

**REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN
TO THE
LAO PEOPLE'S DEMOCRATIC REPUBLIC
FOR THE
GREATER MEKONG SUBREGION:
NORTHERN ECONOMIC CORRIDOR PROJECT**

November 2002

CURRENCY EQUIVALENTS

(as of 31 October 2002)

| | | |
|---------------|---|----------|
| Currency Unit | – | kip (KN) |
| KN1.00 | = | \$0.0001 |
| \$1.00 | = | KN10,760 |

ABBREVIATIONS

| | | |
|----------|---|---|
| ADB | – | Asian Development Bank |
| AP | – | affected person |
| DCTPC | – | Division of Communication, Transport, Post and Construction |
| EIRR | – | economic internal rate of return |
| GMS | – | Greater Mekong Subregion |
| HIV/AIDS | – | human immunodeficiency virus/acquired immunodeficiency syndrome |
| km | – | Kilometer |
| IUCN | – | International Union for the Conservation of Nature and Natural Resources (World Conservation Union) |
| Lao PDR | – | Lao People's Democratic Republic |
| MCTPC | – | Ministry of Communication, Transport, Post and Construction |
| NBCA | – | national biodiversity conservation area |
| PRC | – | People's Republic of China |
| SAP | – | Social Action Plan |
| SEIA | – | summary environmental impact assessment |
| STD | – | sexually transmitted disease |

NOTE

In this report, "\$" refers to US dollars.

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- C. Survey of Habitat Value of Nam Ha Area

LOAN AND PROJECT SUMMARY

| | |
|-------------------------------|--|
| Borrower | Lao Democratic People's Republic (Lao PDR) |
| Classification | Poverty intervention Thematic: Economic growth |
| Environment Assessment | Category A. A summary environmental impact assessment was prepared and circulated to the Board on 21 August 2002. |
| Project Description | <p>The Greater Mekong Subregion: Northern Economic Corridor Project (the Project) aims to improve the road from Houayxay to Boten in the Lao PDR so as to create an international north-south corridor linking Thailand and the People's Republic of China (PRC). The governments of Thailand and the PRC have provided concessional loans to the Lao PDR to finance the Project. The improved road will follow a combination of class II and class III standards, with 7-meter wide paved road and pavements ranging between 1.5 meters and 2.5 meters in width. The Asian Development Bank (ADB) will finance one third of the cost of the Project, covering construction of 74 kilometers in the middle section.</p> <p>The Project also includes a resettlement plan, a social action plan, and an environment management plan so as to meet ADB's safeguard policies for the entire project road.</p> |
| Rationale | <p>The Project is a high-priority project and will help accelerate trade and transport in the Greater Mekong Subregion. The Project will also link two remote provinces of the Lao PDR to fast growing economies. Louang Namtha province is the most transport deficient province in the Lao PDR whereas Viangphoukha district of Bokeo province is among the poorest in the country. The Project will enhance access to these two areas that remain isolated for extended periods of the year.</p> |
| Objectives and Scope | <p>The primary goal of the Project is to accelerate regional development through more efficient infrastructure networks. A direct link between the PRC and Thailand via the Lao PDR will reduce transport costs in the regional project influence area, and will increase the efficiency of vehicle, goods, and passenger traffic. The road will link two remote provinces of the Lao PDR and help reduce poverty by providing access to markets, extension services, income, and employment opportunities, thus enhancing development potential.</p> <p>The project scope includes upgrading the existing 228-kilometer road between Houayxay and Boten, area development including a social action plan for the ethnic minorities, and capacity building in environmental and social monitoring.</p> |

| | |
|---|---|
| Cost Estimates | Total cost of the Project is estimated at \$95.8 million. |
| Financing Plan | ADB will finance a loan of \$30 million from the Special Funds resources. The governments of Thailand and the PRC have provided loans (currently estimated at \$30 million each) on a bilateral basis to cover the remaining cost of the Project. The Government of the Lao PDR will cover domestic costs amounting to \$7.3 million. |
| Loan Amount and Terms | A loan of Special Drawing Rights 22,731,000 (\$30 million equivalent) will be made from the Special Funds resources for a term of 32 years with a grace period of 8 years. The loan will carry an interest rate of 1.0% during the grace period and 1.5% thereafter. |
| Period of Utilization | 4 years |
| Estimated Project Completion Date | 31 December 2006 |
| Executing Agency | Ministry of Communication, Transport, Post and Construction, Department of Roads |
| Procurement | Goods and services financed under the ADB loan will be procured in accordance with ADB's <i>Guidelines for Procurement</i> . Civil works will be procured through international competitive bidding. Advance action for the procurement of civil works was approved on 16 August 2002. |
| Consulting Services | Services of international consultants for 190 person-months assisted by about 960 person-months of domestic consultants will be provided to assist in (i) project coordination and construction supervision, (ii) resettlement planning, implementation, and capacity building, (iii) social action plan, and (iv) environment management plan. |
| Project Benefits and Beneficiaries | <p>The project road is one of the most important links between Thailand and the PRC and will help accelerate trade and investment in the region.</p> <p>The Project has mobilized concessional resources of nearly \$60 million from two of ADB's developing member countries to fund an infrastructure project in another Greater Mekong Subregion country.</p> <p>Two remote provinces of the Lao PDR will be linked to Thailand and the PRC and this will create income and employment generation opportunities. Local Lao PDR communities will have better access to markets and social infrastructure facilities</p> |

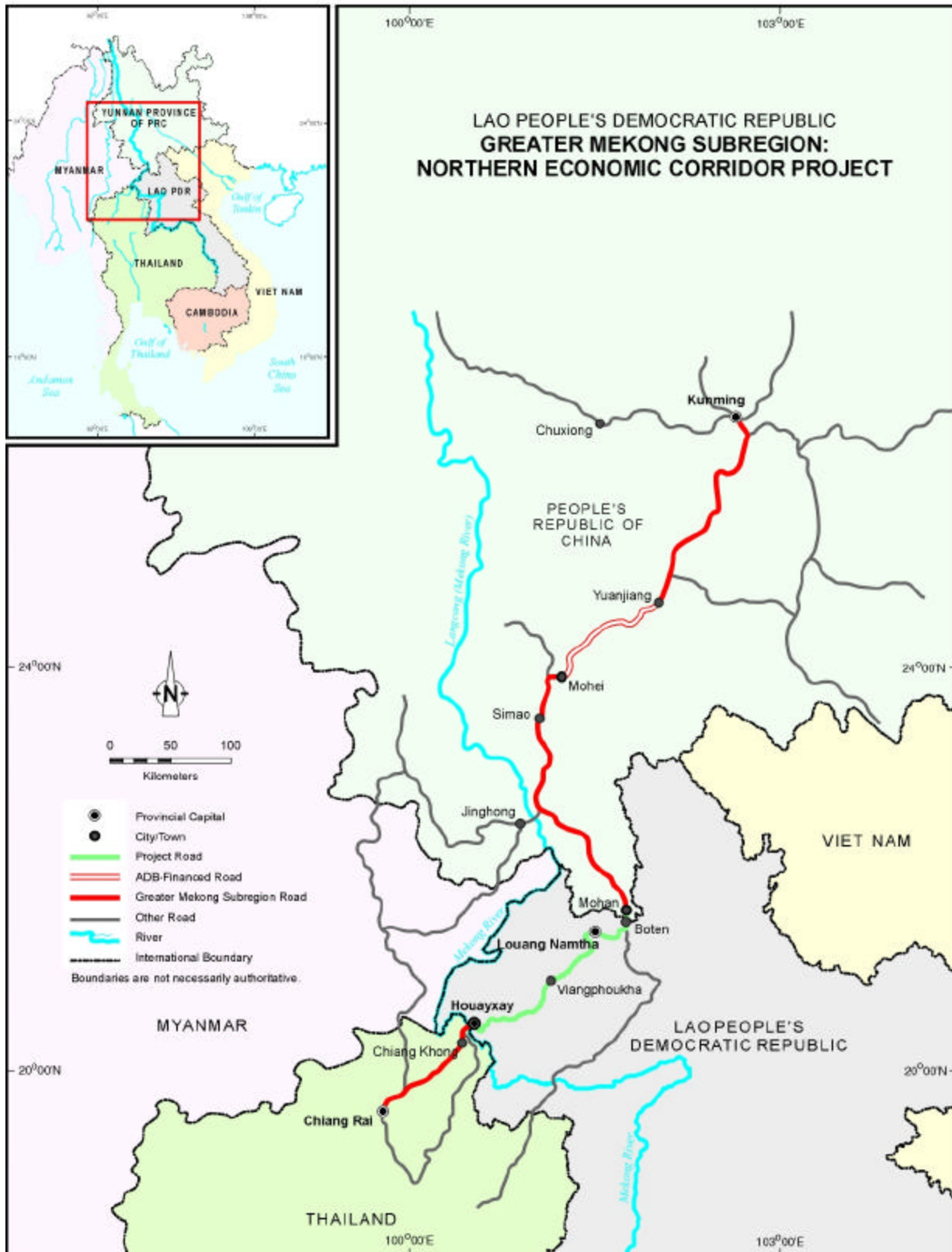
throughout the year and benefit from the social action plan that aims to enhance community infrastructure availability and development.

The revenue stream from the road charges for the regional traffic will more than cover the debt service and road maintenance costs and will thus contribute to increased foreign exchange generation for the Government of the Lao PDR.

Risks and Assumptions

The Project carries a commercial risk, in case regional traffic is actually lower than present projections. The current traffic forecasts for international traffic are conservative and represent only a very small fraction of the total potential traffic. The overall commercial risk is reduced considerably due to financing from Thailand and the PRC on very concessional terms.

A second major risk relates to environmental and social safeguard policies during implementation period. Adequate loan covenants, system of performance bonds and third-party monitoring are built into the project design and cost estimates. This issue will be an important aspect to monitor during project implementation.



I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Lao People's Democratic Republic (Lao PDR) for the Greater Mekong Subregion: Northern Economic Corridor Project (the Project).

II. INTRODUCTION

2. The Project includes improvement of the existing road in the Lao PDR linking two of its remote provinces with Yunnan Province in the People's Republic of China (PRC) and Chiang Rai in Thailand, thus creating an international north-south corridor in the Greater Mekong Subregion (GMS).¹ A project preparatory technical assistance helped the Government of the Lao PDR update the feasibility study prepared earlier.²

3. The project road is an unpaved seasonal road, known as national route 3 in the northern provinces of the Lao PDR, namely, Louang Namtha and Bokeo connecting Houayxay on the Mekong River and Boten on the border with the PRC. Given the good road network from Chiang Khong to Singapore and Kunming to Beijing, improving the Houayxay-Boten link would create a safe, viable, continuous, all-weather, overland route between Singapore and Beijing. The Government of the Lao PDR has requested assistance from the Asian Development Bank (ADB) for this Project. The governments of Thailand and the PRC are also assisting the Lao PDR in financing this Project through bilateral loans on very concessional terms.

4. The Project was formulated based on the findings of ADB missions, information provided by the Government of the Lao PDR, beneficiary consultations, the PRC and Thailand governments, and recommendations of the feasibility study. Appendix 1 presents the project framework.

III. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

5. ADB has taken a lead role in promoting cooperation among the six states (five countries and one province) bordering the Mekong River through the GMS Program. The GMS Program, initiated in 1992, aims to promote the development of the six members by strengthening economic links among them. The ultimate objective of the GMS Program is to facilitate trade and sustainable development by enhancing subregional cooperation in seven identified areas, namely: transport, energy, telecommunications, environment, human resources development, trade and investment, and tourism. Appendix 2 lists major GMS projects supported by ADB.

6. The Government of the Lao PDR recognizes that regional cooperation can help narrow the gap between the Lao PDR and other regional economies and to achieve this, the country needs to strengthen its role as a land link at the center of the GMS. Regional trade is becoming more important for the Lao PDR, with the increasing overall share of total exports and imports with neighboring countries such as Thailand. In the last few years, ADB has supported strengthening the road network in the Lao PDR to enhance its linkages with its neighbors, e.g.,

¹ ADB provided a regional technical assistance to examine the viability of a project linking Chiang Rai in Thailand to Kunming, Yunnan Province, via the Lao PDR (ADB. 1997. *Regional Technical Assistance for Chiang Rai-Kunming Road Improvement via Lao PDR*. Manila).

² ADB. 2001. *Technical Assistance to Lao PDR for Preparing the Northern Economic Corridor Project*. Manila.

the East-West Corridor Project, currently under implementation, linking central Lao PDR with northern Thailand and central Viet Nam.³ The Project was identified as a high priority regional road in 1994 Hanoi Meeting of the Transport Ministers of the GMS Program. The Government of the Lao PDR established a joint venture with a private investor to construct this road. However, for various reasons, the private investor was unable to make much progress in constructing the road. After considerable time and effort, a settlement has been reached between the Government and the private investor. The Government has officially advised ADB that the joint venture has been terminated and that it has full rights to construct and develop the road.

A. Performance Indicators and Analysis

7. ADB's operational strategy is directed at assisting the Government of the Lao PDR to meet its ambitious goal of graduating from least developed country status by 2020. ADB's medium-term goals are to assist in achieving sustainable reduction in poverty and improvement in human development indicators by 2005. Poverty reduction through economic growth and improved access to the poor is the basic theme of ADB's interventions in the transport sector of the Lao PDR over the next 10 years. Five operational objectives of this strategy include (i) efficient transport network for rural development, (ii) greater transparency and accountability, (iii) viable private sector, (iv) efficient regional transport network, and (v) sustainable transport sector. Since transport in the Lao PDR is almost exclusively road based, roads will continue to be the main focus of ADB's activities in the sector. Appendix 3 provides an overview of the sector performance and analysis.

8. The proposed road will enhance overall accessibility of the two northwestern provinces with central Lao PDR and neighboring economies. Despite considerable improvements in the national road network, the Lao PDR continues to lag behind other Asian countries with very low road density—about 0.03 kilometers (km) per km². The road connection between Vientiane and provincial capitals is a major problem. Both provinces, namely Louang Namtha and Bokeo, have limited infrastructure: existing road links are in deteriorated conditions and remain impassable during the rainy season. Other physical and social infrastructure in these provinces also remains limited.

B. Analysis of Key Problems and Opportunities

1. Access

9. The Project is conceived as a regional development initiative that will link two remote provinces of the Lao PDR to two growing economies of the region. The project road is impassable for 4 months a year and as a consequence, the existing traffic is light. Upgrading this road will create an important north-south link between Thailand, Lao PDR, and Yunnan Province of the PRC. A better road will facilitate trade and investment within the region.

10. High dependence on subsistence agriculture is a major reason for poverty in the project area. As per the participatory poverty assessment of December 2001,⁴ the problem most cited by villagers as preventing economic growth is lack of all-weather roads by which to market their produce. Accessibility to markets in the wet season is essential since that is when most

³ ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Lao PDR for the GMS: East-West Corridor (Lao PDR) Project*. Manila.

⁴ ADB. 2001. *Participatory Poverty Assessment: Lao People's Democratic Republic*. Manila, p. 65.

agricultural goods are mature and ready for sale. Areas that have potential for developing cash crops cannot take advantage of such income-enhancing opportunities due to lack of reliable transportation. Table 1 shows the percentage of villages in Bokeo and Louang Namtha with access to roads. Louang Namtha is among the most transport-deficient areas in the country. Restricted access and weather-dependent roads also have implications for cost-effectiveness of development programs, on the ability to target health care and educational services to the poor and the sustainability of such programs.

Table 1: Access to Roads (% of villages)

| Provinces | 6+ km to Main Road | Access in Rainy Season | Access in Dry season |
|----------------|--------------------|------------------------|----------------------|
| Louang Namtha | 42 | 31 | 41 |
| Bokeo | 38 | 41 | 77 |
| Lao PDR | 35 | 50 | 79 |

Lao PDR = Lao People's Democratic Republic.
Source: National Statistics Centre.

11. The socioeconomic status of villagers living along the Project varies considerably: from the vulnerable highland minorities to the more prosperous lowland communities, particularly those close to the towns of Namtha and Houayxay. The villagers located along the project road range from impoverished peasants with a marginal existence to small farm entrepreneurs who are able to respond to the market opportunities associated with improved transportation. Nonfarm employment has increased in the villages nearer to Houayxay, and other towns in mining and construction work. Indeed, the average annual incomes of the people in the first five villages along the road north of Houayxay and closer to the Thailand border varies almost directly with distance from the provincial capital (Table 2).

Table 2: Distance from Houayxay and Income of Villagers

| Item/Village Name | Pa Oi | Ou Dom | Pak Hao Neua | Mok Ka Chok | Nam Ho Tai |
|-----------------------------|-------|--------|--------------|-------------|------------|
| Distance from Houayxay (km) | 5.7 | 6.0 | 6.5 | 7.8 | 9.0 |
| 1996 per capita income (\$) | 162 | 127 | 141 | 68 | 56 |
| 2001 per capita income (\$) | 190 | 172 | 121 | 84 | 80 |

Source: ADB. 2002. *Draft Final Report for Preparing the Northern Economic Corridor for the Lao PDR*. Manila.

2. Poverty and Social Analyses

12. While the potential impact zone of the Project covers a wide area, the primary zone for the purpose of project classification has been defined as covering Namtha and Viangphoukha districts in Louang Namtha province and Houayxay district in Bokeo province. The majority of the population is rural, living in villages of between 100 and 1,000 people. The poverty profile of the project area indicates that nearly 2% of the country's poor and about 17% of the northern region's poor reside in these three districts. The overall incidence of poverty at the province level is 43.4%, which is significantly above the national incidence of 38.6% (Table 3).⁵ Under ADB's loan classification system, the Project will fulfill the criteria for poverty intervention.

⁵ The average poverty line (rural and urban) for the Lao PDR is estimated to be equal to KN19,184 per person per month (Lao Expenditure Consumption Survey II).

Viangphoukha is classified as a poor district by ADB's participatory poverty analysis for the Lao PDR because more than 50% of the district population is below the national poverty line.

Table 3: Poverty Profile in Project Area

| Province | District | Total Population | Poor | Poverty Incidence (%) | Share of Region's Poor (%) | Poverty Gap | Severity of Poverty |
|---------------------------|--------------|------------------|------------------|-----------------------|----------------------------|-------------|---------------------|
| Louang Namtha | | 123,237 | 70,861 | 57.5 | 31.9 | 18.5 | 7.5 |
| | Namtha | 26,841 | 11,810 | 44.0 | 5.3 | | |
| | Viangphoukha | 13,200 | 11,920 | 90.3 | 5.4 | | |
| Bokeo | | 122,342 | 45,756 | 37.4 | | 9.5 | 3.4 |
| | Houayxay | 48,802 | 14,836 | 30.4 | 6.7 | | |
| Total Project Area | | 88,843 | 38,565 | 43.4 | 17.4 | | |
| Lao PDR | | 5,087,542 | 1,964,809 | 38.6 | | 10.3 | 4.0 |

Lao PDR: Lao People's Democratic Republic.

Sources: Staff estimates and National Statistics Centre.

13. **Ethnic Minorities Profile.** The Project has a high degree of ethnic diversity: at least 16 ethnic groups, belonging to four ethno-linguistic families, have been identified along the project road. In Louang Namtha, 98% of the population consists of ethnic minorities—33% of minorities are considered lowlanders, 29% uplanders, and 38% highlanders.⁶ These designations are rough categorizations by ethnic group residential preferences. In Bokeo, 87% of the population belongs to ethnic minorities. Only one village is inhabited by the Lao Loum ethnic majority group, all the rest are ethnic minorities.

14. **Gender Profile.** The participatory poverty assessment showed that ethnic minority women and girls are the most disadvantaged segment in Lao PDR society. They perform 70% of the agriculture and household tasks, and have little access to labor-saving facilities such as rice mills. They also make up the majority of the lowest income quintile in Lao PDR society. Infant and child mortality rates are some of the highest in the world—one out of four children die before age 1 and three out of 20 fail to live to reach age 5. They constitute the largest segment of the illiterate population, approximately 70%. Reverse literacy—learning then losing literacy—is common among women in minority villages, as it is difficult for them to retain a nonmother tongue language they may not see or hear for months. As a result, few ethnic minority women engage in formal or nonformal businesses or are employed in manufacturing or government work. Given such constraints, integrating ethnic minority women into mainstream development programs is an enormous challenge.

15. **Vulnerability.** The Lao PDR has experienced economic growth and reduction in overall poverty since the early 1990s, but poverty levels in the northern region have remained stagnant. The poor in this region have been unable to capture the benefits of economic growth. More than 80% of households in Louang Namtha derive their main source of livelihood from subsistence agriculture. One key reason for such dependence on subsistence agriculture is that Louang Namtha has the lowest market penetration rate in the country, with only 9% of villages having access to markets. Diversification and cash income remain limited, leaving poor households vulnerable to external shocks, especially to natural disasters. Households often resort to high

⁶ ADB. 2001. *Participatory Poverty Assessment: Lao People's Democratic Republic*. Manila.

risk coping strategies in response to food shortages and rice deficiencies, including collection of nontimber forest products, sale of livestock, and opium cultivation. The World Food Program vulnerability index ranks Namtha and Viangphoukha among the most vulnerable districts in the country.⁷

16. **Health Service.** Household access to social services in the project area is limited due to limited funds, shortage of qualified staff, and inaccessibility of the villages. Only 31 villages along the project road have some type of social infrastructure. Sixty villages have no access to even primary health clinic or service facilities. Malaria, gastroenteritis, and respiratory infections are common. Rural health services are scarce and rudimentary.⁸ Self-medication is the most common mode of treatment of illnesses, with opium often used for medical purposes. Less than 30% of the population use health facilities when ill. Overall, health awareness remains low, especially for women. For instance, according to the recent National Health Survey,⁹ 80% of women have never heard of HIV/AIDS.¹⁰

17. **Education.** Only 50 villages along the project road have a primary school. Dropout rates are especially high for girls. Female literacy rate in Louang Namtha is 19% compared to the male literacy rate of 55%. Corresponding figures for Bokeo are 33% and 70%. This is well below the national average. While parents are not convinced of the relevance of formal education to their daily livelihood needs, limited access and poor quality are exaggerated by the fact that few people in the project area speak an official language. While language and cultural constraints are barriers for seeking social services on the part of villagers, the Government's limited access to villages severely constrains its ability to provide health and educational services.

C. Lessons Learned

18. ADB's experience in the Lao PDR road sector indicates that projects have generally been implemented as planned, delivering the main output, namely improving the carriageway. Overall capacity within the Department of Roads has been developed to implement projects well. Projects that have been recently evaluated indicate that road networks have had important beneficiary impacts on the socioeconomic conditions. Road improvements that led to all-weather roads have resulted in beneficial impacts on agricultural incomes where inhabitants were able to switch to cash crops.

19. The environmental and social concerns in implementing road projects are new areas for the Government and the relevant institutions need considerable capacity strengthening, especially at the local level. Another important lesson that emerges from evaluation of environmentally sensitive projects in the Lao PDR is that adequate resources need to be provided to ensure mitigation measures for environmental and social concerns. The Project has attempted to mainstream most of the lessons within the design of the Project, with adequate resources to build local capacity and on-the-job training.

⁷ The World Food Program vulnerability index is a weighted index of six indices: net rice production, large animals per household, access to road, and access to forested land, education, and health.

⁸ Medical practitioner, trained nurse, community health worker, or dispensary.

⁹ Lao PDR. 2001. *Report on the National Health Survey: Health Status of the People in Lao PDR*.

¹⁰ Human immunodeficiency virus/acquired immunodeficiency syndrome.

IV. THE PROPOSED PROJECT

A. Objective

20. The primary goal of the Project is to strengthen regional infrastructure linkages between GMS members. The project road will help facilitate trade and investment in the region. A direct link between the PRC and Thailand via the Lao PDR will reduce transport costs in the regional project influence area, and increase the efficiency of the movement of vehicles, goods, and passengers. The area of the indirect influence of the Project is potentially large and covers a population of about 42 million in the immediate provinces in these three countries. At present, international trade flows rely on one of three links that are quite restricted and not very reliable: (i) river traffic on the Mekong River, (ii) Thailand to the PRC via Myanmar, and (iii) the poor quality project road. Upgrading the project road will provide the essential transport infrastructure to facilitate the economic and social development of the project influence area.

21. This link will also help to accelerate the development process of the Lao PDR by linking its economy to two rapidly growing economies of the region. The road link will help reduce poverty by providing access to markets, extension services, income and employment opportunities, and enhancing development potential. At present, domestic trade flows within Bokeo and Louang Namtha provinces are constrained by a single, narrow, unsealed road that is closed for about 4 months of the year during the wet season. The project road is Bokeo province's only connection with the rest of the Lao PDR, other than limited river traffic along the Mekong River.

B. Components and Outputs

22. The Project will consist of three components: (i) construction of the project road, (ii) implementation of an area development plan, and (iii) capacity building at the provincial and sector levels.

1. Project Road

23. The project road consists of approximately 228 km of national route 3 from Houayxay in Bokeo province to Boten in Louang Namtha province. Of the 228 km, the last 20 km will follow the existing national route 13N to Boten. The civil works will consist of: (i) reconstruction and upgrading of the entire length of the road to a sealed, two-lane road; (ii) construction of new bridges, and widening of existing bridges as required; (iii) upgrading of ferry facilities at the Mekong River; and (iv) construction of 7.1 km of new bypass around the town of Louang Namtha.

24. ADB will finance the civil works to upgrade a 74 km section of the project road to a standard consistent with its potential as a major international link. The other two sections of the road will be built under separate bilateral financing arrangements with the governments of the PRC and Thailand. The three financiers will be responsible for one section each but the road will be designed and constructed for a single set of geometric design standards. The division of the road is based on three sections of equal cost. The northern section of the project road will be funded by the PRC Government and this section will consist of approximately 69 km of road, starting from the PRC border. The southern section of the project road will be funded by the Government of Thailand and will cover approximately 85 km, starting from Houayxay and heading north. The central section of 74 km will be funded by ADB.

25. The project feasibility study considered several improvement options ranging from modest improvements to the existing track to a high standard two-lane highway with significant changes to the existing alignment and geometry. The feasibility study concluded that a high standard two-lane highway was, in economic terms, the optimum solution but noted that construction of such a road would have undesirable environmental and social impacts. Therefore, the geometric design standard adopted for the Project is that of a high standard, two-lane highway but these geometric standards will be allowed to vary along the road (with implications for the speed of travel) such that the existing alignment may be retained. Construction standards will be uniform for the entire road for a two-lane road with a 7-meter (m) wide sealed pavement and sealed shoulders varying between 1.5 and 2.5 m on each side.

26. Existing border facilities will be retained at both the Thailand and PRC borders, although construction of new facilities at the Thailand border will be required if detailed design shows that the existing ferry facilities need to be relocated. It is possible that the ferry facilities to cross the Mekong River will prove inadequate to deal with the flows of transit traffic. The financial and economic analyses of construction of a bridge across the Mekong River were carried out to assess viability of the additional investment required for such a bridge. The Project will include construction of the bridge if adequate resources, including loan savings, are available to complete the construction of the bridge.

2. Area Development

27. The second component—area development—will include two separate, but interdependent, plans designed to ensure that the development benefits reach the people living in the project area and that the resources that they rely on are protected and developed in a sustainable way. The first subcomponent will consist of a resettlement plan (Appendix 4 and Supplementary Appendix A) that will ensure that the immediate impact of construction of the road will not be directly adverse on the communities presently living along the road. The second subcomponent—social action plan (SAP)—is designed to enhance project benefits to the communities, especially the ethnic minorities along the road. The SAP includes an ethnic minority development plan and has been prepared in accordance with ADB's *Policy on Indigenous Peoples* and Section 53 of the *Operations Manual* (Supplementary Appendix B). It is based on a preliminary assessment of the present conditions of the communities along the road, potential project impacts, their capacity to benefit from the Project, and suggested interventions for mitigating adverse impacts. A total of \$3.7 million will be allocated to the SAP, comprising community roads (\$1.6 million), water and sanitation schemes (\$1.2 million), and education and other awareness campaigns (\$0.9 million).

28. **Community Roads.** An amount of \$1.6 million is allocated for the construction of community roads along the project road. The various road segments are to be selected based on a participatory process involving the communities and the provincial authorities. This participatory process will be guided by consultants engaged as part of the project coordination team. The consultants will prepare and submit a justification report for the selected roads based on the following criteria: (i) the roads will be selected using a community-based participatory approach; (ii) the roads will not be widened to more than 3.5 m; (iii) no new alignments will be constructed; (iv) arrangements will be in place for community-based maintenance; (v) roads that provide access to protected forests, virgin forests, and steep slope areas will not be included; (vi) tree felling must be avoided; (vii) road selection will comply with all regulations regarding impacts on provincial and national biodiversity areas; (viii) the roads will not involve the construction of major drainage structures; and (ix) the roads will avoid displacing or adversely affecting villages, individual homesteads, or agricultural land.

29. **Water and Sanitation Schemes.** The SAP will also cover village water and sanitation schemes for villages along the project road and the town of Viangphoukha at an estimated cost of \$1.2 million. The selection of villages to benefit from water and sanitation schemes will be based on the following criteria: (i) the villages will be selected using a community-based participatory approach, (ii) arrangements will be in place for community-based maintenance, (iii) construction of the schemes will avoid displacing or adversely affecting villages or individual homesteads/agricultural production areas, and (iv) construction of the schemes will avoid environmental degradation.

30. It is expected that the projects developed under these subcomponents of the SAP will be relatively small and not involve resettlement or adverse environmental impacts. If small displacement seems essential, appropriate compensation measures will be provided in accordance with ADB's *Policy on Involuntary Resettlement* and will be consistent with the resettlement plan prepared for the Project.

31. **Education and Awareness Programs.** The Project may lead to short-term and medium-term negative impacts in terms of higher incidence of sexually transmitted diseases (STD), HIV/AIDS, drug use, and trafficking in women and children. The SAP will also include subcomponents such as: (i) a preventive education program for HIV/AIDS/STD and trafficking awareness, (ii) a nonformal education program, and (iii) a road safety awareness program. A total of \$0.9 million will be allocated to these programs. Detailed design of the SAP will be done during project implementation, using a community-based participatory approach (Appendix 5).

32. **Community Development in Nam Ha Watershed.** A linked initiative is a pilot project for proposed funding from the Japan Fund for Poverty Reduction for community development covering nine villages in the Nam Ha watershed. This project will assist these communities continue the development of sustainable and permanent land-use systems of agriculture and forestry. This will enable them to avoid an ever-increasing scale of swidden agricultural production with associated negative environmental and economic impacts. This project aims to maximize the stability and productivity of agriculture while developing an agro-forestry component that will ensure longer-term income and food security, increase the level of forest cover for watershed protection, improve wildlife habitat, and generate additional local income. The major components of this project include participatory assessment of land capability; consultative land-use planning with communities, district, and provincial government personnel; and cooperative development of secure land-use rights and land title for farming families. In parallel, this project will develop alternative livelihood components (small-scale irrigation, rain-fed upland arable land terracing and land stabilization, fruit orchards, nontimber forest products domestication, livestock systems, and firewood and community forest plantation). This would be combined with a component to link the increased productivity with the marketing potential available through the construction of the project road.

3. Capacity Building at Sector and Provincial Levels

33. The Project includes international third-party monitoring of the environmental impact of the road. This program of monitoring will integrate local capacity building through on-the-job training and formal modules of training for the road sector, at the provincial level, and for the Environment Research Institute¹¹ set up under the Science, Technology, and Environment Agency (STEA). This will help enhance the local capacity for carrying out environmental and

¹¹ The Environment Research Institute has been established to monitor environmental conditions in the Lao PDR.

social monitoring of all agencies, including Department of Roads, provincial divisions of transport, local governments at the provincial level, district level science, technology, and environment offices, and the Environment Research Institute through formal and on-the-job training through consulting services.

34. The consulting services for the third-party monitoring includes a specific subcomponent to build capacity of these local units covering (i) environmental impact assessment and project level monitoring; (ii) policies, procedures, and best practices related to resettlement, social preparation, social impact assessment; (iii) stakeholder analysis; and (iv) participatory rapid appraisal, monitoring, and evaluation. The Project will thus help to operationalize the program of policy reforms agreed under the Environment and Social Program Loan¹² relating to environment management and social safeguards for environmentally sensitive infrastructure projects. The Government has agreed to include two affected provinces, Bokeo and Louang Namtha, to implement these policy measures, including setting up environment and social divisions with adequate staff resources ahead of the second tranche schedule of March 2003.

C. Special Features

1. GMS Collaboration

35. The Project is the first example of GMS partnership where two developing member countries have collaborated with ADB to invest in a regional road in a third country to promote regional cooperation. Thailand and the PRC have been equal partners with ADB in supporting this project in the Lao PDR to enhance regional cooperation. ADB has been a catalyst in mobilizing additional development assistance amounting to over \$60 million on terms more concessional than the Asian Development Fund from these two large neighbors of the Lao PDR. The Project thus is an important milestone in ADB's efforts in the GMS Program. The Project will demonstrate that it is possible to set up a cooperative framework among GMS countries to design, develop, and finance an infrastructure facility that is self-sustaining.

2. Environment

36. The project area includes Nam Ha, one of 18 national biodiversity conservation areas (NBCAs). In 1999, large extensions were approved to Nam Ha NBCA in recognition of the need for establishing contiguity. The Government extended the protected area boundaries to include a large area known as Ham Ha National Protected Area in 1999. The entire Nam Ha NBCA covers 222,400 hectares and is contiguous with the Shiang Yong Protected Area in Xishuangpanna National Nature Reserve in the PRC. The road has been in existence for decades, but these extensions have resulted in the road passing through Nam Ha NBCA since 1999. In Lao PDR all NBCAs, including Nam Ha, are in reality multiple use areas: for agriculture, fishing, hydropower, commercial nontimber forest harvests, and sometimes timber harvests. None is strictly a national park as the term is meant in other countries.

37. The Government of the Lao PDR has ranked all NBCAs in terms of priority, assessing their biodiversity contribution to the NBCA system.¹³ The highest ranking NBCAs do not include Nam Ha NBCA, if the importance of Lao PDR's NBCAs is considered exclusively in an

¹² ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Lao PDR on Environment and Social Program*. Manila.

¹³ Government of Lao PDR. 2001. *Report on Review of the National Protected Area System in Lao PDR*. Vientiane.

international, ecosystem context.¹⁴ However, Nam Ha NBCA has high watershed values, ecotourism potential value, and wildlife habitat value. Nam Ha NBCA is an important habitat to at least 37 mammals and 288 bird species, including a number of endangered and threatened species such as wild Asian elephants, tigers, and bears.

38. One of the important goals of the transport sector strategy in the Lao PDR is minimizing negative environmental and social impacts of roads. The Government's strategy includes strengthening linkages between the Road Law 1999, the Environmental Protection Law 1999, and the Land Law 1995. The feasibility report included a baseline survey of the habitat value of Nam Ha NBCA prepared by the World Conservation Society and as per this assessment the existing alignment of the road does not pass through core conservation zone for wildlife (Supplementary Appendix C). This baseline survey will help monitor the long-term impact of this road project and will help the Government establish monitoring and evaluation systems for protected areas.

39. Better road access may lead to indirect impacts such as increased commercial and other logging and wildlife trade in the region. In October 2000, the Government of the Lao PDR introduced new policies leading to the gradual phasing out of logging quotas. The new order prohibits logging in areas other than (i) infrastructure development sites, and (ii) production forests with proper management plans. The latter allows production forest logging only in designated areas (Table 4). There has been some reduction in logging in the two provinces in the last few years and the Government has agreed that during the next 4 years, actual logging levels will be further reduced by 30%.

Table 4: Logging in Louang Namtha and Bokeo Provinces

| Year | Louang Namtha | | Bokeo | |
|-----------|---------------------------------------|--|---------------------------------------|--|
| | Planned Quota (in m ³) | Actual Utilization (in m ³) | Planned Quota (in m ³) | Actual Utilization (in m ³) |
| 1996–1997 | 3,000 | 3,000 | 2,500 | 290 |
| 1997–1998 | 3,300 | 2,172 | 3,000 | 3,000 |
| 1998–1999 | 2,300 | 4,160 | 1,000 | 1,613 |
| 1999–2000 | 2,000 | 2,000 | 500 | 500 |
| 2000–2001 | 2,300 | 2,320 | 500 | 500 |

Source: Ministry of Agriculture and Forests.

40. Overall detection of forest crimes and theft is low in the Lao PDR. The Government needs to undertake comprehensive measures to reduce overall trade in wildlife including measures such as tighter implementation of the existing laws, monitoring, education, and community awareness programs. The Project includes establishing three forestry checkpoints, one in each district for this purpose, and strengthening local capacity to enhance detection. Overall, the Project is expected to have a positive impact on the environment due to lower logging, better monitoring, local capacity build-up, and responsive contracting. The summary environmental impact assessment (SEIA) was circulated to the Board on 20 August 2002.

¹⁴ If one were to rank ecosystems that are most distinctive and limited globally, then the highest value sites would be the Annamite Mountain NBCAs in the Lao PDR and lowland evergreen forests.

D. Cost Estimates

41. The total cost of the project road is estimated at \$95.8 million. Table 5 summarizes cost estimates for the entire Project. Detailed costs are in Appendix 6.

Table 5: Total Project Cost Estimates
(\$ million)

| Item | Foreign Exchange | Local Currency | Total Cost |
|--|------------------|----------------|--------------|
| A. Base Costs | | | |
| ADB Section | | | |
| 1. Land Acquisition and Resettlement | 0.00 | 1.00 | 1.00 |
| 2. Civil Works | 17.64 | 4.41 | 22.05 |
| 3. Consulting Services | 3.16 | 2.67 | 5.84 |
| 4. Project Management | 0.00 | 1.20 | 1.20 |
| PRC Government Section | | | |
| 1. Civil Works | 17.28 | 4.32 | 21.60 |
| 2. Consulting Services | 1.37 | 1.22 | 2.59 |
| Thailand Government Section | | | |
| 1. Civil Works | 17.15 | 4.29 | 21.44 |
| 2. Consulting Services | 1.36 | 1.21 | 2.57 |
| Subtotal | 57.97 | 20.32 | 78.29 |
| B. Contingencies | 8.88 | 2.91 | 11.79 |
| C. Taxes and Duties | 0.00 | 4.51 | 4.51 |
| D. Interest During Construction | 1.20 | 0.00 | 1.20 |
| Total | 68.05 | 27.74 | 95.79 |

ADB = Asian Development Bank, PRC = People's Republic of China.

Source: Staff estimates.

E. Financing Plan

42. The Government of the Lao PDR has requested a loan of \$30 million equivalent from the Special Funds resources to finance 80% of the ADB section of the road. ADB will cover the entire foreign exchange cost of the ADB section of the Project estimated at \$23.77 million equivalent and \$6.23 million of local currency costs from the loan proceeds. The Government will finance the remainder of the local currency cost components of the ADB portion of the Project from its own internal sources, which is approximately \$7.29 million equivalent. The proportion of local currency funding proposed under this loan is justified by the nature of the Project, particularly its focus on poverty alleviation and the current fiscal conditions of the Government of the Lao PDR. On these assumptions, the financing plan is presented in Table 6.

43. A loan of Special Drawing Rights 22,731,000 (\$30 million equivalent) will be made from the Special Funds resources for a term of 32 years with a grace period of 8 years. The loan will carry an interest rate of 1.0% during the grace period and 1.5% thereafter. The Borrower will be the Lao PDR. The foreign exchange risk of the loan will be borne by the Government. The Borrower will make the loan proceeds available through budgetary allocations. The PRC will provide an interest-free loan with a grace period of 10 years and a repayment period of 10 years. The financing includes 20% grant. The Thailand loan has a maturity of 30 years,

including a grace period of 10 years. The Thailand loan will have an interest rate of 1.5% and about 10% of the principal will be interest free, thus effectively reducing the interest rate.

Table 6: Financing Plan
(\$ million)

| Source | Foreign Exchange | Local Currency | Total Costs | % |
|---------------------|------------------|----------------|--------------|--------------|
| ADB | 23.77 | 6.23 | 30.00 | 31.3 |
| PRC Government | 23.18 | 6.82 | 30.00 | 31.3 |
| Thailand Government | 21.10 | 7.40 | 28.50 | 29.8 |
| Lao PDR Government | 0.00 | 7.29 | 7.29 | 7.6 |
| Total | 68.05 | 27.74 | 95.79 | 100.0 |

ADB = Asian Development Bank; Lao PDR = Lao People's Democratic Republic; PRC = People's Republic of China.
Source: Staff estimates.

F. Implementation Arrangements

1. Project Management

44. Project management will be a critical activity given that the construction of the project road will require the coordination of the simultaneous construction of the entire road in three sections, each section being funded and implemented using funds from three different sources. The Ministry of Communication, Transport, Post and Construction has a generally successful record in implementing road and bridge works under projects financed by ADB and other external financing agencies, and has sufficient capacity and experience to be the Executing Agency for the Project. Within the Ministry of Communication, Transport, Post and Construction, Department of Roads will be responsible for implementation and overall coordination.

45. The Project will be managed by a project management unit headed by a project manager appointed on a full-time basis and accountable to the director-general of the Department of Roads. The project manager will be directly responsible for the supervision of the ADB-funded components. Under the project manager, two full-time deputy project managers will be appointed who will take responsibility for the implementation of the road sections to be funded by loans from the governments of the PRC and Thailand. The transport divisions of Louang Namtha and Bokeo provinces will provide suitable counterparts to assist the project management unit. The construction supervision consultant's team leader will act as the employer's representative for the ADB-funded civil works and will provide support to the project management unit for coordination of the implementation of all three sections of the project road.

2. Implementation Period

46. The Project will be implemented over a period of 56 months, inclusive of preconstruction activities. It is expected to be completed by 31 December 2006 (Appendix 7).

3. Procurement

47. Procurement of all civil works contract will be in accordance with ADB's *Guidelines for Procurement*. For the ADB-financed section of the project road, bidding will follow international competitive bidding procedures for a *design-build (turnkey)* contract and the contractor will be selected from prequalified bidders. The contracts for the toll collection including axle load system, community roads and water and sanitation schemes subcomponents of the SAP will be

under local competitive bidding procedures using the Government's standard bidding documents, which have been reviewed and accepted by ADB for other projects. The Government requested ADB approval for advance procurement action for the civil works procurement on the understanding that such approval would not commit ADB to finance the Project. Advance procurement action would allow Ministry of Communication, Transport, Post and Construction to commence work on preconstruction activities and would shorten the implementation period by about 1 year. A list of contract packages and the mode of procurement are given in Appendix 8.

48. For contracts bid under local competitive bidding, the civil works will be implemented by qualified local contractors, engaged by the provincial divisions of communications, transport, post and construction guided by the project management unit and supervised by the project coordination consultants. The contractor selection process will follow the principles set out in the *ADB Guidelines for Procurement*. Local contractors that are state-owned enterprises should be financially independent and operate according to commercial laws.

4. Recruitment of Consultants

49. About 195 person-months of international consultants and about 950 person-months of domestic consultants will be required to assist in project coordination, construction supervision, and management. The consultants are expected to be recruited as an association of international and domestic firms engaged by the Government. The consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB on the engagement of consultants. The services have been divided into four package as follows: (i) Project coordination and construction supervision consultant. Recruitment for this package of services will be based on quality and cost-based selection procedures for international recruitment; (ii) Resettlement planning, implementation, and capacity-building consultants. Recruitment for this package of services will be based on procedures for the recruitment of individual consultants; (iii) HIV/AIDS/STD/Trafficking awareness and preventive education program. Recruitment for this package of services will be based on quality and cost-based selection procedures for international recruitment; and (iv) Environment management plan. The Government has agreed to the recruitment of the International Union for the Conservation of Nature and Natural Resources (World Conservation Union) for the Project on a direct selection basis to implement the environment management plan. Draft terms of reference for consulting services are presented in Appendix 9. The Government requested ADB approval for advance action for the recruitment of the consultants on the understanding that such approval would not commit ADB to finance the Project.

5. Project Review

50. A project inception mission will be fielded soon after approval of the proposed loan to initiate the implementation process. In addition, ADB will conduct regular (at least twice annually) detailed reviews of the overall progress of the Project. If the results of such reviews indicate serious implementation problems, the Government and ADB will agree on appropriate measures, including changes in the scope of implementation arrangements, to ensure that objectives are met. ADB reviews will also, in consultation with the Government, determine the need for complementing facilities and measures to enhance the effectiveness of the Project.

51. The Executing Agency will prepare a project completion report within 3 months of completion of the Project. Aside from assessment of the execution and operation of the Project, the project completion report will indicate compliance with loan covenants.

6. Disbursements

52. Loan disbursements for all consulting services contracts will make use of the direct payment procedures defined in ADB's *Loan Disbursement Handbook*. Disbursements for international and local competitive bidding civil works contracts and for incremental expenditures will also make use of direct payment procedures.

53. Disbursements for the water and sanitation schemes subcomponent of the SAP will be through an imprest account, from which drawdowns will be made upon approval of subprojects by ADB. To ensure the timely disbursement of funds for the construction of small-scale works under this component under force account and direct purchase procurement arrangements, a second-generation imprest account will be established at the provincial level.

7. Accounting, Auditing, and Reporting

54. The Executing Agency will maintain separate records and accounts adequate to identify the goods and services financed from the proceeds of the loan, the financing resources received, the expenditures incurred for the Project, and the use of local funds. Within 6 months of the close of the fiscal year, MCTPC will submit annual project accounts to ADB, which provide a detailed description of the source of funds and expenditures made. Annual project accounts must be audited by an auditor acceptable to ADB, and the auditor's terms of reference will be approved by ADB prior to commencement of work. The audit results will be submitted to ADB on an annual basis.

55. Regular progress reports for the Project will be prepared by MCTPC and submitted to ADB on a quarterly basis. The reports will include a description of the physical progress, procurement and contractual status, and highlights of any implementation issues. These reports will include an evaluation of progress in implementing the SAP, resettlement plan, and environment management plan for the Project. The progress reports should also contain a summary of project accounts, including details on the latest project expenditures and contract amounts.

G. Project Performance, Monitoring, and Evaluation

56. The Executing Agency assisted by the consultants for project coordination will establish systematic project performance monitoring and analysis throughout the life of the Project in accordance with ADB's *Project Performance Management System Handbook*, integrating it with the existing management information system. Initially, the monitoring system will develop and conduct sample surveys to establish baseline data for subsequent performance monitoring. Thereafter, surveys will be conducted depending on the need to provide feedback on implementation of the Project. Key indicators identified in the project framework will form the core of the data required for such an assessment. Such a monitoring system will also include parameters for natural resources and social conditions for the project beneficiaries.

V. PROJECT BENEFITS, IMPACTS, AND RISKS

57. The beneficiaries of the Project will be people living along the corridor, transport companies, exporters and importers in these three countries, and people who derive income from enhanced trade and investments in the region. The benefits will take the form of lower transportation costs, faster and more reliable transport services, and income and growth opportunities along the road.

A. Project Benefits

1. Institutional and Policy Aspects

58. It is expected that the Project will enhance two important aspects for the transport sector in the Lao PDR: first, the development and implementation of a system of road charges for the Project and all other major international corridors will open an opportunity for the Lao PDR—a landlocked country at the center of the GMS—to generate revenue from infrastructure services. An agreement has been reached with the governments of the PRC and Thailand that a system of road charges for vehicles and passengers will be in place so as to generate adequate resources for the Lao PDR to cover debt service and road maintenance.

59. Second, it is important to ensure that such corridors do not lead to negative environmental and social impacts and hence the Project will also develop capacity at the sector and institutional levels to implement environmentally sensitive projects and monitor social safeguard issues. Given the limited capacity and resources to monitor natural resources, local capacity and incentives are the only viable options to preserve these local assets. It is expected that the Project will enhance both these aspects, by developing local capacity and by creating economic opportunities in this remote region of the country.

2. Development Impacts

60. It is expected that the Project will enhance market opportunities for the two provinces and the northern region in terms of expanding agriculture and other income-generating activities. A neighboring district, Moung Sing, has seen rapid agricultural development covering new crops such as sugar cane, plantation crops, and other cash crops with the improvement of the road infrastructure linking it to the PRC.

61. The area has been attracting a number of international tourists traveling through to the PRC and Thailand and spending a few days in these provinces for trekking, even though the tourist infrastructure, including transportation, is inadequate. In the last few years, a number of guest houses and restaurants have opened to meet tourist needs. An important destination in the region, the Golden Triangle, expects to receive about 1 million tourists in 2002. There is significant tourism development potential once the road opens up this area as the road passes through beautiful locations that have remained hidden to outsiders for lack of infrastructure.

62. High dependence on subsistence agriculture is a major cause for poverty in the project area. Improved access to markets is expected to facilitate the transformation from subsistence to commercial agriculture. Off-farm employment opportunities in the services sector such as restaurants and transport services, as well as other income diversification potential will reduce vulnerability to external shocks, especially natural disasters.

63. Average household expenditure on food accounts for 71% of total consumption in Louang Namtha and 66% in Bokeo province. The poor spend about 80% of their total consumption on food. Improved access and reduced transportation costs into the area have two major impacts on food expenditure. First, they reduce vulnerability to food shortages and rice deficiencies by the increased inflow of food items. Second, they reduce consumer prices and thus expenditure on food items not only for the poor but all. Further, preliminary analysis indicates that the ability of development and assistance program to target both poor households and poor villages is largely governed by access to all-weather roads. Thus, both the quantity of development programs and the cost-effectiveness of these programs can be expected to

improve. The ability to target poverty can also be expected to improve with better access. This is especially important for Viangphoukha, the poorest and most access-deprived district in the project area (Appendix 10).

3. Economic Analysis

64. The Project is an important north-south link in the GMS. The demand for this road can be gauged from the river traffic on the Mekong between Thailand and the PRC: with the effectiveness of the commercial navigation agreement in June 2001, river traffic between Yunnan Province and Thailand has increased by over 140% in one year, amounting to two-way trade of over \$65 million or 150,000 tons. This is still an insignificant 1% of total trade between Thailand and southern China, estimated at about \$6.5 billion.

65. The project road has also experienced significant growth of 20% per annum in local traffic compared to 1997, when the pre-feasibility study was prepared. Traffic forecasts for normal local traffic were prepared looking at past growth rates, vehicle registration trends, and income growth for the two provinces (Appendix 11). At present, lignite traffic equivalent to 90 vehicles is carried daily between Viangphoukha and Houayxay and across to Thailand. Lignite traffic is assumed to remain constant over the project life because this is constrained by actual extraction rates. The Project also includes benefits from two other categories of traffic savings accruing to land-bridge traffic and time savings. Land-bridge traffic essentially indicates how the Lao PDR will serve as a bridge between Thailand and Yunnan Province once this north-south route is developed. In order to estimate regional benefits from this traffic, analyses were carried out of existing trade and tourist traffic among the three countries, alternative routes, and development plans for Yunnan Province and northern Thailand.

66. The project economic analysis was carried out for the Lao PDR and for the subregion, i.e., PRC, Lao PDR, and Thailand based on a comparison of with and without project cases. The economic capital cost of road improvement excludes price contingencies, taxes, and duties. The costs were expressed in constant 2002 prices and include routine maintenance costs and periodic resurfacing of the pavement for the improved road. Without the road, operation and maintenance costs are estimated for a gravel road. All local costs were assumed to be nontradables and a standard conversion factor of 0.8 was used. The benefits include mainly vehicle operating cost savings arising from improved road and distance savings of about 23 kms as well as time savings. Overall, the economic internal rate of return (EIRR) was 27% for the subregion. For the Lao PDR, the EIRR is 12.8% if we only account for savings in vehicle operating costs accruing to local traffic. If we add the benefits from road charges from international traffic, the EIRR for the Lao PDR increases to 18%. The Project results in net benefits of the \$20 million for the Lao PDR, and about \$47 million each for the PRC and Thailand. If the fiscal impacts of additional toll revenues are included, the net benefits are distributed to the Lao PDR at \$55 million, and that of the PRC and Thailand at \$30 million each.

67. The project analysis is based on the assumption that existing ferry facilities on the Mekong River will be able to cope with the increased traffic with minor investments. This may not be feasible and so an incremental analysis is also carried out to assess the viability of constructing a bridge over the Mekong River. The net present value of the bridge was found to be significantly higher compared to the net present value of ferry facilities. The EIRR analysis indicates that constructing a bridge will result in enhancing overall viability for the Lao PDR.

4. Affordability and Financial Analysis

68. Even though the Project is viable with EIRRs of 26% to 28%, it is important to ensure that the Project generates adequate financial revenues to cover debt service and road maintenance costs. All the financiers have agreed to a system of road charges on traffic crossing borders such that the Project does not add to the fiscal burden of the Lao PDR. An analysis was carried out to estimate the level of road charges needed to cover debt service and road maintenance and other related costs. It was found that the Project would require road charges from regional traffic of \$20 per passenger car unit equivalent at each border crossing or \$40 in total. The lignite traffic is assumed to have a concessional transit fee of \$10 per crossing because of their past investments in the road section from Viangphoukha to Houayxay. With these levels of road charges, the financial internal rate of return is 6.4% compared to the weighted average cost of capital of 4.25% (Appendix 12).

B. Project Risks

69. The economic analysis of the Project suggests that there are no significant economic risks since the project investments are viable for the Lao PDR even if there were no international traffic, however, the Project carries a commercial risk: if the land-bridge traffic is lower than projected, the economy will still have to service the debt. The Project implies a large debt for a country that is already classified as a heavily indebted country. The level of traffic needed to cover this commercial risk is only 150 passenger car units equivalent compared to the actual traffic of nearly 100 at present.¹⁵ There is considerable local freight and passenger traffic that also cross borders and so if there is a fiscal deficit, additional revenues can be generated from local users as well. Overall, the commercial risk is reduced significantly by ensuring concessional terms for the bilateral loans: the loan terms from both countries are more concessional than the Asian Development Fund.

70. The Project also carries a risk of deforestation and loss of habitat value over the medium-term if adequate steps are not taken to protect the natural resource base in this area. This will have a negative impact on indigenous people who depend on these resources for their livelihood. The Project has a linked component that will demonstrate how a sustainable livelihood can be assured while still improving overall infrastructure services. Government agencies are conscious of this risk. In Louang Namtha province, a pilot eco-tourism project has shown that the best way to preserve the natural resource base is to ensure that local communities participate in preservation and have incentives to support such a program. It is expected that with growth in alternative employment and income generation activities, swidden or slash-and-burn practices will be reduced considerably. The Project integrates mitigative measures and builds in awareness campaigns over a medium-term to preserve natural resources in the region. In addition, the Government has agreed to lower the levels of logging allowed in the two provinces, such that the overall impact of the Project on the environment will be positive.

71. The main implementation risks for the Project relate to social safeguard issues, especially for the sections financed through bilateral loans. The governments of the PRC and Thailand have agreed to fully respect the SEIA prepared by the Lao PDR Government and

¹⁵ At present, considerable transshipment takes place because of the constraints to freight movement across borders. With cross-border agreements in place between all GMS members by 2005, it is expected that transshipment will not take place and vehicles will be able to cross borders freely.

mitigation measures identified therein. The Loan Agreement with the Government of the Lao PDR will cover conditions covering these aspects. In addition, clauses to meet ADB's safeguard policies will be integrated in the contracts with the construction companies in terms of performance bonds. The Project includes third-party monitoring by the International Union for the Conservation of Nature and Natural Resources (World Conservation Union) and an allocation of \$1.0 million is included in the Project costs. There is strong government ownership of environmental and social safeguard issues, as indicated in the provisions already covered under ADB's Environment and Social Program Loan (footnote 12).

VI. ASSURANCES

A. Specific Assurances

72. In addition to the standard assurances, the Government and the Department of Roads have given the following assurances, which are incorporated in the legal documents:

- (i) **Technical Design and Standards.** The Government will ensure that technical audits are carried out on the project road at quarterly intervals. The schedule for the first such audit will be decided by the Government and ADB, but will not be later than 6 months after the award of civil works contracts for construction of the project road. The project management unit will set up institutional arrangements to approve the actual design of all sections of the project road acceptable to ADB. These approvals will be governed by the agreements on design standards and criteria as agreed in the Kunming Quadripartite Meeting held on 6–7 August 2002 and will follow the mitigation measures adopted in the SEIA. The Government has given an assurance that such arrangements will be an integral part of the loan documents with the governments of Thailand and the PRC to ensure compliance.
- (ii) **Land Acquisition and Resettlement.** Any material change in the design or alignment of the project road will require the Government's approval so as to be consistent with the Government's assurances given to ADB regarding safeguard issues as detailed in the SEIA. A change of project scope or realignment of the project road will require the SEIA and the resettlement plan to be updated and discussed and mutually agreed between the Government and ADB before work can continue. The Government will ensure that, following detailed design of all project sections, a full census and inventory of lost assets for each section will be undertaken.
- (iii) **Road Charges.** The Government will set up a system of road charges to recover the required debt service, road maintenance, and other related costs for the project road. Based on current traffic projections, the Project will require collection of an average road charges of \$40 per passenger car unit equivalent to cover debt service, road maintenance, and other related costs. The Government agreed that detailed arrangements for determining actual levels of road charges for different vehicle types, rules, implementing regulations, and other institutional arrangements will be prepared and mutually agreed with ADB within 18 months of loan effectiveness so that revenue can be collected as soon as a section of the road is completed.

- (iv) **Counterpart Funds.** The Government will ensure timely and adequate provision of counterpart funds for the Project.
- (v) **Environment Management.** The Government will ensure that the approved SEIA will be implemented for the project road irrespective of contractual and financing arrangements. The Government will inform the bilateral financing partners of its safeguard obligations on ADB's loans and incorporate these aspects in bilateral loan agreements. Environment impacts of the Project will be minimized through the appropriate mitigative measures recommended in the SEIA. The Government will ensure that appropriate prohibitions are built into the contract documents for the contractors' work financed under loans from the governments of Thailand and the PRC so that negative environmental and social impacts are mitigated during construction. The SEIA will be attached to the bidding documents and appropriate clauses inserted into the contract documents for all sections of the project road. In such cases where contracting is carried out directly by the financiers, loan documents will clearly specify these requirements. Within 6 months of loan effectiveness, Department of Roads will strengthen the capabilities of the Environment and Social Division in social analysis, particularly to monitor social impacts of road projects. Additional staff resources will be provided in areas of social development issues.
- (vi) **Reduced Logging.** The Government has agreed to review and reduce the present level of logging by about 30% in the next 4 years in Louang Namtha and Bokeo provinces. The Government will monitor agreed logging levels and provide reports to ADB, which will be published widely.
- (vii) **Axle Load and Forestry Checkpoints.** Within 6 months of loan effectiveness, the Government will establish three weighing stations and three forestry checkpoints on the project road with one in each of the three districts through which the road passes. The Government will also put in place a framework acceptable to ADB for monitoring wildlife trade. The Government will provide regular reports on the status of load enforcement measures and incidence of vehicle overloading.
- (viii) **Environment Monitoring.** The Government will put in place a system of environment monitoring for the Project. The Government, through the Environment Research Institute, will directly engage the services of International Union for the Conservation of Nature and Natural Resources (World Conservation Union) to undertake independent monitoring of the environmental impact of construction on the project road. Provincial offices of transport divisions at Louang Namtha and Bokeo will also set up functional provincial level environmental and social monitoring units prior to the start of construction activities. The Government will provide the necessary staff and other resources for these units to function effectively.
- (ix) **Operation and Maintenance.** Department of Roads will be responsible for the operation and maintenance of the project road through proper technical supervision and adequate allocation of funds. The completed Project will be maintained to a standard consistent with an international link as part of the Lao PDR national road network under the Road Maintenance Fund. A predetermined amount of revenue will be allocated from the road charges to be imposed on the

international transit traffic to ensure that adequate resources are available for maintenance.

- (x) **Social Action Plan.** The Government will take all measures necessary to implement to the satisfaction of ADB a detailed SAP developed and approved for the Project in a community participatory manner. The participatory process to develop the SAP will ensure 50% participation in decision making by women.
- (xi) **Health Risks.** The Government will ensure that all civil works contracts reflect the need for an information and education campaign on STD and HIV/AIDS and trafficking in women and children as part of the health and safety program at campsites during the construction period.
- (xii) **Labor Laws.** The Government will ensure that all civil works contractors comply with all applicable labor laws and do not employ child labor in construction activities. The Government will ensure a policy of gender-equal wages for construction activities.
- (xiii) **Cross-Border Arrangements.** The Borrower will finalize the necessary implementing rules, regulations, and protocols for passenger and vehicle traffic with the PRC and Thailand so as to ensure that by 2005, the Annexes and Protocols to the Agreement Between and Among the Governments of the Lao PDR, the Kingdom of Thailand, and the Socialist Republic of Viet Nam for Facilitation of Cross-Border Transport of Goods and People, dated 26 November 1999, and as amended from time to time, may be completed.

B. Condition for Loan Effectiveness

73. The Government of the Lao PDR shall have been able to conclude loan agreements with the governments of Thailand and the PRC, in a form and substance acceptable to ADB, and such loan agreements shall have become effective.

VII. RECOMMENDATION

74. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan in various currencies equivalent to Special Drawing Rights 22,731,000 to the Lao People's Democratic Republic for the Greater Mekong Subregion: Northern Economic Corridor Project, with an interest charge at the rate of 1% per annum during the grace period and 1.5% per annum thereafter, and a term of 32 years, including a grace period of 8 years, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board.

TADA0 CHINO
President

26 November 2002

PROJECT FRAMEWORK

| Design Summary | Performance Targets | Project Monitoring Mechanism | Assumptions and Risk |
|---|---|--|--|
| <p>Goals</p> <ul style="list-style-type: none"> Accelerate regional development by linking two rapidly growing economies of Thailand and the People's Republic of China by facilitating trade and investment in the region Help reduce poverty in the Lao PDR by providing access to markets, extension services, income, and employment opportunities, and by enhancing development potential | <ul style="list-style-type: none"> Economic growth for the impact regions in the immediate planning period Increased tonnage of interregional trade via project road Increased foreign direct investment in the road influence area Access to health and education facilities Improved access to wider range of markets Improved access to employment opportunities | <ul style="list-style-type: none"> National and provincial income accounts, statistical yearbooks Participatory rural appraisal results, monitoring and evaluation | <ul style="list-style-type: none"> Continued growth of Thailand and Yunnan Province, PRC No adverse fiscal impact on the Lao PDR Complementary investments in other economic infrastructure, social services and programs, adequate resettlement, and environment measures |
| <p>Purpose</p> <ul style="list-style-type: none"> Establish a direct link between the PRC and Thailand via the Lao PDR to reduce transport cost within the regional influence area and increase efficiency of the movement of vehicles, goods, and passengers | <ul style="list-style-type: none"> Reduced transportation cost of goods and passenger traffic Reduced travel time by 3 days (from 5 days) in 2006 International transit and cross-border agreements in place by 2005 | <ul style="list-style-type: none"> Direct measures of travel time and vehicle operating costs through periodic surveys Direct measures of freight and passenger charges through periodic surveys | <ul style="list-style-type: none"> Timely completion of sections financed by Thailand and PRC governments Allocation of sufficient funds for road maintenance Institution of international transit system |
| <p>Outputs</p> <ul style="list-style-type: none"> Upgraded 74 kilometer section of Route 3 to a standard consistent with its potential as a major international link Resettlement plan Social action plan Environment management plan | <ul style="list-style-type: none"> Safe, all weather overland route from Yunnan Province, PRC to Thailand meeting appropriate road standards Implementation of right-of-way acquisition and resettlement plan Implementation of the social action and environment management plans | <ul style="list-style-type: none"> Project administration missions, progress reports, project completion report, participatory rural appraisal results International third-party monitoring Independent monitoring of resettlement plan | <ul style="list-style-type: none"> Good implementation coordination of the three road sections financed by Asian Development Bank and by Thailand and PRC governments Adequate social mobilization program Adherence to adequate mitigation measures as identified in the Summary Environmental Impact Assessment in environmentally sensitive project areas by contractors |
| <p>Inputs</p> <ul style="list-style-type: none"> Civil works Consulting services Salaries and other inputs by Lao PDR Government | <ul style="list-style-type: none"> Construction completed by December 2006 Acceptance and implementation of the various plans | <ul style="list-style-type: none"> Project administration missions, progress reports, consultant's reports, project completion report | <ul style="list-style-type: none"> Implementation capacity of the Department of Roads; good performance of contractors and consultants; effective construction supervision and quality control Commitment and allocation of government counterpart resources |

Lao PDR = Lao People's Democratic Republic; PRC = People's Republic of China

MAJOR GREATER MEKONG SUBREGIONAL PROJECTS

| Loan No. | Country | Project Name | Date Approved | Total Project Cost (\$ million) | Financing | | |
|--|----------|-------------------------------------|---------------|---------------------------------|-----------|------------|-------------|
| | | | | | ADB | Government | Cofinancing |
| National Projects with Subregional Dimensions | | | | | | | |
| 1325 | PRC | Yunnan Expressway | 29 Sep 94 | 461.4 | 150.0 | 311.4 | |
| 1329 | Lao PDR | Theun Hinboun Hydropower | 08 Nov 94 | 270.0 | 60.0 | 14.5 | 195.5 |
| 1369 | Lao PDR | Champassak Road Improvement | 31 Aug 95 | 60.1 | 48.0 | 12.1 | |
| 1456 | Lao PDR | Nam Leuk Hydropower Development | 10 Sep 96 | 112.6 | 52.0 | 22.1 | 38.5 |
| 1503 | Cambodia | Siem Reap Airport | 12 Dec 96 | 17.0 | 15.0 | 2.0 | |
| 1691 | PRC | Southern Yunnan Road Development | 24 Jun 99 | 770.3 | 250.0 | 520.3 | |
| Purely Subregional Projects | | | | | | | |
| 1659 | Cambodia | Phnom Penh-Ho Chi Minh City Highway | 15 Dec 98 | 52.7 | 40.0 | 12.7 | |
| 1660 | Viet Nam | Phnom Penh-Ho Chi Minh City Highway | 15 Dec 98 | 144.8 | 100.0 | 44.8 | |
| 1727 | Lao PDR | East-West Corridor | 20 Dec 99 | 40.0 | 32.0 | 8.0 | |
| 1728 | Viet Nam | East-West Corridor | 20 Dec 99 | 36.0 | 25.0 | 11.0 | |

ADB = Asian Development Bank; Lao PDR = Lao People's Democratic Republic; PRC = People's Republic of China;

ROAD SECTOR ANALYSIS

A. Transport Modes

1. Transport in the Lao People's Democratic Republic (Lao PDR) is dominated by the road sector, which carries over 90% of freight and around 85% of passenger traffic on a network that extends over about 26,000 kilometers (km) consisting of national, provincial, and local roads. River traffic is limited to the Mekong and its tributaries, the Nam Ou and the Se Kong rivers. The Mekong provides the only option for long-distance movement by river but in the wet season significant navigation hazards limit capacity. Air transport is limited by the poor quality and limited number of operational air strips but plays a crucial role in linking the provincial centers in otherwise inaccessible parts of the country. Facilities at Vientiane and Louang Prabang are equipped to handle international traffic; a further 10 airstrips are located in provincial capitals.

B. The Road Sector

1. Road Network

2. The country has a road network of about 26,000 km comprising national roads (28%), provincial roads (34%), and urban and local roads (31%). Only 18% of the total road network is paved. The rest have gravel or earth surfaces. Some roads included in the official transport system are only at the planning stage and many of the local roads are mere tracks. The public road network in the Lao PDR is divided into several different classes of roads: (i) national, (ii) provincial, (iii) district, (iv) urban, (v) rural, and (vi) special. Formal definitions of each class are given in the Road Law, which was published in 1999, with definitions of national and provincial roads also included in Ministerial Decision 1312, issued in 1997, which formalized the list of national roads.

3. Despite the many positive advances achieved in the national network, the Lao PDR continues to lag behind its neighbors in road infrastructure with a national road network of very low density—about 0.03 km per sq km. Road contact between Vientiane and many provincial capitals remains problematic. Almost two thirds of the national road system remain unpaved and much of it remains impassable during the wet season. More than half of all district centers do not have year-round road access and almost one sixth of them are inaccessible by road at any time.

2. Road Sector Institutions

4. Overall transport planning and coordination responsibilities lie with the Committee for Planning and Cooperation, which is headed by a Deputy Prime Minister. Committee for Planning and Cooperation reviews and monitors all planning activities, including those originating from Ministry of Communication, Transport, Post and Construction (MCTPC), liaises with external aid agencies, and monitors and supervises the implementation of development projects. The organization and activities of MCTPC are defined by the Prime Minister's Decree No. 66/PM of 12 May 1999. MCTPC has overall responsibility for developing national and provincial roads, telecommunications, river, road, and air transport, and postal services. Based on five-year development plans, the provinces prepare and submit annual implementation plans for transport projects to MCTPC, which then submits those to the State Planning Committee for approval.

5. The Department of Roads within MCTPC is responsible for administering, planning, constructing, and maintaining national roads and assisting the provinces with implementing road improvement and maintenance programs. The permanent staff assigned to the Department of Roads currently number 99, of whom 73 are professional and 26 technical or administrative. However, there are an additional 74 staff assigned to externally financed projects, making a

total of 173. Of the seven divisions (including Local Roads) within the Department of Roads, the Road Administration Division with 17 permanent staff is the main division dealing with road maintenance, and responsibility for planning and disbursement of payments from the Road Maintenance Fund for national road maintenance. The Planning and Technical Division has 16 staff. The Project Monitoring Division is expected to have 15 staff when fully established.

6. In recent years, MCTPC has been delegating responsibility for work to the provincial divisions of communication, transport, post and construction (DCTPC). DCTPCs form the provincial arms of MCTPC and are responsible both to central Government through the MCTPC and to the provincial administration. Staff of DCTPCs are appointed partly by MCTPC and partly by the provinces. Within the road sector the responsibilities of DCTPCs include the maintenance of national road projects within each province, and full responsibility for construction, improvement, and maintenance of district and provincial roads. The average number of DCTPC staff in each province is 75. The resources and skill base in DCTPCs is somewhat less developed and more variable than that found in MCTPC. However, the delegation process has increased the ownership and involvement in the road sector at all levels, including districts and the rural community.

3. Vehicle Fleet and Traffic

7. The registered motor vehicle fleet in the Lao PDR in mid-2000 comprised 191,440 units: 150,760 motorcycles/tricycles (79%) and 40,680 motor vehicles (Table A3.1). The average annual growth rate has been about 7% over the last 5 years. Throughout the Lao PDR, there is a generally low level of traffic on national and provincial roads. With the exception of areas around Vientiane and Savannakhet, traffic levels on the national network are below 1,000 average annual daily traffic, and on most sections below 500 average annual daily traffic. On provincial roads, traffic levels are typically below 100 average annual daily traffic.

Table A3.1: Registered Vehicles

| | Motorcycles | Three Wheelers | Car | Pickup | Jeep | Bus | Large Bus | Truck | Total |
|------|-------------|----------------|-------|--------|-------|-------|-----------|-------|---------|
| 1985 | 40,701 | 832 | 5,153 | 5,422 | 957 | 423 | 1,498 | 4,795 | 59,781 |
| 1990 | 57,878 | 897 | 5,730 | 5,983 | 1,090 | 473 | 1,625 | 6,236 | 79,912 |
| 1995 | 104,879 | 3,833 | 7,588 | 9,855 | 2,103 | 962 | 1,673 | 7,714 | 138,607 |
| 1999 | 143,846 | 4,235 | 8,461 | 13,764 | 3,828 | 1,630 | 1,760 | 9,517 | 187,041 |
| 2000 | 146,507 | 4,235 | 8,789 | 14,294 | 3,980 | 1,863 | 1,790 | 9,982 | 191,440 |

Source: Ministry of Communication, Transport, Post and Construction.

8. All passenger transport service providers in the Lao PDR have been privatized except for Vientiane Municipal Transport. The fare structure for urban, interurban, municipal, and private association services is based on the following criteria: (i) where kilometer costs exist, these are used to provide a cost per trip with fares fixed on the basis of a 90% load factor to achieve profitability; and (ii) where kilometer costs are not available, actual and estimated costs for return journeys are used and fares based on minimum number of passengers required to cover costs. Thus, fares are based on road condition and distance, with higher fares charged for services over poor roads. Although the DCTPCs are required to approve fare structures and tend to equalize fares across operators, the quality of roads traveled is the most important consideration in transport costs.

4. Road Sector Revenues and Expenditures

9. The road sector receives funding from a number of sources: government funding from the consolidated fund, road charges, grants (both bilateral and multilateral agencies), soft loans from multilateral agencies, agreements with private interest groups, and commercial loans. The June 2000 budget document released by the Ministry of Finance indicates a budget for MCTPC including provincial expenditures of KN700 billion for FY2000 (approximately \$74 million).

10. The Department of Planning and Budget handles accounting and financial matters of MCTPC, with all transactions passing through the Department of Roads regardless of source. The Department of Roads is the largest office in MCTPC and accounts for 90% of the MCTPC budget. Currently, finance and accounting for projects is located in the Disbursement Division of Department of Roads. Financial and accounting systems in MCTPC and the DCTPCs are being improved to provide functional and reliable budget expenditure reporting and accountancy. The Department of Roads has reviewed and agreed to adopt the recommendations proposed under the Lao-Swedish Road Sector Project 1 to meet the long-term objective of establishing a uniform financial and accounting system that includes all sources of funding and consolidates DCTPC accounting in MCTPC. The system complies with generally accepted accounting principles, and government and MCTPC regulations and procedures.

5. Maintenance

11. The Government's goal and strategy is to give highest priority to routine and periodic maintenance of the existing road network and to progressively increase the level of funding in these areas. A key part of this strategy was the establishment in 2001 of the Road Maintenance Fund, under the World Bank's road maintenance project, to provide funding for maintenance of national and local roads. Except for 10% of its revenues, the Road Maintenance Fund will only finance maintenance for national roads until sufficient resources are available to meet requirements for these roads. World Bank projections estimate that this will be in 2005. The main source of revenue for the Road Maintenance Fund is a levy on fuel. Additional revenue will be generated from heavy vehicle surcharge, road charges, and transit charges. The Road Maintenance Fund Advisory Board determines the application of funds to maintenance work. The Swedish International Development Cooperation Agency is supporting the maintenance of rural roads under the ongoing project.

12. The Road Maintenance Fund will allocate funds based on reports from a road maintenance management system. These reports will be based on data on road conditions input by provincial DCTPCs with each proposed periodic maintenance subproject ranked in terms of economic return. The selection of periodic maintenance subprojects will be based on location, type of works, cost estimates, and economic analysis based on the Highway Development Maintenance model.

6. Axle Load Control

13. In December 1999, the Government signed the Association of South East Asian Nation Transit Traffic Agreement, in which maximum gross vehicle weights were set at approximately 9.1 ton axle load equivalent, with optional lower limits to be declared officially. Currently, MCTPC is implementing a heavy transport management program. The main activities under this program comprise review of existing regulations, enforcing regulations, providing equipment (weigh scales) and training and supporting a public information campaign. The World Bank is supporting the formulation and implementation of a national strategy to reduce overloading

under its road maintenance project. This is in line with earlier Asian Development Bank project components.

7. Road Safety

14. Road accident fatalities in the country have been rising sharply since 1991, with a 245% increase between 1991 and 1999. Road accidents have also increased by 176%. Current fatality rates are the highest among the Southeast Asian countries at almost 20 persons per 10,000 vehicles. The figure is growing and with the current rate of increase in vehicles, a growing population, and an improved road network, the potential for even greater accident rates is high. A draft national road safety strategy has been prepared that is built around five elements (i) education, (ii) enforcement, (iii) technical environment, (iv) coordination, and (v) research and evaluation. The strategy envisages implementation through a national road safety committee under MCTPC and the forging of a road safety partnership among the Traffic Police Department and the Department of Education. International nongovernment agencies such as Handicap International are supporting efforts to create a network to increase awareness of road safety issues and to address the trauma of road accidents.

C. Government Objectives and Priorities for the Roads Sector

15. The Government has given high priority to the improvement of the road transport system, principally to facilitate (i) movement of agricultural products from surplus to deficit areas, (ii) flow of consumer goods and agricultural inputs to rural areas, (iii) marketing and export of cash crops and other produce, and (iv) effective participation in regional and international trade. The targets for physical infrastructure development include (i) completing the national road network, including road links with Cambodia, the People's Republic of China, and Viet Nam, and bridge links with Thailand; (ii) improving the provincial road network; (iii) upgrading access roads to the central part of Viet Nam to facilitate the Lao PDR's international trade through ports in Viet Nam; and (iv) establishing a sustainable maintenance system to preserve the country's transport infrastructure. Infrastructure development, particularly roads, is being coordinated closely with regional cooperation initiatives being developed under the ADB Greater Mekong Subregion initiative as the country is centrally located among Cambodia, People's Republic of China, Myanmar, Thailand, and Viet Nam.

SUMMARY RESETTLEMENT PLAN

1. **Scope of the Resettlement Plan.** As part of the Project's preparation, a social analysis was carried out along the entire project road. A census and inventory of lost assets was carried out for all households potentially affected by loss of homestead land and dwellings within a 14-meter (m) wide corridor of impact (COI) in towns and villages and within a 20-m wide COI in rural areas. Based on the information collected for this COI, a resettlement plan has been prepared for the Project in compliance with the Asian Development Bank (ADB) *Policy on Involuntary Resettlement* (1995) and the *Handbook on Resettlement: A Guide to Good Practice*.

2. **Scope of Land Acquisition and Resettlement.** For the present COI, the Project would require land acquisition of 122 hectares of mainly rice land and 1.7 hectares of residential land, affecting 2,550 people in 502 families, 543 dwellings, 61 small retail shops, and 133 rice storage bins, all of which would need to be relocated. Also affected will be gardens, fishponds, and plantations. There will also be some temporary impact on land during construction and disruption to irrigation systems, which will be restored. The exact alignment will be determined during detailed design, following which the amount of actually affected land, households, and assets will be identified and measured during the detailed measurement survey. If the scope of the Project is changed, the resettlement plan will be updated; however, such change is not anticipated.

3. **Policy Framework and Entitlements.** The policy framework and entitlements have been built upon the laws of the Lao People's Democratic Republic (Lao PDR), principally the Constitution (1991) and the Land Law (1997), the draft National Resettlement Policy for All Projects in the Lao PDR, which will be the basis for a ministerial decree being drafted under the ADB environmental and social program loan,¹ ADB's *Policy on Involuntary Resettlement* (1995), and government-approved resettlement plans for other ADB and World Bank projects. Provisions and principles adopted in the resettlement plan for the Project supersede the provisions of relevant decrees currently in force in the Lao PDR wherever a gap exists.

4. **Project Principles.** The following basic principles have been adopted for the Project:
 - (i) Acquisition of land and other assets, and resettlement of people will be minimized as much as possible.
 - (ii) All affected persons (APs) will be identified in the project-impacted areas at a yet to be determined cutoff date, and will be covered under the resettlement measures sufficient to assist them to improve or at least maintain their preproject living standards, income-earning capacity, and production levels.
 - (iii) APs will not be required to have formal legal title to the land used by them to be eligible for compensation and rehabilitation measures.
 - (iv) APs will be provided with full replacement costs so as to enable them to have a house or a structure of the same size and standard; agricultural land for land of equal productive capacity acceptable to the AP; replacement of residential and commercial land of equal size acceptable to the AP; and transfer and

¹¹ ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Lao PDR for the Environment and Social Program*. Manila.

subsistence allowances during the transition period, while people are dismantling and rebuilding their structures and reestablishing their productive incomes.

- (v) Replacement residential and agricultural land will be as close as possible to the land that was lost, and acceptable to the AP. In cases where sufficient replacement land is not available in villages, the Project will assist the villages to develop new rice land. The Project will also assist villages to level residential sites and sites for livestock and fishponds. Villages will be provided with land titles for their existing and replacement land in due course.
- (vi) Temporarily affected land and community infrastructure will be restored to preproject conditions.
- (vii) The compensation and resettlement activities will be satisfactorily completed and rehabilitation measures will be in place before commencement of civil works.
- (viii) The Ministry of Communication, Transport, Post and Construction (MCTPC) will see to it that institutional arrangements are in place to ensure effective and timely design, planning, consultation, and implementation of the land acquisition, compensation, resettlement, and rehabilitation program.
- (ix) Existing cultural and religious practices shall be respected and, to the maximum extent practical, preserved.
- (x) Special measures have been incorporated in the resettlement plan and complementary social action plan to protect socially and economically vulnerable groups such as ethnic minority peoples, women-headed families, children and elderly people without support structures, and people living in extreme poverty.
- (xi) There will be effective mechanisms for hearing and resolving grievances during the implementation of the resettlement plan.

5. **Entitlement Matrix.** The project entitlements have been designed to provide compensation, resettlement, and rehabilitation for lost assets and to restore the livelihoods of all categories of APs. The entitlement matrix for the Project (Table A4) summarizes the main types of losses and the support entitled for each type of loss. Compensation for structures will be calculated at full replacement cost at current market value, based on a competent technical survey. Structures that cannot be moved will be compensated at their full replacement cost of labor and materials to build a new structure. Movable structures will be assessed for their ability to be moved. If APs agree that the structure can be moved, assistance will be provided to cover the full replacement costs of site preparation, dismantling, moving, and rebuilding the structures.

Table A4: Summary Entitlement Matrix

| Type of Loss | Entitled Persons | Compensation | Implementation issues |
|--------------------------------------|--|---|--|
| Dwellings | Registered taxpayer or occupant identified during survey | Full replacement cost so as to enable affected persons to have a dwelling of the same size and standard | Stakeholder consensus on replacement value assessment |
| Residential land | Registered taxpayer or occupant identified during survey | Replacement land if relocating to another site or compensation in cash at replacement cost for households who can move back to existing site | Stakeholder consensus on suitability of replacement land |
| Expenses of residential relocation | Registered taxpayer or occupant identified during survey | Lump sum payment sufficient to cover all relocation costs as agreed with the affected person | Stakeholder consensus on definitions |
| Rice storage bins | Owner identified during survey | Lump sum payment sufficient to cover all relocation costs as agreed with the affected person | Assessment of suitability of relocation sites |
| Small retail shops | Owner identified during survey | Lump sum payment sufficient to cover all relocation costs as agreed with the affected person | Review of shop recorded during survey |
| Agricultural land | Owner or person with use rights identified during survey | Replacement land of comparable yield | Stakeholder consensus on suitability of replacement land |
| Crops and trees | Owner or person with customary use rights | Full compensation of anticipated harvest at market value | Consensus among stakeholders on valuation assessment |
| Common property resources | Community losing the resources | (i) Restoration of affected community buildings and structures to at least previous condition; or (ii) Replacement in areas identified in consultation with affected communities and relevant authorities; (iii) Full compensation for loss of income. | |
| Temporary impact during construction | Owner or person with use rights identified during survey | (i) Extreme care by contractors to avoid damaging property. (ii) Where damages do occur, the contractor will be required to pay compensation immediately to affected families, groups, communities or government agencies. (iii) Damaged property will be restored immediately to its former condition. | |

Source: ADB. 2002. *Draft Final Report for Preparing the Northern Economic Corridor for the Lao PDR*. Manila.

6. **Resettlement Strategy.** Land acquisition impacts and rehabilitation measures have been assessed at the individual and community levels. During the detailed design, every effort will be made to reduce the need for relocation and rice land. Households will be assisted to move back from the road. For households that have to move, the Project will assist communities and households by leveling new land for house plots and livestock pens, fencing for livestock and vegetable gardens, and guiding village planning, expanding rice land, and establishing fishponds. Villages will be assisted to fence the roadsides to prevent children and livestock from wandering onto the road. The Project will also provide improved multipurpose water supply, following a village needs assessment.

7. **Income Rehabilitation.** The Project includes several income restoration programs as part of the resettlement plan and Social Action Plan. The Project will include assistance for rice land preparation, digging of fish ponds, training in literacy, numeracy, and business and marketing skills to take advantage of small businesses and trade opportunities.

8. **Participation in Resettlement Planning and Implementation and Grievance Mechanism.** There was an extensive consultative process during the social analysis and resettlement planning period of the feasibility study. Resettlement planning and implementation will follow a participatory approach using facilitators to mobilize the affected communities to participate in alignment selection, inventory of losses, validation of compensation rates and entitlements, delivery of entitlements, design and delivery of the social action plan, monitoring of impacts and benefits, and design and participation in a grievance redressal mechanism.

9. **Disclosure.** Key information on the resettlement plan is disclosed to the affected communities through an information brochure. Three Project information centers, one in each district, have been established. The summary of the resettlement plan has been put on ADB's web site.

10. **Institutional Arrangements.** At the national level, the environmental and social division of the Department of Roads will be strengthened to provide overall guidance and technical support to the provincial and district resettlement committees. The environment and social units at provincial levels will also be established under the Project. Provincial, district, and village resettlement committees will be established. Village resettlement committees will actively participate in design and implementation of the resettlement plan and social action plan.

11. **Monitoring of Resettlement Plan Implementation and Impacts.** Monitoring of the land acquisition process will be conducted independently of the MCTPC by a local qualified agency.

12. **Implementation Schedule.** All resettlement activities will be coordinated with the civil works schedule. The Government and ADB will ensure that demolition and construction will not begin unless the Government has completed satisfactorily and in accordance with the approved resettlement plan compensation payments and relocation of APs to new sites.

SUMMARY SOCIAL ACTION PLAN

A. Introduction

1. The Northern Economic Corridor (the Project) passes through about 90 villages, all except one, are ethnic minority villages. Whereas the resettlement plan is designed to mitigate impacts from land acquisition, the social action plan (SAP) is designed to enhance project benefits to the communities along the road. The SAP serves as an ethnic minority development plan required under the Asian Development Bank (ADB) *Policy on Indigenous Peoples*. The SAP has been prepared in full consultation with ethnic minority people along the road.

B. Legal Framework

2. A series of recent laws and decisions reflect increasing awareness of the Government of the Lao People's Democratic Republic (Lao PDR) on the need to incorporate the concerns of ethnic minorities in development process in all sectors. The Department of Ethnic and Social Affairs of the Lao Front for National Construction is responsible for coordinating ethnic minority issues at the central government level and developing and implementing policies toward ethnic minorities and the mountainous regions. The Resolution of the Party Central Organization Concerning Ethnic Minority Affairs in the New Era (1991) mandated all government agencies to create a targeted plan for the development of rural, mountainous area. The National Socio-Economic Development Plan for 2001–2005 has adopted as its objective the alleviation of poverty for ethnic minorities in remote areas and forestry laws recognize customary land use rights.

C. Baseline Data

3. A primary social feature of the Project is the high degree of ethnic diversity found in the population along the road. To date, at least 16 ethnic groups, belonging to four ethno-linguistic families, have been identified along the project road (Table A4.1). In Louang Namtha province 97.7% of the population are ethnic minorities, whereas in Bokeo province, the proportion of the population who are ethnic minorities is 86.6%. The majority of the populations are rural, living in villages of about 100 to 1,000 people. Agriculture is the primary economic activity, with much of it at a subsistence level.

Table A4.1: Languages Spoken in the Northern Economic Corridor

| Language Family | Branch of Language Family | |
|-----------------------|----------------------------------|--------------------------|
| Tai-Kadai | Southwestern | Northern |
| | Lao, Leu, Kalom, Nyouan, Tai Dam | Nhang (Yay) ^a |
| Austroasiatic | Khmuic | Palaungic |
| | Khmou, Khmou Ou, Kwen, Ngouan | Sam Tao, Lamet, Bit |
| Tibeto-Burmese | Lolo-Burmese | Central Loloish |
| | Southern Loloish | Lahu Shi (Kui) |
| | Panna | |
| Hmong-Mien | Kim Moun (Lanten), Hmong | |

^a Names in parentheses are the terms more commonly used by outsiders.

D. Land Tenure

4. Since 1997, the Land Law has provided the primary legal basis for the Land-Forest Allocation Program. The Land-Forest Allocation Program was originally conceived as a way of preventing illegal logging by provincial and district entrepreneurs by giving villagers ownership of forest resources through a process of participatory land use planning. However, the original intention became diluted through the intervention of the program to reduce shifting cultivation and through the rural development approach of bringing villages to services (as opposed to taking services to villages), which involved village relocation and consolidation. Land-forest allocation is premised on the lowland notion that permanent agriculture comprises only paddy cultivation, gardens, orchards, and plantations. These are not subject to reallocation since they are classed as permanent and land title is given automatically, provided it can be verified by local authorities. Swidden farming, on the other hand, is considered impermanent and is therefore the target of the national goal to “reduce shifting cultivation”. The Land-Forest Allocation Program issues temporary land certificates to upland farms only if they meet the “permanent” criteria.

5. In principle, obtaining land use rights under the Land-Forest Allocation Program begins with the issuance of a temporary land use certificate that is valid for 3 years. At the end of the period, if land is used as specified, a land title for long-term use may be requested. It may be inherited, sold, and leased according to land registration procedures and land tax payment requirements. Land-forest allocation is a government policy designed to assist villages with high-quality land use planning and titling; however, implementation has often not followed the policy and has caused severe hardship for many swidden cultivators. The worst problem has been reduction of fallow periods to 3–4 years from the original fallow cycles of an average of 15 years and longer. Adequate “permanent” livelihood substitutes have not been successful. Most families are given paddy land that cannot be cultivated due to poor soils or lack of water. Suitable paddy land, especially in mountainous zones, is not enough to meet the needs of the program, and technical assistance is not readily available to support either paddy or permanent upland cropping.

6. Rights of women with respect to land titling include the right of certification and the right of inheritance of lands and other assets. Although a considerable proportion of inheritance accrues to women, only a fraction of this is registered in the name of the wife, notwithstanding the fact that males and females have equal right under the Land Law of the Lao PDR. The low level of women’s registration is attributed to (i) lack of knowledge of ownership rights on the part of women; (ii) cultural reluctance on the part of women; (iii) low levels of female literacy and education, particularly in the remote rural areas; and (iv) lack of capacity and awareness of gender issues on the part of the certifying officers.

7. The World Bank is financing a land-titling project to assist the Government with its land-titling program. This project does not include Louang Namtha or Bokeo provinces, although dialogue is ongoing with the government to consider extending it to the project area. This would enable all households in the project villages to be issued with land titles on a priority basis. The World Bank land-titling project is also addressing constraints to land registration facing women.

E. HIV/AIDS/STD¹ and Trafficking

8. Official data on blood tests for HIV/AIDS indicate increasing levels of incidence: the number of deaths from HIV/AIDS has also increased from 72 between 1990 and 2000 to 24 in 2001 alone.² A recent study by CARE International's STD Training and Education Materials Project in Louang Prabang and Oudomxay suggests that outreach program should focus more on "at risk" populations groups, namely female traders, truck drivers, male government officials, commercial sex workers, and ethnic minorities.³ The Project may lead to negative impacts in terms of higher exposure of local population to HIV/AIDS and STD, both during construction period and in the medium-term. The SAP therefore includes an awareness program, aimed at preventive measures for the target groups.

9. Human trafficking is on the rise in Asia as people flee poverty and conflict. Better transport and communication links contribute to the problem. According to a recent study by the Swedish Government, human trafficking ranks third, (after drugs and arms smuggling), in the scale of organized crime. Women and children are the most vulnerable. They are used for commercial sex, domestic labor, and construction work. Children are also in demand for factory or farm work or in the entertainment sector. Trafficking amounts to a gross violation of human rights and hampers the struggle to end poverty and gender inequality in Asia. One effective way to reduce the degrading trade is to address the factors that render women and children vulnerable. The SAP proposes prevention through mass and targeted campaigns to address the risk of trafficking of women and children.

F. Development Activities

10. The overall strategy for the SAP is to develop a strong social and economic base upon which communities, the Government, and development assistance programs can build in future. The focus will be on the communities in greatest need of coping skills to respond to the opportunities presented by an all-weather road. The design and implementation of all components of the SAP will be done following a participatory approach during project implementation using facilitators for identification of community needs and appropriate design of SAP activities. The SAP will address the special needs of the ethnic minority women by specifically targeting ethnic minority women and girls in the participatory design and implementation of all components. The SAP will include the following activities to be undertaken in the communities along the road.

1. Community Roads

11. An amount of \$1.6 million is allocated for the construction of community roads along the project road. The various road segments are to be selected based on a participatory process involving the communities and the provincial authorities. This participatory process will be guided by consultants engaged as part of the project coordination team. The consultants will prepare and submit a justification report to ADB and the Government of Lao PDR for the selected roads based on the following criteria: (i) the roads will be selected using a community-based participatory approach; (ii) the roads will not be widened to more than 3.5 meters; (iii) no

¹ Human immunodeficiency virus/acquired immunodeficiency syndrome/sexually transmitted disease.

² Official data from NCCA, dated 22 March 2002.

³ CARE International in Lao PDR. *STD Training and Education Materials Project*, Mid-Term Evaluation, November 2000.

new alignments will be constructed; (iv) arrangements will be in place for community-based maintenance; (v) roads that provide access to protected forests, virgin forests, and steep slope areas will not be included; (vi) tree felling must be avoided; (vii) road selection will comply with all regulations regarding impacts on provincial and national biodiversity areas; (viii) the roads will not involve the construction of major drainage structures; and (ix) the roads will avoid displacing or adversely affecting villages or individual homesteads or agricultural land.

2. Water Supply and Sanitation Schemes

12. The Project will support the Lao PDR's Strategy for the National Water Supply and Environmental Health Program, led by the National Centre for Environmental Health and Water Supply (Nam Saat). The long-term goal of this strategy is that every rural person of the Lao PDR has access to safe and adequate water supply and sanitation facilities and lives in a hygienic environment. The World Bank water and sanitation program has been supporting this strategy in Louang Namtha Province since 1994. The World Bank's direct project support will come to an end in December 2002; however, the non-project support to Nam Saat will continue. The project has built considerable capacity within Nam Saat and Louang Namtha Division of Communication, Transport, Post and Construction for rural water supply, sanitation, and hygiene. Nam Saat is now seeking funding to continue their project work of providing water supply and sanitation to the remaining people of Louang Namtha province. Nam Saat Bokeo province is receiving funding and technical assistance from the Swedish International Development Cooperation Agency to carry out their program in Bokeo. As a part of the SAP, the Project will support Nam Saat at the central level and in the provinces of Louang Namtha and Bokeo so as to provide access to safe and adequate water supply and sanitation facilities and enhance awareness. Nam Saat together with the Department of Health, will be the implementing agency for this component of SAP. The Division of Communication, Transport, Post and Construction will be responsible for overall coordination. Nam Saat, Louang Namtha will recruit a local consultant to provide technical assistance whereas Swedish International Development Cooperation Agency's technical expert will continue to assist Nam Saat in Bokeo. Provincial and district coordination teams already exist and comprise of the Department of Education, Lao Women's Union and Youth Union, Urban Water Supply Department, Rural Development Committee, and Nam Saat.

13. Nam Saat Louang Namtha will be asked to take the lead in preparation of the proposal together with Nam Saat Bokeo, and with guidance from Nam Saat at the central level. The World Bank has offered to finance the costs of the proposal preparation if so requested by Nam Saat and ADB. The proposal would be based on a needs and demand assessment for the villages along the project road that do not yet have water supply and sanitation schemes, and would include an awareness program. The selection of villages to benefit from water and sanitation schemes would be based on the following criteria: (i) the villages will be selected using a community-based participatory approach; (ii) arrangements will be in place for community-based maintenance; (iii) construction of the schemes will avoid displacing or adversely affecting villages or individual homesteads/ agricultural production areas, and if displacement is essential, appropriate compensation measures will be applied in accordance with ADB's *Policy on Involuntary Resettlement* and consistent with the resettlement plan prepared for the Project; and (iv) construction of the schemes will avoid environmental degradation.

3. Education and Awareness Program

14. **HIV/AIDS/STD.** This subcomponent of SAP will be designed and implemented by an international NGO through the National Committee for Control of AIDS and the Provincial Committees for the Control of AIDS. The program will generally follow the methodology established by the STD and HIV/AIDS Reduction Project, which CARE International has been implementing in Bokeo province since 1991, and will also involve the Lao Women's Union. The program will include: (i) baseline survey on HIV/AIDS/STD and village populations (to check the movement of people later on); (ii) the formation of village monitoring groups; (iii) preventive education and awareness through peer education and training of trainers (beginning with the formation of core groups of village heads, leaders of women's and youth groups); (iv) behavior, communication, and change awareness, including preparation of information, education, and communication materials; and (v) STD services/health clinics on construction sites, including condom promotion and distribution, drugs for treatment, revolving drug funds. The 2-year program will target communities, border crossings, truck companies, bars and tea shops, construction workers and truck drivers during construction. The program will also target truck drivers and border crossings facilities after the project completion.

15. **Non-formal Education.** This subcomponent will include non-formal education of communities in areas such as (i) birth-spacing services to mitigate the likelihood of increased rates of unwanted pregnancies associated with improvements in health and economic status; (ii) literacy and numeracy; (iii) marketing and other skills for setting up and running small business; (iv) skills and leadership training for women and girls; (v) land zoning and titling, and (vi) land use rights awareness.

16. **Road Safety Program.** The road may lead to increased accidents and so road safety awareness program has been made an integral part of SAP. This subcomponent will consist of the development and delivery of a road safety awareness and education program activities such as (i) enforcement of construction safety standards during construction period; (ii) installation of appropriate signs warning drivers to slow down in settled areas; (iii) establishment and enforcement of speed limits; (iv) road safety education for rural children and awareness in communities; and (v) construction of roadside fences as necessary to discourage livestock and small children from stepping into the roadway, as is done already in some roadside villages in Bokeo province.

4. Pilot Project for Community Development in the Nam Ha Watershed

17. A Japan Fund for Poverty Reduction project⁴ is proposed to be undertaken as a pilot in nine villages in the Nam Ha Watershed (seven villages in Viangphoukha district and two villages in Namtha district). From the perspective of Government, the major issues facing the population and target area are secured livelihood and increased economic capacity for communities, while conserving and protecting the national biodiversity conservation area watershed and remaining forest. Therefore, this project concept has been developed to assist these communities to continue the development of sustainable and permanent land use systems of agriculture and forestry that will enable them to avoid an ever-increasing scale of swidden agricultural practice with associated negative environmental and economic impacts. The project aims to maximize the stability and productivity of agriculture while developing an agro-forestry component that will ensure longer-term income and food security and actually increase the level of forest cover for

⁴ The proposed project was appraised between 31 August and 14 September 2002.

watershed protection, wild life habitat, and local and national income. The main project activities would comprise: (i) participatory analysis of the land capability, consultative land-use planning with communities, district and provincial government personnel, and the cooperative development of secure land-use rights/land title for farming families; (ii) development of alternative livelihood (small-scale irrigation, rain-fed upland arable land terracing and land stabilization, fruit orchards, nontimber forest products domestication, livestock systems, firewood and community forest plantation); and (iii) this would be combined with a component to link the increased productivity with the marketing potential of the road.

G. Institutional Capacity

18. Within the central Government, the lead coordinating agency for ethnic minority issues is the Lao Front for National Construction and its Department of Ethnic and Social Affairs helps the Government develop and implement policies toward ethnic minorities and the mountainous regions. The national level Central Leading Committee for Rural Development and provincial rural development committees and rural development offices oversee rural development. Design and implementation of the various components of the SAP will be undertaken by locally recruited consultants in coordination with the local agencies. Institutional capacity will be assessed during the participatory needs assessment during project implementation and on-the-job assistance for design and implementation will be provided to these agencies.

H. Monitoring

19. MCTPC will recruit an independent local consulting agency or locally based non-governmental organization to monitor and evaluate the implementation and impacts of the SAP. Monitoring and evaluation will involve the participation of the project communities.

DETAILED PROJECT COST ESTIMATES

(\$ million)

| Item | Foreign Exchange | Local Currency | Total Cost |
|--|---------------------|-------------------|---------------|
| A. Base Cost^a | | | |
| Asian Development Bank Section | | | |
| 1. Land Acquisition and Resettlement | 0.00 | 1.00 | 1.00 |
| 2. Civil Works | | | |
| a. Project Road | 15.04 | 3.76 | 18.80 |
| b. Toll Collection | 0.36 | 0.09 | 0.45 |
| c. Community Infrastructure for Social Action Plan | | | |
| i. Community Roads | 1.28 | 0.32 | 1.60 |
| ii. Water and Sanitation Schemes | 0.96 | 0.24 | 1.20 |
| 3. Consulting Services | | | |
| a. Construction Supervision | 0.88 | 0.78 | 1.67 |
| b. Project Coordination | 1.20 | 1.07 | 2.27 |
| c. Social Action Plan – Education & Awareness | | | |
| i. HIV/AIDS/STD and Trafficking | 0.13 | 0.12 | 0.25 |
| ii. Nonformal Education | 0.24 | 0.21 | 0.45 |
| iii. Road Safety Awareness | 0.11 | 0.09 | 0.20 |
| d. Environment Management Plan | 0.60 | 0.40 | 1.00 |
| 4. Project Management | 0.00 | 1.20 | 1.20 |
| People's Republic of China Section | | | |
| 1. Civil Works for Project Road | 17.28 | 4.32 | 21.60 |
| 2. Consulting Services | 1.38 | 1.22 | 2.60 |
| Thailand Section | | | |
| 1. Civil Works | 17.14 | 4.29 | 21.43 |
| 2. Consulting Services | 1.36 | 1.21 | 2.57 |
| Subtotal (A) | 57.97 | 20.32 | 78.29 |
| B. Contingencies^b | | | |
| 1. Physical | 5.80 | 1.95 | 7.75 |
| 2. Price | 3.08 | 0.96 | 4.04 |
| Subtotal (B) | 8.88 | 2.91 | 11.79 |
| C. Taxes and Duties | 0.00 | 4.51 | 4.51 |
| D. Interest During Construction | 1.20 | 0.00 | 1.20 |
| Total | 68.05 | 27.74 | 95.79 |

HIV/AIDS/STD = human immunodeficiency virus/acquired immunodeficiency syndrome/sexually transmitted disease.

^a In August 2002 prices less taxes and duties.

^b Includes physical contingency at 10% and price contingency at 2.4% annual increase.

Source: Asian Development Bank estimates.

IMPLEMENTATION SCHEDULE

| Task Name | 2002 | | | | 2003 | | | | 2004 | | | | 2005 | | | | 2006 | | | | 2007 | | | |
|---|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Project Preparation | | | | | | | | | | | | | | | | | | | | | | | | |
| Loan Processing | | | | | | | | | | | | | | | | | | | | | | | | |
| Procurement of Consultants | | | | | | | | | | | | | | | | | | | | | | | | |
| Appointment of Consultant | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil Works Construction - Funded by ADB^a | | | | | | | | | | | | | | | | | | | | | | | | |
| Procurement of Contractor ^a | | | | | | | | | | | | | | | | | | | | | | | | |
| Contract Awards for Civil Works Contract | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobilization | | | | | | | | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | | | | | | | |
| Construction Work | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil Works Construction - Funded by PRC | | | | | | | | | | | | | | | | | | | | | | | | |
| Procurement of Contractor | | | | | | | | | | | | | | | | | | | | | | | | |
| Contract Awards for Civil Works Contract | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobilization | | | | | | | | | | | | | | | | | | | | | | | | |
| Construction Work | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil Works Construction - Funded by Thailand | | | | | | | | | | | | | | | | | | | | | | | | |
| Procurement of Contractor | | | | | | | | | | | | | | | | | | | | | | | | |
| Contract Awards for Civil Works Contract | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobilization | | | | | | | | | | | | | | | | | | | | | | | | |
| Construction Work | | | | | | | | | | | | | | | | | | | | | | | | |

ADB = Asian Development Bank; PRC = People's Republic of China; Q = quarter.

a Based on Design Construct Contract.

PROPOSED CONTRACTUAL ARRANGEMENTS

1. Implementation of the Project will be undertaken through a number of civil works and consulting services packages. The proposed packaging and procurement or recruitment procedures for these civil works and consulting services packages are presented in Table A8 with details and justifications, for the proposed procurement or recruitment procedures for each package given below.

Table A8: List of Contracts and Consulting Services

| Contract No. | Contract Details | Approximate Value (\$ million) | Procurement Mode |
|--------------|---|--------------------------------|----------------------------------|
| 1. | Civil Works^a | | |
| A. | Project Road – ADB Section | 18.80 | ICB |
| B. | Toll Collection | 0.45 | LCB |
| C. | Community Infrastructure | | |
| | (i) Community Roads | 1.60 | LCB (Multiple) |
| | (ii) Water and Sanitation Schemes | 1.20 | LCB (Multiple) |
| | Subtotal (A) | 22.05 | |
| 2. | Consulting Services | | |
| A. | Project Coordination and Construction Supervision ^b | 4.39 | International Recruitment (QCBS) |
| B. | Resettlement Planning, Implementation, and Capacity Building ^c | 0.20 | Individual Recruitment |
| C. | Social Action Plan | 0.25 | International Recruitment (QCBS) |
| D. | Environment Management Plan | 1.00 | Direct Selection |
| | Subtotal (B) | 5.84 | |
| | Total | 27.89 | |

ADB = Asian Development Bank; ICB = international competitive bidding; LCB = local competitive bidding; QCBS = quality and cost-based selection.

^a Civil works only, excluding all land acquisition and resettlement.

^b Services include the following components of the Social Action Plan: (i) nonformal education; and (ii) road safety awareness.

^c Included in project coordination component of project cost estimate.

A. Civil Works Procurement

2. Procurement of all civil works contract will be in accordance with the Asian Development Bank (ADB) *Guidelines for Procurement*. The proposed packaging and mode of procurement of the civil works contracts is as follows:

- (i) **ADB-Financed Section of the Project Road.** Bidding will follow international competitive bidding procedures for a *Design-Build (Turnkey) Contract* and the contractor will be selected from prequalified bidders.
- (ii) **Toll Collection.** Bidding will follow local competitive bidding (LCB) procedures. The facilities to be procured under this contract will include the construction of toll plazas and checkpoints, and the provision of associated equipment. As these

plazas and checkpoints will be small scale and will be constructed at various location along the Project Road, it is not expected that this work will be attractive to international contractors.

- (iii) **Community Infrastructure–Community Roads.** Bidding will follow LCB procedures. As the roads to be constructed under this component are small scale, the nature of the work and the size of the contracts will not be attractive to international contractors.
- (iv) **Community Infrastructure–Water and Sanitation Schemes.** The civil works for the water and sanitation schemes under the Social Action Plan will be carried out by qualified local contractors, selected and engaged in accordance with the Bank's *Guidelines for Procurement* by the provincial offices of the Division of Public Health.

B. Recruitment of Consultants

3. Consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to the ADB on the engagement of domestic consultants. The services have been divided into four packages as follows:

- (i) **Package 1: Project Coordination and Construction Supervision Consultant.** Recruitment for this package of services will be based on quality and cost-based selection (QCBS) procedures for international recruitment with full technical proposals. Shortlisted firms will be required to demonstrate experience of construction supervision of major international roads in remote areas.
- (ii) **Package 2: Resettlement Planning, Implementation, and Capacity-Building Consultants.** Recruitment for this package of services will be based on procedures for the recruitment of individual consultants. This procedure is justified as the implementation schedule indicates that civil works contracts will be awarded for the People's Republic of China and Thailand funded portions of the project road before the consultants under package 1 can be recruited. As resettlement activities must commence in advance of the award of civil works contracts, the period of time available to complete the recruitment of these consultants is very short. In addition to the above, as the project passes through a region of ethnic and cultural sensitivity there is a need to ensure that the resettlement plan is implemented in a manner that is complementary to the local cultural and ethnic environment. Therefore, recruitment of the consultants for this work must ensure that the individuals have extensive experience of working on social projects within the context of Lao culture and ethnicity.
- (iii) **Package 3: Social Action Plan.** Recruitment for this package of services will be based on QCBS procedures for international recruitment with simplified technical proposals. Shortlisted firms will be required to demonstrate that they have experience of (a) the design of effective awareness and prevention programs, and (b) implementing these programs within the Lao cultural and ethnic context.
- (iv) **Package 4: Environment Management Plan.** The Government has agreed to the recruitment of the International Union for the Conservation of Nature and Natural Resources (IUCN) on a direct selection basis to implement the

environment management plan. A simplified technical proposal will be requested. It was agreed that this was justified on the basis of IUCN's experience in international environmental monitoring and biodiversity conservation in the Lao People's Democratic Republic. Furthermore, these services will include acting as an independent third-party environmental monitor, a role that IUCN has been engaged for under the ongoing Rural Access Roads Project.¹ It was further agreed that IUCN would be engaged through a contract with the Environment Research Institute under the Science, Technology, and Environment Agency.

¹ ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Lao PDR for the Rural Access Roads Project*. Manila.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

1. The consulting services for the Project will be divided into four contracts as follows (i) Package 1: Project Coordination and Construction Supervision; (ii) Package 2: Resettlement Planning, Implementation, and Capacity-Building Consultants; (iii) Package 3: Social Action Plan; and (iv) Package 4: Environment Management Plan. An outline of the terms of reference for each part of the services follows.

A. Package 1: Project Coordination and Construction Supervision

1. Project Coordination

2. The scope of work of this portion of the services are designed to assist the Ministry of Communication, Transport, Post and Construction (MCTPC) in the implementation of the entire Project and the scope of the work will include the following activities. For these components, the Project Road includes all three sections: from Houayxay to Boten whereas the Asian Development Bank (ADB)-funded section refers only to that part of the project road to which ADB funds are being applied for the civil works.

- (i) Review and monitor planning, progress, and coordination of the three contracts for the construction of the Project Road. Prepare and submit regular reports to MCTPC and ADB in a format to be agreed;
- (ii) Ensure that all land acquisition and resettlement activities have been completed prior to the handover of any section for construction of the Project Road;
- (iii) Assist MCTPC with the review of designs proposed for the sections funded by the People's Republic of China and Thailand governments. Any deviations of these designs from that proposed under the ADB-funded technical assistance TA 3817-LAO: *Northern Economic Corridor* must be brought to MCTPC's attention;
- (iv) Undertake (a) a safety audit of the final detailed designs of the project road, and (b) technical and quality audits of construction activities to ensure that construction work for the Project Road conforms with the technical and commercial requirements of the construction contracts. These audits are to be conducted on a quarterly basis, the timing of the first audits will be agreed with MCTPC but will not be later than 6 months after award of any civil works contract;
- (v) Assist MCTPC with the administration of contractors' statements and submission of loan withdrawal applications for all contracts under the Project;
- (vi) Review study reports on tolling for the Project Road and prepare: (a) a detailed toll collection system that addresses maximization of toll revenue and minimizes revenue leakages; (b) implementation plan for the proposed toll collection system; and (c) construction documentation to construct, equip, and commission the toll collection system under a civil works contract to be completed under this Project;
- (vii) Assist MCTPC in identifying sites suitable for the establishment of truck weigh stations at three points along the Project road with one station in each district;

- (viii) Prepare a justification report for the selection of community access roads to be constructed under the Project. This report will confirm that all selected roads have met the required selection criteria; and
- (ix) Prepare contract documentation for the construction of the roads under the community infrastructure component suitable for construction by domestic contractors under local competitive bidding procedures. Contract documents are to be based on MCTPC's standard documentation. Assist MCTPC in the procurement of these contracts and in the supervision of the work and the administration of the contracts.

2. Construction Supervision

3. The scope of work for this portion of the services will assist MCTPC with the administration of the civil works contract for the portion of Project road to be funded by ADB. This contract will be procured under international competitive bidding under *Design-Build (Turnkey)* conditions of contract.

a. Design Review

4. The consultant will review the designs prepared by the contractor. The consultant will be responsible for ensuring that the contractor's proposed design is in accordance with the agreed design standards and international best practice. The scope of work will include all necessary survey, investigations, analysis, and testing to check that the proposed designs are complete and contain all necessary information for construction. Designs to be reviewed will include pavement, all drainage structures, and bridges. The consultant will be responsible for the issuance of all notices to the contractor for approval of design drawings and for ensuring that all resettlement and land acquisition works have been completed prior to the hand over of any section to the contractor for civil works to commence.

b. Construction Supervision

5. The consultant will be responsible for the supervision of all construction work. As the employer's representative, the consultant will administer the construction contract and ensure that the contractual clauses for both quality and quantity of work are respected and the works are constructed in accordance with the provisions of the construction contracts. The consultant will be required to nominate an employer's representative who will be a full-time resident on the Project.

6. The supervision consultant will make all necessary measurements and control the quality of works. The consultant will make all engineering decisions required for the successful and timely implementation of the construction contracts, and have all the powers that are defined as those of engineer.

7. In addition to, or as an expansion of the activities and responsibilities required of the employer's representative under the construction contract, the responsibilities of the supervision consultant will (i) ensure that the construction methods as proposed by the contractor for carrying out the works are satisfactory and monitor compliance mitigation measures for adverse environmental impacts, (ii) undertake project performance monitoring and evaluation of the Project in accordance with ADB's project performance management system guidelines, and (iii) assist the MCTPC in the procurement of three sets of axle weighing equipment stations under the civil works contract and the establishment of this equipment at the sites to be identified under the project coordination component of the services.

3. Preparation and Implementation of the Social Action Plan

7. The consultant will guide and assist the Social and Environment Division of the Department of Roads and implementing nongovernment organization or consultant to develop and implement a detailed Nonformal Education Program and Road Safety Awareness Program for the entire project area. The scope of work includes, but is not limited to, the following tasks:

- (i) Guide and assist in design of a detailed program using appropriate participatory techniques. Specific activities will include, but not be limited to the following (a) literacy and numeracy, (b) birth spacing, and (c) marketing and small business skills;
- (ii) Facilitate coordination with relevant government agencies, local organizations and bilateral agencies or international nongovernment agencies providing nonformal education and road safety awareness programs in the Project area. This is to allow possible integration of project activities with existing interventions being implemented by various agencies and avoid duplication;
- (iii) Supervise recruitment of (a) an independent agency to monitor implementation and effects of the social action plan and ensure that the terms of reference are properly and effectively achieved; and (b) consultants for the Nonformal Education Program, the Road Safety Awareness Program, and the independent monitoring agency.

4. Provide Technical Support for the Water and Sanitation Schemes

8. Two local consultants will be recruited to provide technical support to the agencies in Louang Namtha and Bokeo provinces for this component. Each consultant will be required for a period of 6 months full time at the beginning of the program. The consultants will have appropriate experience with the ongoing programs and be acceptable to the Government.

B. Package 2: Resettlement Planning, Implementation, and Capacity-Building Consultants

1. Facilitate Establishment and Implementation of a Centralized Resettlement/Social Management System

10. The consultant will guide and assist in the establishment and implementation of a centralized resettlement/social management system for dealing with resettlement and other related topics such as ethnic minorities and gender aspects of the Project Road. The consultant will guide and assist the Social and Environment Division of the Department of Roads and resettlement committees based on the approved resettlement plan for activities that include, but are not limited to, the following:

- (i) Implement the resettlement plan, including information campaigns, stakeholder participation, and facilitation of disclosure of the resettlement plan and its implementation to affected communities and general public;
- (ii) Establish and implement procedures for (a) minimizing adverse social impacts from land acquisition and loss of other assets throughout the planning, design and implementation phases (e.g., validation of drainage design to ensure they

are appropriate for local conditions); (b) undertaking and completing census and detailed measurement survey of all losses; (c) coordination of resettlement and compensation activities on the various road sections; (d) participatory needs assessment for replacement house plots, village planning, and village fencing; (e) tracking compliance with project policies; and (f) implementing promptly corrective actions and resolving grievances;

- (iii) Design and implement detailed income restoration programs for people severely affected by loss of income, including provision and development of replacement rice land, fish ponds, livestock, or other income generation activity as compensation for lost land;
- (iv) Establish and implement (a) liaison mechanisms to ensure proper technical and logistical support to the project management unit and resettlement committees, and (b) procedures for a management information system and ongoing internal monitoring; and
- (v) Supervise recruitment of independent monitoring agency and its activities and ensure that the terms of reference are properly and effectively achieved.

2. Formal and On-the-Job Training on Resettlement and Social Issues

90. The scope of consulting services will include the following:

- (i) Provide formal and on-the-job training for the Social and Environment Division of Department of Roads, resettlement committees, project management unit, monitoring agencies, other members of the project team, and domestic consulting agencies related to resettlement, social preparation, social impact assessment, gender, ethnic minorities and social development, and benefit monitoring and evaluation;
- (ii) Provide training sessions on, but not limited to the following (a) policies, procedures, and best practices related to resettlement, social preparation/mobilization, social impact assessment, gender, ethnic minorities and social development, and benefit monitoring and evaluation; (b) social assessment methodologies; (c) stakeholder analysis; (d) participatory rapid appraisal; (e) participatory monitoring and evaluation; and (f) basic social research methodologies; and
- (iii) Develop and implement capacity building strategy for all local partners dealing with the resettlement issues to sustain and coordinate all resettlement, social impact assessment, gender, ethnic minorities and social development-related activities, and benefit monitoring and evaluation; Familiarize, orient, and prepare project management unit, Department of Roads, and resettlement committees to perform tasks and responsibilities related to resettlement, social preparation, social impact assessment, gender, ethnic minorities and social development.

C. Package 3: Social Action Plan

10. Design an awareness and preventive education program to address the risks of HIV/AIDS/STD¹ as well as trafficking of children and women, and drug use through mass and targeted campaigns to include: (i) the formation of village monitoring groups; (ii) baseline survey on HIV/AIDS, STD, drug use, and village population (to check impacts and the movement of people later on); and (iii) targeting of truck drivers, construction gangs, employees at tea shops, commercial sex workers, and all communities in general along the road. The program will be implemented over a 2-year period in three phases. The first phase will target communities before contractors are mobilized, the second phase will target construction workers and truck drivers during construction, and the third phase will design a program for targeting of truck drivers after project completion.

D. Package 4: Preparation, Implementation, and Monitoring of Detailed Environment Management Plan

1. Preparation and Implementation of an Environment Management Plan

11. The consultant will assist the Department of Roads in developing a detailed environment management plan for environment compliance certificate and its implementation in accordance with laws and regulations in the Lao PDR. The scope of work includes, but is not limited to, the following: (i) assist Department of Roads in establishing a project social and environment division and advise the unit on its operation; (ii) develop an environment database for the environment management; (iii) establish an implementation schedule of mitigation measures for the entire project based on the environmental impact assessment, including the detailed roles by government offices, contractors, and others; (iv) establish the environmental monitoring and reporting based on the environmental impact assessment, including responsible parties, frequency, and methods of monitoring for items to be monitored; and (v) provide relevant national and local government offices with training for implementation of the detailed environment management plan.

2. Implementation of the Environment Management Plan

12. In order to implement the environmental monitoring as identified in the Summary Environmental Impact Assessment, an internationally recognized intergovernmental agency will be engaged directly by the Government. The scope of work includes (i) quarterly environmental monitoring and audits of the Project to identify potential problems that should be corrected, and provide Department of Roads with guidance on monitoring and how problems might be resolved; and (ii) preparing regular audit reports for submission to Department of Roads and ADB, as well as the final project environment completion report.

¹ Human immunodeficiency virus/acquired immunodeficiency syndrome/sexually-transmitted disease.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

A. Linkages to the Country Poverty Analysis

| | |
|--|---|
| Sector identified as a national priority in country poverty analysis? Yes | Sector identified as a national priority in country poverty partnership agreement? Yes |
| Contribution of the sector/subsector to reduce poverty in the Lao People's Democratic Republic (Lao PDR) : | |
| <ul style="list-style-type: none"> • Private sector development and regional integration: Enhance rural-urban communication linkages. • Subregional development: Increased trade and investments by facilitating cross-border movement of goods, services, and people. • Economic activity: Promote employment opportunities, access to markets and information, and enhance productivity. • Human development: Access to social services. | |

B. Poverty Analysis

Proposed Classification: Poverty intervention

| |
|---|
| <p>Of the population residing in the primary impact zone of the Project, 43.4% are poor. Over 17% of the Northern Region's poor reside in the three districts through which the road passes through. Namtha and Viangphoukha are ranked among the most vulnerable districts in the country by the World Food Program. The majority of the poor are ethnic minorities with a high dependence on subsistence agriculture with limited access to markets and social services. The population is vulnerable to adverse external shocks, especially natural disasters, for which coping strategies include high risk opium cultivation, collection of nontimber forest products, and sale of livestock (dissaving).</p> <p>The Project is expected to lead to economic transformation from subsistence to commercial activities in the project area and enhance regional integration of the northern area into the main economy. This will reduce livelihood dependence on subsistence agriculture, opium production, and natural resources by facilitating livelihood alternatives, risk diversification, access to markets, and off-farm employment opportunities. Whereas the improved road access will not alone reduce poverty and vulnerability, it will facilitate the ability of the Government to provide health, veterinary, and educational services in the area. Improved road access will also enhance cost-effectiveness and poverty targeting for the provision of social services (and reduce the opportunity cost of providing such services) and development programs.</p> |
|---|

C. Participation Process

| |
|--|
| <p>Stakeholder analysis prepared : Yes, under preparation by consultants.</p> <p>Participation strategy : Under preparation and to be included in social action plan components and proposed Japan Fund for Poverty Reduction project with the objective of enhancing benefits of road access, reducing vulnerability, and promoting diversification of livelihood activities.</p> |
|--|

D. Potential Issues

| Subject | Significant, Not Significant, Uncertain, None | Strategy to Address Issues | Output Prepared |
|---|---|--|-----------------|
| Resettlement | Significant | Resettlement plan | Yes |
| Gender | Not Significant | Social action plan, proposed Japan Fund for Poverty Reduction project | Yes |
| Affordability | None | | |
| Labor | Not Significant | Construction labor: social action plan | Yes |
| Indigenous People | Significant | Social action plan/ethnic minorities plan, proposed project to be funded by Japan Fund for Poverty Reduction | Yes |
| Other Risks/ Vulnerabilities | Significant | Social action plan and environment management plan | Yes |

ECONOMIC ANALYSIS

A. Introduction

1. The economic viability analysis examined the contribution of the Project to the Lao People's Democratic Republic (Lao PDR) and the subregion as a whole, comprising the economies of the People's Republic of China (PRC), Lao PDR and Thailand. The analysis includes only direct savings in transportation costs: value-added from better transportation linkages resulting in new investments or employment generation is not quantified. The economic analysis considered the economic cost and benefits of the Project over the construction period and a 30-year operation period. Costs and benefits are valued at 2002 border prices using a world price numeraire.

B. Traffic Forecast

2. Vehicle count surveys were conducted in March 2002 to establish the base year average daily traffic (ADT). The Project Road has experienced high growth of traffic estimated at more than 20% per annum compared to 1997. The vehicle count and user surveys were used for making the traffic forecast along the Project Road.

Table A11.1: Average Daily Traffic by Vehicle Type, – March 2002

| | Road Sections | | | | |
|--------------------------|------------------|-----------|--------|------------------|--------------------|
| | Boten- Natuay | Natuay-LN | LN-VPK | VPK- Houayxay | Houayxay- River |
| 18-Wheelers | 3 | 0 | 0 | 3 | 5 |
| 10-Wheelers Lignite | 0 | 0 | 0 | 90 | 0 |
| 10-Wheelers Non- lignite | 17 | 12 | 6 | 6 | 129 |
| 6- Wheelers | 12 | 14 | 7 | 15 | 41 |
| Bus (45-seater) | 8 | 5 | 2 | 2 | 2 |
| Bus (25-seater) | 14 | 16 | 3 | 3 | 2 |
| Pick-up | 22 | 42 | 23 | 141 | 260 |

LN = Louang Namtha; VPK = Viangphoukha.

Source: ADB. 2002. *Draft Final Report for Preparing the Northern Economic Corridor for the Lao PDR*. Manila.

3. Forecasts for the future traffic were made for the following types of traffic: (i) normal (or existing) traffic; (ii) generated traffic; and (iii) land-bridge traffic. Normal traffic refers to the existing traffic using the Project Road, inclusive of passenger, commodity, and lignite traffic movements.¹ Generated traffic refers to the traffic that will be developed in future as a function of the reduced production costs arising from lower transport costs in the subregion. Land- bridge traffic refers to the regional traffic, largely between Thailand and the Yunnan Province, PRC diverted from other transport modes and new traffic that will be facilitated due to better infrastructure linkages between these two growing economies. Land-bridge traffic is a term used to distinguish induced from generated traffic and is meant to reflect how the Project Road will serve as a land-bridge between Yunnan Province, PRC, the Lao PDR, and Thailand.

4. Normal traffic forecasts were prepared based on past income growth, trends in numbers of tourist arrivals at border crossings with Thailand and the PRC, and vehicle registration growth

¹ Lignite traffic refers to the traffic for the transport of lignite from mines that use certain sections of national route 3. Traffic volume is assumed constant over the entire project life.

in the northern Lao PDR. Generated traffic was estimated as 60% of normal traffic, starting from the base year and growing at the same rates as existing traffic with a five-year phasing allowed for both generated and land-bridge traffic to fully develop. Land-bridge traffic growth is estimated based on growth of passenger travel between Yunnan Province and Thailand, the growth of trade between northern Thailand and Yunnan Province, regional development plans for these two areas, and growth in river traffic. On the land-bridge forecasts, traffic crossing from the PRC border has grown at the rate of 28% per annum since 1995: in 2001, 44,000 vehicles or 120 ADT equivalent crossed the Mohen border to enter the Lao PDR. There are two important border crossings with Thailand: trade between Thailand and Lao PDR at the Houayxay border has more than doubled since 1995 growing at the rate of 19% per annum whereas at the Chiang Sen border crossing, trade has increased from Baht42 million to Baht501 million during 1995-2001 with a compound growth rate of 51%. Once the road opens, this will be the most important link for this trade and tourist traffic. In addition more than 116,000 passengers crossed Houayxay border in 2001. Against this background, the traffic forecasts used for the analysis seem conservative (Table A11.2).

Table A11. 2: Annual Traffic Growth Rates by Vehicle and Traffic Type

| | Normal (%) | Generated (%) | Land-Bridge (%) |
|-------------------------|------------|---------------|------------------|
| 18-Wheelers | 10% | 10% | |
| 10-Wheelers Lignite | 0% | 0% | |
| 10-Wheelers Non-lignite | 10% | 10% | 10% ^a |
| 6 Wheelers | 5% | 5% | 10% ^a |
| Bus (45-seater) | 10% | 10% | 10% ^a |
| Bus (25-seater) | 7% | 7% | 10% ^a |
| Pick-up | 5% | 5% | |

^a Growth for initial few years, thereafter it slows down to 7%.

C. Vehicle Operating Costs

5. Actual economic vehicle operating costs were estimated for each of the predominant types of vehicles using the Project Road. Given the very bad condition of the road, impedance factors were considered to be more appropriate measure rather than using roughness index to derive with and without project vehicle operating costs. Technical investigations were carried out to assess impedance factors² for each of the major 13 links for each vehicle type to derive base vehicle operating costs. The resulting with and without project vehicle operating costs were found to be comparable with the vehicle operating cost estimates recently prepared for the rural road access project using highway development model III. The weighted average vehicle operating costs for the entire roads for each vehicle type are presented below (Table A11.3).

D. Project Costs

6. Project costs consist of construction costs and civil works, project management and supervision, consulting services including the implementation of resettlement, social and environment management plans, physical contingencies, cost of road user charge collection,

² Impedance factors reflect the condition of the road on a specific link. It is an engineering estimate used to transform actual link distance into equivalent distances that reflect the real cost of operating a vehicle on it. An impedance factor of 5 represents an equivalent vehicle operating cost equal to the cost of driving five times farther on a level tangent paved road.

and routine and periodic maintenance of the Project Road with and without project. Civil works cost were derived from the draft feasibility report for the Project Road. The financial costs were converted to economic costs by eliminating the effects of taxes and duties and by adjusting for the price of traded and non-traded cost components. A standard conversion factor of 0.8 was used to convert the prices of non-traded goods. Detailed operations and maintenance costs were estimated in economic terms for the without project and with project scenarios.

Table A11.3: Economic Vehicle Operating Costs

| Vehicle Types | Without Project (in KN1,000/km) | With Project (in KN1,000/km) |
|-------------------------|--|---|
| 18-Wheelers | 3.99 | 3.16 |
| 10-Wheelers Non-Lignite | 2.05 | 1.33 |
| 6-Wheelers | 1.37 | 0.86 |
| Bus (45-seater) | 2.34 | 1.51 |
| Bus (25-seater) | 1.91 | 1.11 |
| Pick-up | 1.57 | 1.09 |

KN = kip.

Source: ADB. 2002. *Draft Final Report for Preparing the Northern Economic Corridor for the Lao PDR*. Manila.

E. Project Benefits

7. A major benefit for the Lao PDR economy results from the improvement in vehicle operating costs for the local traffic and the revenue it derives from higher regional traffic from the road charges. Benefits resulting from reduction in road accidents were not quantified. Benefits accruing to normal traffic were calculated as the difference between total user costs incurred by using the existing unpaved Project Road less the total costs incurred with the improved Project Road. These differences in user costs accrue to the users of the road. Benefits accruing to generated traffic is taken as half of the actual vehicle operating cost savings.

8. For the land-bridge traffic, regional savings were estimated for the different types of vehicles for the freight depending on the alternative transport mode. The interviews carried out in the PRC and Thailand indicate that there is a large demand for a road link between northern Thailand and Yunnan Province for freight traffic. In the absence of such a link, river traffic is growing even though the cost and time of using river are much higher. Alternative trip costs were estimated to derive savings accruing to freight operators in Thailand and the PRC. These savings, net of ferry costs and road charges provided the magnitude of savings for regional traffic. For the passenger traffic, vehicle operating cost savings were used as a proxy for "with" and "without" project cases. The imputed savings are small compared to the actual potential benefits in terms of travel time and actual costs incurred if they continued to use other modes of travel or take journeys on the existing road. In addition, overall benefits also include savings in inventory costs as a result of savings in time. The trip on the Mekong River takes five 5 days at present. It is estimated that road use will result in savings of inventory costs, especially for high value goods at the rate of \$2 per ton.

F. Economic Analysis and Sensitivity

9. The economic internal rate of return for the subregion is 27.0% and that for the Lao PDR economy is 12.8% if only benefits of lower vehicle operating costs for local traffic were included. The Lao PDR economy will also receive large revenue from the road charges from the international traffic and if these benefits are included, the EIRR for the Lao PDR is estimated at

17.9%. The Project was found to be sensitive only with respect to volume of traffic. Detailed sensitivity analysis was carried out for different levels of traffic. The EIRR for the subregion is reduced to 18.4% if land-bridge traffic remains at one third of projected traffic. The switching value for capital cost is 190% increase (Table A11.4).

Table A11.4: Sensitivity Analysis

| Item | Subregional EIRR (%) | Lao PDR EIRR (%) |
|--------------------------------------|-----------------------------|-------------------------|
| Base Case | | |
| Base case with toll charges | 27.0% | 17.9% |
| Base case without toll charges | 29.7% | 12.8% |
| Benefits | | |
| 10% increase in land-bridge traffic | 28.2% | 18.3% |
| 10% decrease in land-bridge traffic | 25.8% | 17.5% |
| No landbridge traffic | n. a. | 12.8% |
| 67% reduction in land-bridge traffic | 18.4% | 15.2% |
| 50% reduction in land-bridge traffic | 20.8% | 15.9% |
| Road charges | | |
| Assumed at \$30 per ADT | 28.9% | 16.8% |
| Assumed at \$50 per ADT | 27.4% | 18.9% |
| Costs | | |
| 10% increase in capital costs | 25.0% | 16.6% |
| 10% decrease in capital costs | 29.5% | 19.5% |

ADT = average daily traffic, EIRR = economic internal rate of return, Lao PDR = Lao People's Democratic Republic.

Source: Staff estimates.

G. Distribution Analysis

10. The Project is a subregional project and hence it is important to assess distribution of costs and benefits between different regional economies. Data for this was collected from interviews and surveys of freight forwarders, passenger buses, customs officials, trade statistics, and others. This information was used to determine shares of traffic origin for different economies and between vehicle ownership patterns. Two types of distribution analysis were carried out, distribution between economies and distribution within the Lao PDR by different functional groups. Results and sensitivity analysis for distribution between PRC, the Lao PDR, and Thailand are summarized below as follows:

Table A11.5: Subregional Distribution Analysis, Net Present Value at @12%

| | Thailand (\$ million) | Lao PDR (\$ million) | PRC (\$ million) |
|-------------------------------------|--------------------------|-------------------------|---------------------|
| Base Case | | | |
| Base case with toll charges | 30.0 | 54.9 | 30.0 |
| Base case without toll charges | 47.5 | 20.4 | 46.9 |
| Benefits | | | |
| 10% increase in land-bridge traffic | 33.9 | 58.1 | 33.9 |
| 10% decrease in land-bridge traffic | 26.2 | 51.8 | 26.2 |
| Road charges | | | |
| Assumed at \$30 per ADT | 37.2 | 46.9 | 37.2 |
| Assumed at \$50 per ADT | 22.7 | 62.9 | 22.7 |
| Costs | | | |
| 10% increase in capital costs | 28.2 | 52.2 | 28.4 |
| 10% decrease in capital costs | 31.7 | 57.6 | 31.5 |

ADT = average daily traffic, Lao PDR = Lao People's Democratic Republic; PRC = People's Republic of China
Source: Staff estimates.

11. Second, functional distribution analysis between different groups within the Lao PDR economy was also assessed following the Asian Development Bank's *Guidelines for Economic Analysis of the Projects*. The benefits accruing to the Lao PDR were distributed between four groups: consumers of transport services, private individuals and firms, labor, and government. The consumers of transport services account for 35.2% of total benefits, private individuals and firms that own transport services account for 57.4% of total benefits, labor's share is 3.7%, and government benefits 3.7%. The poverty impact ratio is 46%. Detailed cashflows are in Tables 11.6 and 11.7.

H. Ferry versus Mekong River Bridge Crossing

12. It is possible that the ferry facilities to cross Mekong River will prove inadequate once the cross-border traffic grows beyond present levels. Economic analysis of construction of a bridge across the Mekong River was carried out to assess viability of the additional investment. The bridge project was estimated to cost \$20.5 million and would take four years to construct. The bridge project was found to have an EIRR of 16.1% for the Lao PDR economy. It was assumed that the bridge would have a user charge of \$5 per vehicle crossing, which is comparable to existing charges on the Friendship Bridge.

13. Compared to the river bridge option, the present ferry cost is \$50 per vehicle crossing. However, these costs are considered excessive due to low traffic volumes and so the analysis of ferry is assumed to have a tariff of \$10 per vehicle crossing. The existing ferry facilities are inadequate and would require a ramp in costs put in periodically. It is assumed that the first ramp would cost \$1.8 million, but subsequent costs will be lower for the next two ramps. After that a new site will be needed at a cost of \$1.8 million. The ferry crossing also involves on average a wait of about 2 hours, in terms of loading and unloading as well as queuing time. Since the ferry and Mekong River bridge are mutually exclusive projects, net present values is the correct decision criteria. The results indicate that the net present value of the ferry is \$4.8 million whereas for the river bridge it is over \$8.9 million. Thus the construction of a bridge across the Mekong River is a viable option and would enhance the project viability for the Lao PDR and the subregional economies.

Table A11.6: Economic Analysis for the Subregion
(\$ million)

| Year | Total Vehicle Operating Cost Savings | Total Time Savings for Diverted Traffic | Total Benefits | Investment Cost | O&M Costs | Toll Management Cost | Total Cost | Net Benefit |
|------|--------------------------------------|---|----------------|-----------------|-----------|----------------------|------------|-------------|
| 2002 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | 0.00 | 0.00 | 0.00 | 8.06 | (3.30) | 0.00 | 4.76 | (4.76) |
| 2004 | 0.00 | 0.00 | 0.00 | 20.16 | (3.45) | 0.00 | 16.71 | (16.71) |
| 2005 | 0.00 | 0.00 | 0.00 | 20.16 | (0.15) | 0.00 | 20.01 | (20.01) |
| 2006 | 12.60 | 0.22 | 12.81 | 20.16 | (0.14) | 0.44 | 20.45 | (7.64) |
| 2007 | 13.93 | 0.27 | 14.20 | 12.10 | (0.26) | 0.44 | 12.28 | 1.92 |
| 2008 | 15.45 | 0.32 | 15.78 | 0.00 | (0.26) | 0.44 | 0.18 | 15.59 |
| 2009 | 16.98 | 0.39 | 17.37 | | (0.26) | 0.44 | 0.19 | 17.18 |
| 2010 | 18.74 | 0.46 | 19.20 | | (3.31) | 0.45 | (2.87) | 22.06 |
| 2011 | 20.39 | 0.51 | 20.90 | | 0.07 | 0.45 | 0.52 | 20.37 |
| 2012 | 22.17 | 0.58 | 22.75 | | (0.04) | 0.45 | 0.41 | 22.34 |
| 2013 | 24.21 | 0.64 | 24.85 | | (0.15) | 0.45 | 0.30 | 24.55 |
| 2014 | 26.51 | 0.71 | 27.22 | | (0.05) | 0.45 | 0.41 | 26.81 |
| 2015 | 28.85 | 0.82 | 29.67 | | (0.05) | 0.46 | 0.41 | 29.26 |
| 2016 | 31.44 | 0.82 | 32.26 | | (3.21) | 0.46 | (2.75) | 35.01 |
| 2017 | 33.64 | 0.82 | 34.46 | | 0.18 | 0.46 | 0.64 | 33.82 |
| 2018 | 36.13 | 0.82 | 36.95 | | 0.17 | 0.46 | 0.63 | 36.32 |
| 2019 | 38.62 | 0.82 | 39.43 | | 0.06 | 0.47 | 0.52 | 38.91 |
| 2020 | 41.41 | 0.82 | 42.23 | | 0.06 | 0.47 | 0.52 | 41.70 |
| 2021 | 44.29 | 0.82 | 45.11 | | 0.06 | 0.47 | 0.53 | 44.58 |
| 2022 | 47.48 | 0.82 | 48.29 | | 1.79 | 0.47 | 2.27 | 46.03 |
| 2023 | 50.96 | 0.82 | 51.78 | | 5.18 | 0.48 | 5.66 | 46.13 |
| 2024 | 54.56 | 0.82 | 55.38 | | (0.14) | 0.48 | 0.33 | 55.05 |
| 2025 | 58.38 | 0.82 | 59.19 | | (0.26) | 0.48 | 0.22 | 58.97 |
| 2026 | 62.51 | 0.82 | 63.33 | | (0.26) | 0.48 | 0.23 | 63.10 |
| 2027 | 67.10 | 0.82 | 67.91 | | (0.15) | 0.48 | 0.33 | 67.58 |
| 2028 | 71.98 | 0.82 | 72.79 | | (3.31) | 0.49 | (2.83) | 75.62 |
| 2029 | 76.97 | 0.82 | 77.79 | | 0.07 | 0.49 | 0.56 | 77.23 |
| 2030 | 82.44 | 0.82 | 83.25 | | 0.06 | 0.49 | 0.56 | 82.70 |
| 2031 | 88.41 | 0.82 | 89.23 | | (0.05) | 0.49 | 0.45 | 88.78 |
| 2032 | 94.79 | 0.82 | 95.60 | | (0.05) | 0.50 | 0.45 | 95.15 |
| 2033 | 101.48 | 0.82 | 102.29 | | 0.06 | 0.50 | 0.56 | 101.74 |
| 2034 | 108.87 | 0.82 | 109.69 | | (3.10) | 0.50 | (2.60) | 112.29 |
| 2035 | 116.73 | 0.82 | 117.54 | | 0.28 | 0.50 | 0.79 | 116.76 |
| 2036 | 125.22 | 0.82 | 126.04 | | (0.14) | 0.51 | 0.36 | 125.67 |

O&M = operation and maintenance.

Economic Internal Rate of Return 27.0%

Table A11.7: Economic Analysis for the Lao PDR Economy
(\$ million)

| Year | Total Vehicle Operating Cost Savings | Total Toll Revenue Collection | Total Benefits | Investment Cost | Investment Cost and Net Financing Effect | O&M Costs | Toll Management Cost | Total Cost | Net Benefit |
|------|--|-------------------------------------|-------------------|--------------------|--|--------------|----------------------------|------------|-------------|
| 2002 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | 0.00 | 0.00 | 0.00 | 8.06 | 8.06 | (3.30) | 0.00 | 4.76 | (4.76) |
| 2004 | 0.00 | 0.00 | 0.00 | 20.16 | 20.16 | (3.45) | 0.00 | 16.71 | (16.71) |
| 2005 | 0.00 | 0.00 | 0.00 | 20.16 | 20.16 | (0.15) | 0.00 | 20.01 | (20.01) |
| 2006 | 5.22 | 2.52 | 7.74 | 20.16 | 20.16 | (0.14) | 0.13 | 20.14 | (12.40) |
| 2007 | 5.68 | 2.77 | 8.45 | 12.10 | 12.10 | (0.26) | 0.14 | 11.98 | (3.53) |
| 2008 | 6.19 | 3.06 | 9.25 | 0.00 | 0.00 | (0.26) | 0.15 | (0.10) | 9.36 |
| 2009 | 6.71 | 3.35 | 10.06 | | 0.00 | (0.26) | 0.17 | (0.09) | 10.15 |
| 2010 | 7.27 | 3.70 | 10.97 | | 0.00 | (3.31) | 0.19 | (3.13) | 14.10 |
| 2011 | 7.66 | 4.07 | 11.73 | | 0.00 | 0.07 | 0.20 | 0.28 | 11.45 |
| 2012 | 8.06 | 4.47 | 12.53 | | 0.00 | (0.04) | 0.22 | 0.18 | 12.35 |
| 2013 | 8.45 | 4.94 | 13.39 | | 0.00 | (0.15) | 0.25 | 0.09 | 13.30 |
| 2014 | 8.92 | 5.47 | 14.38 | | 0.00 | (0.05) | 0.27 | 0.23 | 14.16 |
| 2015 | 9.37 | 6.01 | 15.38 | | 0.00 | (0.05) | 0.30 | 0.25 | 15.13 |
| 2016 | 9.89 | 6.61 | 16.50 | | 0.00 | (3.21) | 0.33 | (2.88) | 19.38 |
| 2017 | 10.40 | 7.09 | 17.49 | | 0.00 | 0.18 | 0.35 | 0.53 | 16.96 |
| 2018 | 11.06 | 7.61 | 18.68 | | 0.00 | 0.17 | 0.38 | 0.55 | 18.13 |
| 2019 | 11.66 | 8.15 | 19.81 | | 0.00 | 0.06 | 0.41 | 0.46 | 19.35 |
| 2020 | 12.39 | 8.75 | 21.14 | | 0.00 | 0.06 | 0.44 | 0.49 | 20.65 |
| 2021 | 13.11 | 9.38 | 22.49 | | 0.00 | 0.06 | 0.47 | 0.53 | 21.97 |
| 2022 | 13.86 | 10.07 | 23.93 | | 0.00 | 1.79 | 0.50 | 2.30 | 21.63 |
| 2023 | 14.73 | 10.81 | 25.54 | | 0.00 | 5.18 | 0.54 | 5.72 | 19.82 |
| 2024 | 15.62 | 11.59 | 27.21 | | 0.00 | (0.14) | 0.58 | 0.44 | 26.77 |
| 2025 | 16.59 | 12.40 | 28.99 | | 0.00 | (0.26) | 0.62 | 0.36 | 28.63 |
| 2026 | 17.65 | 13.29 | 30.94 | | 0.00 | (0.26) | 0.66 | 0.41 | 30.53 |
| 2027 | 18.83 | 14.26 | 33.09 | | 0.00 | (0.15) | 0.71 | 0.56 | 32.53 |
| 2028 | 20.08 | 15.29 | 35.37 | | 0.00 | (3.31) | 0.76 | (2.55) | 37.92 |
| 2029 | 21.36 | 16.36 | 37.72 | | 0.00 | 0.07 | 0.82 | 0.89 | 36.83 |
| 2030 | 22.84 | 17.51 | 40.35 | | 0.00 | 0.06 | 0.88 | 0.94 | 39.41 |
| 2031 | 24.36 | 18.78 | 43.15 | | 0.00 | (0.05) | 0.94 | 0.89 | 42.26 |
| 2032 | 26.09 | 20.11 | 46.20 | | 0.00 | (0.05) | 1.01 | 0.96 | 45.24 |
| 2033 | 27.87 | 21.53 | 49.40 | | 0.00 | 0.06 | 1.08 | 1.13 | 48.26 |
| 2034 | 29.91 | 23.06 | 52.97 | | 0.00 | (3.10) | 1.15 | (1.95) | 54.92 |
| 2035 | 32.06 | 24.70 | 56.76 | | 0.00 | 0.28 | 1.23 | 1.52 | 55.24 |
| 2036 | 34.36 | 26.46 | 60.82 | | 0.00 | (0.14) | 1.32 | 1.18 | 59.64 |

O&M = operation and maintenance.

Economic Internal Rate of Return 17.9%

FINANCIAL ANALYSIS

A. Introduction

1. A financial analysis of the Project was carried out to determine the appropriate level of road charges for regional traffic to cover debt service and road operations and maintenance costs for the Lao People's Democratic Republic (Lao PDR). The financial internal rate of return for the Project must at a minimum exceed the weighted average cost of capital (WACC) for the Project to remain affordable for the Lao PDR.

B. Major Assumptions

2. For the purpose of this analysis, it has been assumed that construction will be carried out during 2003–2006 with an operating period of 30 years. No salvage value has been assumed. While the construction period will not end until 2006, revenue from road charges is assumed to commence in 2006 as major sections of the road will be constructed. The capital cost of the Project is estimated at \$95.8 million. On the revenue side, the financial analysis assumes that a system of a road charge will be established for the international traffic at both border crossings. Income taxes have not been included as the Project will be operated by the Ministry of Communication, Transport, Post and Construction (MCTPC) or other government agency, not subject to business or profit tax.

3. The financial analysis assumes the same level of daily traffic data as contained in the economic analysis for the international transit traffic. The projected traffic data indicate that land-bridge and diverted river traffic will increase at a moderate pace once the majority of the road upgrading has been completed. Lignite traffic is assumed to remain constant and would be charged a concessional transit fee of approximately \$10 per crossing given their past investments in the road section covering Viangphoukha and Houayxay. The projected level of traffic over the operating period is used to determine the average level of road charges that is required for the Government of the Lao PDR to service the debt. The average road charge collected on the traffic in the initial years would be sufficient to meet debt service liabilities over time and maintenance costs including repaving of the surface.

C. Weighted Average Cost of Capital

4. WACC has been calculated based on estimated financing costs for the three loans from the Asian Development Bank (ADB), the Government of Thailand, and the Government of the People's Republic of China (PRC). The ADB loan is at the Asian Development Fund terms whereas the Government of Thailand has provided 30-year maturity funds, including a 10-year grace period and a 1.5% interest charge. About 10% of the principal is interest free, thus reducing the effective interest rate on the loan. The PRC has agreed to provide an interest-free loan of \$30 million with a 20-year maturity, including a 10-year grace period. The PRC financing includes a grant element of about 20% of the principal. The terms of the bilateral loans are thus more concessional than the ADB.

5. The Government of the Lao PDR contribution (i.e., counterpart funds) can be considered as equity because the Government will retain residual revenue after the debt has been fully serviced. The cost of equity in the Lao PDR is not easy to define given its underdeveloped debt and capital markets. The opportunity cost of government counterpart funds in the Lao PDR, in real terms, has been based on the US dollar savings rate offered by the Banque pour le

Commerce Extérieure Lao at 6% for one year as the risk-free equity rate of return. Commercial banks in the Lao PDR do not typically offer savings rates longer than one year. As there was insufficient information to reflect the typical long-term cost of capital, the one-year savings rate has been used. Four percent has been added to this risk-free rate as the appropriate premium, to reflect the volatile nature of inflation and financing using external currencies in the Lao PDR. After converting this US dollar nominal rate into real terms, the opportunity cost of counterpart funds has been computed to be 7.42%. Therefore, the WACC for this Project is estimated at 4.25%.

D. Financial Analysis

6. Based on these assumptions, the Project requires an average minimum road user charge of approximately \$40 per vehicle crossing from Thailand to Yunnan, the PRC. It is recommended that 50% of the recommended charge be collected at each border crossing. This level of road user charge provides a financial internal rate of return of approximately 6.4%, which exceeds the projected WACC for the Project.

7. Discounting the future cash flows at the WACC of 4.25%, the financial net present value of the Project is \$35.1 million. The Government's return on its counterpart funds equals a financial internal rate of return of 22.9%.

E. Sensitivity Analysis

8. Sensitivity analysis for the Project was carried out to review viability under different scenarios, and included: (i) lower road charges; (ii) higher capital costs; and (iii) lower land bridge traffic. (Table A12.1).

Table A12.1: Sensitivity Analysis

| Sensitivity Analysis on Project Risks | Variable Change (%) | FIRR (%) | FNPV @ at 4.25% (\$ million) | Switching Value (FNPV, %) |
|---------------------------------------|---------------------|-------------|------------------------------|---------------------------|
| Base Case | n. a. | 6.4% | 35.1 | n. a. |
| Road charges at \$30 per ADT | -25% | 4.6% | 5.0 | -30.0% |
| Increase in Capital Costs | +10% | 5.8% | 28.0 | +48.0% |
| Reduced Land Bridge Traffic | -10% | 5.7% | 23.8 | -35.0% |

ADT = average daily traffic, FIRR = financial internal rate of return; FNPV = financial net present value.

9. These results indicate that the Project will be able to maintain its profitability assuming a reasonable level of risks. In adverse conditions beyond reasonable levels, financial viability can be ensured by charging some road charges for local traffic crossing the border or increasing the levels as long as these increases do not deter commercial traffic.

Table A12.2: Financial Internal Rate of Return

| Year | Capital Cost (\$ million) | International Transit Revenues | Toll Revenue | Toll Management Costs | Road Maintenance Costs | Total Revenue | Total Costs | Net Cash Flow |
|------|---------------------------|--------------------------------|--------------|-----------------------|------------------------|---------------|-------------|---------------|
| 2002 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | 9.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.11 | (9.11) |
| 2004 | 22.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 22.79 | (22.79) |
| 2005 | 22.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 22.79 | (22.79) |
| 2006 | 22.79 | 2.19 | 2.52 | 0.13 | 0.15 | 2.52 | 23.06 | (20.54) |
| 2007 | 13.67 | 2.44 | 2.77 | 0.14 | 0.15 | 2.77 | 13.96 | (11.19) |
| 2008 | 0.00 | 2.73 | 3.06 | 0.15 | 0.15 | 3.06 | 0.30 | 2.76 |
| 2009 | | 3.02 | 3.35 | 0.17 | 0.15 | 3.35 | 0.31 | 3.04 |
| 2010 | | 3.37 | 3.70 | 0.19 | 0.27 | 3.70 | 0.46 | 3.25 |
| 2011 | | 3.74 | 4.07 | 0.20 | 0.27 | 4.07 | 0.47 | 3.59 |
| 2012 | | 4.15 | 4.47 | 0.22 | 0.27 | 4.47 | 0.49 | 3.98 |
| 2013 | | 4.61 | 4.94 | 0.25 | 0.27 | 4.94 | 0.52 | 4.42 |
| 2014 | | 5.14 | 5.47 | 0.27 | 0.40 | 5.47 | 0.67 | 4.80 |
| 2015 | | 5.68 | 6.01 | 0.30 | 0.40 | 6.01 | 0.70 | 5.31 |
| 2016 | | 6.28 | 6.61 | 0.33 | 0.40 | 6.61 | 0.73 | 5.88 |
| 2017 | | 6.76 | 7.09 | 0.35 | 0.40 | 7.09 | 0.75 | 6.34 |
| 2018 | | 7.29 | 7.61 | 0.38 | 0.52 | 7.61 | 0.90 | 6.71 |
| 2019 | | 7.83 | 8.15 | 0.41 | 0.52 | 8.15 | 0.93 | 7.23 |
| 2020 | | 8.42 | 8.75 | 0.44 | 0.52 | 8.75 | 0.96 | 7.79 |
| 2021 | | 9.05 | 9.38 | 0.47 | 0.52 | 9.38 | 0.99 | 8.39 |
| 2022 | | 9.74 | 10.07 | 0.50 | 6.40 | 10.07 | 6.90 | 3.17 |
| 2023 | | 10.48 | 10.81 | 0.54 | 6.40 | 10.81 | 6.94 | 3.87 |
| 2024 | | 11.26 | 11.59 | 0.58 | 0.15 | 11.59 | 0.72 | 10.86 |
| 2025 | | 12.07 | 12.40 | 0.62 | 0.15 | 12.40 | 0.77 | 11.64 |
| 2026 | | 12.96 | 13.29 | 0.66 | 0.15 | 13.29 | 0.81 | 12.48 |
| 2027 | | 13.93 | 14.26 | 0.71 | 0.27 | 14.26 | 0.98 | 13.27 |
| 2028 | | 14.97 | 15.29 | 0.76 | 0.27 | 15.29 | 1.03 | 14.26 |
| 2029 | | 16.03 | 16.36 | 0.82 | 0.27 | 16.36 | 1.09 | 15.27 |
| 2030 | | 17.18 | 17.51 | 0.88 | 0.40 | 17.51 | 1.27 | 16.24 |
| 2031 | | 18.45 | 18.78 | 0.94 | 0.40 | 18.78 | 1.33 | 17.45 |
| 2032 | | 19.78 | 20.11 | 1.01 | 0.40 | 20.11 | 1.40 | 18.71 |
| 2033 | | 21.20 | 21.53 | 1.08 | 0.52 | 21.53 | 1.60 | 19.93 |
| 2034 | | 22.73 | 23.06 | 1.15 | 0.52 | 23.06 | 1.67 | 21.39 |
| 2035 | | 24.37 | 24.70 | 1.23 | 0.52 | 24.70 | 1.76 | 22.94 |
| 2036 | | 26.13 | 26.46 | 1.32 | 0.15 | 26.46 | 1.47 | 24.99 |

Financial Internal Rate of Return 6.36%