

## ECONOMIC ANALYSIS<sup>1</sup>

1. **Introduction.** The Asian Development Bank (ADB) approved the Trade Facilitation: Improved Sanitary and Phytosanitary (SPS) Handling in Greater Mekong Subregion (GMS) Trade Project in April 2012.<sup>2</sup> The project aims to improve SPS management in Cambodia and the Lao People's Democratic Republic (Lao PDR) by strengthening SPS surveillance and inspection programs, promoting regional cooperation and harmonization in SPS handling, and enhancing university training of SPS specialists. In the Lao PDR, the project has been successful in delivering its outputs within the indicated time frame. To continue and scale up project activities, the Government of the Lao PDR has requested additional financing for the project. The additional financing project will build on the ongoing SPS project to strengthen SPS management further.

2. **Macroeconomic and sector context.** The real gross domestic product of the Lao PDR grew at an impressive average annual rate of 7.5% from 2002–2017. Gross domestic product per capita at current prices rose almost sevenfold over this period, from \$286 in 2001 to \$1,925 in 2016. The poverty headcount ratio at the national poverty line dropped from 33.5% in 2002 to 23.2% in 2012. Merchandise exports and international tourism were major drivers of growth. The performance of agriculture was relatively modest. The weaknesses of the SPS system are one of the key factors that have constrained the growth of agriculture and exports of agriculture, food, and forestry (AFF) products, and hindered poverty reduction in rural areas. Inadequate protection of plant and animal health adversely impacts on agricultural productivity, growth of agricultural output, and farmers' incomes. Many countries prohibit or restrict imports of AFF products from the Lao PDR because of its weak capacity to control pests and animal diseases, and ensure food safety. The SPS measures applied by the Lao PDR to imports raise the domestic prices of imported food products considerably.<sup>3</sup> Weaknesses in the SPS system are also one of the main reasons for the high incidence of food-borne diseases (FBDs) in the Lao PDR, and a major constraint on further growth of tourism in the country. The disability-adjusted life years (DALY) rate for diarrheal diseases, which are often caused by unsafe food, is much higher in the Lao PDR than in the other member countries of the Association of Southeast Asian Nations (ASEAN).<sup>4</sup> While the Lao PDR ranks 94th out 136 countries in the World Economic Forum's Travel and Tourism Competitiveness Index 2017, it ranks 106th on health and hygiene,<sup>5</sup> which deters many foreigners from visiting the Lao PDR.

3. **Project rationale.** The government plays an important role in the provision of SPS services in the Lao PDR because the private sector fails to provide these services efficiently as a result of market failures pertaining to public goods, asymmetric information, negative externalities, and coordination failures. For instance, the private sector does not set and enforce food safety standards because these standards are public goods. Without food safety standards and their enforcement by the government, consumers may be reluctant to buy even a safe food product because they generally have less information about the safety of a product than its producer. A negative externality often occurs when a pest or an animal disease enters a country with an

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<sup>1</sup> In accordance with ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

<sup>2</sup> ADB. 2012. *Report and Recommendation of the President to the Board of Directors on the Proposed Loans, Grant, and Technical Assistance to the Kingdom of Cambodia and the Lao People's Democratic Republic for the Trade Facilitation: Improved SPS Handling in Greater Mekong Subregion Trade Project*. Manila.

<sup>3</sup> World Bank. 2016. *A Comparative Overview of the Incidence of Non-Tariff Measures on Trade in Lao PDR*. Washington, DC.

<sup>4</sup> The DALY is a measure of the overall disease burden, expressed as the number of years lost because of ill health, disability, or early death. The DALY rate is the DALY per 1,000 persons.

<sup>5</sup> World Economic Forum. *Travel & Tourism Competitiveness Report 2017: Paving the way for a more sustainable and inclusive future*. Geneva.

imported agricultural product. A coordination failure often prevents farmers from effectively stopping the spread of a pest or an animal disease.

4. **Economic cost–benefit analysis.** The project will be implemented during 2018–2020. The equipment that will be procured under the project will be installed in 2019–2020. The replacement period for this equipment is 5–6 years. Therefore, the economic cost–benefit analysis for the project covers 2018–2025. The economic costs and benefits of the project are identified by comparing the without- and with-project scenarios, and are quantified as much as possible given the data constraints. The quantified costs and benefits are expressed in US dollars at constant 2016 prices. The calculations use the domestic price numeraire.

5. All estimated investment and recurrent costs of the project as well as the physical contingency are included in the cost–benefit analysis. Taxes and duties are subtracted from the financial costs. The financial costs are then converted into economic costs using a shadow wage rate factor of 1.0 for skilled labor and 0.8 for unskilled labor, and a shadow exchange rate factor (SERF) of 1.1 for tradable goods.<sup>6</sup>

6. The economic model captures the economic benefits accrued in the country. The potentially significant economic benefits of the project include the following:

- (i) An increase in the income of producers and exporters of AFF products resulting from lower export barriers related to SPS measures. By strengthening SPS management in the Lao PDR and promoting regional cooperation and harmonization in SPS handling, the project will help Lao exporters of AFF products maintain access to existing markets and gain access to new markets. It will also help reduce the cost and time to export AFF products.<sup>7</sup>
- (ii) A rise in farmers' incomes caused by an increase in crop yields. By expanding opportunities for exports of crops, attracting foreign direct investment and modern technologies into crop production, and enhancing the protection of crops from various pests, the project will boost crop yields and farmers' incomes from crop production.
- (iii) A decline in farmers' losses resulting from animal diseases. By increasing opportunities for exports of animals and animal products, attracting foreign direct investment and modern technologies into animal husbandry, reducing the prevalence of animal disease, and helping the government and farmers prevent or better control outbreaks of animal diseases, the project will reduce farmers' losses resulting from animal diseases and boost their income from animal husbandry.
- (iv) A decrease in the population's economic losses resulting from FBDs. By enhancing food safety, the project will help the Lao PDR reduce the incidence of FBDs and the population's economic losses resulting from such diseases (including the cost of treatment and the income that people forgo during illness).
- (v) An increase in domestic income generated by tourism. By enhancing food safety and environmental protection, the project will help attract more tourists to the Lao PDR and boost domestic income generated by tourism.

<sup>6</sup> ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Lao People's Democratic Republic for the Second Strengthening Technical and Vocational Education and Training Project*. Financial and Economic Analysis (accessible from the list of linked documents in Appendix 2). Manila.

<sup>7</sup> Given its scope, the project is not expected to cause—at least during 2018–2025—a considerable reduction in the cost and time to import to the Lao PDR.

7. Since the economic benefits are largely intangible, the cost–benefit analysis only includes: (i) an increase in farmers’ income from rice and corn production; (ii) a decrease in farmers’ losses resulting from foot-and-mouth disease (FMD), classical swine fever (CSF), and avian flu in the four provinces where transboundary animal disease (TAD) surveillance will be carried out (the project provinces); (iii) a decline in the population’s economic losses resulting from FBDs; and (iv) an increase in domestic income generated by tourism.

8. To quantify these benefits, assumptions are made based on expert opinions and findings of empirical studies. It is assumed that the project will increase the yield of rice by 20 kilograms per hectare and the yield of corn by 25 kilograms per hectare, 3% of the total area under rice and 3% of the total area under corn in 2016 will benefit from the project each year during 2018–2025, and all incremental output of rice and corn will be exported. It is assumed that the project will gradually reduce the prevalence of FMD in buffalos and cattle from 1.0% to 0.5%, the prevalence of FMD and CSF in pigs from 0.50% to 0.25%, and the prevalence of avian flu in poultry from 0.2% to 0.1% in the four project provinces over 2018–2025. The DALY rate for diarrheal diseases is used as a proxy for the burden of FBDs, and it is assumed that the project will gradually reduce the DALY rate for diarrheal diseases by 0.5% by 2025. Finally, it is assumed that the project will gradually boost international tourism receipts by 0.1% by 2025, and a tourism receipt multiplier of 0.6 is applied to estimate the resulting increase in domestic income. With these assumptions, the base-case economic net present value (ENPV) for the project at \$0.6 million, the discount rate is about 9.0%, and the base-case economic internal rate of return (EIRR) is 11.5% (Table 2).<sup>8</sup>

9. **Sensitivity analysis.** To assess how adverse changes in the main underlying assumptions affect the results of the cost–benefit analysis, a sensitivity analysis is undertaken. It shows that a smaller increase in the yield of corn in the areas that will benefit from the project and smaller decreases in the prevalence of FMD, CSF, and avian flu in the project provinces do not have significant negative impacts on the ENPV and EIRR of the project (Table 2). The ENPV remains positive even if the project causes no increase in the yield of corn or no decline in the prevalence of any of the three TADs. The ENPV becomes equal to zero if the decrease in the prevalence of all three TADs in the project provinces is 47.2% less than in the base case. At the same time, a smaller rise in the yield of rice in the areas that will benefit from the project, a smaller decrease in the burden of FBDs (as measured by the DALY rate for diarrheal diseases), a smaller increase in tourism receipts, and an increase in the SERF have considerable negative effects on the ENPV and EIRR. To ensure the economic viability of the project, priority will be given to those project activities that will raise the yield of rice and reduce the incidence of FBDs.

10. **Financial sustainability.** The project is non-revenue-generating. Its costs will be financed from two sources. ADB will finance—through a grant from the Asian Development Fund—all the investment costs of the project and most of its recurrent costs (including the recurrent costs of project management and the recurrent costs of operating the laboratory facilities and equipment) during project implementation. The government will cover some of the recurrent costs during project implementation by providing office space and making other in-kind contributions. The government will also finance the recurrent costs of operating the laboratory facilities and equipment after project implementation. The budgetary revenue and savings that the project will generate for the government by raising the income of farmers and exporters of AFF products, reducing the incidence of FBDs, and increasing tourism receipts will be more than enough to cover the recurrent costs of operating the laboratory facilities and equipment after project implementation. Hence, the project is financially sustainable.

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<sup>8</sup> The base-case ENPV would be larger and the base-case EIRR would be higher if the other economic benefits of the project could be quantified and included in the cost–benefit analysis.

11. **Overall assessment.** The economic rationale for the project is strong. The growth of agricultural value added and exports of AFF products was modest, and poverty declined much less in rural areas than in urban areas. Weaknesses of the SPS system are one of the key factors that have constrained the growth of agricultural output and exports of AFF products, increased the incidence of FBDs, and hindered progress in poverty reduction in rural areas. The country needs to strengthen its SPS system further to raise agricultural productivity, speed up the growth of agriculture, boost exports of AFF products, accelerate poverty reduction in rural areas, reduce the incidence of FBDs, and sustain the rapid growth of tourism. Table 1 demonstrates economic rationale.

**Table 1: Results of Sensitivity Analysis**

Scenarios	ENPV (\$'000)	EIRR (%)	Sensitivity Indicator	Difference between Switching Value and Base-Case Value (% of base-case value)
The increase in the yield of rice in the areas affected by the project is 10% smaller than in the base case	179.1	9.8	6.8	(14.6)
The rise in the yield of corn in the areas affected by the project is 10% smaller than in the base case	510.8	11.2	1.0	(100.8)
The increase in the yield of both rice and corn in the areas affected by the project is 10% smaller than in the base case	122.9	9.5	7.8	(12.8)
The decline in the prevalence of FMD in the project provinces is 10% smaller than in the base case	527.7	11.3	0.7	(144.2)
The decrease in the prevalence of CSF in the project provinces is 10% smaller than in the base case	520.7	11.3	0.8	(122.5)
The decline in the prevalence of avian flu in the project provinces is 10% smaller than in the base case	532.4	11.3	0.6	(163.6)
The decrease in the prevalence of FMD, CSF, and avian flu in the project provinces is 10% smaller than in the base case	446.8	11.0	2.1	(47.2)
The decline in the DALY rate for diarrheal diseases is 10% smaller than in the base case	360.7	10.6	3.6	(27.5)
The increase in tourism receipts is 10% smaller than in the base case	395.2	10.7	3.0	(33.0)
The SERF is 10% higher than in the base case	207.4	9.9	(6.3)	15.8

( ) = negative, CSF = classical swine fever, DALY = disability-adjusted life years, EIRR = economic internal rate of return, ENPV = economic net present value, FMD = foot-and-mouth disease, SERF = shadow exchange rate factor.  
Source: Asian Development Bank estimates.

12. The project is economically viable and financially sustainable. Its base-case EIRR is higher than the ADB cut-off rate of 9.0% (even though not all economic benefits of the project are quantified and included in the cost-benefit analysis because of data constraints). The economic viability of the project is robust to adverse changes in the main assumptions used in the cost-benefit analysis. The budgetary revenue and savings that the project will generate for the government will be more than enough to cover the recurrent costs of operating the laboratory facilities and equipment after project implementation.

**Table 2: Base-Case Estimates of Project Economic Costs and Benefits**  
(constant 2016 prices, \$'000 unless otherwise indicated)

Item	2018	2019	2020	2021	2022	2023	2024	2025	
<b>Economic costs</b>	<b>2,871.2</b>	<b>4,124.7</b>	<b>2,502.8</b>	<b>579.8</b>	<b>579.8</b>	<b>579.8</b>	<b>579.8</b>	<b>331.5</b>	
Investment costs	2,181.0	3,395.2	1,805.7	0.0	0.0	0.0	0.0	(248.3)	
Civil works	166.8	143.6	0.0	0.0	0.0	0.0	0.0	(248.3)	
Equipment	541.3	762.8	351.0	0.0	0.0	0.0	0.0	0.0	
Consulting services	776.6	1,510.5	806.0	0.0	0.0	0.0	0.0	0.0	
Training, awareness campaigns, and workshops	607.4	794.4	557.0	0.0	0.0	0.0	0.0	0.0	
Laboratory system support	0.0	95.0	0.0	0.0	0.0	0.0	0.0	0.0	
Support staff	88.9	88.9	91.6	0.0	0.0	0.0	0.0	0.0	
Recurrent costs	690.3	729.5	697.1	579.8	579.8	579.8	579.8	579.8	
Project management	125.6	126.1	126.1	0.0	0.0	0.0	0.0	0.0	
Other recurrent costs	564.7	603.5	571.1	579.8	579.8	579.8	579.8	579.8	
Physical contingency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Quantified economic benefits</b>	<b>449.4</b>	<b>908.9</b>	<b>1,375.0</b>	<b>1,844.1</b>	<b>2,309.5</b>	<b>2,766.9</b>	<b>3,209.2</b>	<b>3,629.3</b>	
Increase in farmers' income from rice and corn production	215.9	431.8	647.7	863.6	1,079.4	1,295.3	1,511.2	1,727.1	
Decrease in farmer's losses resulting from FMD, CSF, and avian flu in the project provinces	47.7	99.7	156.6	218.6	286.3	360.2	440.8	528.9	
Decline in the population's economic losses resulting from food-borne diseases	117.9	232.0	339.6	438.4	523.2	591.5	638.5	659.1	
Increase in domestic income generated by tourism	67.9	145.4	231.1	323.6	420.7	519.9	618.7	714.2	
<b>Net economic benefits</b>	<b>(2,421.8)</b>	<b>(3,215.9)</b>	<b>(1,127.8)</b>	<b>1,264.3</b>	<b>1,729.8</b>	<b>2,187.1</b>	<b>2,629.5</b>	<b>3,297.8</b>	
ENPV at a 9% discount rate									567.0
EIRR (%)									11.5

( ) = negative, CSF = classical swine fever, EIRR = economic internal rate of return, ENPV = economic net present value, FMD = foot-and-mouth disease.  
Source: Asian Development Bank estimates.