

# Lao PDR Development Report 2010

## NATURAL RESOURCE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT: HYDROPOWER AND MINING

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## **LAO PEOPLE'S DEMOCRATIC REPUBLIC**

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October 1 – September 30

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(Exchange Rate Effective as of June 2010)

Currency Unit: Kip

US\$1.00 = 8,243 Kip

### WEIGHTS AND MEASURES

Metric System

<i>Vice President</i>	James W. Adams
<i>Country Director</i>	Annette Dixon
<i>Sector Director</i>	Vikram Nehru
<i>Task Team Leader</i>	Ekaterina Vostroknutova

# Lao PDR Development Report 2010

## NATURAL RESOURCE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT: HYDROPOWER AND MINING



**THE WORLD BANK**  
Washington, D.C.



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This report was written by a World Bank team led by Ekaterina Vostroknutova (Senior Economist) and under the general guidance of Vikram Nehru (East Asia and Pacific Director and Chief Economist, Department for Poverty Reduction and Economic Management, EASPR), Annette Dixon (Country Director for Lao PDR), Linda van Gelder (Sector Manager, EASPR), Mathew Verghis (Lead Economist for South East Asia), Keiko Miwa (Country Manager for Lao PDR), Vijay Jagannathan (Sector Manager for East Asia and Pacific in Transport, Energy, and Urban Sustainable Development, EASIN), and Jeeva Perumalpillai-Essex (Sustainable Development Leader, EASIN). Patchamuthu Illangovan was Country Manager for Lao PDR and a co-chair of the national consultation process during much of the report's preparation. The team consisted of: William Rex, Naazneen Barma, Daniel Gibson, Helene Carlsson Rex, Nina Fenton, Magnus Lindelow, Renae Stenhouse, Jan Bojo, Somneuk Davading, Richard Record, Konesawang Nghardsaysone, Morten Larsen, Giovanni Ruta, Milan Brahmhatt, Verena Fritz, Julia Fraser, Ying Li, and Vivek Suri. The report also benefited from inputs from Kwaw Senyi Andam, Gerard McLinden, Tom Callander, Kate Wallace, Richard MacGeorge, James B. Stewart, Willem van den Toorn, Jutta Krahn, Bjorn Larsen, Andreas Heinimann, and Ian Thomas. Editing by Fiona Mackintosh and administrative assistance from Michael Figueroa, Vatthana Singharaj, and Boualamphan Phouthavisouk are gratefully acknowledged.

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The views expressed in this report are those of the authors and do not necessarily reflect the views of the World Bank, its Executive Directors, or the countries they represent.

## Abbreviations and Acronyms

ANS	Adjusted Net Savings	MOIC	Ministry of Industry and Commerce
CA	Concession Agreement	MOU	Memorandum of Understanding
CDE	Centre for Development and Environment, University of Bern	MPI	Ministry of Planning and Investment
CSR	Corporate Social Responsibility	MTEF	Medium-term Expenditure Framework
DoFI	Department of Forest Inspection	NEM	New Economic Mechanism
EAP	East Asia and Pacific	NGO	Non-governmental Organization
EC	European Commission	NGPES	National Growth and Poverty Eradication Strategy
EDL	Electricité du Laos	NPH	National Policy on Environmental and Social Sustainability of the Hydropower Sector
EIA	Environmental Impact Assessment	NPA	National Protected Area
EPF	Environment Protection Fund	NPEP	National Poverty Eradication Program
EPL	Environment Protection Law	NPL	Non-performing Loan
ES	Enterprise Survey	NPV	Net Present Value
ESIA	Environment and Social Impact Assessment	NSEDP	National Socioeconomic Development Plan
ETR	Effective Tax Rate	NT2	Nam Theun 2 Hydroelectric Dam
FDI	Foreign Direct Investment	NTFPs	Non-timber Forest Products
GDP	Gross Domestic Product	NUoL	National University of Laos
GIS	Geographic Information System	PACSA	Public Administration and Civil Service Agency
GOL	Government of Lao PDR	PDA	Project Development Agreement
IAS	International Accounting Standards	PDR	People's Democratic Republic
ICA	Investment Climate Assessment	PFA	Production Forest Area
IFS	International Financial Statistics	PFM	Public Financial Management
IMF	International Monetary Fund	PMO	Prime Minister's Office
IPP	Independent Power Producer	Project	Mine or Hydropower Station
KCal	Kilocalorie	REF	Rural Electrification Fund
KWh	Kilowatt hour	RMF	Road Maintenance Fund
LECS	Lao Expenditure and Consumption Survey	SME	Small and Medium Enterprises
LHSE	Lao Holding State Enterprise	SOCB	State-owned Commercial Banks
LIC	Low-income Country	SOE	State-owned Enterprises
LICUS	Low-income Country Under Stress	SPS	Sanitary and Phytosanitary
M&E	Monitoring and Evaluation	STEA	Science and Technology Agency
MAF	Ministry of Agriculture	TA	Technical Assistance
MCTPC	Ministry of Construction, Transport, Posts, and Communications	TBT	Technical Barriers to Trade
MDGs	Millennium Development Goals	UN	United Nations
MEM	Ministry of Energy and Mining	UNEP	United Nations Environment Program
MOE	Ministry of Education	WB	World Bank
MOF	Ministry of Finance	WCS	Wildlife Conservation Society
MOFA	Ministry of Foreign Affairs	WDI	World Development Indicators
MOH	Ministry of Health	WREA	Water Resources and Environment Administration
		WTO	World Trade Organization

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## Summary

**Lao PDR is rich in natural capital.** Forests, agricultural land, water and hydropower potential, and mineral resources comprise more than half the country's total wealth. While projected electricity production and mineral extraction may not be large by international standards, they are significant relative to the size of the Lao economy and the government's fiscal revenues.

**With appropriate macroeconomic and governance priorities, Laos' natural resource wealth can contribute to rapid, sustainable growth and poverty reduction.** The expansion of minerals production and the commodity price boom have together led to several positive outcomes, including:

- Higher economic growth (hydropower and mining contributed 2.5 of the annual 7 percent growth in Laos in the last three years)
- A significant increase in fiscal revenues (mining and hydro now constitute about 20 percent of total revenues)
- Infrastructure improvements, increased incomes, and localized poverty reduction at some project sites; and
- Improvements in environmental legislation and institutions prompted by the effective implementation of quality projects, including the Nam Theun 2 (NT2) hydroelectric dam.

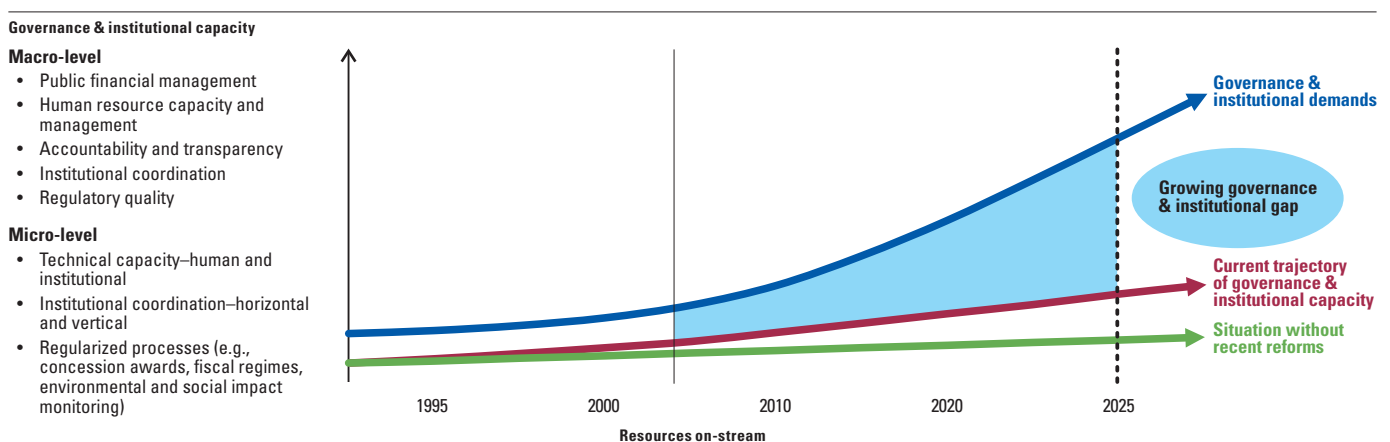
**While there have been important benefits to rapid growth in hydropower and mining, there are also likely to be significant downside risks** that already have or will soon manifest themselves (since only 10 percent of the nearly 200 proposed mining and hydro projects are on stream so far).

- **At the national level, the risks are macroeconomic or involve the opportunity costs of large-scale investments.**
  - At the macro level, the risk of higher volatility and lower employment in the long run stem from the possibility of suppressed industrialization and of economic overheating associated with large resource exports. Some of these effects have been already seen such as an increase in government spending and bank lending, stagnating productivity but rising real wages, a profits squeeze in the manufacturing sector, a slow-down in the growth of sectors that produce tradable goods, and slow export diversification.
  - At the micro level, there is always a risk that investments in hydropower or mining may not represent the best possible use of the natural resources given the socioeconomic goals of the country.
- **At the local level, the risks are mostly two-fold: environmental and social.**
  - **Environmental risks** are associated with increasing and expanding hydropower development and mineral extraction that potentially degrades or destroys the current natural resource base (for example, land, water, forests, and sources of biodiversity). The country's insufficient capacity for implementing and enforcing existing environmental regulations adds to this risk.

- **Social risks could arise** from direct effects such as the relocation of communities from project sites, land loss, the degrading or destruction of natural resources (such as agricultural land, forests, or rivers) that people have previously depended on, and through more indirect effects, such as large inflows of labor that might significantly change the social fabric of communities. Destruction of natural resources is particularly significant for poorer communities and households who disproportionately rely on them for their livelihoods in Lao PDR. As a result, poverty, inequality, and malnutrition could rise among some of the poorest households. Other social risks include a loss of human and cultural capital and difficulties in providing proper compensation to households for their losses. Risks are likely to be distributed unevenly over time, affecting different groups within the affected communities in different ways.
- **The concentration of multiple large-scale developments in one geographical area** combined with the accelerated pace at which these projects are being developed exacerbates these risks at the regional, river-basin, national, and—especially local—levels.
- **Lastly, there is a risk that the institutional and governance gap between the demand for natural resources and the capacity of the government to manage their sustainable use will grow as more resources come on stream** (Figure 1). Good governance is key to ensuring that a country’s resource wealth translates into sustainable economic growth. International experience suggests that governance tends to deteriorate when a country receives large natural resource rents. In particular, the institutional gap can grow when too many projects are starting at the same time in a country where capacity to manage and monitor projects is limited. As a result, the government may not implement projects with high financial and economic returns, or with the appropriate environmental and social infrastructure. This could undermine sustainable natural resource development needed to reduce poverty and enhance growth over the long run.

In order to manage these risks and transform Lao PDR’s significant natural resources into a genuine development blessing, institutional development and reforms must be aligned with the challenges of natural resource sector management in the following crucial ways:

**Figure 1. Potential interaction of natural resources and governance**



Source: Barma et al. (2010).

- **Special attention must be given to mitigating any negative social effects of large-scale development of natural resources.** Appropriate policies will be needed to ensure the social sustainability of natural resource development and to realize its potential benefits, such as reducing the poverty headcount, in part because the population is very dependent on a broad range of natural resources (forest, rivers, land, etc.) for their livelihoods. A wide spectrum of actions will be needed, but this report (on page 24) and Gibson and Carlsson Rex (2010) outline some benefit-sharing mechanisms that could be useful in managing and enhancing positive outcomes at the local level.
- **Environmental sustainability of natural resource production will depend on the effective implementation of existing regulations.** Environmental sustainability must be an integral part of natural resource exploitation. While the legal framework is mostly adequate, there is a crucial need to strengthen the government's capacity for implementing and enforcing those laws. This report (see also Stenhouse and Bojo, 2010) outlines the negative effects of non-enforcement, the main challenges to strengthening capacity, and the potential benefits of doing so. Our key conclusions are:
  - Institutional reform is needed to separate the protection of the environment from the exploitation of natural resources.
  - The government's financial and human resource capacity to implement and enforce the current laws on Environmental Impact Assessments and to mitigate local negative effects needs to be strengthened.
  - As a priority, the capacity of both the national and the local government needs to be strengthened to improve safeguards screening, monitor compliance, and toughen enforcement.
  - There is an urgent need to develop a practical method for payment for ecoservices, a mechanism that recognizes the economic value that ecosystems provide to the project and the country more broadly.
  - Because traditional project ESIA's tend to be project-specific and to look only at the short-term impact, there is a need to undertake Strategic Environmental Assessments of the mining and hydropower sectors to identify any long-term, cumulative effects of these sectors on the environment.
- **The current project-by-project approach to the development of natural resources has outlived its usefulness and may even overlook the cumulative impact of these projects as a group. It can also be failing to prioritize the most valuable projects to maximize overall benefits from natural resource use.** Because of the massive acceleration in hydropower and mining projects development contemplated for the near future, there is a need for the government to adopt an overarching and *comprehensive strategy for hydropower and mining development* to mitigate any cumulative negative effects of resource extraction on existing forests, protected areas, the biodiversity base, and on agricultural lands and people's livelihoods. The goal of this strategy should be to maximize the positive macroeconomic, fiscal, and poverty-reduction outcomes while minimizing the negative outcomes and managing risks. In this report (see page 31), we present some initial ideas that might be included in such a strategy, but arriving at a coherent framework will require more work and is an urgent priority (for hydropower, see also Fraser, 2010).

- **As the number of projects in the pipeline increases, one of the government’s key priorities must be to strengthen the institutions in the relevant sectors and the public financial system (at both the national and local levels)** so that they have the capacity to collect revenues and allocate them in ways that will reduce poverty and promote growth. In this report (see also Barma et al., 2010), we suggest some specific actions that would help to close the governance gap, including:
  - Clarifying accountability and improving the vertical and horizontal coordination between the ministries involved
  - Increasing transparency and administrative capacity in the management of natural resources
  - Providing sufficient resources, through a standardized set of fees and revenue-sharing arrangements, to those agencies and local governments that are responsible for managing natural resource projects.
- **In addition, introducing simple fiscal rules for spending will ensure that volatility in mineral revenues—usually caused by volatility in international mineral prices—does not lead to fiscal crises.** In this report (see page 40), we outline the main principles on which fiscal rules could be based (see also Vostroknutova et al., 2010), including:
  - **Ensuring that mineral resource revenues are not committed to recurrent** or otherwise irreversible expenditures
  - **Setting limits for public debt and the non-resource deficit** with rules to ensure they are not breached
  - **Adjusting the fiscal regime in the hydropower and mining sectors** to minimize risk exposure and to maximize government revenues, while maintaining international competitiveness. In this report (see page 40), we look at this in detail and suggest specific policy actions that should be implemented alongside the broader fiscal policy (see also MacGeorge et al., 2010 and Larsen, 2010). These policies include a non-discretionary fiscal regime with no exemptions that is applied uniformly to all projects in both the hydro and mining sectors and a shift away from dividends as the main source of revenue to less risky methods, such as taxation.
- **Improving the investment climate in the non-resource sectors to reduce the high transaction costs facing traders.** Due to the pressure on manufacturing firms and exporters created by natural resource revenues as well as the importance of the tradable sectors for long-term growth, strong and effective policy reforms are needed to facilitate the development of these sectors. We make detailed recommendations on page 51 of this report, including the following key measures:
  - Immediate attention must be paid to reviewing and, where possible, eliminating any anti-competitive regulations that restrict the availability of cost-effective cross-border transportation and logistics services.
  - In the medium term, attention must be paid to investing in the education of workers; enhancing sanitary and phytosanitary (SPS) capabilities; developing a comprehensive cross-agency risk-based approach to managing

the movement of goods; simplifying procedures in licensing and taxation; and eliminating the dual-track taxation system, including accelerating the implementation of new legislation.

- In the longer term, attention must be paid to making it less costly to access investment finance by deepening the financial sector and by reforming the state banks.

Therefore, to translate its natural resource endowment into social and economic development gains in alignment with the National Socio-Economic Development Plan (NSEDP) and to achieve its socioeconomic objectives, the government should consider the following principles that have emerged from this report:

1. **Develop just enough of the natural resource wealth.** The analysis underlining this report shows that even though Lao PDR is rich in natural resources, it does not have to develop all its natural wealth to achieve the NSEDP goals and economic growth targets, including the 2020 goal of becoming a middle-income country.
2. **Do not rush.** The government should ensure the speed of sustainable natural resource development is in line with its capacity to control and monitor the quality of projects and its ability to close the governance gap. This can be done by improving both horizontal and vertical inter-agency coordination at the licensing stage and across the value chain.
3. **Choose the right projects.** Strengthen the criteria, framework, and enforcement for selecting and prioritizing projects.
4. **Do these projects right.** To ensure environmental and social sustainability, strengthen the framework for doing projects well, including environmental and social safeguards, project-level governance, agency coordination, and the government's capacity to monitor and enforce regulations.
5. **Identify risks and deal with them effectively.** Risks associated with large-scale natural resource development can exist at any level from the international sphere to local communities, and these risks need to be identified and managed at all stages. In particular, reduce social risks by using benefit-sharing arrangements at the local level. Similarly, avoid environmental risks by selecting quality investors, making environmental impact assessments (EIAs) obligatory, and effectively enforcing existing environmental laws and regulations. Finally, lower performance risks by better monitoring the implementation of projects.
6. **Reducing poverty requires proactive policies.** So far, natural resource development has not reduced poverty widely. To ensure that it does in the future, the government should allocate the proceeds from mining for financing investments or saving, instead of spending them on recurrent costs. Investing the proceeds from the natural resource exploitation in education and infrastructure will increase access to markets, increase the productivity of the private sector, and benefit the poor. Other proactive policies include specific regulatory reforms to reduce cross-border transportation costs, enhanced monitoring of agricultural goods for exports, and implementation of the Enterprise Law to reduce the transaction costs of doing business.
7. **Be strategic.** Use resources, specifically to reduce poverty, support growth, and ensure social and environmental sustainability by balancing priorities at the national, river basin, sectoral, project, and local levels. To ensure that

the cumulative risks of several projects concentrated in one geographical area or a river basin are prevented, managed, and mitigated adequately, a strategic approach needs to be adopted that includes the creation of inter-agency and river-basin coordinating bodies and processes.



## Introduction

Lao PDR is endowed with natural resources that could make a major contribution to the country's long-term economic development. The most important of these resources are forests, agricultural land, hydroelectric potential, and minerals. In this Lao PDR Development Report, we quantify the value of these resources based on the data that are available to date. We note that, with more than 100 mines and hydropower stations (hereafter "projects") in the pipeline, tapping into these resources is likely to accelerate in the near future. Drawing on international experience, we make some policy recommendations on how to best manage this expansion, taking into account Lao PDR's unique circumstances.

**Focusing primarily on hydroelectric potential and minerals, we summarize the findings of various background papers and technical notes (see list on page 55).** These lay out a comprehensive framework for devising a sound strategy for developing these natural resources and for managing the economic implications of an influx of natural resource wealth. We conclude by making a number of general and specific policy recommendations and by highlighting several areas that need further research to enable policymakers to make more informed policy choices. Economies like Lao PDR's that are well-endowed with natural resources need to:

- Set the pace of natural resource development to balance long-term development goals and sustainability
- Raise adequate revenues while maintaining a competitive investment regime
- Choose well-designed projects rather than those that will yield rapid but unsustainable gains
- Spend the resulting revenues on the country's development needs while at the same time maintaining and protecting macroeconomic stability
- Strike a sensible balance among the risks, benefits, and distributional effects of natural resource exploitation.

**In this report, we recommend following principles as the basis for selecting and designing specific natural resource projects:**

1. Maintaining a **strategic approach that takes into account administrative capacity** will help to ensure that projects are selected that are financially viable and that have few manageable environmental and social effects. This can be achieved by paying careful attention to the cumulative effects of multiple projects on the environment and social landscape. Taking a strategic approach will require careful advance planning of projects at the sector, river basin, local, and national levels as well as the development of mitigation strategies to offset any negative impact on local people and on the environment.
2. **Strong governance is the key to ensuring that resource extraction has a positive impact on growth and socioeconomic development**, including effective accountability, transparency, and public participation in the management of all natural resources. Increasing regulatory standardization and transparency and creating a non-discretionary regulatory framework and fiscal regime in the hydropower and mining sectors are likely to attract responsible investors and ensure that appropriate revenues are raised from projects in these sectors.

3. **Global experience suggests that tapping into natural resources has not automatically translated into gains for local communities.** In fact, it has in many cases caused harm and has disturbed people's lives and the local environment. This is why special benefit-sharing arrangements are needed at the project, local, and national levels to protect the affected populations.
4. **Doing projects well is the key to sustainable natural resource exploitation.** In particular, the government's oversight and monitoring need to be strong and well-informed. In addition, incentives should be created to encourage developers to plan ahead and to include environmental and social impact assessments and mitigation measures in the design of their projects. At the national and provincial level, implementing and enforcing the existing environmental regulations in the hydropower and mining sector while at the same time building monitoring and enforcement capacity will be crucial for ensuring the success and sustainability of the country's National Socio-Economic Development Plan (NSED). Finally, a consistent approach to properly resourcing national and local government agencies responsible for working with and monitoring projects is key, as large natural projects can create significant additional costs for government.
5. **Global experience also suggests that large exports of natural resources tend to inhibit manufacturing growth.** Therefore, how quickly the resources are developed and the amount and kind of spending from resource revenues affect the country's long-term growth and employment. The spending and saving of the proceeds from the exploitation of resources need to be based on sound fiscal rules that ensure fiscal sustainability and macroeconomic stability and to be invested in ways that will increase productivity and reduce poverty.

**This report has gone through an extensive in-country consultation process** that started with the Launch Workshop, which was led by the Prime Minister's Office (PMO), and was attended by representatives of eight line ministries and of many international development partners. The report team continued to consult with the line ministries on particular topics including fiscal policy, economic growth, social safeguards and benefit sharing, poverty reduction, and governance. These consultations included eight formal workshops and a series of less formal discussions on the environment and a range of more detailed issues. The conclusions of these technical consultations were consolidated during the Second Consultation Workshop, and this report incorporates the comments received during that workshop and during the following cross-sectoral discussions of the background papers. A high-level meeting will launch the dissemination process, which will be followed by a series of events and ongoing dialogue on the topics that have been identified as areas that need more research. It is our hope that the Lao PDR Development Report process will prompt and inform future analytical work and policy dialogue.

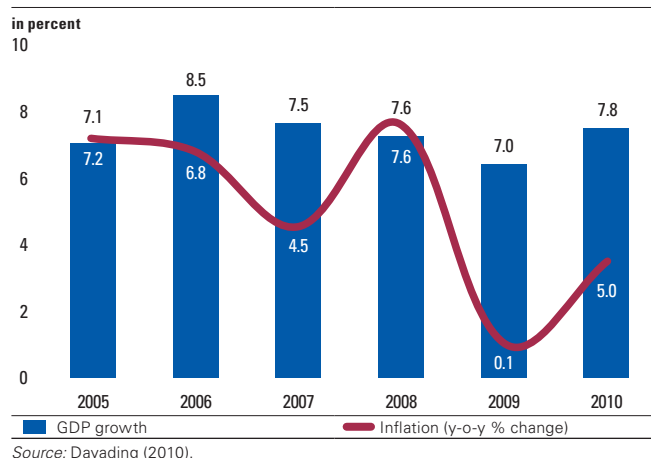
## Chapter I. Natural resource wealth does not imply automatic gains from its exploitation

Natural resource wealth is beneficial as it raises average income, but the benefits to the population in general and to local communities in particular are not automatic and can only be achieved if appropriate policies are adopted. Ensuring that the population benefits from the exploitation of natural resources requires adequate institutional structures across the entire value chain. Moreover, experience around the world has shown that the distribution of these gains throughout the population is likely to be uneven. Positive effects tend to be more broadly distributed while most of the negative effects are experienced locally. Ensuring that the benefits of tapping into natural resources accrue to the population both nationally and locally requires strong institutions in the natural resource sector as well as strong public financial management (PFM) systems and explicit benefit-sharing mechanisms. In many countries, significant institutional strengthening is needed to ensure that the negative environmental and social outcomes of natural resource development do not outweigh the benefits and that appropriate compensation mechanisms are in place to offset any negative impact.

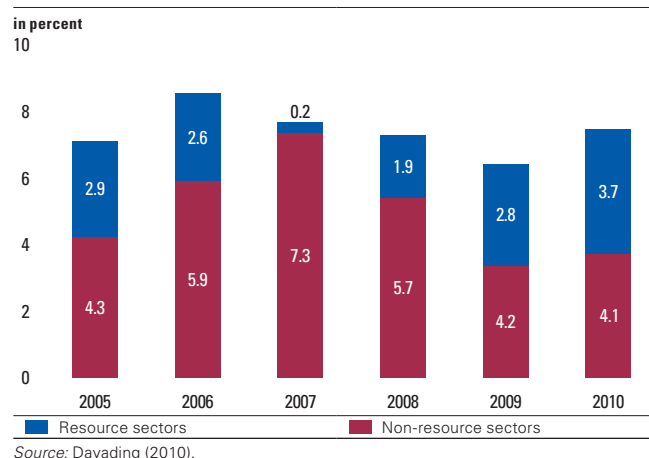
### A strong growth record

The economy of Lao PDR has performed relatively well in recent years, even in the midst of the recent global financial crisis. Growth in Lao PDR averaged a robust 6.5 percent between 1990 and 2009. Real GDP grew by 7 percent in 2009, which was slightly lower than the 7.6 percent in 2008 (Figure 2) but still impressive by international standards in the aftermath of the crisis. The per capita income more than doubled since 1990s, reaching \$880 in 2009 (Figure 5). GDP has also grown faster in comparison with the region's average for low-income countries and with some of its neighbors (Figure 4). Since the country is surrounded by some of the fastest growing economies in the world, it has benefited significantly from external demand and massive inflows of FDI from those neighbors in recent years.

**Figure 2. GDP growth and inflation**



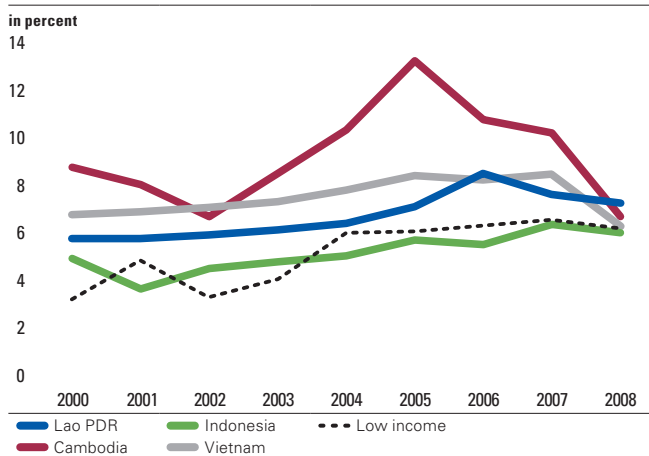
**Figure 3. Contribution of resource and non-resource sectors to GDP growth**



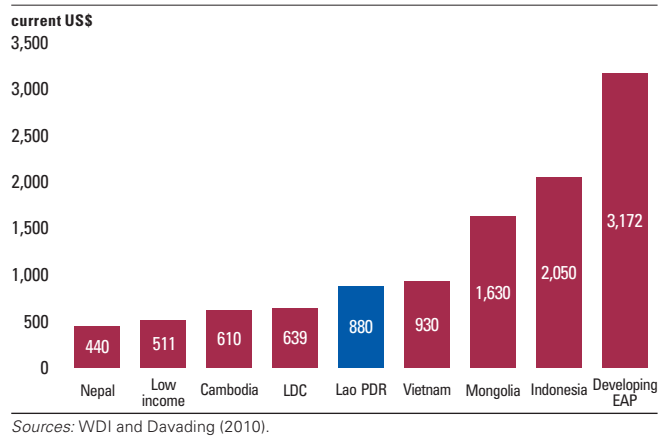
With the expected global recovery, real GDP growth in Lao PDR will strengthen over the medium term. The economy is projected to rebound from around 7 percent in 2009 to 7.8 percent in 2010 and to maintain an annual average of 7.7 percent between 2011 and 2015 and of 7.5 percent over the longer term (2016 to 2020). Future growth will largely be driven by natural resources and the non-tradable sectors (Figure 7). The natural resource sector

contributed about 2.8 percentage points to this growth in 2009 and 3.7 percentage points in 2010 and is projected to average 3.0 percentage points between 2011 and 2015 and 3.5 percentage points between 2016 and 2020. The economy is projected to benefit from a recovery in the tourism sector, the implementation of large hydropower projects that are now under construction or in the pipeline, and a projected increase in demand from Laos' neighboring countries (especially Thailand, China, and Vietnam) and from the European Union.

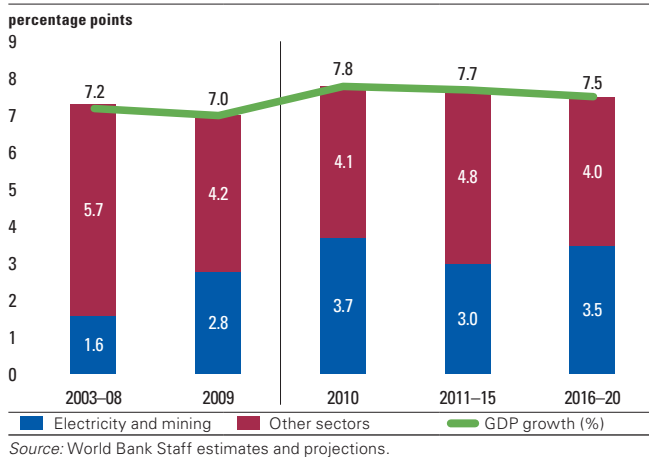
**Figure 4. Real GDP growth in 2000–2008**



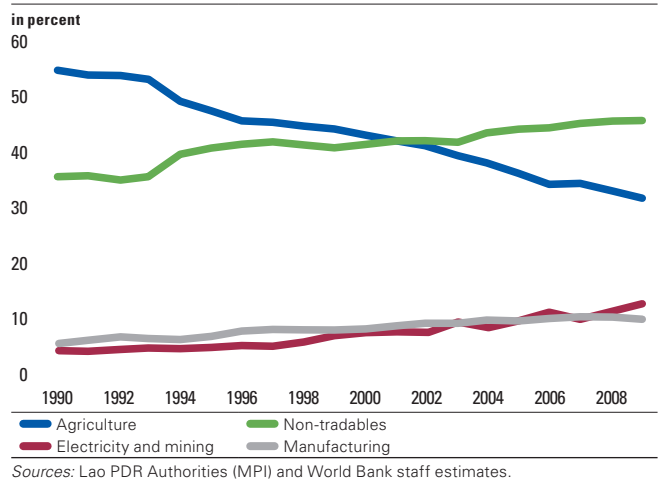
**Figure 5. GNI per capita in 2009, Atlas method**



**Figure 6. Resource contribution to GDP growth**



**Figure 7. Share of key economic sectors in GDP in 1990–2009**

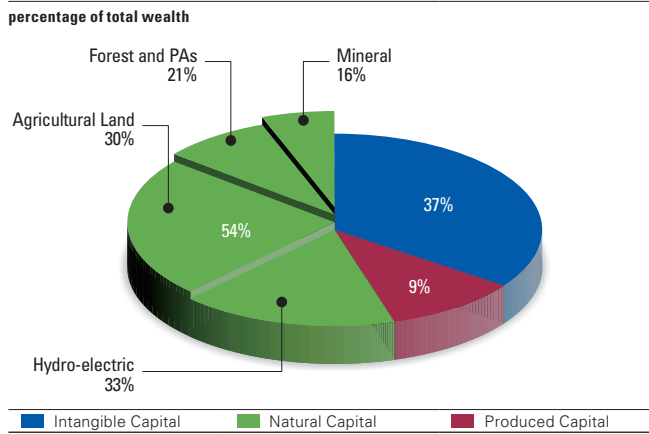


**Laos is increasingly reliant on its natural resources, but it does not have to develop all of its natural wealth to become a middle-income country**

Over half (54 percent) of Lao PDR's wealth is in the form of natural assets – water and hydropower potential, agricultural land, forests, and minerals (see Figure 8). This is higher than in Mongolia and Vietnam and more than double that of Thailand, Malaysia, or China. However, physical capital (capital that is man-made such as infrastructure,

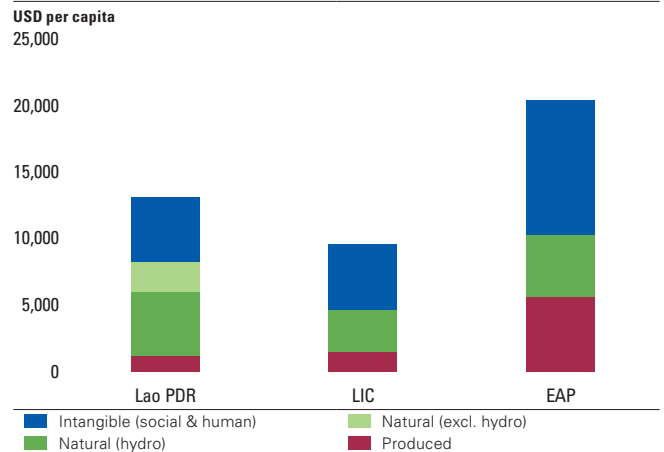
machinery and equipment, housing, and so on) accounts for only 9 percent of Laos’ wealth, which is below the average for low-income countries (17 percent) and for East Asia and Pacific (28 percent). Human and social capital accounts for the remaining 35 percent of Laos’ total wealth. Overall, Lao PDR’s total wealth has been estimated to be around US\$10,000 per capita, one of the highest levels in the low-income country group (Figure 9).<sup>1</sup>

**Figure 8. A major part of Laos’ wealth is in natural capital**



Source: Ruta (2010).

**Figure 9. Laos has more natural capital per capita than other LICs or its neighbors**

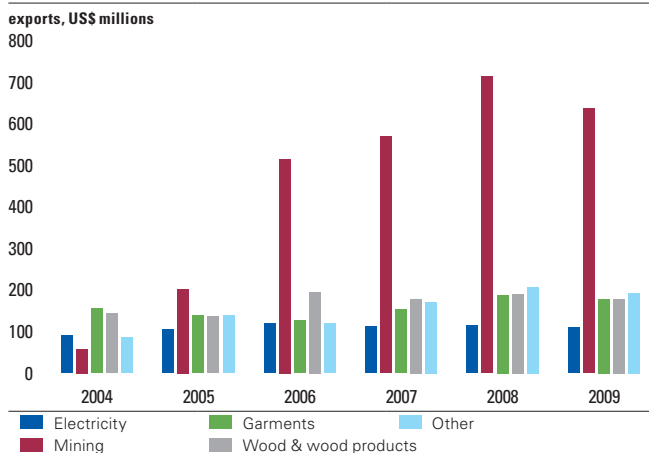


Source: Ruta (2010).

Note: These are simple averages. LICs are low-income countries.

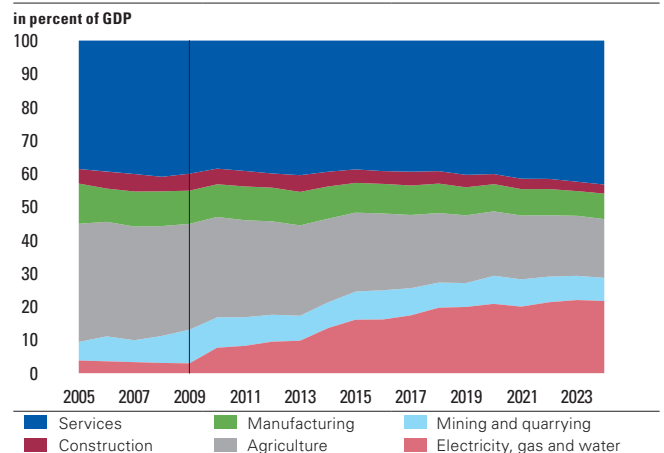
Recently, Lao PDR has started transforming its natural wealth into other forms of capital through sharp increases in mineral extraction and hydropower generation. These have contributed more than 2 percent to the country’s approximately 7 percent real growth rate annually between 2005 and 2009 (Figure 12). In the last four years, driven by volume expansion and the surge in commodity prices, the natural resources sector (which comprises

**Figure 10. Mining currently dominates exports**



Sources: Lao PDR authorities and World Bank staff estimates.

**Figure 11. Shares of mining and hydro are growing while those of agriculture and manufacturing are declining**



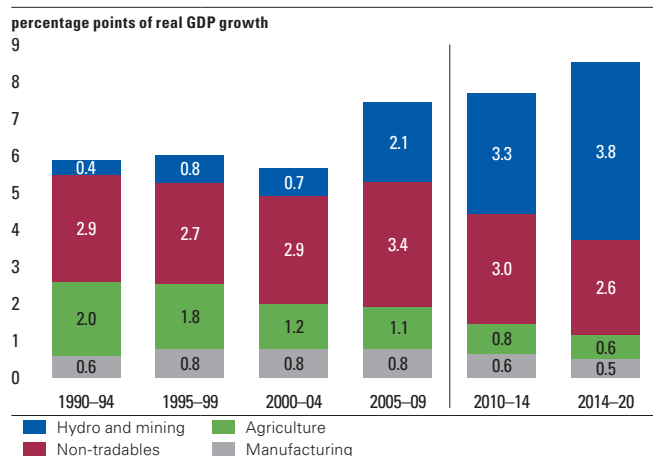
Sources: Lao PDR authorities and World Bank staff estimates.

1 This wealth is the total stock of wealth of a country, comprising its natural (forests, rivers, and minerals), human (such as skills and cultural heritage), physical and produced (such as infrastructure, existing machinery, and GDP) capital. Wealth so defined does not explicitly belong to each person. It is estimated using the World Bank methodology described in Ruta (2010).

the mining, quarrying, and energy sectors, see Definition 1 in Annex 2) has become the largest export sector in the Lao PDR economy (Figure 10), as well as the fastest growing. However, while the contribution of natural resources to GDP growth tripled during the years of the most recent commodity price boom (Figure 12), the sector is still relatively small as a share of GDP (Figure 11).

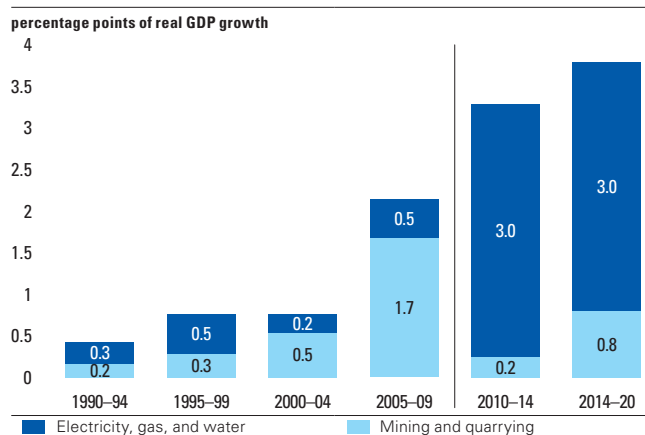
While not large by international standards, the projected volumes of electricity production and mineral extraction are significant relative to the overall size of the economy. In the case of electricity generation, the volume is about international average (Figure 52). Using certain assumptions (see Definition 1 in Annex 2), the future volume of electricity generation as a percentage of GDP in 2014 will be twice as high as in any other country in the world (Figure 53). However, because most of the hydropower dams are not expected to come on stream until some time in the future, these projections are subject to a lot of uncertainty. In the case of mining, copper is the main mineral and its contribution to exports, while not large by international standards (Figure 54), has been at the high end of the spectrum in comparison to other economies (Figure 55). However, the percentage of GDP figures might be misleading, as Laos' economy and production base are small.

**Figure 12. The contribution of hydro and mining to growth is set to increase dramatically...**



Source: Davading (2010).

**Figure 13. ...but hydroelectricity is set to contribute over three times more to GDP growth**

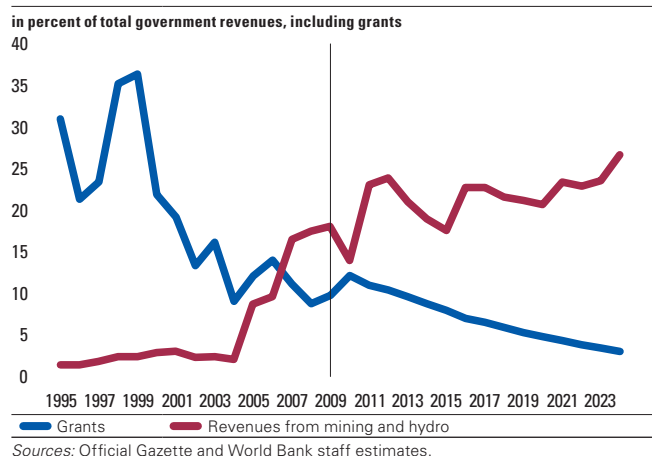


Source: Davading (2010).

In absolute terms, the size of natural resource wealth in Laos is not as large as in Russia or Venezuela, but it is comparable to that in Vietnam, South Africa, and Zambia. Partly because the Lao economy is small, the contribution of mining and hydro resources to GDP is projected to increase from nearly zero in 2000 to more than one-quarter in 2020 (Figure 11) based on conservative assumptions.<sup>2</sup> On the fiscal side, the combined mining and hydro contribution to total government revenues is expected to grow by more than 20 percent over the same period, while the share of international grant flows is likely to decline (Figure 14). Mining and hydro revenues are projected to reach more than 5 percent of GDP a year by 2020. As with GDP shares, by 2015 electricity is projected to surpass mining

<sup>2</sup> We assumed that 64,000 GWh of hydro energy will be produced yearly by 2024. In mining, we assumed that the two current mines will jointly increase production from 60,000 to 230,000 tons a year by 2020 and that around 30,000 additional tons will be produced by other mines. The value produced by the hydro sector is therefore expected to overtake that produced by the mining sector by 2015. Our detailed mining projections and assumptions are summarized in Annex 2 and in more detail in Larsen (2009) and Fraser (2010). Note that these projections are very sensitive to assumptions about price and expansion volume.

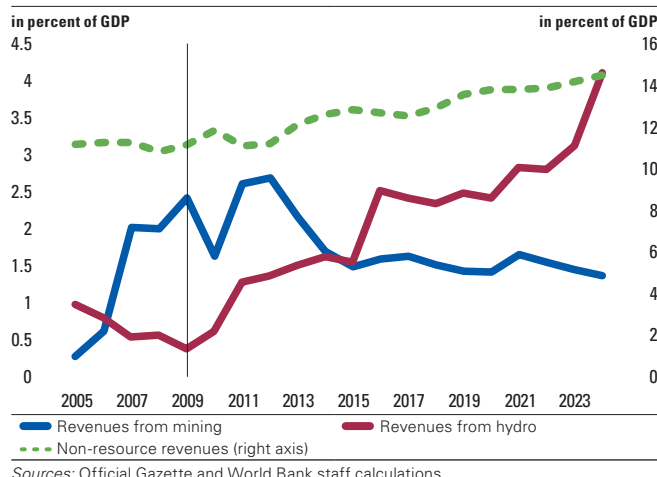
**Figure 14. Fiscal revenues from mining and hydro overtook grants in 2006**



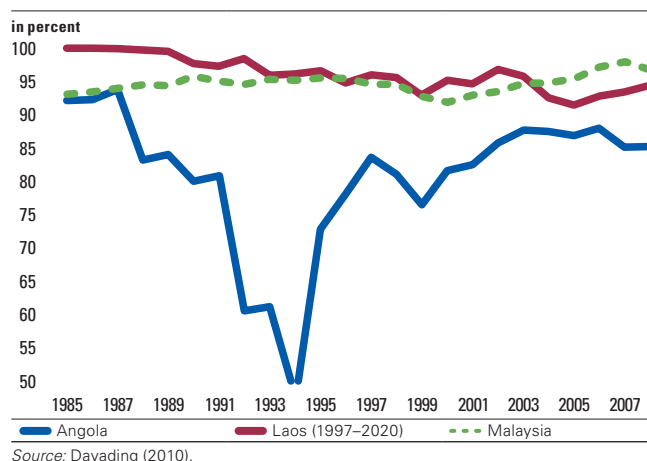
in terms of its contribution to government revenues. If our projections materialize, 4 percent of GDP will come from hydro and only 1.2 percent from mining by 2024 (Figure 15).

The non-resource economy is projected to produce 75 percent of GDP and contribute more than half of all expected GDP growth in the future. Non-resource sectors are important contributors to the economy because their production is traditionally more stable than resource sectors, and they provide more direct employment due to their higher labor intensity. Since projects in the resource industry are largely foreign-owned, repatriation of benefits abroad may be significant. As a result, the actual contribution of such projects to national income and thus to per capita income may be less than their contribution to GDP. If the discrepancy between GDP and GNI is very large, GDP growth may not reduce poverty, and in fact in several countries poverty has increased even though GDP grew. For example, in countries such as Angola, Liberia, and the Republic of Congo the discrepancy between GDP and GNI is more than 20 percent of GDP, meaning that 20 percent of GDP does not contribute to the disposable income of the population nor does it increase per capita income. In Laos, this discrepancy increased from zero to 5 percent between 1997 and 2008 and is expected to stay above 10 percent until 2025 (Figure 16).

**Figure 15. Fiscal revenues from hydro will be four times higher than those from mining by 2024**



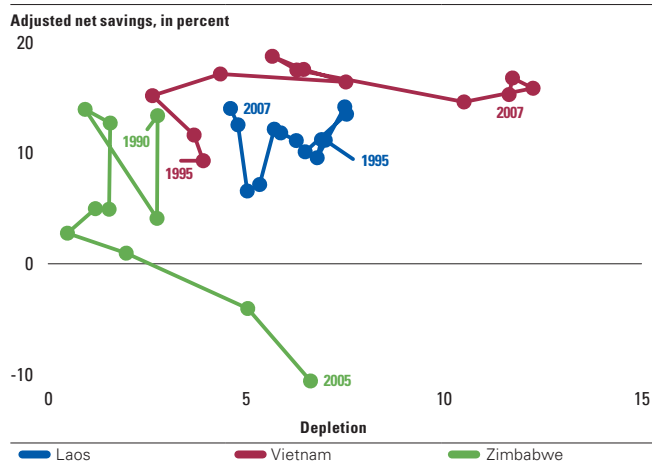
**Figure 16. GNI to GDP ratio**



The ratio of natural resource wealth to produced capital in Laos is higher than the average for low-income countries, so transforming some of these resources into productive investments would be beneficial for growth. However, a positive adjusted net savings rate is required for every country that wants to make sure that its total wealth (consisting of natural, produced, and human capital) does not decline over time. To achieve this, the revenues from the increased resource exploitation will need to be effectively invested in growth-enhancing

infrastructure, education, and poverty reduction. Laos is only now starting to mobilize its rich natural resources and can select from among many different policy options and outcomes. With an adjusted savings rate of almost 10 percent, it appears that Laos has to date managed its resources sustainably, but measurement errors in the data may be large (Ruta, 2010). However, as shown in Figure 17 and Figure 18, different sustainability strategies yielded very different results in other countries. For example, on the one hand, Vietnam has managed to maintain a high savings rate while at the same time using large amounts of its resources to maintain high growth rates. On the other hand, Zimbabwe's savings rate became negative while the depletion of its natural wealth did not contribute to economic growth.

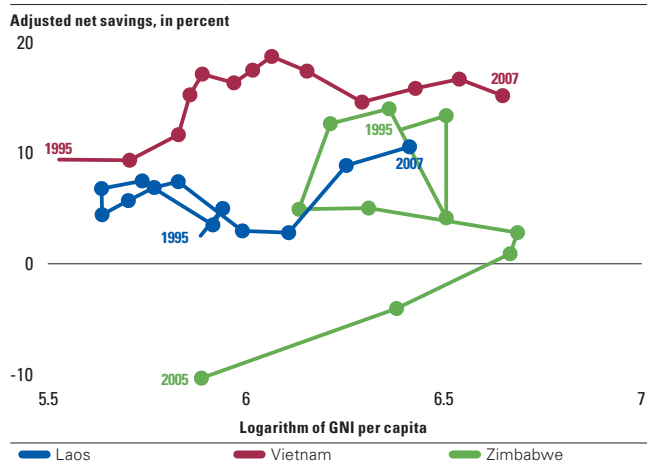
**Figure 17. Adjusted net savings and depletion of natural resources have been sustainable...**



Sources: WDI and Ruta (2010).

Notes: Percentage of GDP annually. Depletion is yearly reduction in natural resource wealth.

**Figure 18. ...but they could deteriorate quickly, with negative implications for growth**



Sources: WDI and Ruta (2010).

Note: Percentage of GDP annually.

The faster the extraction or use of natural resources, the more likely it is that the downside risks may undermine long-term sustainability. In the last decade, Laos has been successful in attracting investments in the hydropower and mining sectors. Some of these investments have involved the use of state-of-the-art environmental and social safeguards that should serve as the model for other ongoing and planned investments. Recently, however, natural resource projects are being developed too fast to qualify as carefully planned and thoroughly assessed long-term investments. This can be seen from the large number of investment proposals for hydropower (about 90 projects) and mining (more than 70 separate areas under exploration or being surveyed) that are currently being contemplated, as shown in Figure 47.

Since the social and environmental costs from large-scale resource exploitation will impact local people and the environment immediately while its social benefits are uncertain, in this report we emphasize the importance of being selective when choosing which projects to develop and then of ensuring that they are implemented well. Based on international experience, we outline the issues that need to be carefully considered in determining which projects should be developed, as well as the absolute importance of good governance and a sound regulatory regime as prerequisites for natural resource exploitation in order to ensure that it has a positive impact on long-term economic growth. We argue that this choice should be made on the basis of a careful balancing of the financial and economic benefits of each proposed project and its potential environmental and social costs. We



then conclude with advice on non-resource sector policies that would enhance growth and eliminate any negative effects from the exploitation of natural resources that may have been encountered in other countries.

**Achieving the government’s growth targets reflected in the National Socio-Economic Development Plan (NSEDP) does not require the exploitation of all of Lao PDR’s natural resource wealth.** Nevertheless, it will be necessary to transform some of the country’s natural resources stock into productive capital gradually. In order to become a middle-income country by 2020, Laos will need to grow by an average of 7.5 percent a year in real terms and to almost double its *per capita* income in a decade (Figure 19). Assuming that the non-resource sector can grow at around 5 or 6 percent a year,<sup>3</sup> that over 60,000GWH of electricity will be produced for export, and that over 200,000 metric tons of copper will be exported a year by 2025, such a scenario is possible. In this case, more than half of the country’s real economic growth and 75 percent of GDP

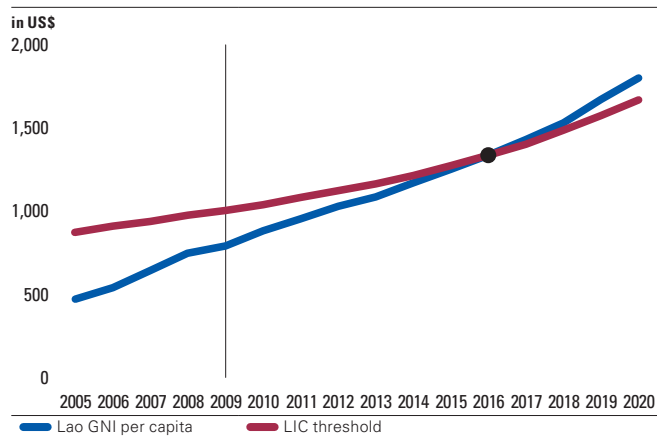
is expected to come from the non-resource sector in the medium term (Figure 12, Figure 11). Therefore it is possible to achieve the growth targets even if less than one-sixth of the currently proposed hydropower stations come on stream and if only a moderate expansion of the existing mines takes place before 2025.

**Therefore, the government has both the time and the room to select the best projects—those with the highest net social benefits.** From the government’s perspective, these benefits include fiscal revenues, returns on equity, and low risk, as well as the sustainability of these returns in the long term. Ensuring that social and environmental risks are minimal will help to increase the sustainability of long-term growth and ensure sufficient reinvestment of revenues into other long-term forms of wealth creation, with only minimal depletion of the social and environmental capital. The framework that is needed for this is discussed in this chapter and in Chapter II.

### Strong poverty reduction but no widespread social gains yet from natural resource exploitation

Impressive poverty reduction has been achieved in Laos, even though the country still lags behind the rest of the region in terms of achieving the Millennium Development Goals (MDGs). According to the national<sup>4</sup> poverty line, poverty fell from 39.1 percent in 1998 to 33.5 percent in 2003 and to 27.6 percent in 2008 (see Figure 20).

**Figure 19. Becoming a middle-income country by 2020 will require 7.5 percent annual real growth**



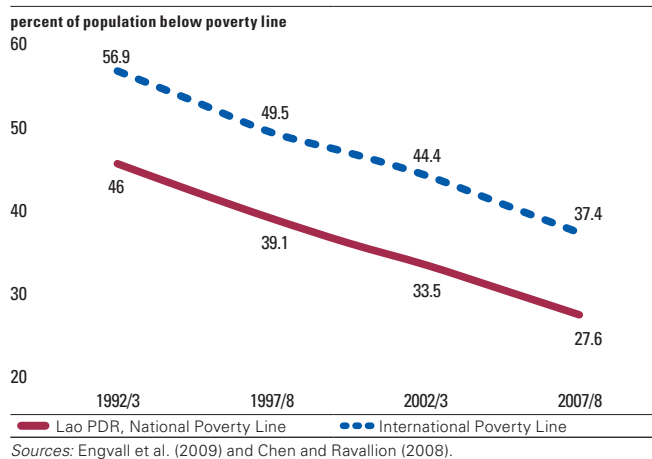
Source: Davading (2010).

Note: Under a scenario of high world inflation and 7.5 percent average GDP growth in Laos.

3 See all assumptions for the baseline case in Annex 2. This scenario assumes world inflation of 4.8 percent on average between 2010 and 2020. See Davading, 2010 for more detailed calculations.

4 The poverty headcount is based on the National Poverty Line, which is defined as consumption of less than 2,000Kcl a day (see Fenton et al., 2010a).

**Figure 20. Poverty fell dramatically between 1993 and 2008**

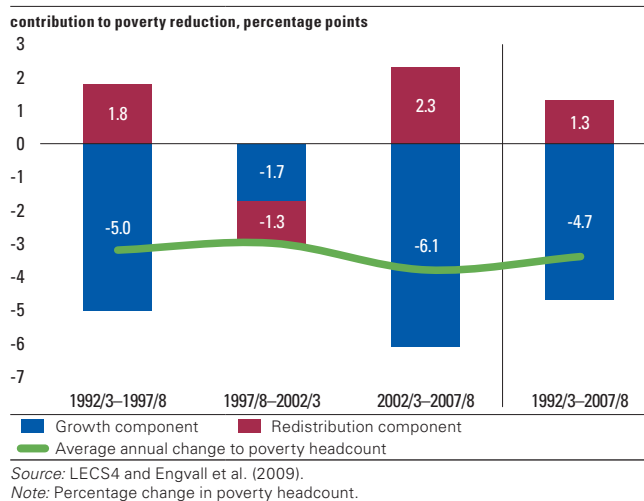


However, Lao PDR remains one of the poorest countries in Southeast Asia. Ethnic minorities and those living in the most remote rural areas, the uplands, and the areas bordering Vietnam and China continue to have higher average poverty rates than the rest of the population as shown in Figure 49. Many of these areas also lag behind the rest of the county in terms of access to clean water supply, sanitation, literacy, and overall poverty rates (Figure 22). Qualitative poverty assessments show that in some regions poverty has not changed and may even have increased. However, it should be noted that, because population density is low in the poorest areas, they are not necessarily home to the largest absolute number of poor people (see Fenton et al., 2010a). Despite increased consumption in the country as a whole, malnutrition remains a stubborn problem. The prevalence of moderately or severely underweight and stunted children under 5 years of age was 37 and 40 percent respectively in 2006. Malnourishment is directly correlated with poverty, while home-grown agriculture is the main source of food and cash for the majority of the population. Land is the most important resource for agricultural livelihoods.

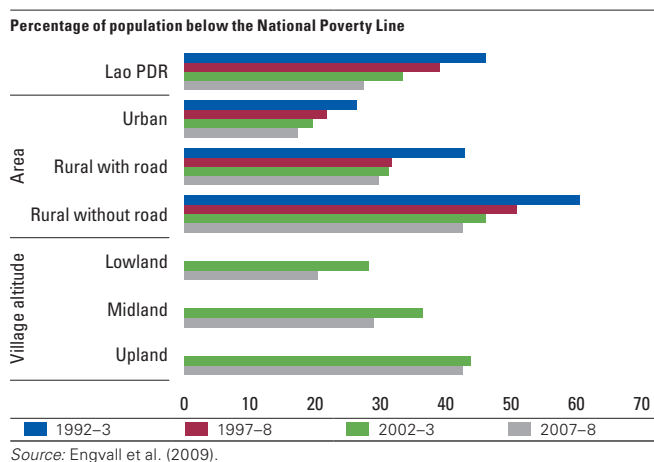
The reduction in poverty has been driven by economic growth, but as inequality has risen, it has reversed this positive impact. Economic growth has been shown to be the main driver of poverty reduction in Lao PDR. Among specific drivers of growth, rural roads have been the most important factor in reducing poverty (Figure 22).<sup>5</sup> In the period leading up to 2003, both growth and falling inequality contributed to driving poverty rates down. In the most recent five-year period, strong growth pushed down poverty rates, but increasing inequality muted its impact

<sup>5</sup> Messerli et al. (2008).

**Figure 21. Growth drove poverty reduction, but rising inequality had a negative impact**



**Figure 22. Poverty has a strong geographical component**



on poverty (see Figure 21).<sup>6</sup> Shifts of labor from agriculture to manufacturing and other sectors has accounted for 0.5 percent of the 6 percent of poverty reduction between 2003 and 2008 (Fenton et al., 2010a).<sup>7</sup>

**Direct gains from employment in the mining sector did not significantly contribute to overall poverty reduction.** Local impact on poverty has been large. Even though poverty among mining sector workers fell by more than 23 percentage points between 2003 and 2008 (compared to falls of 9 percent in manufacturing and 6 percent in services), because of its small share in overall employment, the mining sector's total contribution to poverty reduction was less than 0.1 percent out of the 6 percent nationwide poverty reduction achieved between 2003 and 2008. Due to the high concentration of poor households in agriculture, the largest total contribution to poverty reduction was from this sector (nearly 70 percent), followed by around 10 percent from manufacturing and services, and about 4 percent from construction (see Fenton and Lindelow, 2010).

**Large-scale natural resource exploitation could provide a significant opportunity to reduce poverty and to improve the nutrition of the population,** and can be an integral part of the national poverty reduction strategy:

- Increased tax and royalty revenues can benefit the poor if part of the fiscal windfall is used to **increase government spending on proactive poverty reduction initiatives.** These might include the provision of infrastructure such as roads and the delivery of services that benefit the poor. Mining and hydro projects themselves can be another source of local **investment in infrastructure and services.**
- **Benefit-sharing schemes can be implemented at the local level.** Benefit sharing is understood to be the sharing of profits or advantages to improve the lives of those directly involved, or affected by, an activity or activities that result in unspecified benefits. Benefit-sharing approaches are particularly useful for reducing poverty and malnutrition as well as increasing access to services in remote rural areas where people are not yet benefiting from broader economic growth.
- Locally, households can also benefit from **increased employment and income opportunities,** either directly by being employed in the project itself or indirectly in businesses created through the local sourcing of products or from the increased demand for goods and services coming from the influx of new workers. Increased incomes can help households to escape from poverty and can contribute to improved food security and nutrition.

**However, these gains will not be automatic.** A major study of resettlement associated with over 50 dam projects around the world concluded that, in the case of over 80 percent of the dams studied, the majority of people who resettled were left worse off.<sup>8</sup> The study highlighted poverty and the social risks related to the exploitation of hydro and mining resources and the need to carefully mitigate any negative effects so that positive and sustainable results can be obtained from the exploitation of natural resources. International experience suggests that the final impact of

6 Engvall et al. (2009).

7 The evidence of such positive effects abounds. In Laos, in the nine years of the Sepon and Phu Kham mines operations, average incomes at MMG LXML Sepon have increased seven-fold and at PBM's Phu Kham project total village incomes increased five-fold, according to ICMM (2010). Benefits to the local populations have also been documented in other countries, see for example Aragon and Rud (2009) for the case of a gold mine in Peru, and Michaels (2009) for the case of the United States.

8 See Scudder (2006), page 61.

the exploitation of resources on poverty, nutrition, and other social outcomes depends heavily on what preemptive measures are taken to manage risks and that it is possible to mitigate any adverse effects.

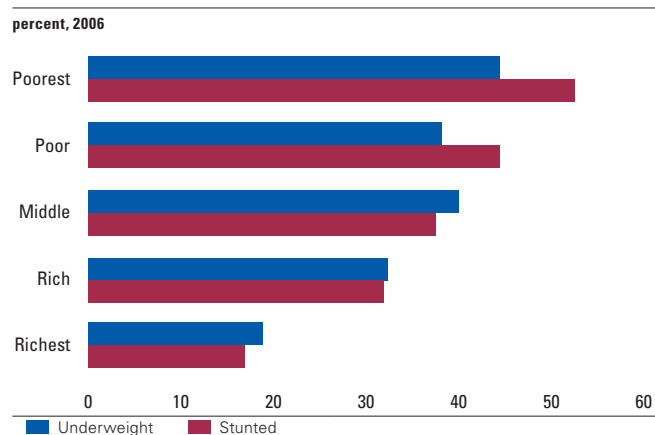
- **How households in Laos will experience these benefits and risks will depend on a variety of factors such as the extent to which each household is dependent on natural resources and on the socioeconomic and demographic profile of the affected population.** Poor households, particularly those in rural areas, typically depend heavily on broadly defined natural resources such as land, forests, and rivers. Therefore, the impact on these households will depend on the availability and quality of these existing natural resources and the extent to which access to these resources becomes restricted to local communities.
- **The benefits and costs of large-scale hydro and mining projects accrue at different times.** In the case of hydropower, most negative effects occur during the early construction phase, whereas the most significant benefits are realized only once the project is fully operational. In the case of mining, while many negative effects may occur early on, they will also continue when new areas of the concession are opened up to active mining. Likewise, while local communities located close to mining or hydro sites may benefit from increased employment opportunities, many other benefits (such as royalties and tax revenues) will only be realized at the national level (Barma et al., 2010).
- **Cumulative effects further complicate matters.** In Laos, several planned natural resource development projects will be located in the same geographical area, which will compound any negative effects on local communities. The most prominent example of this in Laos is the Nam Ngum Catchment, which has a number of operating and planned large-scale mining (Phu Bia Mining's Copper-Gold Operation and Gold Heap Leach Operation) and hydropower projects (Nam Ngum1, Nam Ngum 2, Nam Ngum 3, Nam Ngum 5, and Nam Lik 1 and 2), as well as plantations and other development projects.
- **The way in which benefits and risks translate into outcomes will also be determined by how access to and the use of natural resources is determined and what compensation is made available for loss of access or other negative effects on local people.** Mitigation and compensation efforts can only be effective if the capacity of the local government is sufficient, if any private entities concerned are committed to it, and if there are enough alternative local resources (such as equivalent land) available. Finding ways to help affected households to establish new and sustainable livelihoods is a major challenge, and the most vulnerable households may be at risk of falling into poverty. Benefit-sharing arrangements can mitigate this risk by giving local communities access to opportunities to generate more income (Gibson and Carlsson Rex, 2010). A bigger problem is that the country's Public Financial Management (PFM) system may not be an efficient way to ensure that national project benefits are shared with the poor and with the most affected local people.

## Social and poverty-related risks of mining and hydropower

The considerable dependence of the majority of households on agricultural land, rivers, and forests for their income and food makes them vulnerable to falling or falling more deeply into poverty and to negative nutritional outcomes. Poor households depend on own-grown rice production for 94 percent of their total consumption, and even those in urban centers depend on it for 50 percent of their consumption. The reliance on

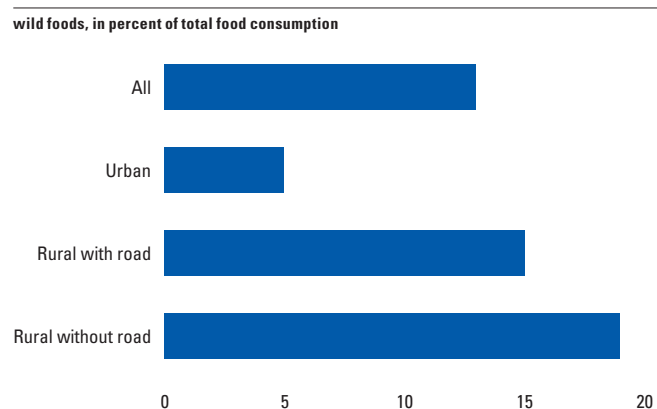
wild protein is also very high; up to 80 percent of fish and more than 20 percent of meat consumed comes from the wild. Since stunting and malnourishment are highest (more than 50 percent) among children from those households that are most reliant on wild foods and subsistence rice production, the disappearance of land and forests along with these non-cash traditional and significant sources of food as a result of the large-scale development of hydropower stations and mineral extraction could lead to serious negative consequences for these families (see Fenton et al., 2010a and 2010b, Figure 23, and Figure 24).

**Figure 23. Malnutrition among children under the age of 5 is highest in the poorest areas**



Source: Fenton et al., 2010a.

**Figure 24. The rural population is dependent on wild foods**



Source: Fenton et al., 2010a.

Most of the proposed hydro and mining projects are located in poorer, more remote, and less densely populated areas than the rest of Lao PDR (see Table 1 and Figure 48, Figure 49, and Figure 50). Based on international experience, there is a common set of related risks that need to be anticipated and mitigated:

- **Loss or reduced access to land, other natural resources, or structural assets.** If sources of wild foods or access to it are eliminated or reduced by the changes introduced by the projects, this can reduce the food intake and incomes of these households. These wild resources include non-timber forest products (NTFPs) and other forest resources, fish, and other aquatic animals. Local people might also lose access to these resources if improved road access leads to increased competition with outsiders who enter the area to extract and sell NTFPs, timber, wildlife, or fish.

**Table 1. Hydro or mining projects are increasingly being planned in areas where people are poorer than in the areas developed earlier**

	Population	Poverty rate, %
National	5.6 million	35
Hydro: under construction	12,600	41
Hydro: in planning	27,400	45
Hydro: feasibility study	64,900	49
Mining: exploitation	19,100	37
Mining: exploration	374,700	31
Mining: general survey	193,600	48

Source: Fenton et al. (2010a).

- **Local negative effects on health.** The changes in landscape brought about by the building of hydro reservoirs can increase the probability of mosquito-borne diseases such as malaria. Also, the influx of construction workers and camp followers can increase the incidence of communicable diseases, including sexually transmitted diseases.

- **Loss of social and cultural capital.** Resettlement, loss of land, and the influx of workers can all lead to rapid social changes, which may result in psychosocial stress, loss of social and cultural capital, and new social tensions for local communities.

**Distributional factors further complicate the effects of mining and hydro projects.** Hydropower and mining projects have different effects on local residents, the region, the national government, and the companies involved. Those living closest to a project tend to have to bear the brunt of the negative effects, while the benefits tend to accrue more to those at the regional and national levels.

- **Inequality may increase within affected communities.** Some people will be better positioned to benefit from local development, for example, because they have education or skills that are in demand by the projects or because they have strong connections to local government. Conversely, others tend to be particularly vulnerable to negative effects (such as women, the elderly, poor households, ethnic minorities, and families with no labor to sell). These factors can combine in ways that enhance people's prospects or exacerbate their vulnerabilities and increase inequality. Well-connected and educated young men commonly do well from these resource development projects, while less-educated women from ethnic minorities are more likely to be excluded from the opportunities generated by the projects.
- **The negative effects and benefits are likely to be distributed unevenly over time.** Many of the most severe effects – the loss of land and livelihoods – typically occur years before construction is complete and operational and before the project begins to generate a flow of benefits. Moreover, the consequences of such detrimental effects can continue well beyond the life of a project.

## Environmental risks of mining and hydropower

**Hydropower and mining development inevitably have environmental implications at the local level** (see Stenhouse and Bojo, 2010 and references therein). Some effects occur only during the construction phase (for example, when quarries and borrow pits are being dug) whereas others continue for the duration of the project (for example, access roads, power transmission lines, and changes in water quality and flow). In particular:

- Land has to be cleared and sometimes inundated, resulting in the loss of forests and agricultural land.
- The removal of the overburden to access ore can create large volumes of solid waste that may exceed the amount of ore produced by two to eight times and this excess material requires adequate storage.
- In the processing stage, the tailings that are generated can cause highly acidic liquid waste and dissolved heavy metals to drain into and pollute rivers and other water sources.
- Significant levels of dust are often generated from mining in the extraction, crushing, and transport stages.
- The processing of extracted minerals can also be highly polluting and can potentially damage the water and air quality.

- The reservoirs associated with hydropower dams negatively affect fish and other aquatic animal life and dynamics.
- Carbon dioxide and methane are released into the atmosphere from reservoirs that flood forests and other biomass, either slowly if flooded organic matter decomposes over time or rapidly if the forest is burned before being filled with water.
- Access roads for construction and operation must be built, which results in further environmental damage because of land clearance, in-migration, and the resulting increased access to and profitability of natural resource exploitation.
- Additional areas are usually cleared for offices and living quarters for staff during construction and operations.
- The resettlement of people to new areas may have additional effects on the environment.

**These negative effects also extend downstream.** Communities further down the river will also be affected by hydropower development. The amount of water will vary less between the wet and the dry seasons. The sedimentation load downstream will be reduced as the dam will trap the silt that would otherwise fertilize areas downstream. The water may become more polluted by the mine tailings and increased waste from hydropower development and related industrial development. Changes to a river's flow can impact fish composition and abundance and fish migration routes, with implications for inland as well as marine fishing stocks. These effects may even extend beyond national borders.

**However, mining and hydropower projects can also create opportunities for environmental conservation.** For example, they can provide and leverage resources that might otherwise not be available for strictly environmental conservation projects, thus contributing to a higher adjusted net savings rate for total wealth (Ruta, 2010).<sup>9</sup> Hydropower and mining projects have been known to contribute to environmental conservation by:

- Establishing new protected areas or adding more land to existing protected areas.
- Strengthening the management of existing protected areas and increasing their funding base. For example, the Nam Theun Power Company provided funds for the management of the Nakai Nam Theun Protected Area, which forms the Nam Theun 2 (NT2) Watershed.
- Providing new funds for research into endangered species. For example, research into the range and population of elephants in the NT2 area and into endangered species through the Sepon mine, both of which were unlikely to have been funded otherwise.
- Increasing efforts in raising awareness and in environmental education. For example, the Phu Bia Mine is providing funds and staff to coordinate with the Department of Forest Inspection (DoFI), the National University

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<sup>9</sup> See Quintero (2007).

of Laos (NUoL), and the Wildlife Conservation Society (WCS) to raise awareness of illegal wildlife trade in local communities.

- Providing training opportunities. For example, the Phu Bia and the Sepon Mines have both helped to increase the capacity of the local provincial Water Resources and Environment Authority (P-WREA) office.

## Macroeconomic risks

At the macro-level, the ways in which resource exploitation can negatively affect the economy include:

- **Volatility that passes through the fiscal account and the balance of payments to the real sector is especially harmful in landlocked countries with underdeveloped financial sectors (such as in Laos).** As the prices of commodities are more volatile than the prices of tradable goods, the concentration of Laos' exports in commodities will pass this volatility through to the economy. This may result in consumption swings, over-borrowing, and other instabilities. In addition, uncertainty about future hydro revenues may have a similar impact.
- **Over-borrowing against future revenues could cause debt overhang that would in turn negatively affect future growth, especially if those revenues do not materialize or are diverted by special interests.** High levels of debt, especially those above 60 percent of GDP, harm growth.<sup>10</sup> This will be particularly important if uncertainty about the development of hydro dams increases or if copper price projections are revised downwards.
- **Suppressed industrialization is also a very important risk.** Dutch disease can have a negative impact on all resource-rich economies by reducing the size of their manufacturing or other tradable sectors. On average, resource-rich countries have a tradable sector (manufacturing and agriculture) that is 15 percentage points lower than other countries.<sup>11</sup> Short- and medium-term effects include real exchange rate appreciation that can harm exporters, as well as overheating resulting from the fast spending of natural resource revenues by the private or public sectors. Because resource sectors are less labor-intensive than non-resource sectors, this suppression of the manufacturing sector will also constrain employment in the long run.

These risks are discussed in Chapters III and IV of this report and in Vostroknutova et al. (2010) and Brahmhatt and Vostroknutova (2010).

<sup>10</sup> See Reinhart and Rogoff (2010).

<sup>11</sup> See Brahmhatt et al. (2010).



## Chapter II. Strengthening governance in the natural resource sector is a key determinant of sustainable, inclusive growth

### Doing projects right

Over the past five years, the Government of Lao PDR has made important advances in general public sector governance and institutional quality. For example, it has strengthened its public financial management system and improved its internal oversight mechanisms. However, weaknesses remain in accountability, regulatory quality, and government effectiveness (see Barma et al., 2010), and the country lacks the institutional capacity necessary for sound natural resource management. These deficiencies, unless addressed carefully, will continue to constrain the country's economic development even as resource exploitation increases. While the government has taken important steps in enhancing its management capacity and competence in the mining and hydro sectors in particular, these key institutional challenges will increase as resource exploitation surges in Lao PDR.

As the sector continues to grow and investments proliferate, the current project-by-project approach to governance will become both inefficient and inadequate. It will be crucial to ensure that the speed of resource development and the number and size of projects is aligned with the country's development needs and sectoral strategies, as well as being within the government's capacity to screen, monitor, and manage projects. The government must make sure that the pace of exploitation does not outstrip its own ability to manage the resource sectors.

Lao PDR still lacks, for the most part, a systematic macro governing regime for natural resource management. Choosing the right portfolio of and timetable for projects will require the government to devise and implement three inter-related layers of governance:

- **An overarching policy framework for the development of both the mining and hydropower sectors.** We strongly suggest that the government give immediate attention to updating and strengthening its policy framework for the natural resource sector to ensure that the timetable for their development does not outstrip its institutional capacity to manage the projects. This issue is discussed further in the sector background reports (Barma et al., 2010, Larsen, 2010, and Fraser, 2010) and has been the subject of ongoing dialogue between the government and its development partners.
- **Specific sector development strategies.** The government should take a careful approach to deciding on how many projects and of what sort it allows to go forward and in what sequence. It should also pay attention to the domestic and international context such as commodity price cycles and fiscal projections. These issues are discussed further in Vostroknutova et al. (2010) and in Larsen (2010).
- **The process of natural resource management.** Having a clear and transparent process for managing natural resource development will make it possible to implement the overarching policies and sector strategies effectively. In this respect, we make three recommendations:
  - **Establishing transparency as a principle of natural resource management.** This would involve being more open about how decisions are made as well as emphasizing transparency across all of the various steps in the value chain. As a result, stakeholders, including the National Assembly and affected communities, would be able to play a more constructive role in decisions about natural resource exploitation and management. Increased transparency would also be likely to attract higher-quality investors who would be better able to judge the risks and returns of large-scale investments. In addition, if governance agencies had more knowledge

of the details of concession arrangements, then this would assist them in carrying out their mandated roles in natural resource management.

- **Standardizing the processes used in natural resource management.** This would reduce unpredictability, create a better climate for potential investors, and ease the constraints on scarce capacity. In other words, this approach would increase efficiency by reducing arbitrary or discretionary power and unnecessary or ineffective steps in the assessment and approval process.
- **Strengthening institutional capacity and inter-agency governmental coordination.** This could be achieved, for example, by involving all relevant parties in the concession-granting process and ensuring that agencies' mandates for inspection and monitoring are clearly defined.

More detailed recommendations are in Barma et al. (2010) and below from page 33 onward.

### Mitigating social risks by implementing benefit-sharing mechanisms at the local level

**Because the benefits and negative effects of natural resource development are not evenly distributed among the population, benefit-sharing mechanisms and mitigation measures are crucial for the sustainability and stability of development in the sector.** Special attention must be paid to mitigating the risks faced by the affected communities, especially as mineral and hydropower resources tend to be located in remote areas that are home to non-Lao speaking ethnic groups and where high levels of poverty are common. It is important to recognize that, within affected communities, some groups will be at a particular risk, such as widows, single parents, or some ethnic groups. Although an efficient public financial management (PFM) system could direct resources to mitigate any negative impact on local communities, the links between central and local levels of administration are often weak (World Bank, 2010).

**Compensating local communities in Lao PDR is complex, because people make their livelihoods by using assets that they do not personally own, such as forests and rivers.** If the price of an asset (stock) reflects the discounted flow of future income to be received from it, then paying the market price of the asset would appropriately compensate people for their loss of income due to the construction of hydro and mining projects. However, because people in Lao PDR do not typically own assets (except livestock in some areas) that can be valued according to the market, traditional compensation can be difficult to calculate. Therefore, compensation schemes that take these challenges into account will be essential for ensuring positive social outcomes from natural resource exploitation. Based on experience elsewhere, it is clear that, if no measures are taken, several negative outcomes are likely to occur in the long term (see Table 2).

**Appropriate benefit-sharing mechanisms will also contribute to ensuring social stability and to aligning Lao PDR's national development strategy with local needs.** In recent decades, international experience has shown that community opposition can drive up the costs of development and slow the pace of construction, and, in some cases, it has brought the development of an entire sector to a standstill. It is clear from this experience that even the payment of adequate compensation may not be sufficient to overcome community distrust or opposition. Communities may question the project's presumed positive development impact if it appears likely that the profits

**Table 2. Possible long-term social consequences of failing to mitigate the negative effects of hydro and mining projects**

Consequences	Affected Party		
	Local Population	National Government	Developer/Investor
Social instability, violence, security concerns	√	√	√
Impede / reverse progress of development	√	√	√
Anti-social behavior (such as alcohol abuse)	√		
Health risks (physical and mental)	√		
Reputation		√	√
Reduced or lost investment		√	√
Stakeholder outcry / protest		√	√
Project delays		√	√
Difficulty securing permits for further operations		√	√
Government sanctions			√
Lawsuits			√

Source: Gibson and Carlsson Rex (2010).

will accrue primarily to developers, that any increase in governmental revenues will not result in local improvements, or if local economic gains such as jobs or business opportunities will primarily benefit outsiders or local elites. Many governments, including that of Lao PDR, have required developers to tighten their environmental and social mitigation standards.<sup>12</sup> In addition, the costs and controversies associated with hydro and mining development have encouraged developers to accept the concept of a “community license to operate” (see Box 1).

### Box 1. Corporate Social Responsibility Principles

The government of Lao PDR is starting to adopt policies that promote various forms of direct or indirect benefit-sharing with local communities affected by hydro and mining projects. Also, the hydro and mining industries themselves are now adhering voluntarily to higher social standards in their business dealings, using, for example, the Corporate Social Responsibility (CSR) principles. There is evidence suggesting that the implementation of CSR policies makes good business sense. In 2007, Goldman Sachs released a report that stated that companies with a strong emphasis on sustainability outperformed the market, often by a large margin. A PricewaterhouseCoopers study confirmed the Goldman Sachs report stating that companies that report sustainability data tend to get better returns on their assets. Several companies operating in Lao PDR, such as Pan Australia, Lane Xang Minerals Limited, the Nam Theun Power Company, and the Theun Hin Boun Power Company, espouse similar CSR policies and approaches on their websites and in their annual reports. The number of mining foundations established for benefit-sharing purposes in Laos has grown significantly in the past 20 years, reflecting a shift in expectations from ‘doing no harm’ to ‘creating net positive benefits.’

Sources: Van Wicklin (1999), Scudder et al. (2005), and Stengel (2009).

**Benefit sharing is a commitment by the government and the developer to sharing the monetary or non-monetary returns of natural resource projects with identified stakeholders. Benefit-sharing mechanisms**

<sup>12</sup> As reflected, for example, in the Decree 192 (2005) and the Technical Guideline on “Compensation and resettlement of people affected by development projects.”

should be designed to channel some of the benefits of hydro or mining development to the communities that are most directly affected and to encourage local support for, and a sense of ownership of, hydro or mining operations. These benefits usually constitute a minor proportion of revenue flows, which can be expected to pay dividends to the developers in terms of improved community relations, lower transaction costs in construction and operation, and a more conducive environment for further expansion elsewhere in the future.

**In the context of Lao PDR, the constraints and complexities that can be associated with the design and implementation of benefit-sharing approaches appear to be manageable.** Specifically, Laos has already had some success in devising and implementing benefit-sharing mechanisms. A number of “good practice” benefit-sharing projects already exist, which can be used as examples by other hydropower and mining projects in the country. Examples include preferential procurement for local communities at the Phu Bia Gold and Copper Mine and exclusive access to village forest and the reservoir as a benefit-sharing arrangement in the Nam Theun 2 Project. Furthermore, both the Sepon and Phu Kham mining operations offer preferential employment to residents of affected villages, and the Phu Kham Mine has developed a market garden scheme where villagers grow vegetables to sell to the mine. This scheme has been particularly successful in engaging and providing benefits to women in affected villages (Gibson and Carlsson Rex, 2010).

**It is important for the government to foster a policy environment that is supportive of benefit-sharing approaches.** Gibson and Carlsson Rex (2010) found that (see also Table 2):

- Large-scale mining and hydropower developments can result in severe negative environmental and social effects, often despite the implementation of standard mitigation measures.
- Unmitigated negative social effects can have significant negative consequences for the industry, the country, and the local residents.
- Benefit-sharing at the community level can be an effective complementary approach to traditional social impact mitigation such as adhoc compensation schemes.
- Benefit-sharing can reduce the risks faced by the hydro and mining industries and by the government because it gives local communities a stake in the effective and successful operation of the projects.

**In particular, screening out inappropriate or high-risk projects at an early stage and monitoring existing projects more closely can reduce risk and maximize their potential benefits:**

- **Monitoring potential negative effects.** The developer is already required under Lao law to carry out environmental and social impact assessments, but increases in capacity, in the availability and quality of data, and in transparency are needed to make these more effective. In particular, given the risk that projects will negatively affect the poverty and nutrition levels of local communities, as highlighted in this report, there is a need for enhanced capacity to monitor the social as well as the environmental effects of all natural resource development.

- **Collecting and collating information to estimate the extent of the effects.** Detailed project-level data are collected by each project team during the feasibility studies and during the Environmental Impact Assessment (EIA) process, but this means that these data are only collected after considerable investments in a particular project have already been made. It is therefore useful for the government to combine several sources of readily available national data such as socioeconomic surveys, land-use mapping, and the census to make some initial estimates about the numbers of people or the extent of the geographical areas that may be affected by the proposed hydropower and mining projects (see a first attempt in Fenton et al., 2010b). Therefore, it is going to be essential to increase the country's capacity to collect accurate baseline data and to carry out an initial assessment of risk (including nutrition and food security) before the project begins and to monitor and manage it once it is underway.
- **Establishing mechanisms for benefit sharing in advance.** In many projects, in Laos and elsewhere, insufficient resources have been devoted to risk mitigation and benefit sharing. Therefore, the government needs to ensure that effective and appropriate risk mitigation and benefit-sharing strategies are effectively funded and implemented. One way to do this is to require developers to sign contractual commitments to mitigate any adverse environmental or socioeconomic effects of their projects, as has been done in Concession Agreement for the NT2 project (see Box 2). Ensuring their compliance by implementing a system of independent review is another useful aspect to this policy. Also, promoting meaningful and open participation by communities in the design of the benefit-sharing schemes can also help to identify effective mitigation and benefit-sharing strategies.

### Mitigating environmental risks will require a serious effort

Environmental protection is enshrined in the Constitution of Lao PDR and in the Environmental Protection Law (EPL, 1999). The EPL, which is now under review, outlines the Environmental Impact Assessment (EIA) process. The EPL stipulates a requirement for the developer of a proposed project to submit an EIA in accordance with regulations. The Decree on the Implementation of the EPL assigns the responsibility for reviewing these EIAs to sector agencies and provinces and requires these agencies to establish EIA regulation and monitoring units in line with the general guidelines of the national agency. The EPL mandated the creation of an Environmental Protection Fund (EPF), which was established in 2006 and provides funds for institutional capacity building, investment, and biodiversity conservation. It is administered by the EPF Board, under the Prime Minister's Office (PMO).

**The existing laws and regulations provide a good legal basis for the protection of the environment, but their implementation and enforcement is weak.** The laws and regulations in Lao PDR have gone through a series of revisions and significant improvements in the past few years, including the adoption of the National Policy on Environmental and Social Sustainability of the Hydropower Sector (NPH). This process has been undertaken to ensure that projects are consistent with and applicable to the existing national requirements and to flag any emerging issues or challenges. The resulting laws mandate the protection and sustainable use of natural resources by minimizing the negative environmental effects of development projects. However, some implementation and enforcement capacity gaps remain:

## Box 2. Environmental Good Practices in Hydropower Development

Three projects in Norway, Argentina, and in Lao PDR itself are examples of good practice in environmental management.

### Yacyretá Hydroelectric Dam, Argentina

The Yacyretá hydroelectric facility on the Paraná River that runs along the border between Argentina and Paraguay is one of the largest dams in Latin America. At full capacity it generates 3,100 MW of electricity. The area that was flooded included eight types of habitats and a considerable diversity of fauna, species, and fish. As part of the environmental management aspect of this project:

- A network of 12 new compensatory protected areas has been created.
- The borrow pits have been reconfigured for conservation purposes.
- Water flow on the Aña Cuá branch of the river has been increased to maintain a nearly natural state year-round.
- Fish regulations have been introduced to avoid the overexploitation of accumulated stocks of fish below the dam.
- The lake water is being monitored to ensure its high quality.

### Ulla-Førre Hydropower Complex, Norway

Ulla-Førre is Norway's largest hydropower complex, located on the River Suldalslågen in south-western Norway. Its main power station, Kvilldal, with a capacity of 1,240 MW is Norway's biggest station. An important environmental issue associated with the project has been the existence of the Atlantic salmon (*Salmo salar*) in the River Suldalslågen. Originally, efforts were made to maintain the Atlantic salmon population in Suldalslågen by stocking the river with artificially produced salmon. However, from the late 1980s onwards, the program took a different approach, focusing on maintaining the Suldal salmon stock by preserving natural processes in the river. Today, the river is being managed in a way that will eventually yield a hydrological regime that is conducive to the natural lifecycle of the salmon. Although it will take time before this new hydrological regime will become visible, some effects have already been observed:

- The measures to prevent stranding have proved to be effective.
- Reduced flow in spring and summer has increased the water temperature and has thus increased the growth of juvenile salmon.
- Flush floods have washed out excess sediment and growth.
- Fluctuations in flow in the summer seem to have increased the migration of mature salmon to the river.

The reasons for this success are strongly associated with the cooperation between Statkraft (the operators of Ulla-Førre), local interest groups, the environmental authorities, the water resources administration and research institutions.

### Nam Theun 2 (NT2) Hydroelectric Dam Project, Lao PDR

The following key lessons in environmental management have been learned from preparing this project:

- Participatory approaches create a platform for dialogue. Two strategic studies – a cumulative impact assessment (CIA) and a strategic impact assessment (SIA) – have been key elements of the project's preparation. Both studies took a participatory approach, consulting with international and local NGOs, the private sector, various levels of government, and donors.
- The CIA and SIA studies evolved over time into advisory studies rather than donor-driven requirements for the multilateral development banks, which strengthened the government's involvement.
- Environmental assessments were used to increase the awareness of the stakeholders of key environmental and social issues associated with the development of the project and to initiate and sustain a dialogue with these stakeholders on environmental issues.
- Throughout the environmental assessments, the role of the NT2 was discussed in a broader development context than just its role as a hydropower project. This reinforced the incentives for all stakeholders to continue the discussion on key environmental issues.

Sources: IEA (2006), Quintero (2007), and World Bank (2009).

- **Sustainable financing for environmental protection is still inadequate**, despite the economic wealth generated by natural resource projects. Foreign assistance has to date been the main source of financing for natural resource management.
- **There are still overlapping mandates, an unclear division of functions and responsibilities, and a lack of coordination** among the agencies involved in natural resource use and management, and across central, provincial, and district levels of government.
- **A lack of finances, capacity, and human resources** in environmental management and planning and in the monitoring of the environmental and social impact assessment process is hampering the implementation of existing legislation, as well as the government's ability to respond to emergency situations.
- **The legislation does not specify any penalties for breaking the law** or for regulatory non-compliance.
- **The specific responsibility for mitigating any negative local effects or damage is not clearly defined in the legislation** and is not required to be included in the project design.
- **A lack of public access to information** about the environmental effects of natural resource development projects and about any proposed or ongoing mitigation measures tends to exacerbate the negative effects.

**Good practices in environmental compliance are included in many mining and hydropower projects in Lao PDR.** Examples include the Sepon<sup>13</sup> and Phu Kham<sup>14</sup> projects, which are internationally operated mines listed on the international stock exchanges that operate under international scrutiny and that exercise corporate social and environmental responsibility. The Nam Theun 2 Hydropower project (NT2) is a large hydropower development that is creating some negative environmental outcomes, to which the developer has applied mitigation strategies, including funding for environmental protection, with varying amounts of success. The NT2 project is an example of good practice in environmental management for hydropower projects generally and has established a framework for the environmental management of hydropower and of watershed management. NT2 is the only project that mandates the tracking of how the revenue that is generated by the project is ultimately used. It is funding the conservation of the NT2 Watershed, which includes a National Protected Area (NPA).

**These good practice examples have also demonstrated the sometimes insurmountable challenges of implementing projects responsibly in countries with low capacity.** They have also illustrated the complexity of managing a high-impact project in a richly biodiverse landscape where there is already heavy localized natural resource exploitation. Given the capacity, financial, and human resource constraints that are common in environmental protection practice in low-income countries, including Lao PDR, we recommend the following actions to ensure adequate protection of the environment:

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13 The Sepon Gold-Copper Operation Project is operated by MMG (Metals and Minerals Group) in the Vilabouly district of the Savannakhet Province of Laos.

14 The Phu Kham Copper-Gold Mining Project is operated by the Phu Bia Mining Limited in the Xaysomboun Province of Laos.

- **The full implementation of the existing legislation and especially of the Decree on Environmental Impact Assessment (2010) is paramount.** Capacity for implementing the environmental and social impact assessment procedures needs to be strengthened within the Water Resources and Environment Administration (WREA) and other relevant ministries. Without these safeguards in place, the projected flood of development investments is likely to cause long-term environmental damage and natural resource losses. Developers must be required to have Environment and Social Impact Assessments (ESIA) carried out by competent firms and evaluated by the WREA before the project is approved or work is begun. Capacity needs to be built within the WREA both to enforce the requirement for developers to prepare high-quality ESIA and to make a competent evaluation of their adequacy. There also a need for a clearer delineation of the responsibilities of the agencies involved, for example, the WREA and the Ministry of Energy and Mining (MEM), and between each level of government. Finally, appropriate coordination mechanisms need to be established to ensure that different agencies and levels of government interpret and apply legislative requirements in a consistent manner.
- **Institutional reform is needed to eliminate conflicting mandates.** Any overlapping mandates among government agencies will tend to result in the under-protection of the environment. This can happen, for example, when conservation and environmental protection agencies are subordinate to the ministries that make the final decisions about natural resource-related projects. In such cases, raising the administrative status of the agencies charged with environmental protection would correct the problem. In Laos, a step in this direction has been the elevation of the Protected Area Management Units at the provincial level to the level of the Forestry Office. This now needs to be replicated at the national level as well.
- **The inclusion of some conservation provisions should be mandatory in the design of projects.** In cases where an ESIA has shown the need to mitigate negative environmental effects, these provisions should be required to be presented clearly in the project design (such as the building of tailing dams to reduce chemical pollution). Both project cost-efficiency and environmental protection will benefit if key negative environmental outcomes are identified early in the process and firm plans are made for mitigating their cumulative effects. Some actions that can be taken from the outset of a project include avoiding key natural habitat areas, minimizing access routes to the site and providing monitoring and enforcement if they lead to a protected area, minimizing the impact on vegetation by using minimal impact methods such as manual tree removal, and ameliorating the areas of impact by, for example, committing to re-vegetation, appropriate waste disposal, water quality maintenance, and the creation of fish passages and habitats.
- **It is necessary to find ways to conserve forest resources in areas affected by hydro projects.** A particularly important issue is salvage logging related to reservoir inundation. This has become a major component of the national timber harvest in Lao PDR, accounting for more than 50 percent of log production in some years. Policies and practices controlling the sale and disposal of this valuable asset affect the viability and credibility of hydropower development and also have important consequences for the success of the government's efforts to develop market-oriented sustainable forest management. The responsibility for managing salvage sales needs to be assigned to an authority capable of drawing on multi-sector expertise and of preparing plans that can be publicly disclosed. Sales should not commence in advance of the final approval and financial closure of the power project, and they should also be planned and completed in advance of reservoir inundation. They should be based on professional assessments of timber volumes and values, and developers should be required to employ competitively selected contractors for logging, site preparation, and the sale of the logs. Concessions for



salvage logging should require developments to prove in advance that they have secure funding to cover the full implementation of the proposed project.

### Watching for cumulative effects

**The geographical imprint of the existing and planned hydropower projects and mining sites is expected to be large.** Maps in Annex 1 summarize the geographical location and coverage of the currently known hydroelectric and mining projects (Figure 47, Figure 48, Figure 49, Figure 50, and Figure 51). Fenton et al. (2010b) discovered the following information on the current and projected project portfolio:

- **In hydropower**, of the 42 planned dams for which data are currently available, the total inundated area is estimated to be 3,086 square km. Two hundred and ninety-three villages will be directly affected, including a total of around 100,000 people who currently live on the land that is to be inundated. An estimated additional 49,000 people live within one hour's walk of a current or planned reservoir. This is based on information for 42 projects in different stages of implementation, though as many as 90 hydropower projects are being planned in total (of which 46 are still in the feasibility study phase). Moreover, several dams are being considered in the mainstream Mekong River, and these will have major environmental effects both locally and across national boundaries.
- **In mining**, the impact on the affected population is estimated to be comparable to that in the hydro sector based on the information that is currently available. However, it is extremely difficult to estimate the potential coverage areas. This is because the areas involved in the actual exploitation of the mineral resources will be much smaller than the area being surveyed or explored. As it is currently unknown where the exploitation areas will be for those projects that are in the exploration and survey stage, the authors made a rough estimate (based on the affected area and population for the known projects under exploitation). Based on these estimates, roughly 100,000 people will be affected by the currently planned mining projects.

**There are areas of overlapping interests between priorities in the hydropower and mining sectors on the one hand and other development needs on the other hand:**

- **Geographical features and the resulting pattern of project development often means that several large-scale projects are concentrated in the same area, thus compounding the negative impact on local villages, regions, or catchments.** For example, the Nam Ngum catchment is vulnerable to the accumulation of negative effects of and interactions between several projects, because a number of operating and planned large-scale mining (Phu Bia Mining's Copper-Gold Operation and Gold Heap Leach Operation) and hydropower projects (Nam Ngum1, Nam Ngum 2, Nam Ngum 3, Nam Ngum 5, and Nam Lik 1 and 2), as well as plantations and other projects are located there (see also Figure 47).
- **A large part of land that is or will be inundated to create reservoirs or used to make way for mining concessions are forest, potential forest, and national protected areas.** It is however known from experience that new developments and construction or other economic activities in NPAs that are part of the watershed of an existing hydropower station reduce the efficiency and lifespan of the project. There are six hydropower projects that are either currently operational or are under construction that use land in the existing national

protected areas, with additional feasibility studies underway. There are three mineral exploration and several general survey concessions that include land under NPAs. The area in southern Laos that is under a petroleum exploration concession covers six NPAs and many production forest and protection forest areas. Up to 12 percent of the NPA system could be under a hydropower or mining concession in the near future; see Figure 51 and Fenton et al. (2010b).

- **The population living in the new exploration areas is poorer and more marginalized than the populations that have previously been affected by natural resource development, as discussed above.** This suggests that more care will be needed to address the challenges related to the demographic and sociological dimensions of natural resource development in the future.
- **One of the most important issues identified in this report is the need to pay special attention to food security because many hydropower developments negatively affect fish availability and habitat.** The background papers and the section above highlighted the vulnerability of the population to the loss of food due to the inundation of agricultural and forest land and to the decline in fish populations (Fenton et al., 2010a and Stenhouse and Bojo, 2010). They also found weaknesses in the compensation that has traditionally been provided by developers and found benefit-sharing a much better instrument for dealing with the negative social effects of hydropower and mining development (Gibson and Carlsson Rex, 2010).<sup>15</sup>

**While the project-by-project approach that the government has used to date has been adequate, the anticipated acceleration in exploitation will necessitate the development of a more holistic and strategic approach.** In particular, the cumulative impact of mining and hydropower needs to be addressed through a strategic framework at both the national and the river basin level. The implementation of environmental and social impact assessment procedures needs to be strengthened within the WREA and other relevant ministries. There is a need for a Cumulative Impact Assessment of multiple hydropower and mining projects within each river basin. The environmental impact assessment study for the first dam on any river should include an assessment of the likely cumulative impact of any additional dams on the same river system. For example, such an assessment was carried out during the preparation of the Nam Theun 2 Hydropower project. Mitigation measures for cumulative (rather than dam-specific) effects on the environment, on livelihoods, and especially on food security should be completed or well underway prior to the construction of the second dam on the river. The national benefit-sharing framework for every project should take into account the needs of the environment as well as the financial and social protection needs of the central and local governments.

## Choosing the right projects and monitoring them

**Governance is a key aspect of the management of natural resource development.** Cross-country evidence suggests that mineral riches can have a negative long-term impact on growth in countries with poor governance

<sup>15</sup> Based on the draft currently under discussion of the ongoing Strategic Environmental Assessment of the proposed mainstream hydropower schemes being undertaken by the Mekong River Commission (MRC) is likely to highlight the need for a more in-depth study of food security, for benefit-sharing arrangements to be put in place in advance, and for an increase in capacity to screen and enforce the implementation of environmental regulations. This assessment will inform the optimal approach that Laos and other riparian countries need to take regarding the future use of Mekong resources, including possible dam building and their benefits and risks. This report will be updated once that assessment is completed.

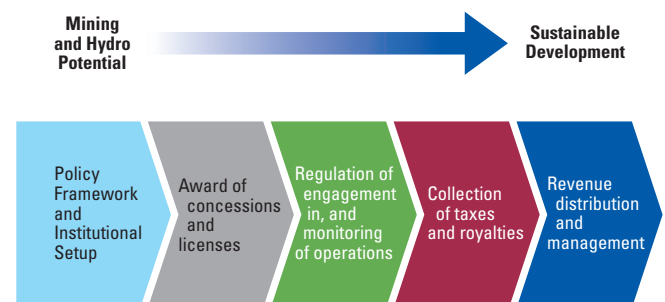
and low institutional quality and a positive impact in other countries. Reconciling the somewhat disparate evidence on the relation between natural resource abundance and growth, Collier and Goderis (2007) found that commodity price booms had indeed had a positive short-term impact on growth but that the impact on growth was significantly negative in the long term. However, this negative long-term effect exists only for “point source” natural resources like oil and minerals and only in countries with poor governance. Natural resources interact with governance and institutions in two interrelated ways:

- The quality of policymaking and implementation in the natural resource sectors is conditioned by governance and institutional quality, including the mandates and implementation capacity of individual agencies as well as the overall governance and regulatory framework.
- The extraction of natural resources can cause governance to deteriorate by intensifying rent-seeking and weakening the core tax-accountability link between state and society and by provoking more intense political or bureaucratic battles for control over natural resource rents between powerful interest groups and the state institutions responsible for collecting and distributing them.

**Only by giving concerted attention to the process of natural resource management itself will the government be able to achieve its strategic vision.** In this report, we use a value chain approach to assess the current governance arrangements that are in place for natural resource project management covering: (i) the legal and contractual frameworks that govern project development; (ii) the government’s role in project implementation, monitoring, and oversight; (iii) revenue collection from projects; and (iv) the mechanisms by which these revenues are channeled into investments in sustainable development.

In addition, increasing institutional capacity and improving governance in the natural resource sectors will require a review of the full range of value chain activities, including the national portfolio-level policy and institutional setup, the awards of contracts and licenses, the regulation and monitoring of projects, the collection of taxes and royalties, and revenue distribution and economic management (see Figure 25).

**Figure 25. The natural resource management value chain**



Source: Barma et al. (2010).

### Policy framework and institutional setup

The goal should be to develop a systematic national portfolio-level governing regime for natural resource management. This would enable the government to be more strategic about selecting the projects given the limitations of its existing institutional capacity. In Laos, the following steps will be necessary:

- **Aligning an overarching policy framework that clarifies national objectives and national resource management principles with sector strategies** that prioritize investments and manage the cumulative impact of projects from a portfolio perspective.

- **Establishing the key governance principles of national resource management** including transparency, information sharing, and standardization of processes to increase predictability and efficiency.
- **Strengthening institutional capacity and inter-agency governmental coordination** by systematically involving all relevant actors in the **national resource management** process, with clearly defined roles and accountability for the implementation of national policy and sector strategies.

### Awarding concessions and licenses

An appropriate framework based on international good practice would clarify the expectations of external investors concerning the investment process and enable the government to enforce the regulations, be transparent and non-discretionary in awarding rights, and execute well-defined institutional responsibilities across all levels of government. In Laos, the following steps will be needed to achieve such a standard:

- **Strengthening the legal and regulatory framework for the mining and hydro sectors** by ensuring the passage and implementation of legislation and supporting regulations in each sector.
- **Increasing agency coordination on technical matters and strategic, comprehensive capacity building**, instituting more systematic processes such as clarifying and formalizing the technical roles of the MEM, the MOF, the WREA, and other relevant government agencies, and instituting an inter-ministerial technical committee responsible for preparing technical assessments for the negotiation and award of concessions to be presented to the Cabinet. These steps would increase administrative efficiency and inter-agency coordination, reduce the risk of rent-seeking at the contract stage, and enhance the fiscal and other terms available to the Government of Lao PDR from external investors.
- **Emphasizing consistency and increasing predictability in the concession negotiation process** by standardizing the concession process and the core concession agreement structure—including a basic fiscal regime—and making rapid regulatory adjustments to encourage high-quality investors. This would enable the government to continue to play a strategic role in developing the mining and hydro sectors while removing cumbersome and inefficient layers of decision-making.

### Regulation, engagement, and monitoring of operations

A clear definition of the responsibilities and separate roles of government agencies, their commensurate capacity and resourcing, and their community outreach are essential parts of a good framework. In Laos, the following steps will be needed to achieve such a standard:

- **Increasing transparency for monitoring and enforcement purposes** by sharing the details of concession agreements, including fiscal terms, with all relevant government agencies. The government should also consider disclosing the final environmental impact assessments and the environmental and social management and mitigation plans to the public, particularly to the communities most affected by the project.

- **Matching sector capacity and resources to sector needs, using financing formulas to build capacity in domestic agencies, and relying on external advisory services when necessary.** Financing formulas could be funded from the general government budget or through suitable “developer-pays” mechanisms. Financing external advisors from project development costs should become standard.
- **Strengthening models for local government engagement** by learning from current project experiences and developing standardized processes for engaging, financing, and coordinating government involvement in projects at the local level. It is also important to ensure that adequate capacity is developed to implement the legislated practices at the local level.
- **Standardizing social and environmental monitoring tools and core indicators,** using systematic data on key parameters of interest to help project developers, the government, and external agencies to better monitor and compare individual projects.

## Chapter III. Fiscal policy is the main instrument for mitigating volatility

In a natural-resource rich economy, three main principles should guide fiscal policy to effectively mitigate the potential negative macroeconomic effects of natural resource extraction. In the short run, fiscal policy can reduce transmission of volatility from commodity prices to the real economy. In the medium term, it helps policymakers to set growth-enhancing public expenditure priorities. In the long term, fiscal policy is a key instrument for mitigating the impact of Dutch disease.

**With respect to these principles, hydropower and mining sectors need sometimes to be treated differently.** While similar priorities in these sectors include, for example, a less discretionary fiscal regime, other policies should be more tailored depending on where they exert the highest impact on the economy. Volatility is the main way in which natural resource exploitation affects the rest of the economy, and this suggests that different priorities are needed for the hydropower and mining sectors. Minerals are an exhaustible resource for which prices are volatile. Hydroelectricity, however, is a potentially renewable resource (provided that environmental challenges are well-managed) and is much less volatile because of its specific fixed-price contract structure (see MacGeorge et al., 2010). As a result, volatility and exhaustibility are the key economic considerations in mining, while in hydro the spending effect is the main challenge. Therefore, the most appropriate policy responses to each sector must also be different. Volatility management is the key issue in mining while ensuring spending does not exacerbate Dutch disease is the key issue in hydro. The fiscal sustainability approach proposed in Vostroknutova et al. (2010) and in this report takes these differences into account while identifying a common framework and a common “optimal” expenditure profile.

### Collection of taxes and royalties

**A transparent and non-discretionary fiscal regime is the key to ensuring that revenues to the government are maximized and to encouraging investor competition.** Developing an adequate administrative and audit capacity and adhering to internationally accepted accounting and reporting standards would reinforce this. In Laos, the following general steps will be needed to achieve these standards:

- **Enhancing revenue administration and monitoring through targeted capacity building.** One key step in this respect would be to ensure that the different authorities involved in revenue administration (the MOF’s Tax Administration, the MOF’s State Asset Management Department, and the MEM) cooperate in sharing information as well as building the auditing capacity of staff involved in revenue collection to enable them to properly assess the tax obligations of mining and hydropower developers. These steps would significantly increase the government’s revenue from the mining and hydro sectors.
- **Making transparent the fiscal terms that apply to mines and hydropower projects.** Making this information on fiscal terms (actual rates for taxes and royalties, tax holidays, etc.) publicly available would be an intermediate step towards the full disclosure of concession agreements.
- **Publishing regular information (quarterly or, at least, annually) on the tax and royalty payments actually collected by the government.** Increasing transparency regarding revenue receipts would enable government officials, local experts, and the wider public to have a dialogue about whether Lao PDR is generating enough

revenue from its natural resources. It would also make it easier to compare this amount with what is being raised in other countries, thus allowing for strategic planning.

**An appropriate fiscal regime in the hydropower and mining sectors can increase the profits of the investor and the government's fiscal revenues at the same time.** In designing the most appropriate regime, governments must strike a balance between the need to continue to attract foreign investment in competition with other countries on the one hand and the need to maximize government revenues on the other hand. Both governments and investors seek to limit their risks while maximizing their revenues. A transparent non-discretionary fiscal and investment regime helps investors to understand the risks beforehand and to take an informed decision about investing. This, in turn, allows the government to attract responsible long-term investors and improve the quality of its project portfolio.

**Three main issues currently negatively impact potential fiscal revenues, and these will be exacerbated when more projects come on stream, and will make monitoring them more complicated.** The first issue is that the current fiscal regime in both sectors is open to government officials' discretion and to the making of case-by-case arrangements with developers. The second issue is that rent capture is relatively low. The third issue is that the current rules governing state participation in projects do not cap the risks facing the government.

### Fiscal regime in the hydropower sector

**In the hydropower sector, there is no clear fiscal regime and every project is considered on a case-by-case basis.** While this approach is convenient when dealing with the specifics of each project, it also involves a significant risk that the government may not capture the full economic rents from hydropower development in some cases, especially through taxation. In order to make sure that the government's expectations are made clear to developers, legislation is needed to define a standard method for determining the fiscal benefits from hydropower projects (particularly export projects):

- Key taxes, such as profit, excise, and business turnover tax should be specified as primary taxes and no dispensation from these taxes should be allowed.
- It is essential to clearly define how economic rents<sup>16</sup> are to be charged and levied by including the specific procedure under which economic rents are to be calculated in the developer's MOU/PDA/CA with the government.
- While the current mechanism for extracting economic rents<sup>17</sup> is working properly, adopting an economic rent taxation system based on actual rather than projected profits would improve the collection process. Furthermore, revisiting the policy for distributing royalties between the government, the off-taker (the purchaser of electricity), and the developer would also deliver significant benefits (see details in MacGeorge et al., 2010).

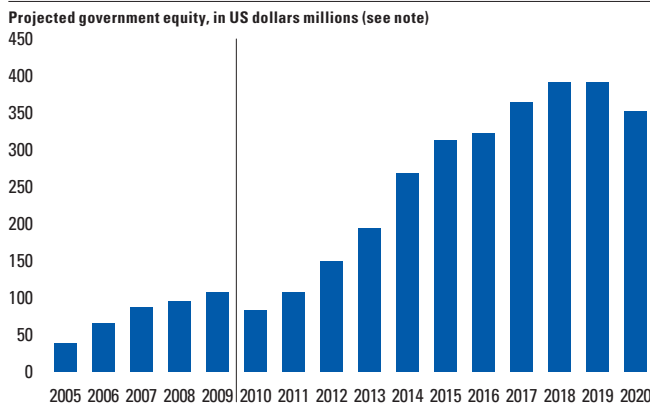
<sup>16</sup> Economic rent from natural resources is defined as the value of production after deductions for operating and capital costs.

<sup>17</sup> Rents can be extracted in a variety of different ways. In Laos, they are levied via a royalty based on a percentage of gross revenue for each concession in each operating year. One-third of the levy is received by the off-taker and the remaining two-thirds are divided between the government and the developer on a case-by-case basis.

- In addition to primary and secondary taxes, the government should consider adopting additional fiscal arrangements such as up-front concession fees, dividend returns from investment, and discounted electricity sales.
- Up-front concession fees, which would be applicable to all projects, could incorporate an amount to cover the cost to the government of the resource development and should consist of a minimum amount (in other words, a fixed fee regardless of the project’s size) and a set percentage proportional to the estimated cost of the project.

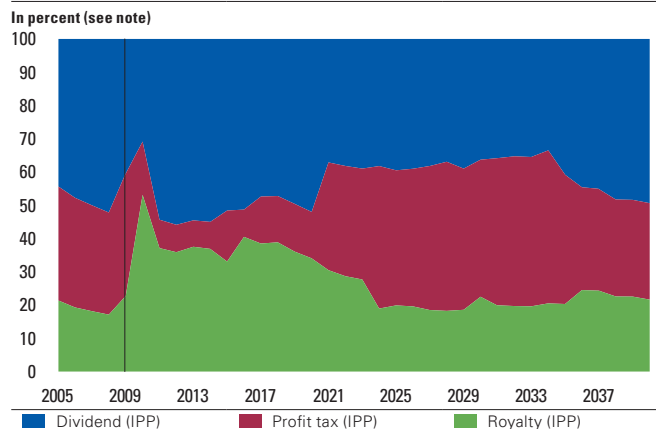
On the investment side, the government has given no clear indication of any independent power producer (IPP) and government equity policy. MacGeorge et al. (2010) calculated, however, that if the government were to take (as is currently under discussion) a 20 percent equity stake in each of the projects that are currently in the pipeline, its financing needs could rise to almost \$400 million a year by 2018 (Figure 26). Given the borrowing constraints that Lao PDR is facing, it would be impossible to raise such an amount and therefore the government needs to think carefully before taking equity in any resource projects or legislating specific minimum amounts in the law.

**Figure 26. Financing all projected equity stakes in hydroelectric projects could become problematic**



Source: World Bank staff estimations.  
 Note: Projected annual requirement for government equity in hydroelectric projects, assuming 20 percent equity stake in each project, and a realization of all 14 projects, including 3 already on stream.

**Figure 27. More than half of the projected fiscal revenues from hydro sources are high risk (dividends)**



Sources: MEM and World Bank staff projections.  
 Note: In percent of total projected government fiscal revenue from hydro-electric dams.

When a high percentage of government revenues from natural resource development projects come from dividends on equity rather than from taxes and royalties, this increases the commercial risk assumed by the government and can lead to losses. Currently, it is projected that around half of the government’s revenues from the current and planned projects will come from dividends (Figure 27). However, equity stakes, especially if they are taken at the beginning when the risks of the project have not yet materialized, are the riskiest source of revenue available to the government. Even though the risks associated with hydropower projects in Laos are expected to be lower than those associated with thermal electricity projects, they will be competing with each other for demand. Instead, the government should consider shareholding based on a small free carried interest to reduce risk. Another means of mitigating up-front risk is by limiting the government’s initial equity share but including an option of taking up additional shares if the project is profitable. To ensure that government takes equity in export-oriented hydropower projects that are not excessively risky but still relatively profitable, the role of the Lao Holding State Enterprise (LHSE), as the government’s official shareholder in these projects, should be specified (see MacGeorge et al., 2010).



Therefore, we recommend a more transparent and less discretionary regime that is internationally competitive, that keeps the government's risk low, and that maximizes revenue. This regime should include:

- **A standard method for determining fiscal benefits** for all hydropower projects should be delineated in a clear policy statement from the MEM and be supported by the MOF.
- **There should be no exemptions from primary taxes.** The government should specify that key taxes, such as profit, excise, and business turnover tax, are primary taxes, and that no dispensations for these taxes should be permitted other than those specified in the zone-based relief available under the Law on the Promotion of Foreign Investment.
- **A resource rent tax system should be adopted.** Secondary taxes, such as the existing royalty arrangements, should continue to apply to extract economic rents. However, a resource tax based on kWh produced is an effective way to capture economic rents, especially for projects with favorable hydrological conditions (with longer operating hours per year).
- **Other revenue sources should also be considered,** including: (a) an upfront concession fee; (b) dividends from investments in IPPs as specified by the government in an IPP investment policy; and (c) minimal use of discounted electricity sales specified under a discounted electricity policy.

### Fiscal regime in the mining sector

A different regime is needed in the mining sector than in the hydropower sector because of the sector's long and costly exploration period, its capital intensity in the initial stages of a project, and its high closure costs. In choosing this regime, a fine balance needs to be struck between various objectives - trying to be internationally competitive, maintaining a simple regime, capturing the maximum possible rents, raising revenue early in the project process, raising dependable revenue, and taking care of central-local issues. This is usually achieved by adopting such fiscal instruments as surface rentals, royalties, income tax and other taxes, and state participation in projects (equity).

The existing regime suffers from several drawbacks, which, when corrected, will improve the collection process and reduce risk. The effective tax rate (ETR) is around 50 percent, which is in line with international best practice (between 45 to 50 percent) and balances competitiveness with the highest achievable revenues. However, under the current fiscal regime, the government has discretion in determining the regime that applies to specific mines, as the Mining Law does not specify numerical attributes to be used by to all mines. This reduces the amount of rent that can be captured from the projects. The gap between the actual and possible amount of rent being captured will increase when more projects come on stream. Moreover, as in the hydropower sector, the risk of having the government take an obligatory stake in all projects may be too high.

The capacity of the authorities to monitor and enforce the fiscal regime in the mining sector is extremely low: there are no staff members, either internally or contracted, with the appropriate skills, there is also no clarity on the technical roles played by different institutions in the assessment, collection, and flow of funds, and there is room for

improvement in the government's forecasting capacity. Most importantly, there are no reliable cadastre data on the country's natural resource reserves or on what explorations have been undertaken.

**In order to maintain international competitiveness and to be able to attract responsible investors** at this early stage of industry development, the government should consider taking the following actions:

- Introducing a clearer and more predictable investment regime, for example, by legislating explicitly a non-discretionary fiscal regime in a decree to the Mining Law
- Increasing the security of tenure associated with the mining title
- Making the approval of "finder's right" more automatic for investors who have successfully explored a mineral resource
- Increasing investors' access to essential inputs, including geological data, a skilled labor force, equipment, finance, and services.

## Revenue distribution and management

**Most importantly, the revenues need to be spent on poverty reduction and public investment as part of the implementation of the government's development program under the NSEDP.** For example, rural infrastructure has been shown to be the single most important driver of growth in Lao PDR. Other investment options that increase growth in the long run, such as human capital including education, health care, and professional training, also should be considered. The NT2 hydroelectric dam represents international best practice in this respect by identifying priority sectors where the revenues can be used (Porter and Shivakumar, 2010).

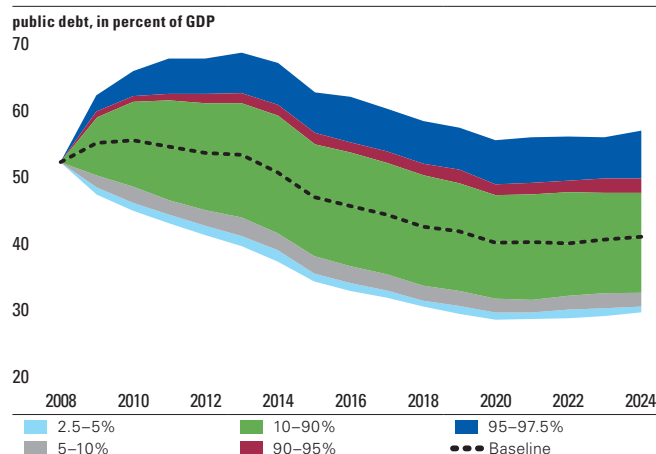
**Strong public financial management and procurement systems have been proven to lead to positive long-term development outcomes if combined with a medium-term expenditure and fiscal framework, adequate scrutiny and appraisal of public investment decisions, and an adequate macroeconomic and fiscal policy.** In Laos, the following steps will be needed to ensure that these factors are in place:

- Adopting a **fiscal framework** that ensures that increases in recurrent expenditures are only financed out of non-mining or other stable revenues and that aims to reduce public debt levels and the non-resource deficit would go a long way towards managing the volatility of mining revenues and the uncertainty of hydro revenue streams.
- Introducing a **simple fiscal rule** that would mandate some precautionary savings in boom times would help the government to manage the revenues in a way consistent with macroeconomic stability and development strategy. Using pessimistic price projections to calculate likely returns would also be prudent.
- Improvements in **public investment management** are needed to facilitate the effective screening of investment projects and to ensure that the resulting revenues are more effectively invested. In particular, budgeting, procurement, implementation, and the capacity to choose, screen, and evaluate projects all need to be improved.

As recommended by Rajaram et al. (2010) and Allen and Tomassi (2001), a capacity-building program should be established to support this objective.

**A fiscal policy that limits government spending over time should be introduced.<sup>18</sup>** This policy would help to reduce volatility, manage the uncertainty and exchange rate appreciation that can arise through the spending effect, and keep spending of natural resource revenues at a sustainable level. Linking fiscal policy with the development plan through a medium-term expenditure framework (MTEF) would help to deploy resources more efficiently to achieve sound development outcomes.

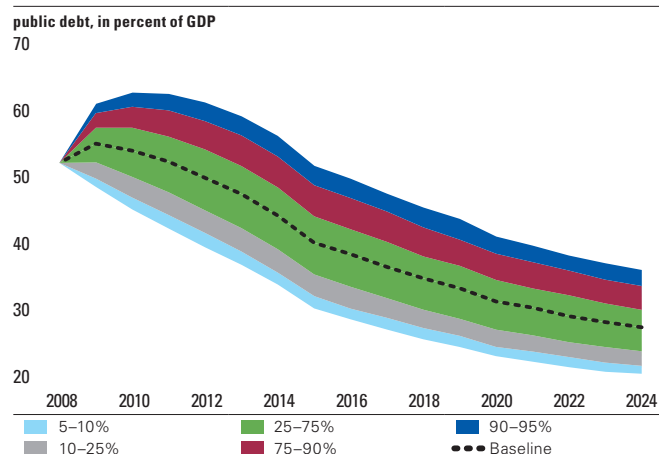
**Figure 28. “Business as usual” implies having the “high risk of debt distress” status**



Source: Vostroknutova et al. (2010).

Note: Percentage of GDP. Intervals are based on copper price volatility.

**Figure 29. “Optimal fiscal strategy” allows Laos to graduate from “high risk” status by 2016**



Source: Vostroknutova et al. (2010).

Note: Percentage of GDP. Intervals are based on copper price volatility.

In particular, under the “optimal-fiscal strategy”, a gradual increase in expenditures from 17 percent of GDP in 2009 to around 22 percent by 2024 would enable the government to reduce its debt, make appropriate savings, and still finance a sizeable amount of the implementation of the NSEDP (Figure 28, Figure 29, Figure 30, Figure 31). We considered specific properties of the hydro and mining revenues and outlined the optimum spending profile that would allow Lao PDR to graduate from the low-income countries’ “high risk of debt distress” status<sup>19</sup> by 2016 while also saving some of its revenues for the future. Figures 26 and 27 compare the two cases - “business as usual” and “optimal strategy” - to show how mining and hydro revenues can be managed in a fiscally sustainable way while at the same time allowing for adequate savings and sound investments in areas likely to offer a strong development dividend. Given current projections, this would allow for 1 percent of GDP in resource revenues to be saved “for a rainy day,” and would also help to reduce foreign debt to a sustainable level.

**Committing to new recurrent spending, such as wage increases, from relatively volatile resource revenues would be unwise.** However, these revenues can be spent on investments that will promote future growth or will help to implement the development agenda, provided that a sound Public Investment Program (PIP) exists and supports

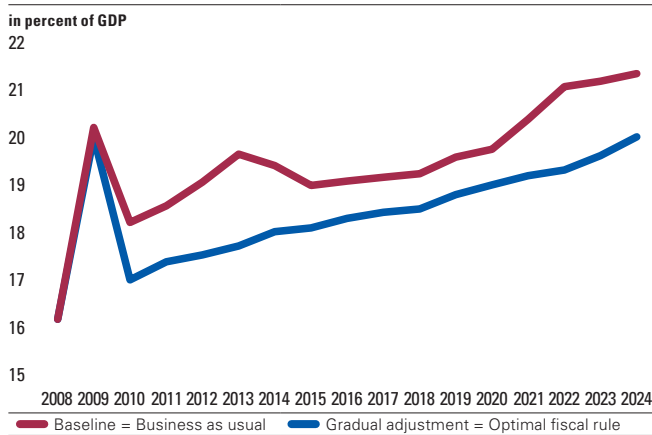
<sup>18</sup> The rest of this section is based on Vostroknutova et al. (2010).

<sup>19</sup> See IMF and WB (2005).

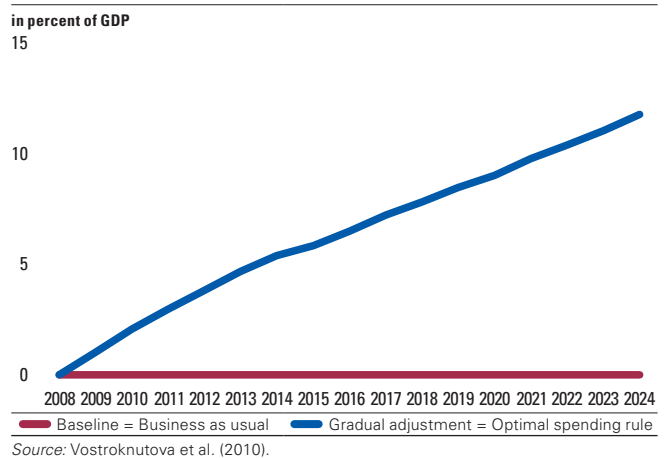
the identification and evaluation of projects so that the funds are not wasted as a result of capacity constraints, corruption, or low absorptive capacity, as has happened in other countries.

Adopting a fiscal framework that funds increases in recurrent and capital expenditures only from non-resource or stable revenues and that aims to reduce public debt levels and the non-resource deficit will go a long way towards managing volatility and uncertainty regarding mineral and hydro revenues. Adhering to simple but broad fiscal rules capping total expenditures and making arrangements for saving during booms combined with the careful use of a non-mineral fiscal balance would be the most appropriate approach given the nature and scale of the wealth that Lao PDR is projected to gain from resource development in the near future. Spending resource revenues on actions that promote poverty reduction and investment in growth has been shown to be a key ingredient in fighting off the “resource curse.”

**Figure 30.** Expenditure profile is higher under the baseline...



**Figure 31.** ...but the optimal strategy builds up a sizeable stabilization fund



## Chapter IV. Growing rapidly will require action in the non-resource economy

The non-resource economy will be contributing half of Lao PDR's economic growth in the medium term and a significant proportion of its GDP in the long term. Specific characteristics of the tradable sectors, such as their ability to create employment, the costly and time-consuming learning by doing that is required for them to operate, and relatively lower macroeconomic volatility also suggest that economic growth in Lao PDR will strongly depend on the non-resource sector of the economy. The challenges in this part of economy are two-fold: (1) how to mitigate the potential negative effects of natural resource exploitation on the non-resource economy and (2) how to create the best conditions for growth in the non-resource sector itself.

### Developing the non-resource economy

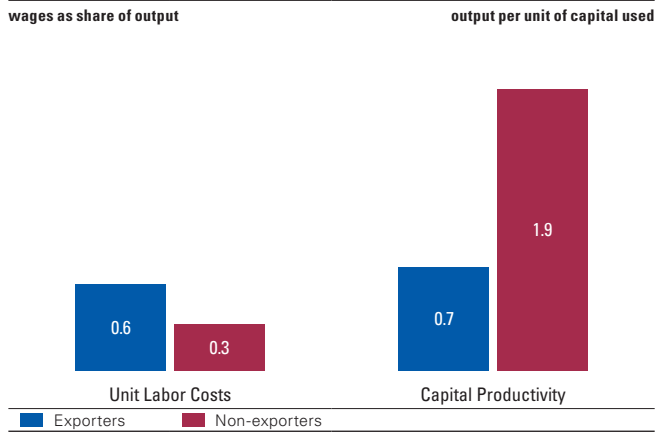
Even though extracting large amounts of natural resources should increase average incomes and government revenues, this wealth has become a "curse" for development in many countries. Exporting large amounts of natural resources can negatively impact the economy in several ways including through the balance of payments, the reallocation of production factors, the spending effect, and over-borrowing. Many countries, especially those endowed with minerals, have experienced reduced growth and increased corruption as a result of the intensive exploitation of their natural resources. In some countries, large inflows of capital and export earnings have exerted strong pressure on exchange rates and resulted in a loss of competitiveness and a reallocation of factors of production to the resource sector. Most importantly, they have suppressed industrialization (Brahmbhatt and Vostroknutova, 2010).

However, some countries have managed to turn this wealth into a blessing by implementing sound policies and by building their institutions. These economies, including several now industrialized nations, were able both to achieve strong productivity growth in their natural resource sectors and to diversify into new, technologically sophisticated manufacturing and services sectors, resulting in steady and robust income growth over many decades.

The development of the manufacturing sector can be suppressed, in particular through the so-called spending effect (high spending induced by significant capital and revenue inflows, which leads to inflation and real exchange rate appreciation). This in turn can result in a loss of competitiveness, a slowdown in industrialization, or even a shrinking of the manufacturing or other tradable non-resource sectors. Pressures for real exchange rate appreciation reflected through the relative price changes between the tradable and non-tradable sectors can lead to further deterioration in competitiveness. If growth in the manufacturing sector is suppressed, then employment will be lower in the long run. Combined with weaknesses in the public financial system that mean that revenues are not allocated to poverty reduction, this could also result in relatively high poverty rates. Although policies to diversify exports will also reduce volatility, other policies are needed to deal with such issues as over-spending, over-borrowing, and real exchange rate appreciation. Brahmbhatt and Vostroknutova (2010) look at these issues in more detail.

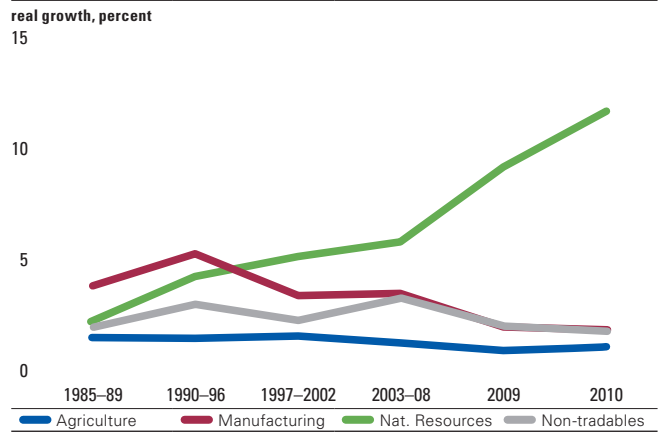
Lao PDR has already exhibited some worrying signs of such negative effects at the macroeconomic level, even though it has been difficult to establish any correlations or causal links to natural resource extraction. This is because the increase in prices during the commodity price boom was relatively short-lived, and its aftermath coincided with the financial crisis and with an associated increase in spending. These signs include:

**Figure 32.** Signs of loss of competitiveness and unproductive rents for domestic firms...



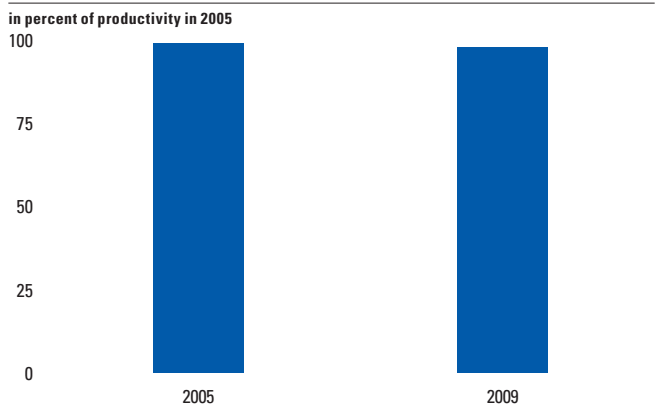
Source: Brahmhatt and Vostroknutova (2010).

**Figure 33.** ...combined with manufacturing growth slowdown



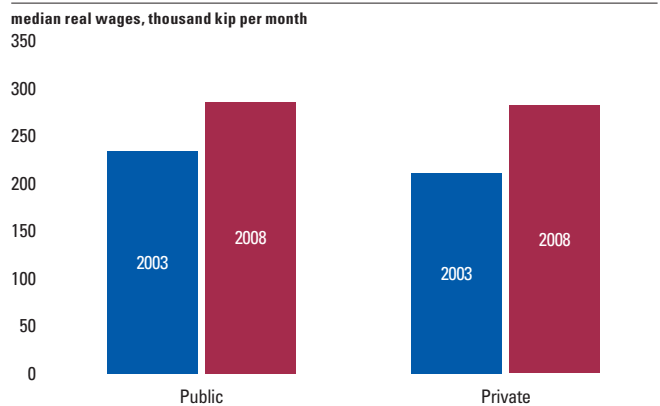
Source: Davading (2010).

**Figure 34.** Stagnating or declining productivity 2005-2009...



Source: Brahmhatt and Vostroknutova (2010).

**Figure 35.** ...combined with real wages growth



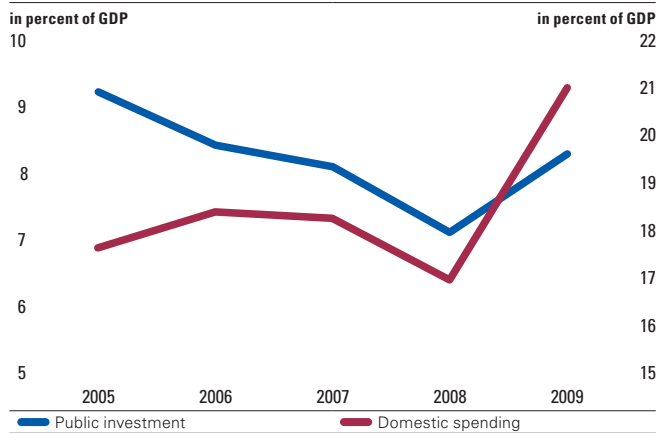
Source: Brahmhatt and Vostroknutova (2010).

- A slow-down in manufacturing growth combined with signs of reduced competitiveness and rents received by incumbent domestic firms (Figure 32, Figure 33). For example, exporters' unit labor costs<sup>20</sup> are double those of non-exporting firms, who also have much higher capital productivity (Figure 32).
- A loss of competitiveness as reflected in real wage growth above that of productivity (Figure 34 and Figure 35) and a squeezing of profits in the exporting sectors. Even though Laos is still very competitive in wages, declining productivity will take a toll on growth in the future (Figure 45).

<sup>20</sup> According to OECD (2007), unit labor costs (ULCs) show how much output an economy receives relative to wages, otherwise known as labor cost per unit of output. ULCs can be calculated as the ratio of labor compensation to real GDP. They are also the equivalent of the ratio between labor compensation per labor input (per hour or per employee) worked and labor productivity. ULCs represent a direct link between productivity and the cost of labor used in generating output. A rise in an economy's ULCs represents an increased reward for labor's contribution to output. However, a rise in labor costs higher than the rise in labor productivity can threaten an economy's cost competitiveness if other costs are not adjusted in compensation. Similarly, capital productivity is real output per unit of capital services used.

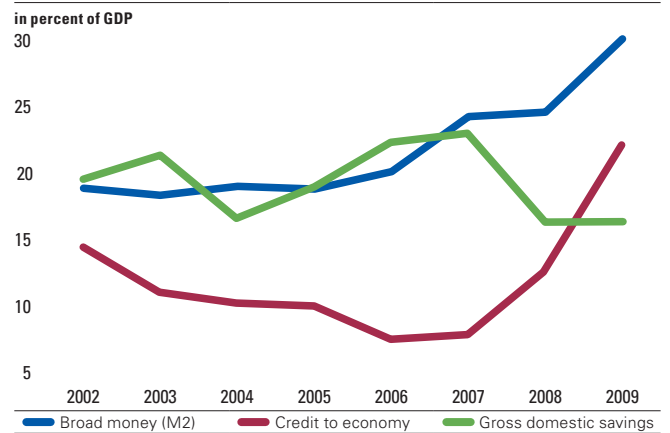
- Significant increases in government spending and signs of overheating, including explosive lending by the state-owned banks (Figure 36 and Figure 37).

**Figure 36.** Before the crisis, spending grew but public investment declined...



Source: Official Gazette.

**Figure 37.** ...and credit to economy shot up as savings declined



Source: Davading (2010).

## Identifying and overcoming constraints to productive growth

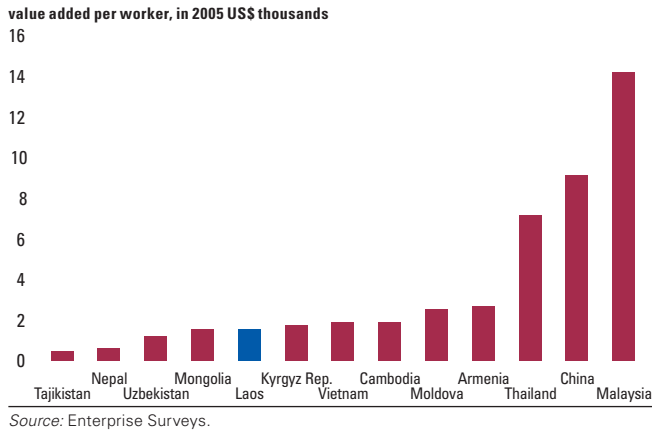
Both the growth rates and the GDP contributions of manufacturing and agriculture have been declining since the Asian financial crisis, as discussed above and shown in Figure 12 and Figure 33. In order for these sectors to contribute more than 70 percent of GDP and at least one-third of growth in the medium to long term, as projected in this report and in the NSEDP, firm-level and labor productivity will need to increase, and exports will need to become more sophisticated and diversified. This section summarizes the results from the Enterprise Survey (2009), Davading (2010), and Record and Nghardsaysone (2010a and 2010b) on the constraints to productive growth and diversification.

Domestic private investments have also been declining, and labor productivity has stagnated at a low level. Even though FDI has been high and growing, more than 90 percent went to the natural resource sector, while domestic private investment as a percentage of GDP has stagnated at below 5 percent (Figure 39). The key precondition for fast and sustainable growth is investment, and in most countries domestic investment is the main driver of growth.<sup>21</sup> Labor productivity has also stagnated at very low levels and is not competitive internationally (Figure 38 and Figure 34). Moreover, productivity is lower than the average in the other countries of the same per capita income group (Enterprise Survey, 2009).

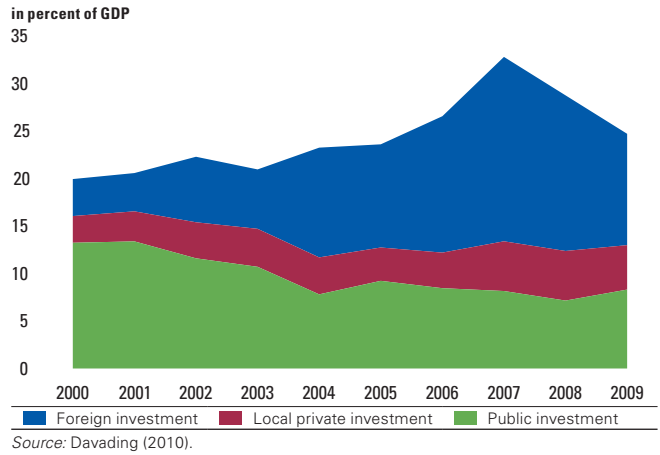
Since 2005 when natural resource exports reached a significant level, Laos' exports have become less diversified (Figure 40). In recent years, the Lao economy has become increasingly open and integrated with the regional economy. Exports as a share of GDP have grown as the country's bilateral trade flows have expanded with a number of partners. The rate of new product discovery has been high, with the number of major products exported

<sup>21</sup> WDR (2006).

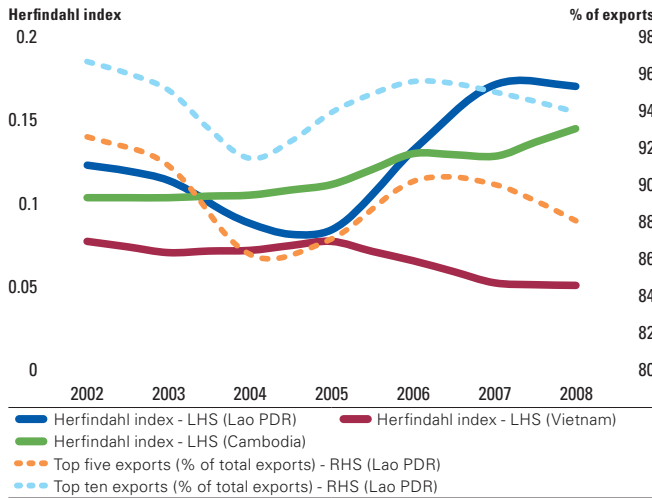
**Figure 38. Labor productivity in Laos is low**



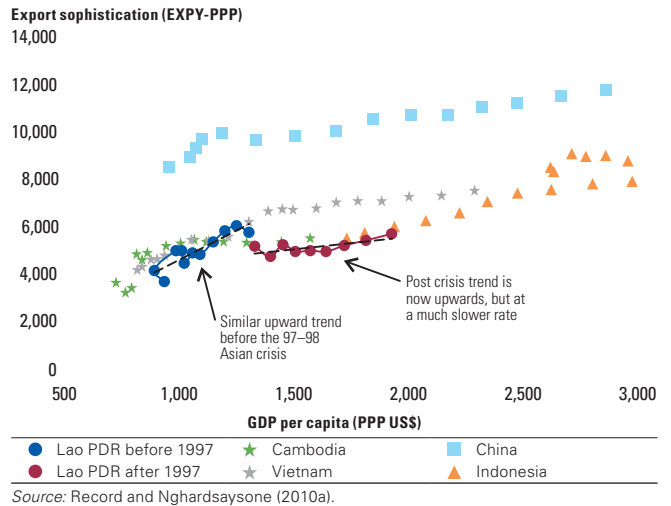
**Figure 39. Domestic private investment has stagnated**



**Figure 40. Low export product diversification was not helped by a surge in resource exports**



**Figure 41. Export basket sophistication grew much more slowly after the Asian crisis 1997-1998**



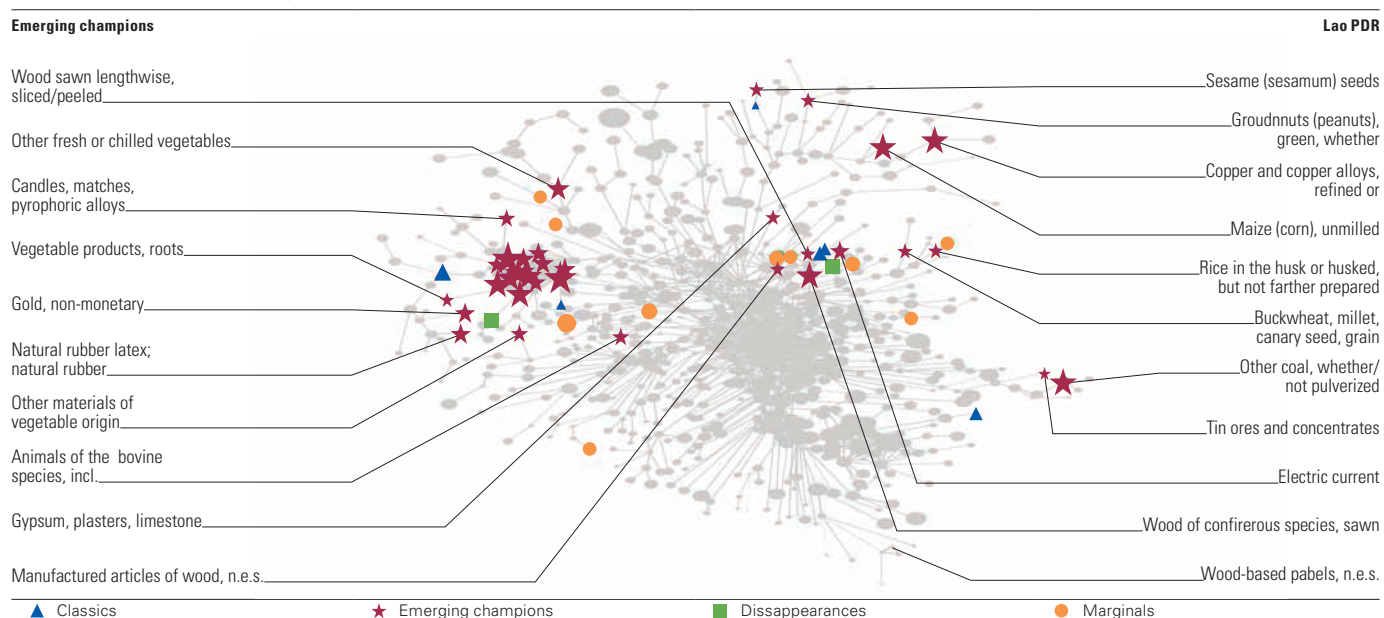
by Lao PDR growing considerably in recent years. However, the retention of new exports has been very low, and export discovery growth in non-resource products has been outstripped by that of products derived from natural resources (Figure 40).

Since the Asian crisis, the sophistication and the number of products in the export basket have increased less than in other countries in the region (Figure 41). As a result, the income potential of products currently exported by Laos is low. Export products are primarily located around the periphery of the product space, which implies that the current export basket does not have the potential to generate a wider range of products that might yield greater value added in the future (Figure 42). The scope for redeploying institutional arrangements and factors of production into new products is limited. For more detail, see Record and Nghardsaysone (2010a).



Diversifying leaves economies less vulnerable to sector-specific shocks, to shifts in terms of trade, and to losses in efficiency. With most export products being located around the periphery of the product space (Figure 42), it is a challenge for Laos to diversify further. Nevertheless, even though income growth in non-resource export products is weak and despite the limited scope for diversification at the product level, Lao PDR is now exporting a wider range of products than in the past. The more product categories are being exported, the more product discoveries will be made in the future.

**Figure 42. Lao product space is sparsely populated and is concentrated in the periphery, but new products are emerging that offer more diversification possibilities**



There are constraints on the expansion of the production and growth of productivity, especially in the tradable goods sector. While not directly caused by the expansion of the natural resource sector, these constraints can be exacerbated by the negative macroeconomic effects of growing natural resource exports. In this report, we identify and rank<sup>22</sup> constraints to growth in the tradable goods sector as follows:

1. The insufficient skills, limited education, and low productivity of workers
2. Shortcomings in trade facilitation
3. A poor investment climate, especially on several regulatory and taxation-related issues
4. Poor intermediation by the financial sector.

However, the constraints differ by sub-sector. In tradable manufacturing, the main constraint is the high costs of labor and capital compared to output. In agribusiness, poor infrastructure, inefficient cross-border processes

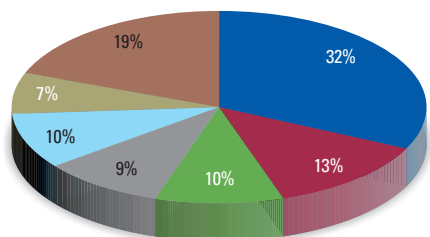
<sup>22</sup> This ranking is based on more detailed analyses in Davading (2010), Record and Nghardsaysone (2010a and 2010b), and World Bank staff calculations using Enterprise Survey (2009).

and regulations, and the lack of capacity to certify exports and the poor quality of produce appear to be the key constraints.

**An insufficiently skilled labor force and low productivity are among the top constraints across the board.** This was reflected in the enterprise surveys that showed an increase in the importance of worker education as the most significant constraint (Figure 43 and Figure 44). In fact, for medium-sized firms, worker education was identified as the most binding constraint to doing business (Enterprise Survey, 2010). Interviews with firms in the garment industry have shown that, even though investment in training is high, labor retention is poor. The migration of skilled labor to Thailand was one of the reasons cited by the respondents. Skill deficits are also a problem in the services sector, where the lack of English language skills and the absence of tourism-related education are often cited as important constraints to the expansion of domestic ownership of firms (ICA, 2006 and ES, 2010).

**Figure 43. Electricity supply was the biggest problem for firms in 2005...**

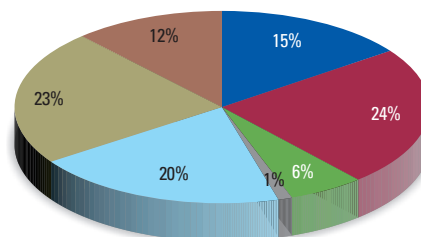
in percent of firms identifying as a major constraint



Source: ICA, 2006.

**Figure 44. ...but worker education, taxes, and access to finance were the biggest problems in 2009**

in percent of firms identifying as a major constraint



Source: Enterprise Survey, 2010.

**Becoming integrated into regional production networks is one way to boost Lao PDR's exports and to reduce its dependency on unprocessed natural resources in the future.** Laos is less integrated into international markets than many other countries. The structure of the Lao economy and its low density of population combined with its higher than average natural resource wealth suggests that it may have a comparative advantage in less labor-intensive industries such as agribusiness, including high-value vegetables and fruits, consumable agricultural products, and processed and fresh produce (Record and Nghardsayone, 2010a). However, it faces some considerable constraints including its limited capacity to adhere to the required international sanitary and phytosanitary (SPS) standards, its time-consuming and inefficient border management procedures, its lack of skilled labor, and the relatively high transport costs faced by these sectors. Exports of fresh produce are particularly sensitive to delays at the border.

**Empirical studies show that foreign firms and firms that have invested in advanced technology are more productive.** According to the results of the Enterprise Survey (2009), foreign-owned firms are about 50 percent more productive on average than domestic firms, firms that use the internet are about 50 percent more productive than those that do not, and firms with ISO certification are about 20 percent more productive than firms without this

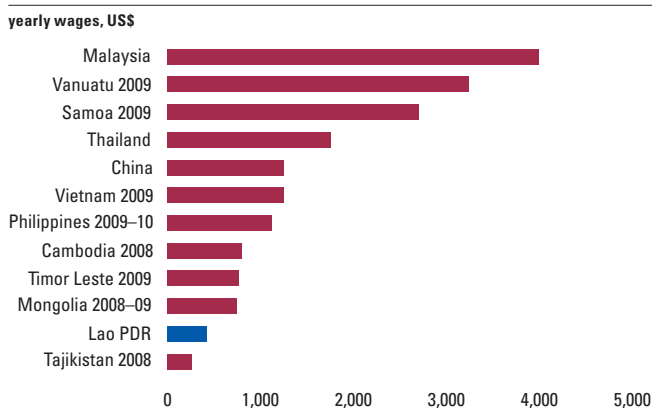
certification. These differences are statistically significant and underscore the importance of skills improvement and spillovers from FDI in integration into the regional value chains. These facts underscore the view that more openness and simplification of trade will improve the performance of domestically owned firms and local exporters.

**Although significant improvements have been made in the regulatory environment, exporters continue to face a greater regulatory burden than non-exporters.** The government recently simplified and streamlined the country’s regulations in the Enterprise and Investment Promotion Laws. However, exporters, especially those in the agricultural production industry, still spend more than twice as much time as non-exporters dealing with regulators. On average, exporters are inspected more times every year than non-exporters (Record and Nghardsaysone, 2010b). More importantly, while the recent reforms have diminished the regulatory burden on non-exporters, the time that exporters had to spend dealing with regulators still increased between 2006 and 2009 (see Record and Nghardsaysone, 2010b). This highlights the need to shift the focus of private sector and trade facilitation reforms from legislative action to the practical implementation of the existing laws and the adoption of international good practices.

**Cross-border trade facilitation, in particular, continues to be a key challenge and presents an area that is ripe for improvement.** Lao PDR ranks 117 out of 150 economies on the World Bank’s Logistics Performance Index (LPI)<sup>23</sup> (see Figure 46). Although Laos is performing better than most landlocked countries, the compilers of the LPI identified some key competitive weaknesses its ability to track and trace shipments, its infrastructure quality, and the efficiency and effectiveness of its customs and other border procedures. This cancels out the comparative advantage that the country is still enjoying because of its relatively inexpensive labor (Figure 45).

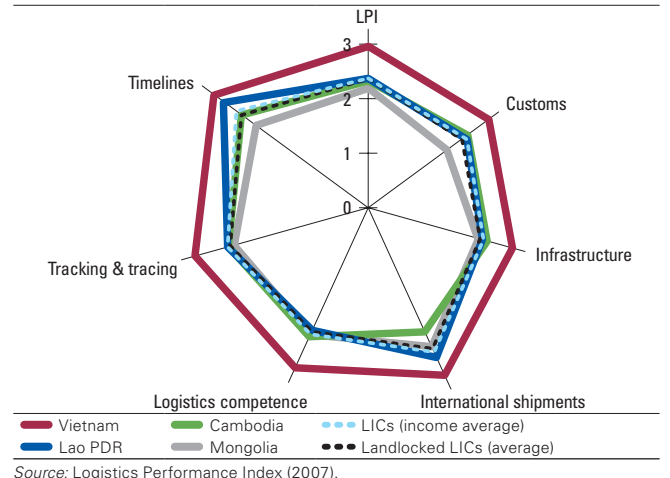
In particular, national competitiveness is severely hampered by high transport and logistics costs. Anti-competitive and inefficient regulations in the transportation and logistics sector result in a lack of competition

**Figure 45. Laos remains competitive on wages**



Source: Enterprise Surveys.  
 Note: For Cambodia, we used the wages of garment sector workers.

**Figure 46. Laos can increase its competitiveness by improving its performance in logistics**



Source: Logistics Performance Index (2007).

23 The LPI aggregates the performance of economies in seven areas, including the efficiency and effectiveness of their customs and other border procedures, their logistics costs (including freight rates), the quality of their infrastructure, their ability to track and trace shipments, how quickly their goods reach their destinations, and the competence of the domestic logistics industry.

between service providers and in the high costs of cross-border shipments to and from Laos. As Record and Nghardsaysone (2010b) describe, exporting a standard container from Laos to Los Angeles (USA) takes twice the time and costs almost 50 percent more than it would to export the same container from Bangkok. The Transport and Trade Facilitation Assessment that is currently being undertaken by the World Bank will highlight and prioritize the key issues and suggest priority reforms to improve this situation. Based on preliminary analysis, however, the anti-competitive regulations, including restrictions on cabotage, are a major part of the problem. The existence of these regulations ensures that there is no level playing field between domestic and foreign trucking firms and results in significant costs to Laos-based traders. The lack of a cost-effective, secure, and integrated regional transit system that incorporates a single integrated transit document and guarantee regime is another heavy constraint on cross-border trade operations. In addition, while much attention has been devoted to the reform and modernization of customs in Lao PDR, work has only recently begun on the implementation of a modern ICT system, and there is still little genuine coordination of the efforts of the key border management agencies. Moreover, transport policies are very restrictive. Expensive and inefficient trans-shipping is the norm at Lao PDR borders, and current regulations require foreign trucks to be unloaded at the border onto local trucks. These inefficiencies exacerbate the geographical constraints commonly faced by small land-locked countries, including small import and export quantities that cannot justify full container loads and limited return loads, which causes the shipping companies to be reluctant to release containers.<sup>24</sup>

**The high variability in the time it takes to clear customs and border management procedures indicates that streamlining specific clearance processes at the border will be increasingly important, especially as trade volumes grow.** The Time Release Study recently conducted by the World Customs Organization (WCO) and the Department of Customs concluded that delays at customs are not a major cause of these lengthy processes. Instead, these delays are mostly due to the warehouse operations and the need to unload all shipments for obligatory inspection and to transfer them into new trucks. This suggests that introducing a risk-management approach and leveling the playing field in the transportation and logistics sector will significantly reduce warehouse-related time and transaction costs and halve the time it takes for goods to cross Lao PDR's borders.

**In addition, several constraints preclude farmers and agribusinesses from setting up organized production of agricultural export goods in which Laos has a comparative advantage, such as coffee, fresh vegetables, and livestock.**<sup>25</sup> With China becoming increasingly strict about requiring SPS documentation that is not available at the current level of administrative capacity and with the enforcement of pest and disease requirements by Thailand and Vietnam, Laos faces ever-higher phytosanitary constraints. In particular, these include the need to introduce risk-based procedures that are consistent with Laos' long and porous borders and to improve testing and introduce a monitoring framework for pests, diseases, and hazards that will provide information for both Laos' trading partners and for its health risk managers. The inefficient SPS regulations that were introduced to raise revenue are hurting the business climate more than they contribute to tax collection and should be eliminated. Only then can a modern SPS system be put in place that both facilitates exports and safeguards plant, animal, and human health.

**Microeconomic risks, including taxation and regulation, have improved but still need attention.** While trade regulations have improved dramatically (Record and Nghardsaysone, 2010b), business entry is still constrained by a

<sup>24</sup> For Laos, see World Bank (2006).

<sup>25</sup> According to several studies. See Record and Nghardsaysone (2010b) for a review.

convoluted and time-consuming licensing system, cumbersome taxation of SMEs, and incomplete implementation of the legal framework. This is also reflected in the higher regulatory burden faced by exporters (see above).

**Poor intermediation by the financial sector is a growing constraint.** Even though domestic savings in Laos (on average around 18 percent of GDP during the last decade) are higher than in the average low-income country (14 percent) and compare favorably to countries such as Cambodia or Nepal, savings rates have been declining recently (Figure 37). Even though the real interest rate (10 percent) and the interest rate spread (over 20 percent according to the IMF's International Financial Statistics) have both declined somewhat, they are still the highest in the region, thus making official financing in Laos expensive. The problems faced by traders, discussed above, are compounded by a lack of financial integration in some key support services. For example, there is no mutual recognition of automotive insurance between countries.

**The high transaction costs involved in accessing credit coupled with the growing need for financing in Laos' fast developing economy suggest that affordable investment finance is increasingly a binding constraint to growth, especially in the medium term.** According to a recent Enterprise Survey, not a single firm has used the banking sector to finance investment, and only 4 percent have used it for working capital, compared to 5 and 15 percent respectively on average in South East Asia. More than 95 percent of firms use retained earnings to finance their investment and working capital. Many firms also resort to moneylenders to finance their investments, suggesting that intermediation is one of the key challenges in the financial sector. Indeed, finance was rated as one of the most severe constraints to business operations in ES (2010) (see Figure 43 and Figure 44). More importantly, while 20 percent of all firms said that finance was their most severe constraint, 46 percent of firms that had access to credit identified it as such, whereas only 11 percent of firms without access to credit did so. Most of the firm managers who had not applied for a loan but needed one indicated that difficult application procedures, high interest rates, and corruption were the reasons why they had not applied. In the survey of manufacturing firms, most loans were relatively short-term (most had been awarded within a year of the time of the survey), which suggests a relatively underdeveloped banking sector. Also, collateral requirements were high, and the predominant forms of collateral required by lenders were land and buildings. Very few firms reported using machinery and equipment as collateral, and none reported using accounts receivable. This suggests that most firms have more trouble with the opportunity and transaction costs of acquiring finance than with accessing it.

**Sustaining high growth in Laos will require the adoption of policies that encourage the emergence and retention of new products, reduce transaction costs, and improve the investment climate in agriculture, manufacturing, and services (including tourism and transportation).** We therefore recommend that, in order to sustain growth and promote quality investment, the government should focus on the following key areas:

- **Improving the quality and increasing the skills of the labor force.** In addition to the existing national education program, attention should be devoted to addressing the *short-term technical and vocational training needs of the existing workforce* through formal and non-formal delivery channels.
  - At the national level, *the existing PFM system should be strengthened to channel the revenues from natural resources into education for growth.* In close collaboration with the private sector, the government should develop a national strategy for increasing the long-term technical and vocational training available to the labor force and should promote public-private partnership in delivering such training. The government should

strengthen the capacity of the newly established National Training Council (NTC) and develop job information systems (careers guidance or counseling structure) that are able to deliver relevant labor market information to youths and adults about job requirements, opportunities, and work placements to reduce the continuing mismatch between labor demand and supply.

- At the sector level, it will be crucial to find ways to *increase access to quality practical management training by strengthening the capacity of business development services*, including greater private participation in delivering tailored management training and advisory services to meet the needs of markets. One good example is the garments training center being developed by the MDTF Trade Development Facility in collaboration with the private sector.
- **Improving trade facilitation, especially SPS regulations and infrastructure for agribusiness exports.**
  - *Eliminate the anti-competitive and inefficient regulations in the transportation and logistics sector* that result in the high costs of cross-border shipments to and from Laos.
  - The government should continue to *modernize border procedures*, introduce a *risk-based approach* to the screening of imports and exports, ensure the procedures are applied consistently, and make rules, regulations, and procedures more transparent by publishing requirements in a user-friendly manner.
  - A *domestic protection system for SPS compliance* is needed that would disseminate information to the private sector and would control import quality with risk-based, low-cost screening techniques.
  - The government should encourage *public-private partnerships in creating near-border storage facilities* and encourage by other means the establishment of market infrastructure as well as market access, including rural roads for agribusiness and roads to tourism sites.
- **Continuing improvements in the business enabling environment and move from legislating to effective implementation of the recently approved laws.**
  - In the short term, gains can be made by *streamlining the licensing process* to increase its transparency and efficiency and by improving the tax regime to ensure a level playing field between small and large enterprises.
  - In the longer term, an investment law is needed that will *rationalize and simplify investment incentives regulations*.
  - Also in the longer term, policymakers need to increase *the access of exporters to domestic and international markets* by (i) investing in business infrastructure such as rural roads, electricity, logistics, and communications; (ii) continuing policy reforms to facilitate the movement of goods within and across borders; and (iii) helping the private sector to build its capacity to comply with market standards such as SPS and technical barriers to trade (TBT).

- The government should focus on *fully implementing all recently approved legal and regulatory instruments for business*, including the Enterprise Law, the Unified Investment Promotion Law, the Customs Law, bankruptcy laws, and regulations to simplify procedures for international trade.
- In the long term, there is also a need to *improve tax administration* by lowering the VAT threshold and moving towards a unified accounting system while gradually eliminating the dual-track accounting and lump-sum taxation system. The government should also introduce unified minimum tax rates and accounting and financial statement requirements, while also streamlining tax administration for small firms.
- **Increasing access to bank financing by implementing the Financial Sector Strategy.**
  - The government should *increase the capacity of the private banking sector* to serve local enterprises, especially SMEs, by *reconsidering collateral requirements and procedures* as well as the institutional arrangements for exercising creditors' rights, by upgrading the bankruptcy law, and by improving loan screening procedures.
  - Continued stability and *increased formalization of the banking sector* will stimulate confidence and thus mobilize savings that can be on-lent in the future. With the loan-to-deposit ratio having risen to over 90 percent in 2009 from 40 percent in 2007, liquidity will be a more important issue for the banks in the future. In particular, they should start to move away from administered interest rates to an *environment with more competition*, better prudential regulations, and more effective supervision.

The government has identified some sectors as priorities in its NSEDP. However, some of the specific or excessively targeted sector-level interventions carry risks. Thus, with respect to industrial policy, the government should not adopt any sector- or industry-level interventions that go further than the provision of public goods and should avoid any interventions that are too finely targeted as this may disturb the natural discovery of the comparative advantage.

- **If any sector-specific interventions are contemplated, at a minimum they need to be carried out in an open and transparent manner and to be aimed at both new investors and existing firms within identified sectors.** Interventions to support one sector can result in unanticipated negative consequences in other sectors. Focusing on narrowly defined sectors can therefore result in potential future champion sectors being missed that have not yet emerged.
- **In some sectors, it may be advisable to provide wide sector-specific non-discriminatory public goods as a way to increase competitiveness in sectors with high growth and with value-added potential.** Some examples include business development services, skills training, and research. Examples of industries that might benefit from such support are emerging champion sectors (such as garments, footwear, and fresh vegetables) and future champion sectors with high sophistication and with potential spillovers to additional export products (such as wood furniture or prepared and preserved vegetables and fruit).
- **We recommend that broad support, such as the provision of public goods to agribusiness and light manufacturing, is less risky than direct support to narrowly defined product producers, given the unreliability of the data on which these conclusions are based (see Annex 2).** The best way to do this is

likely to be by expanding and replicating successful pilot approaches, such as public-private facilitation of cross-border contract farming arrangements in agro products, the creation of sector skills training facilities, and the targeted provision of infrastructure and support services at the sector level.

- **Policymakers should continue to lighten the regulatory burden for exporters to give them more flexibility to adapt to external conditions.** In particular, the establishment of an effective SPS regime is needed to facilitate exports by agribusinesses and to enable more firms to participate in the international supply chains.
- **It is necessary to ensure that investors in products with low value and limited scope for future diversification are not given preferential incentives.** The analysis in Record and Nghardsaysone (2010a) revealed that some export sectors that are currently growing fast (such as rubber) have very limited income potential as they are unlikely to be able to diversify into higher income exports. Unless there are strong public goods arguments in favor of supporting these sectors, the government should be cautious in extending sector-specific support or preferential treatment.



## List of background papers

The policy notes and background papers listed below provide an informative background for a comprehensive natural resource management strategy, and have formed an integral part and analytical basis for this report.

- Barma, Naazneen, Verena Fritz, and William Rex (2010). "Governance of Natural Resource Management in Lao PDR: A Value Chain Perspective." Background Paper.
- Brahmbhatt, Milan and Ekaterina Vostroknutova (2010). "Development with a Rapidly Expanding Natural Resources Sector: Challenges and Policy Options for the Lao PDR." Background Paper.
- Davading, Somneuk (2010) "Lao PDR: Growth Analysis for a Small Resource-Rich Transition Economy," Background Paper.
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- Vostroknutova, Ekaterina, Ying Li, Somneuk Davading, and Vivek Suri (2010). "Fiscal Policy Options for a Resource-Rich Laos." Background Paper.

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- Barma, Nazreen (2010). "Governance of Natural Resource Management in Lao PDR: A Value Chain Perspective." Policy Note (based on the background paper Barma et al., 2010).
- Fenton, Nina (2010). "Natural Resources, Poverty, Food and Nutrition in Lao PDR: An Overview." Policy Note (based on background paper Fenton et al., 2010a).
- Carlsson Rex, Helene (2010). "Benefit-Sharing Approaches: Impact Mitigation at the Community Level in Hydropower and Mining Development." Policy Note (based on background paper Gibson and Carlsson Rex, 2010).
- Record, Richard and Konesawang Nghardsayson (2010c). "Mapping the Lao Product Space, Trade Development Briefing Note." Issue 1. December 2009. Policy Note (based on background paper Record and Nghardsaysone, 2010a).
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# Annex 1: Natural resource development and extraction on a map

**Figure 47.** Map of mining and hydropower sites in Lao PDR, by stage

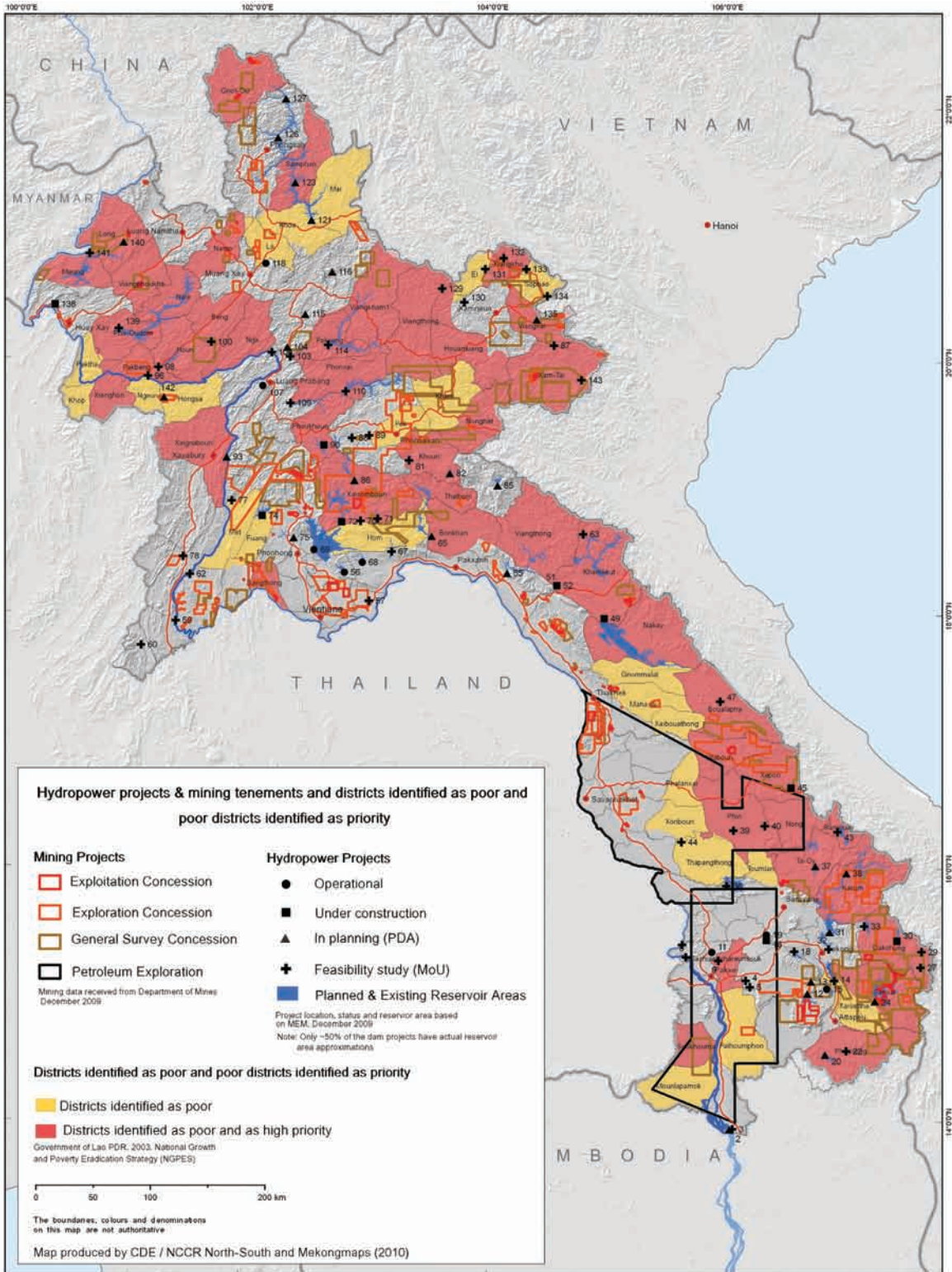
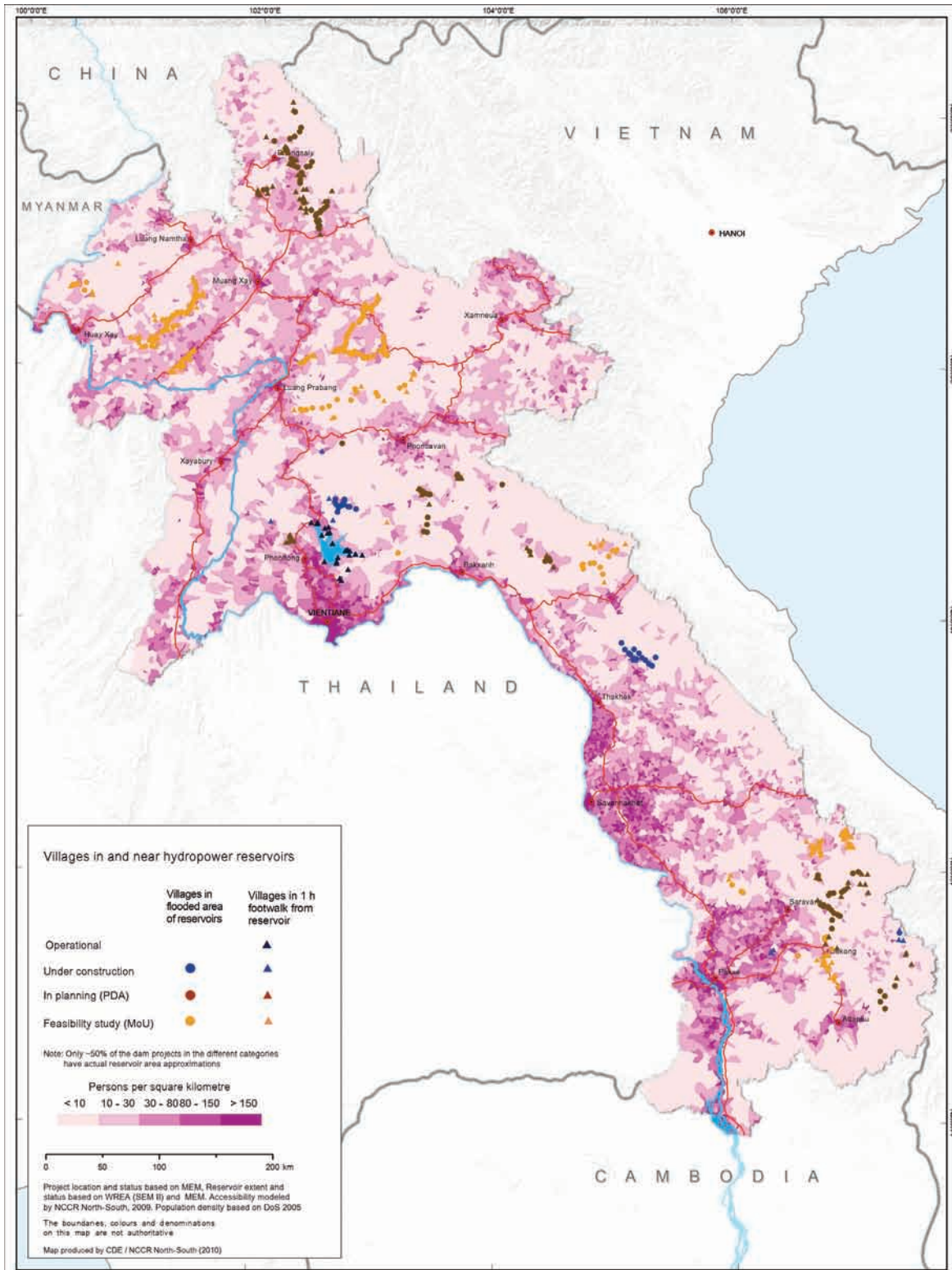
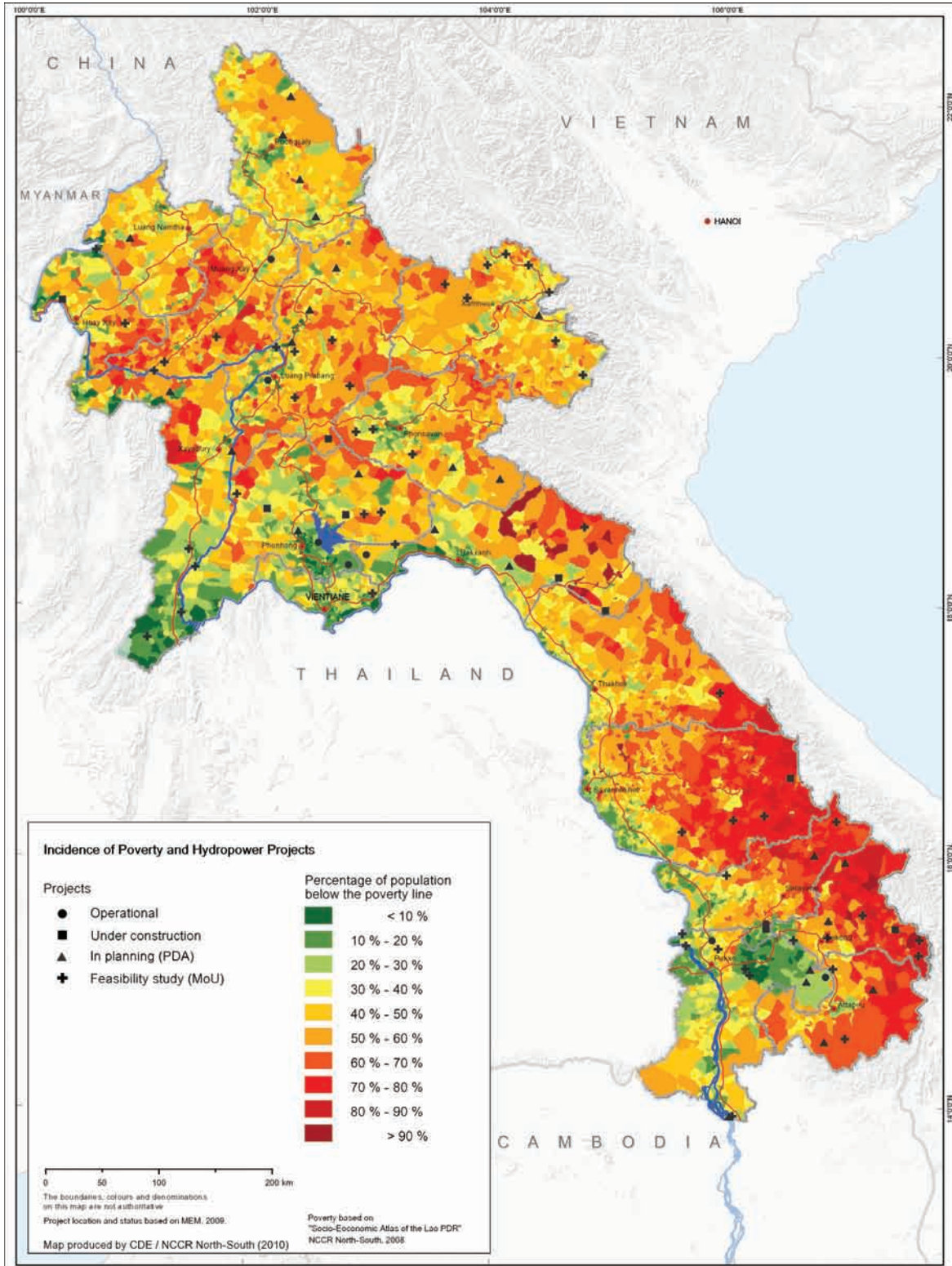


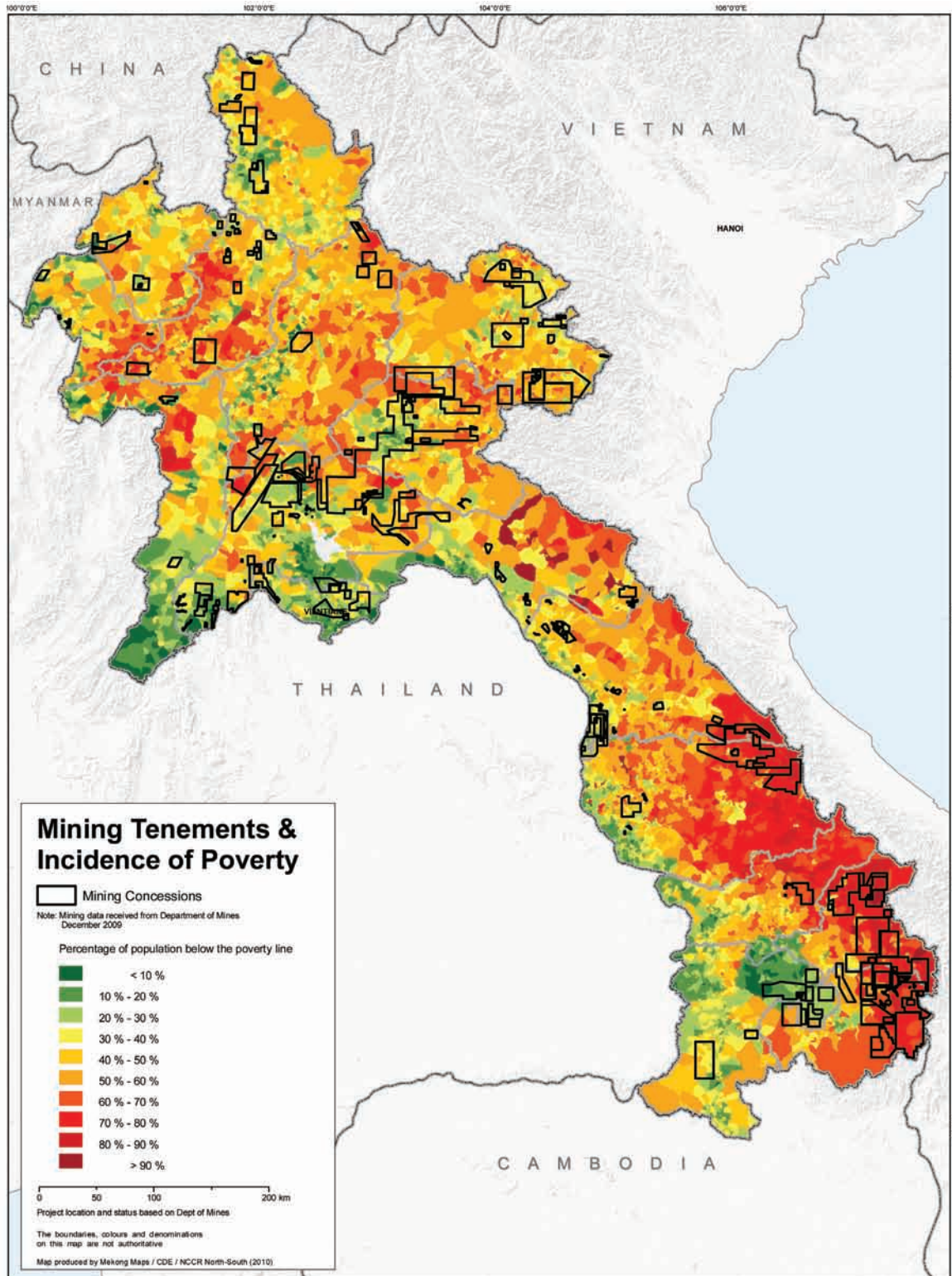
Figure 48. Map of current and planned hydropower plants and population density



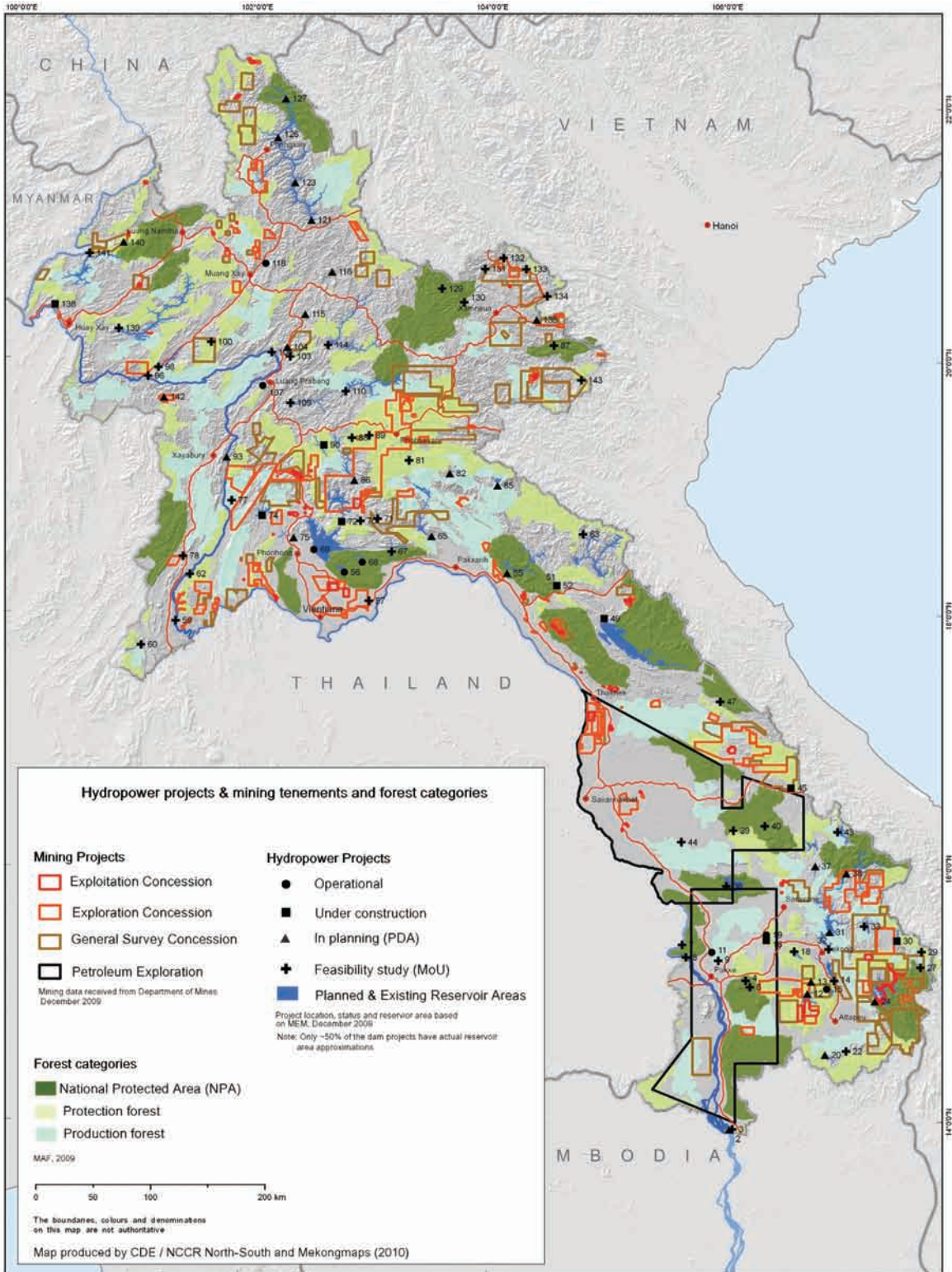
**Figure 49.** Map of current and planned hydropower plants and poverty incidence



**Figure 50.** Map of mining concessions and poverty incidence



**Figure 51.** Map of hydro and mining concessions vis-à-vis national protected areas and forest cover





## Annex 2: Assumptions and data

### Definition 1. Natural resources and “resource sectors”

Different definitions of the natural resource sector can be used depending on the aim of the analysis.<sup>26</sup> Forests, water, agriculture, sub-soil minerals, and hydro-electric energy potential can all be considered parts of Laos’ natural resource-related wealth. In this Lao PDR Development Report, we refer to energy and mining as the “resource sectors” and to the full set of natural resources as “natural resources, broadly defined.”

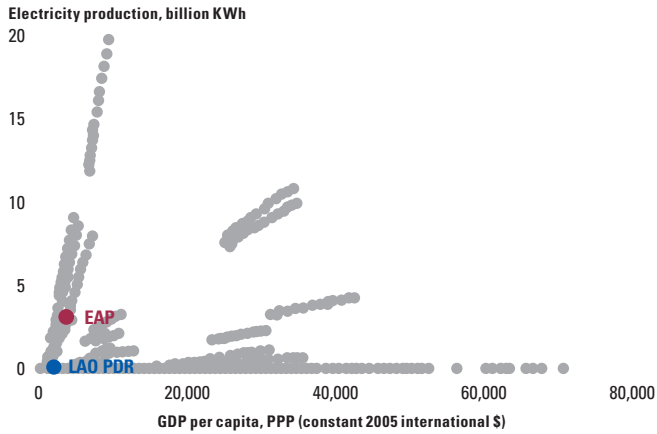
We distinguished between renewable and non-renewable natural resources in some background papers for this report. Mining is the most non-renewable resource, while hydropower is the most renewable resource. Other resources are renewable but only by incurring costs, so that policymakers need to stipulate the need for conservation and replenishment in developing these resources. This distinction between renewable and non-renewable natural resources is most useful in the fiscal sustainability analysis (see Vostroknutova et al., 2010).

Lao PDR has had a short but eventful history of industrial mining. Its production value multiplied close to hundred-fold between 2002 and 2008 from around US\$8 million to US\$600-700 million. Currently, the country’s total reserves of copper are estimated to be 10 million tons. Government revenue from taxes, royalties, and fees exceeded US\$120 million in 2007 and amounted to approximately US\$90 million in 2008, adding some 20 percent to total government receipts (excluding grants). Depending on how the global economy performs in the next decade, mining production could account for between 20 and 30 percent of government revenues by 2020, bringing between 3 and 9 trillion kip annually to the country’s budget and contributing up to 10 percent to its GDP (see Definition 2 below). Even though the projected production of minerals as a share of GDP is large, it is not exceptional in volume terms compared to other countries (Figure 54 and Figure 55).

In the energy sector, with the recent commissioning of Nam Theun 2 (NT2) and given the projects currently in the pipeline, net government revenues from hydropower exports could grow 20-fold from relatively little today (US\$17 million) to approximately US\$350 million by the year 2020 (and could exceed \$700 million by 2025). The government’s priority in the power sector is to develop its hydropower and thermal resources not only to meet domestic needs but also to earn export revenues. To further explore hydropower’s potential for earning export revenues, the government has concluded MOUs with its neighboring countries for 11,500 MW worth of exports of Lao PDR electricity, and there is room for further expansion of these MOUs without jeopardizing the domestic market. Most future projects are export-oriented, although some may also supply the domestic grid. Hydropower export is driven by demand in Thailand and Vietnam and, to a lesser extent, Cambodia. Two IPPs, Theun-Hinboun (210 MW) and Houay Ho (150 MW), are connected to the Thai system through dedicated transmission lines and are dispatched by EGAT, the power utility in Thailand. Domestic electricity consumption in 2007 was 2,200 GWh with 400 MW peak demand and an electrification rate of 61 percent. More than 75 percent of the domestic demand for electricity is in the Central Region. It is expected that domestic electricity consumption will more than double by the year 2020 provided that no large power-consuming industrialization takes place such as alumina refining or aluminum smelting. Lao PDR’s total hydropower potential is estimated to be more than 30,000MW; it is also estimated that by 2011 the sites that are currently under construction will cause a four-fold expansion in installed capacity from the current 624 MW to 2,735 MW. Even though electricity production is huge in terms of percentage of GDP, it is not large in volume terms by international standards (Figure 52 and Figure 53).

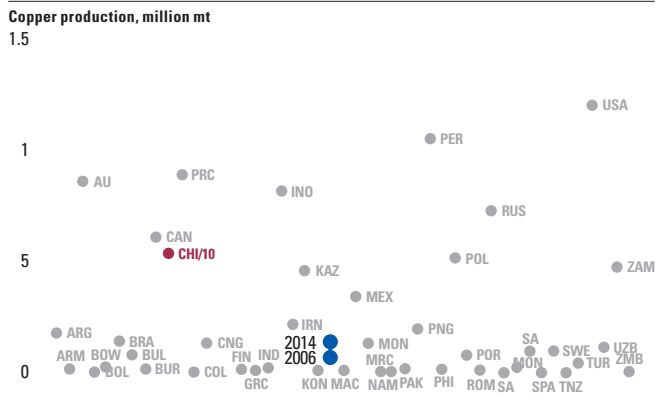
<sup>26</sup> The sources for this annex are Larsen (2010) and van der Toorn (2009).

**Figure 52.** Lao electricity production volume is not high by international standards...



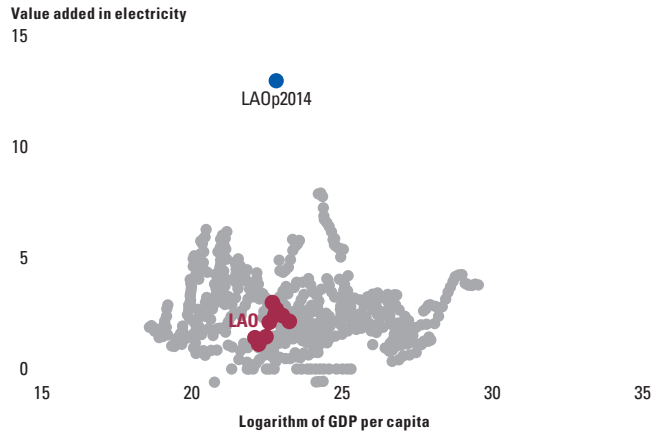
Source: WDI.

**Figure 54.** Lao copper production is relatively low in volume terms...



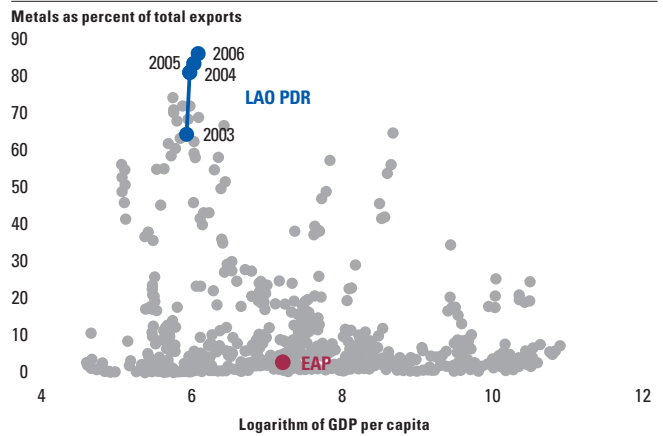
Source: United States Geological Survey Mineral Resources Program.

**Figure 53.** ...but electricity, gas, and water projected value added is large as percent of GDP



Sources: WDI and staff projections. 1990-2008, and projection for Laos in 2014. Note: Percentage of GDP.

**Figure 55.** ...but the percentage of metals in total exports is among the largest in the world



Sources: WDI and staff projections.

## Definition 2. Underlining assumptions and scenario analysis

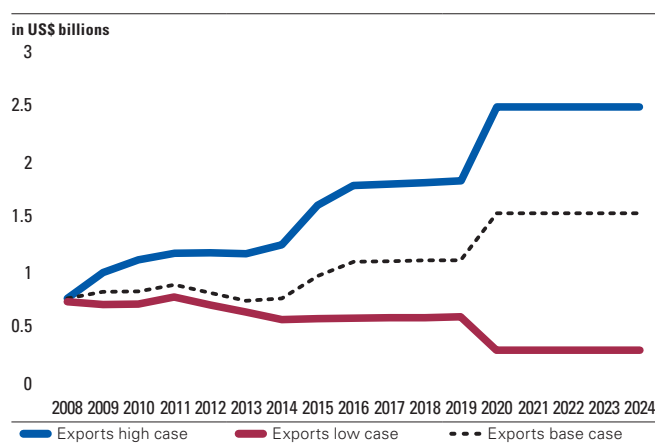
Given the uncertainty about the global economy, we considered three scenarios for the development of the mining sector between 2009 and 2025.<sup>27</sup> For each of the three scenarios, we calculated a corresponding GDP and macroeconomic outcome including estimates of GDP, fiscal revenues, and exports. In hydropower, we did not make a series of different scenarios but instead we made a single conservative assumption given the currently projected timetable for the development of hydropower stations.

Our assumptions for the mining sector included three different scenarios based on Larsen (2010). In the baseline scenario, we took the price of minerals to be as officially projected by the World Bank. In these projections, if the price of copper is assumed to be around \$5,000/mt (with some variations), by 2016 the volume of copper

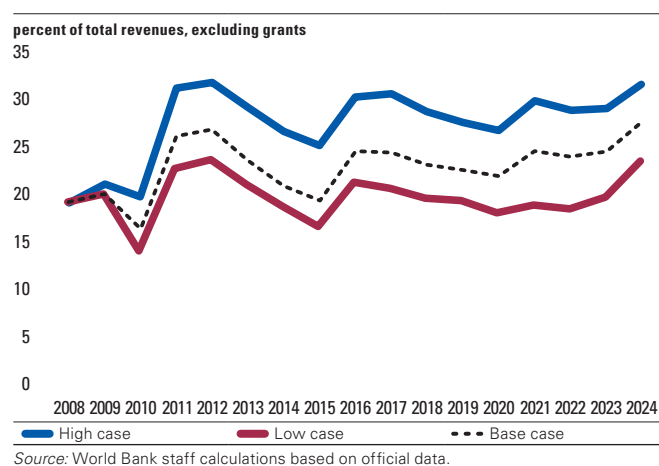
<sup>27</sup> The sources for this section are official data, World Bank staff calculations and projections, Davading (2010), Larsen (2010), and Fraser (2010).

exports is expected to reach 210,000mt a year. This scenario takes into account the currently planned expansion of the existing mines. In the low-case scenario, we projected that the prices of minerals would be 10 percent lower on average and that the volume of copper would be only 67,000mt/year by the end of the projection period. In the high-case scenario, we assumed that prices would be 20 percent higher than in the baseline and that some currently planned but more uncertain expansions of existing mines as well as new mines would go forward, bringing the volumes of copper exported to 340,000mt/year by 2020. In this scenario, we also assumed that bauxite production would begin. These scenarios result in the exports and revenue profiles depicted in Figure 56 and Figure 57.

**Figure 56. Mining products exports**

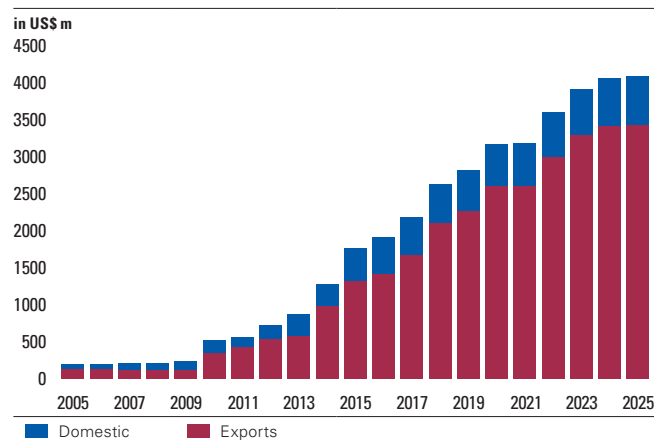


**Figure 57. Revenues from the mining sector**

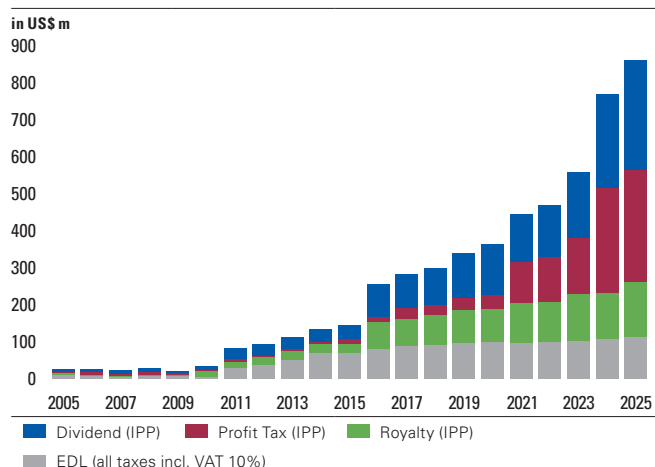


**In hydropower and energy, we made the following assumptions.** We assumed that the projects would produce the amount of electricity as specified in the existing or preliminary agreements and would include the projects that are currently operational (Theun-Hinboun, including expansion in 2014, Houay-Ho, and Nam Theun 2) as well as those that are expected to start operating later on. Under this assumption, we projected that electricity exports would reach close to 65,000GWH, would be valued at over 3.5 billion dollars, and would be providing up to about 800 million dollars in government revenues by 2025 (Figure 58 and Figure 59).

**For the non-resource sector, we made the following assumptions.** We assumed that, as the regional and Lao economies recover from the crisis, real economic growth will resurge to more than 7 percent a year. This will lead to further expansion in agriculture, especially cash crops, industrial tree plantations, livestock, and fisheries. This expansion will mean that growth in agriculture will remain at about 2.8 percent in 2010 and will average 3.0 percent between 2011 and 2015 and 3.1 percent between 2016 and 2020. Construction and services (the non-tradable sector), including the construction of large projects and housing, a recovery in tourism, and an expansion in banking and transport services, will exhibit steady growth at 4.5 percent in 2010 and 7.2 percent on average between 2011 and 2015 and 6.6 percent between 2016 and 2020, supported largely by the construction and tourism sectors. Manufacturing, including the production of cement and other construction materials, food, beverages, and other processing, and a recovery in the garment sector, is expected to grow by more than 6 percent a year after 2011, driven mainly by food processing and light manufacturing.

**Figure 58. Electricity generation**

Source: World Bank staff calculations based on official data.

**Figure 59. Revenues from the hydro and energy sector, by source**

Source: World Bank staff calculations based on official data.

**Table 3. Growth assumptions by sector**

	2008	2009	2010	2011-15	2016-20
GDP	7.6	7.0	7.8	7.7	7.5
Agriculture	3.4	3.0	2.8	3.1	3.4
Manufacturing	6.5	3.1	7.5	7.3	5.6
Non-tradable sectors	8.2	7.4	5.0	7.3	6.3
Natural resources	19.8	21.2	30.9	16.5	13.9

Source: World Bank staff calculations based on data provided by MPI.

## Data limitations

The lack of accurate data in Lao PDR severely constrains the ability of the government and its partners to analyze the Lao economy, to make projections, and to draw appropriate policy conclusions. Based on the World Bank's regional and international experience, the data availability problems in Lao PDR are more severe than in other countries with similar income levels. Therefore, building statistical capacity and the implementation of the National Statistical Master Plan are urgently needed to ensure the implementation of the NSEDP. We used several different data sources in this report, including the macroeconomic and fiscal framework based on the data provided to the team by the authorities on a regular basis, the LECS4 household survey including the GIS coordinates of the villages that participated in the survey, two investment climate assessments and enterprise surveys (2006 and 2010), and global databases such as the World Bank's World Development Indicators and the IMF's International Financial Statistics. However, the lack of accurate data in the following areas severely constrained our analysis: employment and wages by economic sector; investment and capital formation and stocks; product-level data for industrial analysis; and high-frequency macroeconomic data including information on external sector, capital flows, and banking and financial sector data.

## Annex 3: Areas for future work

More research and analytical work will be needed to enable policymakers:

- to develop more precise fiscal rules for natural resource management that are based on the government's priorities;
- to develop a sub-regional trade facilitation program to eliminate and reduce the high costs of the existing logistics and transport constraints;
- to develop an effective investment program and sound PIP management;
- to arrive at an efficient and workable benefits-sharing regime from the national level down to the provincial, local, and project levels;
- to take a more strategic approach to land development based on studies of alternative uses for the currently available land;
- to develop policies that allow payment for ecosystem services;
- to prepare a strategic assessment of the mining and hydropower sectors that identifies the needs and cumulative effects of all planned projects on the environment and the people; and
- to draft regulations regarding the taxation regime in the mining sector.



Photos:  
Front cover: NT2 hydroelectric dam  
Below: Lao PDR landscape (photo credit: Nanda Gasparini)  
Back cover: MMG LXML Sepon mine (photo credit: MMG)



# Lao PDR Development Report 2010

## Natural Resource Management for Sustainable Development: Hydropower and Mining

