MAKING THE ECONOMIC LINKS BETWEEN BIODIVERSITY AND POVERTY REDUCTION: the case of Lao PDR

Biodiversity contributes directly to poverty reduction in at least five key areas: food security, health improvements, income generation, reduced vulnerability, and ecosystem services[1]. Conservation is therefore key to achieving the Millennium Development Goals (MDGs). It does not only link to MDG 7, the "environmental sustainability goal", but also provides a strong source of support to the development and poverty reduction targets that are outlined in the other MDGs concerned with hunger, education, gender, child mortality, maternal health and disease. At the same time the degradation of biodiversity and natural ecosystems poses a significant barrier to the achievement of the MDG targets for 2015, and may actually undermine progress that is made towards meeting them[2].

Although biodiversity underpins socio-economic wellbeing — and despite the fact that ensuring sustainability will bring large payoffs in development and poverty reduction terms[3] — the linkages between biodiversity, poverty reduction and economic development are often overlooked. In all too many cases "conservation" goals are seen as being distinct from (and sometimes even as being in conflict with) "development" goals. A choice or a trade-off is posed between investing in biodiversity and investing in poverty reduction.

Wider development and economic concerns, and especially the targets towards global poverty reduction that are articulated in the MDGs, cannot in reality be separated from biodiversity conservation — in relation to policy formulation, funding decisions and on-the-ground actions. In contrast, failing to understand that biodiversity offers a basic tool for reducing poverty, strengthening livelihoods and sustaining economic growth leads to the risk of incurring far-reaching economic and development costs — especially for the poorest sectors of the world's population.

This paper provides concrete examples of the linkages between biodiversity, poverty reduction and socio-economic development in Lao PDR. It articulates the economic contribution that biodiversity makes to local livelihoods and national development indicators, and in particular underlines its vital role to the poorest and most vulnerable groups in the country.

The paper describes how, over the last decade, both domestic and overseas funding to biodiversity has declined dramatically in Lao PDR. At the same time many of the policy instruments that are being used in the name of promoting development have acted to make conservation financially unprofitable and economically undesirable.

The case of Lao PDR illustrates a situation, and highlights an apparent paradox, that is also found in many other parts of the world. If biodiversity has such a demonstrably high economic and livelihood value, especially for the poorest, then why is it persistently marginalised by the very economic policies and funding flows that are tied to strengthening livelihoods, reducing poverty and achieving sustainable socio-economic development?

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Lao's biodiversity: a declining asset

Stuart Chape/IUCN

Almost half of Lao PDR's land area is under forest, containing some of the richest biodiversity in the region

Lao PDR is one of the most forested countries in Asia, and in biodiversity terms ranks as one of the richest in the region[4]. It is estimated that almost half of Lao's land area, or 11.6 million hectares, is under forest[5]. Fish diversity and endemism are considered to be very high in the rivers, water bodies and other natural and constructed wetlands that are estimated to cover just under 945,000 ha or 4% of Lao PDR. With the exception of a small number of introduced fish used for aquaculture, almost all of the fish caught in Lao PDR are indigenous species.

At the same time the country also has important agrobiodiversity. Indigenous crop and livestock varieties and their genetic diversity play an important role in agricultural production. Lao lies within the primary centre of origin and domestication of Asian Rice, *Oryza sativa L*. More than 13,000 samples of cultivated rice have been collected in the country, including wild species such as *Oryza ranulata*, *O. nivara*, and *O. rufipogon*, along with spontaneous interspecific hybrids between wild and cultivated rice. The majority of livestock originate from stock domesticated within Lao PDR or in nearby China and Vietnam, and can be considered to be indigenous or traditional breeds[6].

The human population of Lao PDR are also characterised by their extremely high economic dependence on biodiversity. Alongside rice farming, biological resources underpin the majority of Laotians' livelihoods – more than 80% of the country's 5.5 million people live in rural areas, and depend largely on harvesting wild plant and animal products for their day-to-day subsistence and income.

Despite – or perhaps because of – the conservation significance of Lao PDR's wild species and ecosystems, and the high economic reliance on them, biodiversity loss is becoming a major problem. During the 1980s reduction in national forest area was estimated to be between 100,000-200,000 hectares per year or about 1% of the 1981 forest area[7]. Estimates of deforestation in the latter part of the 1990s range between 0.3% to 2% of the national forest area per year[8]. Over-fishing is rapidly depleting aquatic biodiversity, at the same time as wetlands and water bodies are being degraded due to upstream water diversion and on-site land reclamation. The proportion of rice production in Lao PDR made up of indigenous varieties has been decreasing over time, as improved cultivars and introduced varieties have become more common and have been promoted by government agricultural extension agencies and donor projects. In 1993 it was estimated that less than a tenth of rainfed lowland area was grown to improved varieties. By 2000 more than 70% of the area in some provinces along the Mekong River Valley was planted with improved varieties, and all of the dry season irrigated rice was composed of introduced or improved varieties – today only upland fields are planted wholly with traditional varieties[9].

Why under-valuation undermines biodiversity conservation

Although the causes of biodiversity loss in Lao PDR are multiple and complex, one important reason that biodiversity is being allowed – and in some cases even being encouraged – to decline is that it is under-valued in national economic statistics and development decision-making.

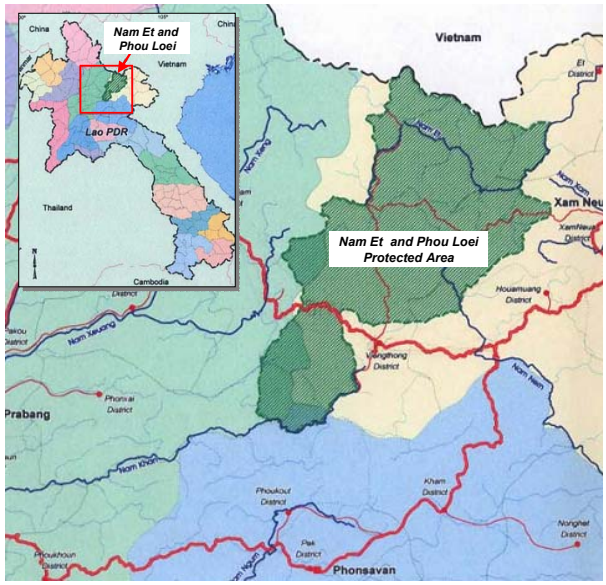
Especially, little importance is attached to non-market biodiversity benefits, including local livelihood values. For example, according to official statistics, the forest sector contributed only 3% of Gross Domestic Product in 2000 – representing a real GDP of $4.3 million or nominal GDP of $52.5 million[10]. This figure is based almost wholly on estimates of formal-sector timber output, including gross revenues from commercial round log harvesting of up to $50 million[11] and government timber revenues of approximately $11.6 million[12]. It however makes little or no reference to household use of forest resources. A similar situation can be found for other biodiversity resources and sectors.

These figures, and commercially-marketed biodiversity output, represent just the tip of the iceberg in economic terms. Lao PDR's biodiversity is actually worth many times this amount, but the bulk of this value is comprised of household-level benefits that never appear in formal markets and therefore remain largely invisible to economic decision-makers and planners. Because biodiversity is under-valued, and in the light of urgent and pressing needs for socio-economic development, many policy-makers see little economic gain from conserving or investing in biodiversity and perceive little economic cost associated with its degradation and loss.

Biodiversity-poverty links at a local level

Nam Et and Phou Loei Protected Area

Lao's national network of Protected Areas (PAs) covers more than 29,000 km^2. The 4,200 km^2 Nam Et-Phou Loei (NEPL) Protected Area, located in the north-east of the country, is considered to have particular global and national conservation significance[13], harbouring among the highest faunal biodiversity of any protected area in northern Lao[14].

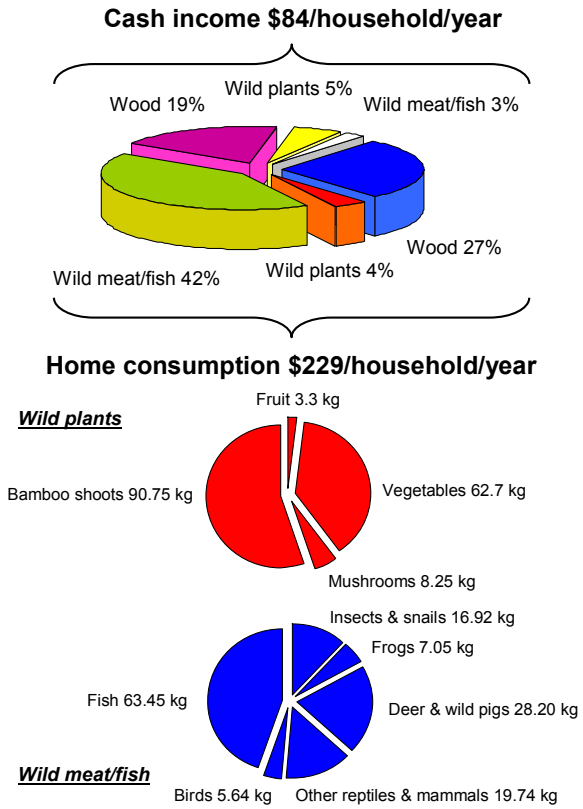


Nam Et and Phou Loei lies in the north east of Lao PDR, abutting the border with Vietnam

NEPL lies mainly in Houaphan Province of the Northern Region of Lao PDR. The Northern Region has the highest prevalence of poverty in the country. Within the Northern Region poverty is highest in Houaphan Province, where three quarters of the population were classified as poor in 1998 with an equivalent 2002 per capita GDP of just $204[15] (as against a national average of some $350). Other socio-economic indicators such as infant mortality rate, access to safe water and medical facilities also lie far below the national average, underlining the fact that there are few basic services or infrastructure in the area around NEPL.

More than 160 villages are located inside or on the boundary of NEPL[16]. Most of these villages, and two thirds of the PA's area, are found in Viengthong District of Houaphan Province. The vast majority – more than 80% – of the residents of Viengthong's villages are engaged in farming and forest products collection as their primary occupation. While farming is dominated by upland subsistence cropping under slash-and-burn practices, some communities also have a history of paddy cultivation. Cash crop farming is limited, due to low quality produce, poor access to markets and small profit margins. Livestock remain an important source of cash income, draft power and store of wealth.

The role of forest biodiversity in local livelihoods



Forest biodiversity use is worth an average of $313 a year for households living around the PA

District is significant. It is estimated to be worth more than $1.12 million a year overall, or $313 per household. Subsistence-level consumption (mainly for food, medicines and building) accounts for almost three quarters of this value, while approximately a quarter is earned as cash income from selling forest products.

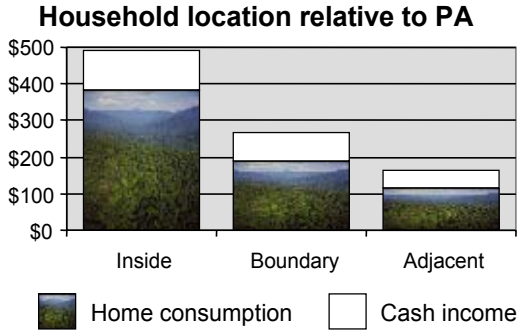
Annual values range from $160 per household living outside the PA, through $270 for those bordering the PA, to an average of $500 in villages that are located inside the PA.

NEPL's resources provide a wide range of products that are used for income and subsistence by the 3,600 PA-resident and PA-adjacent households in Viengthong District., who together include more than 24,000 people. Forest use includes harvesting wild products for food, medicines, fodder, house construction and handicrafts production.

Over 40 species of trees, 15 bamboos, 6 palms, 34 wild vegetables, 12 wild fruits, 7 grasses, 4 vines, 56 medicinal plants and 13 mushrooms have been identified as being used by local villagers[17], and birds, snakes, frogs, fish, porcupine, barking deer and wild pigs are all regularly consumed as food.

In total, it is estimated that 165 kg of wild plant products and 141 kg of wild meat are consumed each year at the household level[18], that almost all of domestic energy and construction needs are sourced from the PA, as well as the bulk of livestock fodder and pasture, human medicines and raw materials for crafts and utility items[19].

Unsurprisingly, the economic value of forest product utilisation for villages in Viengthong



The value of forest use rises sharply for households living near the PA

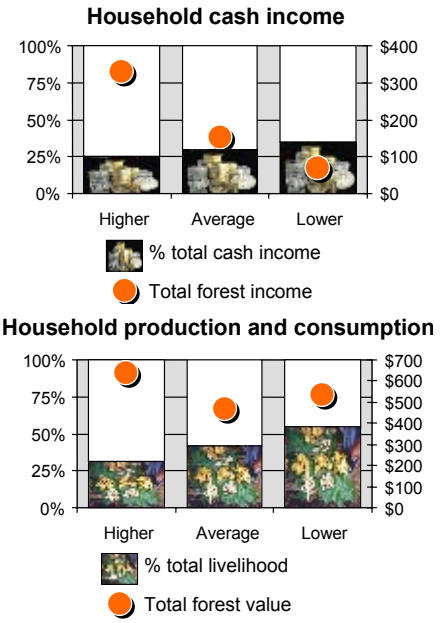
Links between household poverty and biodiversity dependence

There are notable differences in socio-economic status between the households who live in and adjacent to NEPL, with richer households generally having higher levels of food self-sufficiency, benefiting from a much greater range (and level) of subsistence items and income-earning opportunities, and being able to access more and better quality farming land. There is a corresponding variation in the types, overall values and relative importance of forest product use between households. In particular, there is a clear relationship between socio-economic status and the relative wealth or poverty of individual households, level and value of forest use, and livelihood dependence on biodiversity.

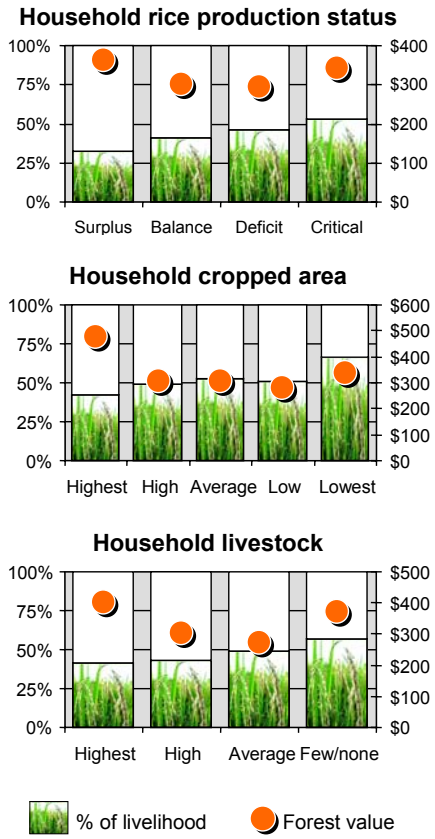
There is a direct correlation between the amount of income earned from forest products and a household's overall cash income status — in other words, the absolute level of income earned from forest products is greater for cash-rich households (an average of $340 a year) than for cash-poor ones (an average of $80). In relative terms, forest sources of income — although smaller in terms of money value — however make a much greater contribution to the overall income of cash-poor households' (35%) than those of cash-rich households (25%).

Poorer households who have access to both a smaller range and a lower amount of cash earnings depend far more on forest products to generate income than do richer households — even though the latter are able to tap a far higher value of earnings from the sale of forest products.

Looking at the total value of household livelihoods, including all sources of marketed and non-marketed production and consumption, it is possible to see a slightly different pattern emerging. Here, forest use is worth the most for households whose total production and consumption is the highest (an average of $650 per year) and the lowest ($550), as compared to "average" households ($480). Again, however, it is possible to discern the same clear relationship between the relatively greater contribution of forest biodiversity to the livelihoods of poorer households (55%) as compared to average (42%) and richer ones (30%).



Forest products make a relatively greater contribution to cash income and livelihoods for poorer households



While the richest and the poorest households gain the highest value from forest products, biodiversity consistently makes a far greater contribution to the livelihoods of the poorest

Thus, while the total value of all forest uses is worth the most in absolute terms for households with the highest and the lowest livelihood base, its relative importance to overall household production and consumption is consistently higher for poorer households than for average and richer ones.

Relating forest value and forest dependence to socio-economic differences and relative poverty levels as measured by other indicators gives a similar picture. Households can be differentiated according to access to productive assets which can be taken as proxies for wealth, including rice surplus/deficit, cropped area, and livestock numbers. These measures are chosen to reflect indicators emphasised in the 2001 Lao PDR Interim Poverty Reduction Strategy Paper[20], which highlights degree of rice self-sufficiency as the primary determinant of poverty, livestock ownership as the primary indicator of wealth, and lack of arable land as a secondary condition of poverty.

According to all of these socio-economic and poverty indicators, both the richest and the poorest households consistently harvest forest products to a much higher annual value than other sectors of the population.

Yet whereas richer households focus primarily on higher-value and market commodities, the high forest values accruing to poorer households reflects their reliance on forest products for subsistence and home consumption, and sales of low-value wildlife and NTFP due to the absence of alternative sources of income.

Although valuable in absolute terms, forest resources do not form the main component of richer households' production. As poverty levels rise, so forest products make a progressively greater economic contribution to livelihoods.

Putting biodiversity values in the context of other local development indicators

Against a background of widespread poverty in the region around NEPL, the value of forest resource use is extremely significant at an average of $313 per household per year, or about one third of per capita GDP.

For villages inside the PA, who are among the most vulnerable in the Province, this rises to $500 per household, almost 40% of per capita GDP and 73% of household subsistence. Among the poorest PA households, defined as those who suffer recurrent rice deficits, own few or no livestock, have access to little cropland and limited sources of cash income, PA resources comprise up to half of household cash earnings and contribute nearly two thirds of the total household economy.

Like many other forests in the country, NEPL plays an essential role in meeting the gap between the level of basic subsistence and income that a rapidly growing human population require to survive, and that which the government is currently able to afford to provide. Reflecting this role, in 2000 the annual worth of PA resource use for Viengthong villages was equal to the total recorded economic output for the District, and on a per capita basis was more than double the entire annual development expenditures made by central government and donors in Houaphan Province each year[21].

Biodiversity-poverty links at the national level

The role of forest biodiversity in production and consumption

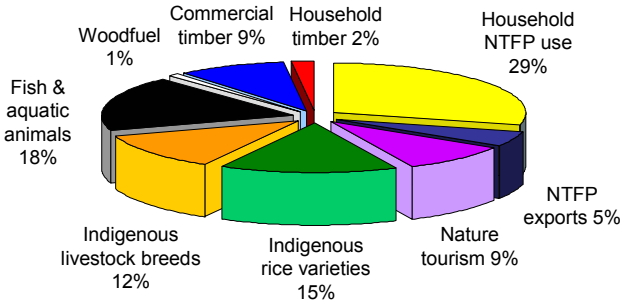
A similar situation to that of NEPL exists in most other parts of the country. At the national level, non-wood forest products have been calculated to be worth an average of $320 per year for rural households in Lao PDR, contributing about 44% of subsistence value, 55% of cash income, and 46% of the total household economy[22]. Forest foods are estimated to contribute between 61-79% of non-rice food consumption by weight, and provide an average of 4% of energy intake, 40% of calcium, 25% of iron and 40% of vitamins A and C[23]. More than three quarters of the population, and many businesses and enterprises, rely on woodfuel as their primary energy source to an annual value of more than $6.5 million a year, use of natural forest wood for house construction is worth more than $13 million, and commercial non-timber forest product exploitation is thought to generate gross revenues of more than $46 million, including $32 million in export earnings[24].

Such figures have major implications for national economic and development processes. Far from being a minor component of Lao PDR's national and local economies, the forest sector may in fact be one of the most important sources of economic production and consumption in the country. In total, forest products contribute more than $350 million a year in terms of gross production and consumption. More than two thirds of this figure is contributed by local-level household consumption, and under a fifth is accounted for by the formal-sector logging and timber extraction which dominate official calculations of sectoral income and output[25].

The value of biodiversity in the national economy

Just looking at direct values, biodiversity is worth some $650 million a year at the national level. This includes contributions from various sectors, including forests, wildlife, aquatic resources and agrobiodiversity.

For example NTFP alone are thought to comprise nearly half of household subsistence and cash income[26]. Rice, much of it indigenous varieties, contributes two thirds of household calorie intake[27], wild food provide up to 80% of non-rice food consumption by weight[28], and fish and other aquatic animals comprise between 30%-50% of protein consumption[29].

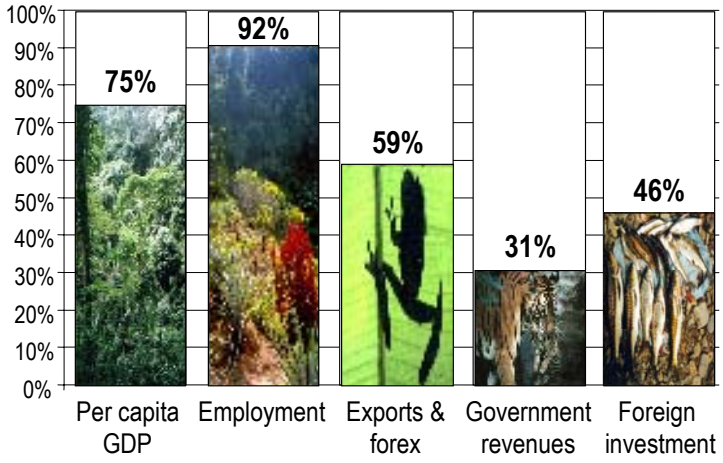


Direct use of biodiversity in Lao PDR, at household and commercial levels, is worth some $650 million a year

How biodiversity contributes to national development goals

Clearly, national statistics have miscalculated the economic value of biodiversity in the Lao economy. They have also under-estimated the importance of biodiversity to some of the country's key development goals. So, for example, analysis of the full value of biodiversity shows that it contributes, directly or indirectly, three quarters of per capita GDP, more than 90% of employment, almost 60% of exports and foreign exchange earnings, just under a third of government revenues and nearly half of foreign direct investment inflows. The direct use of biological resources by poor rural households is worth some $475 million a year, or an average of $100 per capita.

These figures are meaningful in relation to Lao's current Five Year Socio-Economic Development Plan and National Development Vision. Here, an overriding goal is poverty reduction[30] — the government has a stated aim to reduce poverty by half by the year 2005, and to eradicate poverty completely by 2010. This is a pressing problem – thirty nine percent of the country's population are currently thought to be living in poverty and Lao PDR is ranked 140 out of 174 in UNDP's Human Development Index, making it one of the poorest countries in the Asia region and in the world[31].



When non-marketed and "hidden" values are incorporated into statistics, it becomes clear that biodiversity made a significant contribution to many of Lao PDR's economic and development indicators between 1995-2000

It is possible to discern important — and quantifiable — ways in which biodiversity contributes to poverty reduction and to other key elements of Lao's Socio-Economic Development Plan. For example the main purpose of the national rural development programme is to reduce poverty in rural areas through income generation and service improvement. Biological resources underpin

not just people's basic requirements for food, fuel, medicines and shelter, but also provide significant income-earning opportunities. In addition to the role of biodiversity in meeting day-to-day needs, it typically provides vital fallback when other sources of livelihood fail and in times of stress and emergency.

Another major national development priority is to provide food for national self-sufficiency and to generate a surplus that can be sold in cross-border regions. The major proportion of the nation's foodstuffs, and a large part of exports, depend on indigenous agrobiodiversity and forest and aquatic products. A stated goal in service development is to develop the potential of new and emerging sectors such as tourism and trade. These sectors, too, are currently based largely on biodiversity.

Biodiversity loss as a development cost

Stuart Chape/IUCN

Biodiversity loss incurs high development and economic costs to the poorest households

At the same time, biodiversity degradation and loss poses real threats to economic development and poverty reduction. The Lao PDR economy has experienced rapid growth rates, in excess of 6% over the last decade. Agricultural output has grown by 5.2% over the last 5 years, the industrial sector by 10% and services by 6.8%. The incidence of poverty has fallen by over 13% since 1993, and per capita GDP has increased almost threefold since 1985. Interest rates have fallen, exchange rates remained stable and inflation held down, the trade balance has improved and private sector investment has grown rapidly. Overall the national economy has performed well, and gives a positive picture of economic growth prospects for the country.

Closer analysis of this encouraging economic picture however raises causes for concern. While the national economy is undoubtedly growing, at the same time there are signs of biodiversity loss. Forest area has declined, wetlands have decreased and wildlife numbers have fallen. Land degradation and resource depletion are occurring, and other renewable and non-renewable natural resources are being rapidly depleted.

Stuart Chape/IUCN

Biological resources provide livelihood benefits as well as supporting a high level of trade, industry and export earnings

Biodiversity degradation and loss is not just an ecological issue, it is also incurring high economic and development costs. Already vulnerable and with limited sources of income, employment and foreign exchange, these are economic costs that the Lao PDR economy can ill afford to bear. **.** Biodiversity degradation and loss has potentially devastating impacts at the local level, reflected in falling income and subsistence and severely weakened livelihoods.

Most rural communities in Lao PDR depend on biological resources for their livelihoods, and are hit hardest by biodiversity degradation. Biodiversity loss impacts the most on the poorest and most vulnerable sectors of the population, whose livelihood bases are already limited and insecure, who lack alternatives sources of income and subsistence, and who are least able to bear these social and economic costs.

Biodiversity loss is also reflected in a decline in government revenues, many of which depend on biodiversity-based or biodiversity-dependent sectors of the economy. Increased public expenditures are also required as a response to the effects of biodiversity loss. The government of Lao PDR,

because it is responsible for maintaining the basic living standards and security of the country's population, is be forced to deal with many of the social and economic effects of biodiversity degradation – such as falling income, declining production and livelihood insecurity.

Biological resources support a high level of industry, commerce and trade, add value through processing, and have major multiplier effects on national employment, services and industrial output. Biodiversity degradation and loss has the potential to impact heavily on trade, commerce and industrial output, and on the jobs, earnings, exports and revenues that these sectors generate for the broader Lao PDR economy. Finally, there is a risk that biodiversity loss will undermine much of the progress achieved in national economic growth over the last decades. Effects include a slowdown in national income and growth, macroeconomic instability, and declining foreign exchange earnings, trade, employment and output. Many of the areas of the economy that have been targeted for growth over the current planning period depend on biodiversity goods and services, including hydropower, irrigated agriculture, tourism and other service industries.

Biodiversity, economic instruments and development finance: recent trends and impacts

Under-valuation of Lao PDR's biodiversity is not just a hypothetical issue – it also has serious consequences for economic policy and practice. Most basically, it has meant that conservation has been given a low priority in economic planning, continues to receive extremely little funding, and often faces discriminatory market and fiscal signals. Despite the extremely high value of Lao PDR's biodiversity, at national and local levels, neither domestic nor donor economic policy-making pay much heed to these non-market values.

When economic policy instruments undermine biodiversity

The aim of using economic instruments is to promote and encourage behaviour that will meet particular socio-economic targets. In some cases, however, they may actually have the opposite effect, because they undermine these goals. Instruments that present disincentives and perverse incentives and cause biodiversity loss largely act against poverty reduction and socio-economic development.

Stuart Chape/IUCN

Market and price distortions such as subsidies often encourage biodiversity degradation

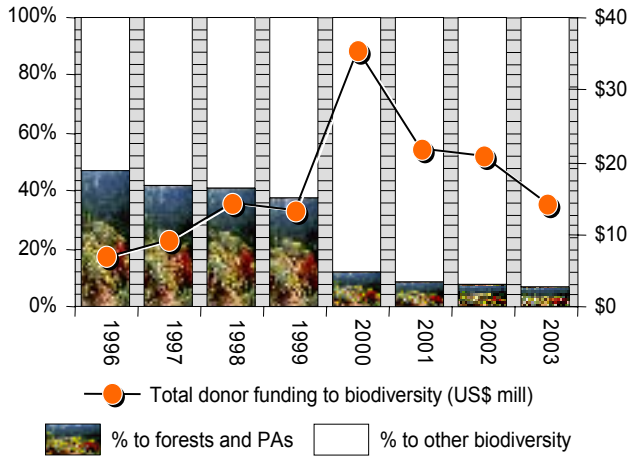
Even though there exist some positive economic incentives for conservation in Lao (such as reduced land taxes on stabilised land use and reforestation, exemptions on turnover tax for forestation activities, and release from the reforestation component of timber tax against replanting), biodiversity continues to be marginalised by some of the economic policy instruments that are being used to support other sectors.

For example a wide range of implicit subsidies favour land clearance for farming, including the provision of preferential credit to agriculture, minimum farmgate prices, relatively lower tax rates and reduced trade duties on agricultural products and inputs. Sustainable biodiversity -based activities are not subject to such special treatment. The relative profitability of agriculture vis-à-vis conservation is enhanced still further by exemptions on agricultural land tax for newly-cleared land in both mountain and lowland areas, and on newly-established industrial orchards. Within the logging sector below-market royalties are also thought to promote excessive

demand, and tax variation between different timber products encourage the use of only premium quality logs and encourage wastage in harvesting[32].

Diminishing trends in biodiversity funding

Because biodiversity is under-valued, it is also often not considered a priority when public budgets are formulated or donor funds are released. Recurrent allocations to the national, Provincial and District government agencies mandated with biodiversity management and conservation remain extremely low compared to other public sectors, and the share of forestry and wildlife in the government Public Investment Programme has fallen by more than a half over the last decade, from 7.5% in 1991 to just 3.6% in 2000[33].



Donor funding to biodiversity in Lao PDR has declined steeply over the last 4 years. In particular there has been a dramatic drop in budgets allocated to forests and PAs — in both absolute and relative terms

After rising over much of the 1990s to peak in 2000, donor commitments to biodiversity conservation in general, and to sustainable forest management and PAs in particular, have declined dramatically over recent years in Lao PDR.

Between 2000 and 2003 total donor commitments to biodiversity-related activities fell from $36 million to $14 million, and between 1996 and 2003 the share of PA and forest conservation expenditures in total donor funding to biodiversity had dropped from 89% or $6 million to just 7% or $1 million[34].

Today, little foreign or domestic funding is available for biodiversity conservation in Lao PDR.

Conclusions: why biodiversity matters to poverty reduction

The close linkages that exist between biodiversity conservation, poverty reduction and socio-economic development in Lao PDR also hold in many other parts of the world. Other countries also face similar constraints to conservation. Economic and development decision-makers frequently undervalue biodiversity, both in terms of its overall economic worth as well as in the way that it contributes to national and local development processes.

The case of Lao PDR Lao PDR illustrates that, contrary to such misperceptions, biodiversity often generates very high – and quantifiable – livelihood and economic benefits. At the site level, Protected Areas such as Nam Et-Phou Loei make a demonstrable contribution to the country's primary socio-economic development goal: poverty reduction. Not only do they underpin local subsistence and income but they also fill the gap between the goods and services that a poor and rapidly growing human population require to survive, and that which the government is currently able to afford to provide. At the macroeconomic level, biodiversity in Lao PDR forms a foundation for generating national income, employment, foreign exchange earnings, public sector revenues and inflows of investment funds.

The under-valuation of biodiversity benefits is however not just an accounting problem. In many cases it has acted to the detriment of conservation, and of sustainable local livelihoods. Both the government and the international donors who claim to support the country's development

processes have a strong stated commitment to sound environmental management and poverty reduction. Yet national budget decisions and economic policies often act against these goals because they lead to biodiversity loss. At the same time overseas development assistance has been progressively reducing its support to conservation.

The net result is that biodiversity is in many cases being managed unsustainably, converted, degraded and lost. This is not, for the most part, seen as an economic cost or as detracting from the achievement of basic development and poverty reduction goals.

Biodiversity loss runs the risk of incurring immense economic and development costs to the Lao economy. Ultimately, under-valuation may undermine the very aims of socio-economic development, and the MDGs, themselves: income and employment generation, food security, rural development, improved health, poverty reduction, and economic growth. These are costs which neither the population and the government of Lao PDR, nor the global community, can afford to bear, now or over the long-term.

Stuart Chape/IUCN

Failure to invest in biodiversity conservation gives rise to immense development and economic losses, and may ultimately undermine poverty reduction goals

The information and results presented in this paper are based on work carried out in Lao PDR between 2001-03. The field study of Nam Et-Phou Loei PA was carried out as part of project "A Review of Protected Areas and their Role in the Socio-Economic Development of the Four Countries of the Lower Mekong Region", led by International Centre for Environmental Management, Brisbane and IUCN – The World Conservation Union, and implemented in collaboration with the National Mekong Committee Secretariat; Science, Technology and Environment Agency; Department of Forest Resource Conservation; and the Nam Et-Phou Loei Integrated Conservation and Development Project. Information obtained from a community livelihoods analysis of PA villages in Viengthong District carried out by Gregoire Schlemmer formed a key part of this study, which also relied heavily on data from a socio-economic survey carried out by Viengthong District Office in June 2001. The economic assessment of Lao PDR's biodiversity was carried out as an input into Lao PDR's National Biodiversity Strategy and Action Plan, funded through GEF-UNDP under Project LAO/98/012 and implemented in collaboration with the Science, Technology and Environment Agency of the Government of Lao PDR. Particular acknowledgement is due to these institutions and to the individuals involved in the research, including S. Bouttavong, L. Kettavong, O. Philavong, S. Manivong, S. Sivannavong and K. Thanthatep. Thanks are also due to Chris Flint (formerly CTA of the Nam Et-Phou Loei Integrated Conservation and Development Project), Guenther Meyer (formerly of UNDP Lao), and Latsamay Sylavong and Kelsey Jack (IUCN Lao Country Office) for their support to these studies and their comments on the reports.

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