

ECONOMIC AND FINANCIAL ANALYSIS

A. Project Objectives

1. The overall objective is to contribute to halting the increase in HIV prevalence among target populations in the Lao People's Democratic Republic (Lao PDR) and Viet Nam. The project will assist the ministries of health in the Lao PDR and Viet Nam in meeting target 6A of the Millennium Development Goals (MDGs): halt and begin to reverse the spread of HIV/AIDS. The expected project outputs are (i) strengthened planning and management capacity at national, provincial and district levels; (ii) enhanced capacity to provide quality, accessible and appropriate services to people vulnerable to HIV transmission; (iii) improved access to HIV prevention outreach among target populations in communities and cross-border areas; and (iv) effective and sustainable regional cooperation mechanisms established.

B. Project Beneficiaries

2. The project will benefit the national economies of Viet Nam and the Lao PDR by reducing the macroeconomic impacts of HIV/AIDS and a number of other diseases in high-risk and vulnerable populations. The project will include 15 provinces in Viet Nam and 8 provinces in the Lao PDR. These provinces are located in economic corridors, cross-border areas, and in regions with high seasonal and long-term populations attracted by the economic opportunities provided by large infrastructure projects (e.g., roads and hydropower) and industrial and economic zones. The 15 target provinces in Viet Nam have a combined population of about 15.4 million (17% of the national population), while the 8 provinces under the project in the Lao PDR have a combined population of about 2.2 million (36% of the national population). Transport sector workers and truck drivers as well as sex workers are vulnerable to HIV infection, while poor ethnic women living along the roadside, with limited awareness of HIV/AIDS and poor access to health services (including reproductive health) are most affected. The proposed project interventions have been designed to specifically address these groups through capacity development, improved access to health facilities, and provision of quality services by trained health providers with adequate equipment and drugs in areas of priority need.

C. Rationale for Investment

3. The vulnerability to HIV infection of migrant and mobile populations in and near border areas and economic corridors in Viet Nam and the Lao PDR has been recognized, but there has not been an effective and sustainable response. In 2011 183,938 HIV positive persons and 44,022 AIDS cases were reported as having been observed in Viet Nam.¹ These confirmed cases represent a proportion of total infections, as only 5% of men and 6% of women have been tested for HIV.² In the 15–49 year-old age group, the current prevalence of HIV in the Lao PDR is estimated to be 0.2% and the adult HIV prevalence in the general population was 0.45% in 2011.³ The implementation of behavior change activities will help to reduce vulnerability of the target population to HIV and decrease the burden of AIDS in both countries.

¹ Viet Nam Administration on AIDS Control. 2011. *AIDS and Community*, No.3.

² Ministry of Health, National Technical Working Group on HIV Estimates and Projections. 2011. Preliminary Viet Nam HIV/AIDS Estimates and Projections. Ha Noi.

³ Global AIDS Response Progress. 2012. *Country Report, Lao PDR*. Vientiane.

D. Cost–Benefit Analysis

4. The economic analysis has been carried out in accordance with relevant Asian Development Bank (ADB) guidelines.⁴ Project costs consist of (i) all investments made under the project (i.e., equipment, medical supplies, vehicles, training, workshops, fellowships, consulting services, and project management support); and (ii) incremental operation and maintenance (O&M) costs incurred each year for maintaining project sustainability. Incremental on-going recurrent costs are calculated for the 30 years following the 5-year project implementation period.

E. Economic Costs

5. Base investment costs are in constant 2012 dollar prices. Taxes and duties account for a small proportion of the project costs. Incremental recurrent costs are calculated for the 30 years following the 5-year project implementation period.

F. Economic Benefits

6. The main benefits that were quantified include health cost savings due to the reduction of medical costs incurred in the course of undergoing treatment for HIV/AIDS, and cost savings from the reduced burden of childhood diseases and the reduction in loss of income earnings of those suffering from the disease. Specifically, the following economic benefits are quantified.

- (i) Health cost savings consist of reduction in medical expenditures, including anti-retroviral treatment, treatment of opportunistic infections, and AIDS care. For the purpose of estimating the total (financial) cost, an average medical treatment cost of \$1,458/person/year was applied.⁵
- (ii) Treatment cost savings were estimated for reduced incidence of childhood diseases from increased village health worker (VHW) activity supported by the project. Average treatment cost savings were calculated for respiratory disease and diarrhea.
- (iii) Productivity gains result from a reduction in morbidity and in premature mortality. Productivity gains are also realized when less time is spent by family members for the care of people living with HIV/AIDS.

7. Direct and indirect health benefits are significant due to fewer days lost at work and a general increase in the overall quality of life. Improved HIV prevention will reduce the burden of AIDS and generate economic benefits largely through reduced medical expenditures and decreased costs associated with lost labor associated with morbidity and premature death. Much of the project investment is associated with strengthening of district-level health systems, which will improve access to health services and lead to decreases in disease incidence in target provinces. The burden of childhood diseases⁶ is particularly acute in the Lao PDR and a reduction in this disease burden would generate treatment cost savings and improved labor productivity in the districts covered by the project.

⁴ ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila; and ADB. 2000. *Handbook for the Economic Analysis of Health Sector Projects*.

⁵ PPTA Consultant Report, 7582 REG: Capacity Building for HIV/AIDS Prevention in Lao People's Democratic Republic and the Socialist Republic of Viet Nam, 20 March 2012.

⁶ WHO. http://www.who.int/healthinfo/global_burden_disease/estimates_2000_2002/en/index.html.

Table.1: Cost–Benefit Analysis Assumptions

New infection	Health Costs	Productivity Costs	Reduced Disease Burden
HIV/AIDS			
Base incidence (new infections) of 1,500 HIV cases per year in target Vietnamese provinces, and 500 in the Lao PDR provinces.	Avoided annualized cost (benefit) of \$1,458 per AIDS case.	30 days of labor lost per case through health care seeking (valued at \$6 per day), and premature death using human capital approach.	Coefficients of reduced HIV incidence derived from the Goals model. Assumes 40% of reduced disease burden attributable to this investment
Childhood Diseases			
Base incidence of 200,000 cases of childhood illness per year in target provinces in Viet Nam, and 43,000 cases per year in the Lao PDR.	Avoided cost of \$1 per case. ^a	Premature mortality valued using human capital approach. Assumes more than 4,000 childhood illness mortalities in target provinces in the Lao PDR and 3,000 in Viet Nam without project. ^b	Assumes 3% reduction in childhood illness burden in target provinces in Viet Nam and 1% in the Lao PDR. Procurement of medical equipment, mobile clinics, and motorcycles improve access to quality services and benefits target population.

Lao PDR = Lao People's Democratic Republic.

^a The unit cost of oral rehydration diarrhea treatment varied from \$0.7-2.9 per child in Asian countries.⁷ An average cost of \$1 per year is assumed.

^b National childhood illness mortality rates taken from WHO. http://www.who.int/healthinfo/global_burden_disease/estimates_2000_2002/en/index.html.

Source: Asian Development Bank.

8. The Goals model^{8,9} estimates a 40% reduced disease incidence from moderately effective behavior change activity implementation, such as to be conducted in this project. For the purposes of estimating the stream of health benefits or health cost savings attributable to the proposed project, interventions were assumed to reduce annual HIV incidence by 10%, 20%, and 30% during the first 3 years of implementation, with the realization of a full reduction of 40% being achieved in 2020 (and continuing for the remainder of the projection period). Behavior change programs promoting condom use and sexually transmitted infection management have been shown to dramatically decrease HIV incidence. For example, in 1993, some 4% of Thai military conscripts were found to be HIV positive, prompting their inclusion in a national behavior change health campaign. By 2001, prevalence had fallen to 0.5%.¹⁰ Similar results were observed in Cambodia following the introduction of health promotion to reduce HIV

⁷ D. Jamison, J. Breman, A. Measham, et al., editors. (2006) Disease Control Priorities in Developing Countries. 2nd Edition. Washington (DC): World Bank; 2006.

⁸ J. Stover, L. Bollinger, and K. Cooper-Arnold (2001). Goals model: for estimating the effects of resource allocation decisions on the achievement of goals of the HIV/AIDS strategic plan. Glastonbury: The Futures Group International, 2001.

⁹ J. Stover, et al. 2002. Can We Reverse the HIV/AIDS Pandemic with an Expanded Response. *The Lancet*. 360, pp. 73–77.

¹⁰ D. Celentano et al. 1998. Decreasing Incidence of HIV and Sexually Transmitted Diseases Among Young Thai Men: Evidence for Success of the HIV/AIDS Control and Prevention Program. *AIDS*. 12 (5) 29–36.

incidence. Consistent use of condoms among sex workers increased from 53% to 96% between 1997 and 2003. HIV prevalence among adults fell by more than 30% over this period.¹¹

9. Access to health services is a major constraint in border areas. For example, in the Lao PDR, around 55% of children were treated in appropriate health facilities in 2000 for respiratory diseases in urban areas, whereas in rural areas only 32% were treated in the public system.¹² Improving the capacity of the district level health system to deliver services and health promotion by VHWs is likely to decrease disease incidence through more timely treatment, improved diagnosis and in some cases improved transportation. Decreased childhood disease incidence (3% in Viet Nam and 1% in the Lao PDR) was assumed. VHW activities, procurement of district-level equipment and the purchase of vehicles to improve access to health services are more widespread in project activities in Viet Nam, and the assumed reduction in incidence therefore greater than in the Lao PDR.

G. Economic Internal Rate of Return

10. The calculation of the economic internal rate of return (EIRR) is based on the investment costs and quantified benefits derived from reduction in medical treatment costs and reduction in productivity losses. The EIRR for the Lao PDR is estimated to be 13.1%, and the economic net present value (NPV) is calculated to be \$0.7 million; the EIRR for Viet Nam is estimated to be 12.7%, and the NPV \$1.5 million. The overall EIRR is estimated at 12.8%, with a calculated NPV of \$2.2 million.

H. Sustainability analysis

11. Based on the results of the national AIDS spending assessment (NASA) in 2009–2010, \$139 million was spent on supporting the national Vietnamese HIV response in 2010.¹³ AIDS expenditures accounted for 0.13% of gross domestic product, while per capita AIDS expenditure was \$1.54. Around 73% of the program was financed by international donors, while the government contributed about 14%–15% of total expenditure. The central government financed \$9 million and provincial governments \$12 million in expenditures in 2010. Affordability is assessed by comparing current levels of government financing with the annual funds required for O&M after implementation. Ongoing annual financial support is required to sustain O&M of equipment and other project investments. This requirement is estimated at an annual equivalent of 5% of investment costs, or \$0.72–0.96 million per year; it is estimated to be equivalent to 0.6% of overall national AIDS spending (which totals \$139 million annually).

12. Nationally, public AIDS expenditure in the Lao PDR increased from \$5.1 million in 2007 to \$5.9 million in 2009. Most expenditure is supported by external assistance from donors, including the United Nations organizations, ADB, the Global Fund to Fight AIDS, Tuberculosis and Malaria, bilateral donors, and international nongovernment organizations (NGOs).¹⁴ Government support accounted for around 2% of all expenditure in 2009, or \$0.1 million in 2009. Average annual counterpart financing requirement during project implementation is \$0.1

¹¹ United Nations Joint Programme on HIV/AIDS. 2006. *Report on the Global AIDS Epidemic*. Geneva., P.M. Gorbach et al. 2006. Changing Behaviors and Patterns among Cambodian Sex Workers: 1997–2003. *Journal of Acquired Immune Deficiency Syndromes*. 42(2). pp.242–247.

¹² United Nations Children's Fund (UNICEF), Department of Statistics (Laos), Ministry of Health (Laos). Laos Multiple Indicator Cluster Survey 2006. New York, United States: United Nations Children's Fund (UNICEF).

¹³ Viet Nam National Committee for AIDS, Drug and Prostitution Prevention. 2012. *Vietnam AIDS Response Progress Report 2012*. Hanoi.

¹⁴ Lao PDR National Committee for the Control of AIDS. 2010. *United Nations General Assembly Special Session LAO PDR 2010 Country Progress Report*. Vientiane.

million per year. This is estimated to be 2% (2009 data) of total national expenditures on AIDS programming, or equivalent to the total AIDS financing provided by the Government of the Lao PDR. Ongoing financial support is required to sustain O&M for equipment and other project investments. This requirement is also estimated to be equivalent to 2% of investment cost per year (i.e., \$0.1 million per year).

Table.2: Cost–Benefit Analysis Projections

(\$ million)

Year	Economic Cost	O&M	Total Cost	Avoided New HIV Infection (cases)	Total Reduction in HIV Treatment Cost	HIV Productivity Loss	Avoided Childhood Disease Benefits	Total Benefits	Net Benefits
2012	3.24		3.24						(3.24)
2013	9.23		9.23						(9.23)
2014	2.73		2.73						(2.73)
2015	2.07		2.07						(2.07)
2016	1.80		1.80						(1.80)
2017		0.81	0.81	200			1.08	1.08	0.27
2018		0.82	0.82	400			1.09	1.09	0.27
2019		0.83	0.83	600			1.10	1.10	0.27
2020		0.84	0.84	800			1.11	1.11	0.27
2021		0.85	0.85	800			1.12	1.12	0.28
2022		0.85	0.85	800			1.14	1.14	0.28
2023		0.86	0.86	800			1.15	1.15	0.28
2024		0.87	0.87	800	0.13	0.02	1.16	1.32	0.44
2025		0.88	0.88	800	0.39	0.07	1.17	1.64	0.76
2026		0.89	0.89	800	0.79	4.20	1.19	6.17	5.28
2027		0.90	0.90	800	1.31	5.49	1.20	8.00	7.10
2028		0.91	0.91	800	1.84	5.58	1.21	8.63	7.72
2029		0.92	0.92	800	2.36	5.68	1.23	9.27	8.35
2030		0.93	0.93	800	2.89	5.78	1.24	9.90	8.97
2031		0.94	0.94	800	3.41	5.87	1.25	10.54	9.60
2032		0.95	0.95	800	3.94	5.97	1.27	11.17	10.22
2033		0.96	0.96	800	4.46	6.07	1.28	11.81	10.85
2034		0.97	0.97	800	4.99	6.16	1.29	12.44	11.47
2035		0.98	0.98	800	5.51	6.26	1.31	13.08	12.10
2036		0.99	0.99	800	6.04	6.36	1.32	13.71	12.73
2037		1.00	1.00	800	6.56	6.45	1.34	14.35	13.35
2038		1.01	1.01	800	7.09	6.55	1.35	14.99	13.98
2039		1.02	1.02	800	7.61	6.65	1.36	15.62	14.60
2040		1.03	1.03	800	8.14	6.74	1.38	16.26	15.23
2041		1.04	1.04	800	8.66	6.84	1.39	16.89	15.85
2042		1.05	1.05	800	9.19	6.94	1.41	17.53	16.48
2043		1.06	1.06	800	9.71	7.03	1.43	18.17	17.10
2044		1.08	1.08	800	10.24	7.13	1.44	18.80	17.73
2045		1.09	1.09	800	10.76	7.23	1.46	19.44	18.35
2046		1.10	1.10	800	11.28	7.32	1.47	20.08	18.98
TOTAL	19.07	28.43	47.50	22,800	127.28	132.39	37.93	297.61	250.11

O&M = operations and maintenance, () = negative.

Source: Asian Development Bank estimates.

I. Sensitivity Analysis

13. There is substantial uncertainty surrounding a number of the variables used in the baseline evaluation. The impact on investment returns resulting from changes in the reduction in HIV incidence attributable to the project and from avoided childhood illness are reported in tables 3 and 4. It is calculated that the NPV of the project would decrease by \$2.8 million if the reduction in annual HIV incidence was reduced by 10% in the Lao PDR and Viet Nam.

**Table 3: Sensitivity of Investment
Criteria to Changes in Assumed Reductions in HIV Incidence**

Investment Criteria	Low (90% of Base Reduction)	Base	High (110% of Base Reduction)
Net present value (\$ million)	(0.6)	2.2	5.0
Economic internal rate of return (%)	11.8	12.8	13.7

() = negative.

Source: Asian Development Bank estimates.

**Table 4: Sensitivity of Investment
Criteria to Changes in Assumed Reductions in Childhood Disease Incidence**

Investment Criteria	Low (90% of Base Reduction)	Base	High (110% of Base Reduction)
Net present value (\$ million)	1.7	2.2	2.8
Economic internal rate of return (%)	12.6	12.8	13.0

() = negative.

Source: Asian Development Bank estimates.

14. Improved health system capacity stemming from investments in transport, staff and laboratories is estimated to decrease the burden of childhood diseases. The magnitude of this impact is difficult to quantify. It is calculated that the NPV of the project would decrease by \$0.5 million if the reduction in annual childhood disease incidence was reduced by 10% in the Lao PDR and Viet Nam. While this parameter has an impact on results, overall investment returns are more sensitive to HIV incidence reductions. The economic and social benefits of undertaking the project are positive. The analysis above demonstrates an expected EIRR of greater than 12%. However, a number of the economic benefits of HIV prevention are hard to quantify, which leads to underestimation of certain benefits.