Ex-Post Project Evaluation 2011: Package I-4 (Thailand/Laos, Vietnam, Cambodia, Bangladesh)

July 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2009, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2008. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

July, 2012
Masato Watanabe
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

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“Jamuna Bridge Access Road Project”

Thailand / Laos

Ex-Post Evaluation of Japanese ODA Loan Project

"Second Mekong International Bridge Construction Project"

External Evaluator: Masumi Shimamura

Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

The relevance of the project is high due to the high consistency between the project objective and the GMS[1] regional development policy as well as the national development policy and needs of Thailand and Lao P.D.R. While the project outputs materialized as planned, and the project cost was within the plan, the efficiency of the project is fair because the project period exceeded. Although substantial increase of traffic volume was observed for cars, sluggish growth has seen for trucks in comparison with the expected traffic. On the other hand, the effectiveness of the project is fair since the project is deemed as to have yielded a number of positive effectiveness and impacts including increase of number of tourists and activation of tourism demand, facilitation of agricultural production, increase of industrial production, facilitation of river crossing of local residents, contribution to the regional economic development, etc. The sustainability of the project is high as no particular issue has observed for the operation and maintenance system, technology, and finance, and the state of operation and maintenance is maintained in good condition. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Second Mekong International Bridge (taken from Lao side)

[1] Greater Mekong Subregion

1.1 Background

The Mekong basin includes five countries and a region: Thailand, Lao P.D.R., Cambodia, Myanmar, Vietnam and Yunnan Province in China. Development of the Mekong basin has been actively promoted since the first half of the 1990s after the restoration of peace in Cambodia and in Indochina Peninsula, and with the transition to a market economy among socialist states in the post-Cold war era. Multilateral frameworks that have continued to actively promote the development include the GMS led by Asian Development Bank (ADB). GMS recognizes ten road development projects in transportation sector, and among them high priority was placed on the development of three routes: 1) the Thailand-Lao P.D.R.-Vietnam East-West Economic Corridor (EWEC), 2) the Phnom Penh-Ho Chi Minh-Vung Tau road, and 3) Kunming-Chiang Rai road. As part of 1) the EWEC, this project was to develop an international bridge over the Mekong River that serves as the border between Thailand and Laos in order to connect Northeastern Thailand and Central Vietnam via National Road No.9 in Lao P.D.R. The construction of the bridge was expected to activate inter-regional distribution in Northeastern Thailand, Central Laos and Central Vietnam, and to promote regional economic development of each country. Given that Laos and Northeastern Thailand are a landlocked country and region respectively, trade facilitation was expected to be realized utilizing the Central Vietnam's port facilities located at the east gateway of the EWEC.

1.2 Project Outline

The objective of this project is to connect the EWEC that runs through Vietnam, Laos, Thailand, and Myanmar by constructing a two-lane bridge with an overall length[2] of 2,050 meters over the Mekong River at the border of Laos and Thailand,[3] thereby contributing to the promotion of bilateral trade between Laos and Thailand, as well as encouraging economic development along the area of the EWEC.

Loan Approved Amount/ Disbursed Amount	Thailand: 4,079 million yen, Laos: 4,011 million yen / Thailand: 2,736 million yen, Laos: 3,977 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	For both countries: September, 2001 / December, 2001
Terms and Conditions	For both countries:

[2] Total length of the main bridge (1,600m) and the approach bridges (Thai side: 250m and Lao side: 200m)

[3] The official opening of the Second Mekong International Bridge was on December 20, 2006, and commenced its general use on January 9, 2007.

	Interest Rate: 1.0%, Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General untied Consultant Interest Rate: 0.75%, Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: General untied
Borrower / Executing Agencies	The Kingdom of Thailand / Ministry of Transport, Department of Highways The Lao People's Democratic Republic / Ministry of Public Works and Transport
Final Disbursement Date	For both countries: April, 2009
Main Contractor (Over 1 billion yen)	Thailand: Sumitomo Mitsui Construction Co., Ltd.(Japan)・Krung Thon Engineers Co., Ltd.(Thailand)・Vichitbhan Construction Co., Ltd.(Thailand)・Siam Syntech Construction Public Co., Ltd.(Thailand) (JV) Laos: Sumitomo Mitsui Construction Co., Ltd.(Japan)・Krung Thon Engineers Co., Ltd.(Thailand)・Vichitbhan Construction Co., Ltd.(Thailand)・Siam Syntech Construction Public Co., Ltd.(Thailand) (JV), Shimizu Corporation(Japan)・Italian-Thai Development Public Company Ltd.(Thailand) (JV)
Main Consultant (Over 100 million yen)	Thailand: Nippon Koei Co., Ltd. (Japan)・Oriental Consultants Co., Ltd. (Japan)・Communication Design and Research Institute(Laos)・Asian Engineering Consultants Co., Ltd.(Thailand) (JV) Laos: Nippon Koei Co., Ltd. (Japan)・Oriental Consultants Co., Ltd. (Japan)・Communication Design and Research Institute(Laos)・Asian Engineering Consultants Co., Ltd.(Thailand) (JV)
Feasibility Studies, etc.	・Feasibility Study (ADB) in 1992 ・Feasibility Study including East-West Economic Corridor (France) in Dec. 1996 ・Special Assistance for Project Formation Study (OECF) in March1998 ・Special Assistance for Project Implementation Study (JBIC) in March 2004

Related Projects (if any)	ODA Loan (JICA) ・Vietnam: Da Nang Port Improvement Project ・Vietnam: Hai Van Tunnel Construction Project (I)～(III) ・Vietnam: National Highway No.1 Bridge Rehabilitation Project (I)(II) Grant Aid (JICA) ・The Project for Improvement of the National Road Route 9 Technical Cooperation (JICA) ・Detailed Design Study Assistance from the Asian Development Bank ・National Road Improvement Project (NR.9) in Vietnam ・National Road Improvement Project (NR.9) in Laos Assistance from the World Bank ・Highway Rehabilitation Project in Vietnam

2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: August, 2011 – June, 2012

Duration of the Field Study: October 16 – November 15, 2011, February 19 – March 3, 2012

2.3 Constraints during the Evaluation Study

None.

3. Results of the Evaluation (Overall Rating: B)[4]

3.1 Relevance (Rating: ③)[5]

3.1.1 Relevance with the Development Plan

3.1.1.1 Consistency with GMS Regional Development Policy

At the time of appraisal in 1998, development of the Mekong basin has been actively promoted, with a creation of multilateral frameworks led by ADB to facilitate the economic cooperation to the GMS. The ultimate goal was to promote sustainable economic growth and to improve the living standards of people in the region. The GMS

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ② Fair, ① Low

focuses on socio-economic regional cooperation in seven areas: transportation, energy, communication, environment, human development, trade and investment, and tourism. Among these, transportation was given the highest priority with road sector being the most important. Within the high priority road projects, this project which takes up the focal point of the development of the Thailand-Laos -Vietnam EWEC was expected to contribute towards higher efficiency in inter-regional logistics, to regional economic development and to reduce the living standard gap within in the region.

At the time of ex-post evaluation, development of the EWEC continues to be regarded as a high priority in the GMS regional development policy.[6] The project is to connect the missing link (physical bottleneck) of the Corridor, and to contribute to the development of efficient logistics network in the GMS, which is consistent with the direction of the GMS regional cooperation. From the institutional perspective, the Cross-Border Transport Agreement (CBTA) regarding transport, custom, immigration and quarantine within GMS region has been prepared. Initially, the CBTA was signed as a tripartite agreement among Laos, Thailand and Vietnam in 1999, and later in 2001, 2002 and 2003, Cambodia, China, and Myanmar jointed respectively. In March, 2007, all Annexes have been signed by all six GMS countries.[7]

[6] Under the GMS Economic Cooperation Program, the development of the nine economic corridors: the North South Corridor, the Northern Corridor, the Eastern Corridor, the East West Corridor, the Southern Corridor, the Southern Coastal Corridor, the Central Corridor, the Northeastern Corridor, and the Northwestern Corridor have been promoted, and in particular the priority for developing and enhancing the East West Corridor is regarded very high.

[7] Although all the Annexes have been signed by all six GMS countries, ratification within each country is yet to be completed.

Source: ADB GMS Transport Sector Strategy, 2007

Figure 1: Nine Economic Corridors in GMS

3.1.1.2 Consistency with National Development Policy in Thailand

At the time of appraisal, the Thai government set forth its strategy to facilitate regional economic development and expansion of economic exchanges with neighboring countries through development and connection of national roads linking regions and cities. Under the 7th National Economic and Social Development Plan (1992-1996), the improvement of arterial highway network connecting North-South of the country via Capital Region was implemented to resolve shortage of road capacity. The improvement of the North-South and the East-West arterial highway network continued to take place in the subsequent Regional Road Improvement Project (II), taking into consideration of connectivity to the EWEC, under the following 8th National Economic and Social

Development Plan (1997-2001).

At the time of ex-post evaluation, the Thai government set forth in the 10th National Economic and Social Development Plan (2007-2010) the following missions: 1) human resource development, 2) regional and social based development, 3) enhancement of economic efficiency, 4) conservation of natural resources, and 5) development of national administration to achieve good governance. As one of the targets to realize mission 3), "improvement of the efficiency of logistics" was set out as one of objectives. In addition, the Thai government considers the direction of the country's sustainable development taking into consideration the expansion of globalization, as becoming "entrance to GMS" and "Indochina hub for business and transportation". The Second Mekong International Bridge (SMIB) project is fully in line with such direction of the country.

3.1.1.3 Consistency with National Development Policy in Laos

At the time of appraisal in 1998, the Laos government was aiming to get out of least developing country status by 2020. In order to achieve this goal, the highest priority was placed on the following eight areas.[8] 1) expansion of food production, 2) production of commercial crops, 3) reconsideration of burn agriculture, 4) local development, 5) social infrastructure development, 6) facilitation of foreign economic relations and cooperation, 7) human resource development, and 8) service sector development. This project contributed to the development of the foreign economic relations of the country, and was clearly identified as a national flagship project in the Socio-Economic Development Plan (1996-2000) to realize these objectives.

At the time of ex-post evaluation, the Laos government also indicated in its eighth party meeting in 2006 its national goal to get out of least developing country status by 2020. As part of this, the government has been promoting economic development and foreign investment. In this regard, securing access to deep-sea ports (removing obstacles as a landlocked country) through expanding economic relationships with neighboring countries such as Thailand, Vietnam and China has become the country's top priority – this is stipulated in the Seventh Socio-Economic Development Plan (2011-2015). The project continues to be regarded as a national flagship project to realize the national goal.

3.1.2 Relevance with the Development Needs

3.1.2.1 Consistency with Development Needs in Thailand

At the time of appraisal in 1998, the road sector was regarded as being highly important among Thailand's five major transportation modes (road, railway, marine,

[8] Laos government initiated economic reform in 1986 called "New Economic Mechanism" and has been promoting market economy and open economy since then.

inland waterway, and aviation), as it took up 89% (in 1998) of the country's freight transportation. At the time of appraisal, the Department of Highways (DOH) was planning to connect the Eastern Seaboard Area, with a view to realizing the SMIB project.

At the time of ex-post evaluation, the road sector continues to be the core transportation infrastructure within the country. The Master Plan on Inter-City Motorway Construction covering 1997-2016 emphasizes the substantial importance of road sector development. More than half (770km) of the entire distance of the EWEC (1,450km) from Myanmar (Mawlamying) to Vietnam (Da Nang) passes through Thailand, and the Thai government has been developing a four-lane road in order to facilitate the efficiency of logistics of the EWEC. This project contributes to the economic development of Thailand's Northeast region, one of poorest regions, and the government regards the SMIB as the important gateway for trade between Vietnam and China.

3.1.2.2 Consistency with Development Needs in Laos

At the time of appraisal in 1998, the Laos government placed high priority for investment in economic development areas, including transportation and agriculture sectors in the National Development Plan extending until 2003. Especially, investment to transportation sector accounted for about 35% of the total investment. The government placed road sector development as the highest importance in order to rectify disparities among regions, facilitate market economy, and promote logistics among Indochina regions from the perspective of GMS development after becoming ASEAN member. In this regard, the country received assistance from bilateral and multilateral organizations to develop and improve national roads that constitute arterial road network.

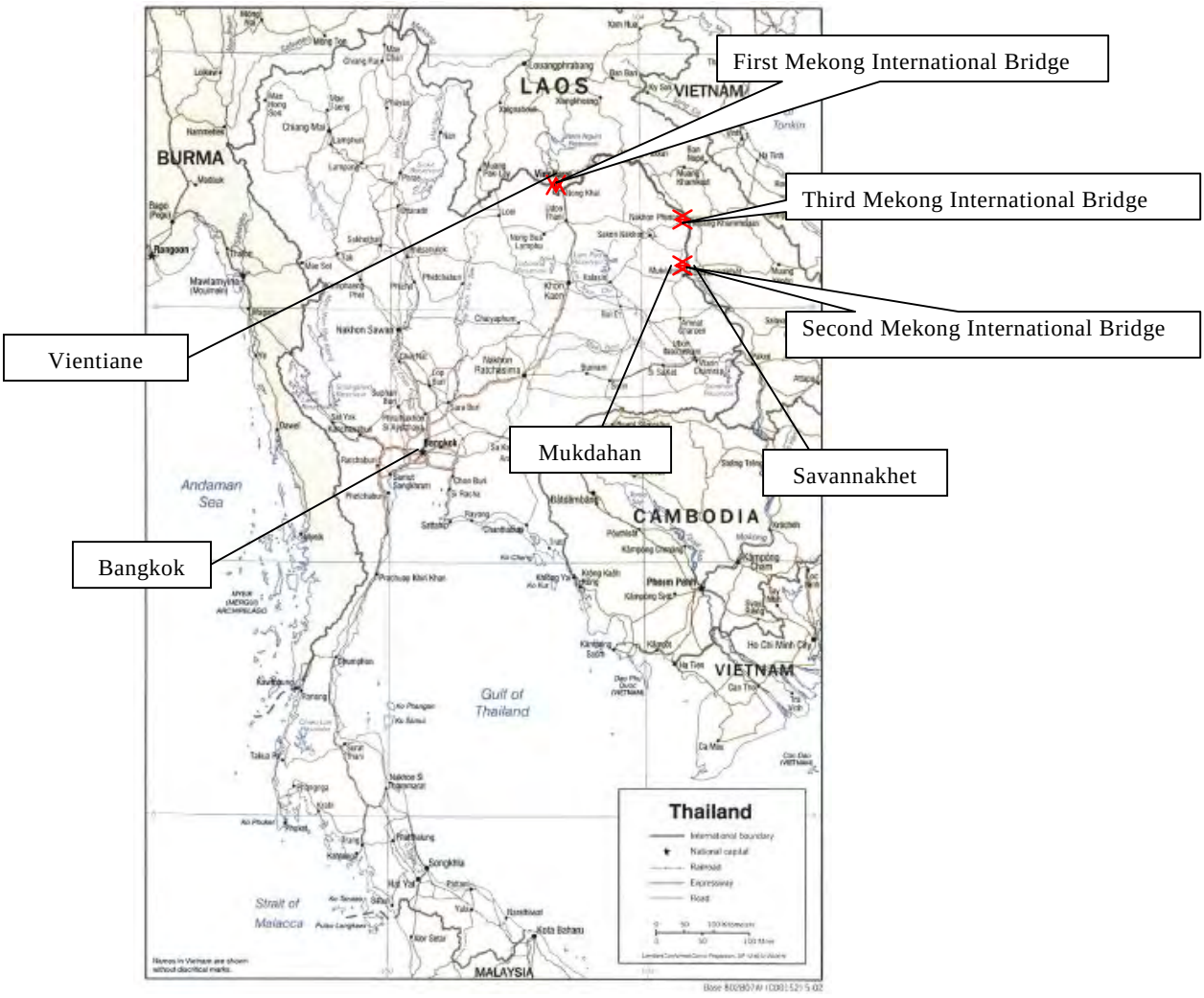
The direction of development is maintained at the time of ex-post evaluation. Laos is a landlocked country, places very importance to distribute goods and materials through road transportation, and road has become important means of transportation to secure access to sea ports. In particular, the National Road No.9,[9] which constitutes a part of the EWEC, has been regarded as highly critical land transportation to strengthen economic relationships with Thailand and Vietnam, and has become important road for the economic development of Central Laos. The project is to connect a missing link in the EWEC/NR9, and is expected to be utilized to further promote trade and investment.

[9] Development of National Road No.9 has been implemented through the assistance from Japan and Asian Development Bank. About two thirds of the sections of NR9 have been developed through Japan's grant aid. In addition, Hai Van Tunnel was completed in Vietnam in June 2005 through Japanese loan assistance. In this way, the development of the EWEC has been steadily promoted in each country.

3.1.3 Relevance with Japan's ODA Policy

At the time of appraisal in 1998, JICA had indicated a policy of proceeding economic cooperation in the East Asian Region to support ASEAN regional cooperation, the GMS Economic Cooperation Program, and has consistently expressed its support at international conferences, including ASEAN-Japan Summits. Especially in the implementation strategy of the overseas economic cooperation operation at the time, regional cooperation with regards to the development of the entire Mekong River basin was given greater importance, with the emphasis on the transportation and power sectors, as well as the agriculture sector as a measure for poverty reduction. With regards to the road sector in Thailand, JICA has implemented its strategy to support road improvements focusing on the EWEC and the North-South Corridor (which JICA has provided assistance to in the past) and their connecting roads. As regards the road sector in Laos, although no Japanese loan project has been provided in the past, JICA has indicated the transportation sector as one of the major sectors as a potential candidate for a Japanese yen loan project in its Country Assistance Strategy. Since the onset of the project, there has been no change in the assistance policies of the Government of Japan or JICA, which might affect the direction of the project. Thus, the consistency of the project with the Japanese assistance policies is still maintained.

This project has been highly relevant with the GMS Regional Development Policy, the country's development plans in both Thailand and Laos, the development needs in both Thailand and Laos, as well as Japan's ODA policy, therefore its relevance is high.



Source: University of Texas Austin Library, Map Collection
http://www.lib.utexas.edu/maps/middle_east_and_asia/thailand_pol_2002.jpg

Figure 2: Map of Project Site

3.2 Effectiveness[10] (Rating: ②)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

As no operation and effectiveness indices were set at the time of appraisal, the estimation made in the Special Assistance for Project Implementation (SAPI) Study in 2004 was utilized as a reference.

3.2.1.1 Traffic Volume on the SMIB

Tables 1 and 2 below show the trend of the actual traffic volume of the SMIB (one-way traffic volume from Mukdahan, Thailand to Savannakhet, Laos, and one-way traffic volume from Savannakhet, Laos to Mukdahan, Thailand, respectively). Table 3 is the

[10] Sub-rating for Effectiveness is to be put with consideration of Impact

both-way traffic volume in 2009, and Table 4 is the traffic estimation in 2009 under the SAPI study[11] as a reference.

Substantial increase of traffic volume was observed for cars and busses, however, sluggish growth has been recorded for trucks, which is dragging down the traffic volume of the whole SMIB. Concretely, the actual daily average traffic volume of trucks (both sides) in the third year after the opening of the bridge (in 2009) remains at 100. In fact, the initially assumed "24-hour operation of the SMIB" has not been realized with no good prospect of sufficient traffic volume.

Table 1: Traffic Volume from Thailand (Mukdahan) to Laos (Savannakhet)

(Upper figures: Vehicle/year, Lower figures: Vehicle/day)

FY in Thailand	Truck	Bus	Car	Others	Total
2007	12,517 53	8,205 35	19,061 81	5,374 23	45,157 193
2008	21,481 59	17,142 47	43,931 120	8,151 22	90,705 249
2009	27,502 75	32,015 88	64,031 175	8,674 24	132,209 362
2010	29,024 80	43,308 119	82,661 226	8,639 24	163,632 448
2011	29,274 80	54,871 150	97,331 267	7,785 21	189,207 518

Source: Mukdahan Regional Office, Thailand Department of Highways (DOH), Ministry of Transport

Note 1): The fiscal year (FY) in Thailand is from October of the previous year to September of the current year. FY2007 is from January 2007 when the bridge started its general operation until September of the same year. Vehicle per day was calculated given that there were 234days for FY2007.

Note 2): "Others" indicates vehicles not subject to paying toll fee. Breakdown of vehicle type is not available.

Note 3): There are years when sum of traffic volume of trucks, busses and cards do not coincide with the total number. (FY 2007, 2009 and 2011, respectively)

Note 4): The sum of lower figures for trucks, busses and cars do not necessarily coincide with the total number due to the rounding error.

Table 2: Traffic Volume from Laos (Savannakhet) to Thailand (Mukdahan)

(Upper figures: Vehicle/year, Lower figures: Vehicle/day)

Calendar Year	Truck	Bus	Car	Others	Total
2007	10,328 28	9,450 26	25,299 69	6,949 30	56,003 153
2008	10,805 30	10,091 28	40,195 110	8,920 24	70,011 192
2009	9,139 25	22,372 61	57,650 158	12,392 34	101,184 278
2010	7,393 20	22,773 62	63,539 174	13,532 37	107,241 294
2011	12,796 42	36,288 119	61,932 204	17,496 58	128,546 423

[11] Traffic estimation was conducted in the Special Assistance for Project Formation (SAPROF) Study in 1998, however, the estimation was pointed out to be excessive and data was reexamined in the SAPI Study to make downward adjustment.

Source: Bridge Management Committee (BMC), Savannakhet, Laos
Note 1): Year 2007 is from January 2007 when the bridge started its general operation until December of the same year. Vehicle per day was calculated given that there were 356days for 2007.
Note 2): Year 2011 is from January 2011 until October of the same year. Vehicle per day was calculated given that there were 304days for 2011.
Note 3): "Others" indicates vehicles not subject to paying toll fee. Breakdown of vehicle type is not available.
Note 4): There are years when sum of traffic volume of trucks, busses and cards do not coincide with the total number. (FY 2007, 2009, 201 and 2011, respectively)
Note 5): The sum of lower figures for trucks, busses and cars do not necessarily coincide with the total number due to the rounding error.

Table 3: Simple Addition of Traffic Volume for Both Sides in 2009

(Upper figures: Vehicle/year, Lower figures: Vehicle/day)

Truck	Bus	Car	Others	Total
36,641	54,387	121,681	21,066	233,393
100	149	333	58	639

Note 1): Although difference in calendar year (Laos) and FY (Thailand) exists, simple addition of traffic volume was made.
Note 2): "Others" indicates vehicles not subject to paying toll fee. Breakdown of vehicle type is not available.
Note 3): The sum of traffic volume of trucks, busses and cars do not coincide with the total number.

Table 4: Traffic Estimation in 2009 under the SAPI Study

(Traffic on both ways, Vehicle/day)

Truck	Bus	Car	Total
517	117	225	859

Note 1): It was assumed that the general opening of the bridge would take place in early 2007, and the ex-post evaluation to be conducted in 2009.

The main factors for the slower growth of traffic volume of trucks, and points of concern can be considered as follows.

- Issues related with physical infrastructure:

1) Deterioration of National Road No.9, the Laos section of the EWEC, has been increasing. As the road remains a two-lane road, it has become a traffic bottleneck for large size containers/trucks to pass through, which has been drawing up logistics costs. The improvement of NR 9 is planned to be implemented for some sections with critical damages through Japan's grant assistance soon.[12]
2) The road leading to Da Nang Port from the east gateway of the EWEC (between Quang Tri and Dong Ha) is two-lane and narrow. In addition, there are sections along National Road No.1 where private houses are located just on the side of the road, which poses traffic safely issues for large size containers/trucks. While travel convenience has drastically improved after the construction of the Hai Van Tunnel, there are still sections passing through mountainous areas, thus increasing travel time and cost. The Vietnamese government is planning to develop the North South Highway[13] to cope with such issues.

[12] Exchange of Notes was concluded on August 2, 2011.
[13] One of the highest priority sections of the Highway between Da Nang and Quang Ngai will be developed with Japanese yen loan support – loan agreement was signed on June, 2011.

・ Issues related with institutional arrangements:

1) Issues related with the reciprocal exchange of traffic rights for commercial cross-border need to be improved. Bilateral agreements have been signed for registered vehicles for mutual entry of traffic between Thailand and Laos, and Laos and Vietnam, however, a bilateral agreement has yet to be signed between Thailand and Vietnam, and mutual entry has not been realized under the current situation. Containers need to either change the head of the vehicle or reload their cargo to another container, which has resulted in bottlenecks for cross-border transport.
2) Simplification of custom clearance procedures have not realized. The initially expected Single Stop Inspection (SSI) has not been realized at the Common Control Area (CCA),[14] and vehicles passing through the bridge need to go through customs, quarantine and immigration procedures both at the exit point and entry point of each country.[15]
3) While custom procedures have improved at the Lao Bao border between Laos and Vietnam, customs declaration forms still differ between the two countries, thus resulting in the need to prepare two different forms. The fact that the forms cannot be filled in English has resulted in a bottleneck for custom clearance.

・ Issues related with transportation cost:

While travel time between Bangkok and Hanoi takes about two weeks by maritime shipping, travel time is reduced to three to four days by land transportation via the SMIB. However, transportation costs by land is more than double[16] compared to the costs of maritime shipping, therefore, sea transportation is still advantageous for bulk transport that does not require prompt distribution.

・ Points of concern:

Possible diversion of traffic to the Third Mekong International Bridge (the Third Thai-Laos Friendship Bridge) connecting Nakhon Phanom in Thailand and Thakhek in Laos, which opened in November 2011, is pointed out. Since there is an alternative route to go to Vietnam utilizing the Third Mekong International Bridge and the National Road

14 CCA is a facility for both officers from Thailand and Laos to conduct operation at the same time on clearance of custom, quarantine and immigration. It will realize Single Stop Inspection (SSI) and expected to enhance efficiency of distribution through conducting inspection at the single check point (usually located at the entrance side of a country). In order to realize SSI, officers in both Thailand and Laos need to conduct inspection work for custom, quarantine and immigration jointly across borders. Revision of domestic law is necessary in Thailand in order for Thai officers to work across borders as well as to receive Lao officers in the country.

15 SSI has already been introduced at the Lao Bao border between Laos and Vietnam on the EWEC.

16 For a 40ft container, while it costs 4,200USD including customs duty by land transpiration, maritime shipping costs only 2,000USD. Source: JICA Study on Challenges of the GMS Countries utilizing Cross-Border Transport
（http://www.jica.go.jp/activities/issues/transport/pdf/cbti_03.pdf）

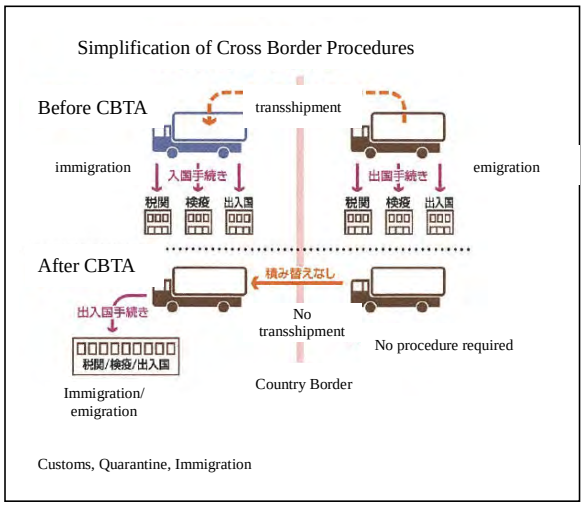
No.12 in Laos to travel from Thailand (Bangkok) to Hanoi (and further to China), it is necessary to take into consideration the effects of the new route when estimating future traffic of the SMIB.

Although the SAPI study has recognized the above institutional issues (issues related with the full implementation of CBTA), traffic estimation was made assuming major bottlenecks have been already resolved. Revisions of laws are necessary when gaps exist between CBTA and the domestic legal system, however, this will necessitate approval of the Parliament, which is beyond control of the government administration, thus causing difficulty to predict the prospect of approval. When taking into account the recent political turmoil in Thailand, the assumptions and conditions made in estimating traffic volume under the SAPI study can be perceived to be ambitious.

Figure 3: National Road No.9 (Laos)

Figure 4: Third Thai-Laos Friendship Bridge

Figure 5: Common Control Area in Laos



Source: Reference from JICA

Figure 6: Cross Border Procedures (comparison between the existing procedures with those after the introduction of CBTA)

3.2.1.2 Passenger Volume on the SMIB

The number of passengers crossing the border using the SMIB has sharply increased, and passenger volume in the fifth year after the opening of the bridge has increased almost threefold compared with that of the opening year. In addition, the passenger volume has considerably exceeded the target[17] (2,501 average daily passengers in 2009, which is equivalent to 912,865 passengers for the year) in the SAPI study. This is consistent with the tourism demand data taken up later, and therefore, it can be confirmed that the SMIB has contributed greatly to the increase of passengers.

Table 5: Passenger Volume Using SMIB to Cross Border

Calendar Year	Arrival in Savannakhet	Departure from Savannakhet	Total Passengers
2007	325,296	293,851	619,147
2008	397,102	414,852	811,954
2009	827,274	766,479	1,593,753
2010	950,430	946,000	1,896,430
2011	939,654	971,647	1,911,301

Source: Bridge Management Committee (BMC), Savannakhet, Laos
Note 1): Actual figures from January until September for 2011.

Table 6: Passenger Volume between Mukdahan (Thailand) and Savannakhet (Laos)

FY in Thailand	Arrival in Mukdahan	Departure from Mukdahan	Total Passengers
2008	434,016	430,235	864,251
2009	652,388	610,196	1,262,584
2010	881,852	849,893	1,731,745
2011	1,130,964	1,099,094	2,230,058

Source: Mukdahan Immigration Office
Note 1): The FY in Thailand is from October of the previous year to September of the current year.

3.2.1.3 Operation Hours of the SMIB

The operation hours of the immigration office at the SMIB are from 6:00 to 22:00, and the expected 24-hour operation has not realized. According to the executing agencies both in Thailand and Laos, traffic demand especially during night-time is low, and traffic volume cannot be expected to realize 24-hour operation yet. In fact, there is no plan to carry out 24-hour operation in near future. This is consistent with the traffic analysis described above.

3.2.1.4 Operation of Ferry Boats After the Operation of the SMIB

Ferryboats for passengers and baggage are still under operation after the opening of the SMIB. Ferryboats connect the center of Mukdahan, Thailand and Savannakhet, Laos, with

[17] The Study assumes the bridge opening to take place in early 2007 and ex-post evaluation to be conducted in 2009.

continued demand from local residents as convenient transportation.[18] Scheduled ferryboats cross the river and come back seven times during their operating hours between 9:30 to 16:30. The cost of a one-way fare is 50Baht or 13,000Kip, which is equivalent to the toll fee for small cars/four-wheel drive cars to cross the SMIB.

Figure 7: Ferryboat

Figure 8: Time Table of Ferryboats

3.2.1.5 Average Required Time for Trucks, Busses and Cars to go through CIQ (Custom, Immigration and Quarantine) on the SMIB

According to the survey conducted by the Mukdahan Custom House,[19] the average required times to pass through the CIQ at the border facilities are: 184 minutes for trucks and 8-11 minutes for busses (it takes about five minutes to cross the bridge). Target times under the SAPI study in 2009 were: 90 minutes for trucks and 15-25 minutes for cars in case SSI is realized, and 180 minutes for trucks and 20-30 minutes for cars in case SSI is not realized. Although SSI is not realized, cars and trucks have reduced the time by more than half. The time taken for trucks is about the same as the target time under the SAPI study.

3.2.1.6 Vehicle Charge Passing through the SMIB

The vehicle charge structure passing the SMIB (one way) is shown in the table below. The fee level for each vehicle classification is standardized based on the Memorandum of

[18] Because the entrance of the SMIB is located 7.5km north of the center of Mukdahan and 5km north of the center of Savannakhet, respectively, cars are necessary in order to move from the bridge to the center of the cities. Demand for ferryboats still exist for residence without cars.

[19] The survey was conducted between January 15-20 and 23-25 in 2012 during the opening hours of the bridge (6:00-22:00).

Understanding concluded between the two countries. Motorbikes and pedestrians are not allowed to cross the bridge.

Table 7: Vehicle Charge Passing through the SMIB (one way)

	Vehicle Classification	Vehicle Charge
1	Small car (max. 7 seats)	50Baht or 13,000Kip
2	Transport car with 4 wheel	50Baht or 13,000Kip
3	Small passenger bus (7 to 12 seats)	100Baht or 27,000Kip
4	Middle passenger bus (13 to 24 seats)	150Baht or 40,000Kip
5	Large passenger bus (over 24 seats)	200Baht or 54,000Kip
6	Transport truck with 6 wheels	250Baht or 67,000Kip
7	Transport truck with 10 wheels	350Baht or 94,000Kip
8	Transport truck with over 10 wheels	500Baht or 135,000Kip

Source: Bridge Management Committee (BMC), Savannakhet, Laos

The trend for toll revenues is shown in the table below. As total traffic volume includes vehicles not subject to paying a toll fee, the toll revenues and traffic volume data do not correspond one-on-one. However, steady growth of the overall toll revenues can be seen – the toll revenues have increased around three times after three years of opening of the bridge (actual figure in 2010) compared with that of the opening year.

Table 8: Vehicle Charge Revenue from Thailand (Mukdahan) to Laos (Savannakhet)

FY in Thailand	Vehicle Charge Revenue (Baht)	Total Traffic Volume
2007	7,374,350	45,157
2008	13,777,650	90,705
2009	19,507,100	132,209
2010	22,289,350	163,632
2011	25,467,300	189,207

Source: Mukdahan Regional Office, Thailand Department of Highways (DOH), Ministry of Transport
Note 1): The FY in Thailand is from October of the previous year to September of the current year.
Note 2): FY2007 is from January 2007 when the bridge started its general operation until September of the same year.

Table 9: Vehicle Charge Revenue from Laos (Savannakhet) to Thailand (Mukdahan)

Calendar Year	Vehicle Charge Revenue (Kip)	Total Traffic Volume
2007	1,827,469,000 Kip + 1,175,800 Baht	56,003
2008	2,094,075,000	70,011
2009	2,648,954,000	101,184
2010	2,565,236,000	107,241
2011	3,869,371,000	128,546

Source: Bridge Management Committee (BMC), Savannakhet, Laos
Note 1): Vehicle charge revenue in 2007 consists of both currencies in kip and baht.

3.2.2 Qualitative Effects

The interview survey was conducted to the concerned parties[20] in the vicinity of the project site regarding 1) facilitation of border trade, 2) activation of tourism demand, 3) changes in socio-economic situation, and 4) improvement of living environment and living standard. Their responses on direct and indirect effects of the SMIB are summarized below.

Table 10: Interview Results with Relevant Parties in the Project Area

(Interviewees are indicated in parentheses)

1) Facilitation of Border Trade
・ Part of the refined sugar has been exported to Laos using the SMIB. Prior to the opening of the bridge, ferry was used for transportation and it took two days to deliver sugar to clients. However, after the project, it takes only a day to deliver, and a 20% cost reduction is realized. (Sugar factory in Mukdahan) ・ After the opening of the SMIB, the secondhand car market has expanded in Savannakhet. Prior to the bridge, ferry was used to import used cars via Mukdahan (seaway from Korea to Laem Chabang Port, Thailand, then land transport to Mukdahan and to Savannakhet using ferry), but transport capacity was limited (only four vehicles per ferry) and time management was difficult since ferry transportation was subject to weather conditions. The SMIB resolved these constraints and expansion of business activities is expected. (Used car dealership in Savannakhet) ・ Coffee products are sold in a newly established branch shop (tax-free shop) in the SMIB compartment. (Coffee manufacturing company in Pakse, Laos)
2) Activation of Tourism Demand
・ After the opening of the SMIB, Mukdahan and Savannakhet have become famous for tourism. Package tours have been organized by travel agencies and a number of tourists are increasing after the bridge opening. (Tourist agent in Mukdahan) ・ Number of visitors to the Inghang Temple, a cultural property in Savannakhet, has increased annually since the opening of the SMIB. Therefore, the temple has started to collect admission fees, with the revenue being utilized for the maintenance of the temple. (Residents)
3) Changes in Socio-Economic Situation
・ Land prices have increased as economic development takes place. Some land owners have sold their land to start up new businesses. (Construction company in Mukdahan) ・ After the opening of the SMIB, many people (mostly members of package tours) from Thailand come to Laos to visit the Casino (24-hour open Savan Vegas), which was opened in November 2008 in Savannakhet. Most of the visitors are from North East Thailand, and the casino workers are from Laos. Since the main purpose of these visitors is to gamble, most of them do not visit sightseeing places in Savannakhet and other places in Laos. (Tourist agent in Savannakhet) ・ Education opportunities have increased since the opening of the SMIB for residents in Savannakhet. Students in Savannakhet attend the Ubon Ratchathani University Second Campus and vocational schools in Mukdahan. Students in Laos return to their hometown during weekends and holidays. (Residents)

[20] The interviewees were private companies in Mukdahan, Thailand (sugar factory, tourist agent, building constructor), private company in Savannakhet, Laos (used car dealership), private companies in Pakse, Laos (coffee manufacturing company, plywood manufacturing company), tourist information center in Savannakhet, Mukdahan Chamber of Commerce, local NGO in Mukdahan, and local residents.

・ Accessing hospitals has become much easier after the opening of the SMIB for residents in Savannakhet. In case of an emergency, an ambulance can cross the river to Mukdahan even after 22:00. Before the SMIB, patients had to wait until the next morning to cross the river by ferry. (Residents)
4) Improvement of Living Environment and Living Standard
・ New business activities and job opportunities have been created for both Thai and Laotian people after the opening of the SMIB. (Mukdahan Chamber of Commerce) ➢ Two para rubber processing factories will be established in Mukdahan soon. The factory is going to be the biggest para rubber factory in North Eastern Thailand. ➢ A flouring mill is going to be established in Mukdahan. ・ Mukdahan has become a starting point for Laotian migrant workers. They are seeking job opportunities in Thailand starting from Mukdahan. (Local NGO in Mukdahan)

As shown in the interview results, the activation of trade, facilitation of tourism, stimulation of the economy, improvement of social benefits, increase in job opportunities have occurred since the opening of the SMIB. Both private companies in Mukdahan and Savannakhet that were interviewed expressed their satisfaction with the reduction of transport time and transport costs, and benefits from the increase of transport volumes of their manufactured goods and parts. Responses from tourist agents are consistent with the data in "3.3.1.4 Impact on Tourism Demand" below, and it can be said that the project has contributed to the facilitation of tourism. Regarding social dimension, local residents in Savannakhet, Laos, in particular, have more opportunities to receive social services in education and healthcare through easier access to Mukdahan, Thailand deployed with more fulfilling services, human resources and facilities. On the other hand, coupled with the issues in wage disparities, some interviewees indicated that migrant workers from Laos to Thailand are increasing. Although increase of employment opportunities is realized, demand for Laotian workers is increasing in heavy labor such as labor in para rubber and sugar plantations. In Mukdahan, with the prospect of becoming the center of the Indochina region within the education and health sectors, taking advantage of regional social and economic activation is indicated and the revision of city plans are underway. It can be said that the project is creating different effects within economic and social aspects of both countries with different national strengths.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Impact on Trade Facilitation between Thailand and Laos / Increase in Border Trade utilizing Seaport in Vietnam

According to the executing agency in Thailand, border trade between Mukdahan and Savannakhet before the opening of the SMIB (prior to 2005) was between 4,000 and 5,000 million baht each year, of which 80 to 90 percent accounted for exports from Thailand to Laos. After the operation of the bridge in FY2008, the trade amount has risen

sharply to 24,037 million baht, and the proportion of exports from Laos to Thailand has also been increasing. Although figures in FY2009 decreased due to the effects of the global economic crisis as a possible factor, trade value in 2010 and afterwards have steadily increased (Table 11).

Table 11: Trend of Cross-Border Trade (Thailand) (Unit: mil. Baht)

FY in Thailand	Export to Laos	Export from Laos	Total
Value of cross-border trade between Thailand and Laos at the Mukdahan Custom House			
2005	5,372.2	954.9	6,337.7
2006	6,418.6	6,531.4	12,950.0
2007	6,346.5	12,654.4	19,000.9
Trade value utilizing the SMIB			
2008	10,297.97	13,738.68	24,036.65
2009	7,874.86	9,424.02	17,298.88
2010	20,270.99	12,777.34	33,048.33
2011	38,996.36	23,695.83	62,692.19

Source: Bank of Thailand (2005-2007) and Mukdahan Custom House (2008-2011)
Note 1): The FY in Thailand is from October of the previous year to September of the current year.
Note 2): Total amount does not coincide for FY2005.

As indicated in the table below, exports and imports from/to third country to/from Thailand via Laos accounted for around 10 percent of total trade value between Laos (Savannakhet) and Thailand (Mukdahan) from 2008 to 2010, and it can be considered that bilateral trade between Thailand and Laos has been facilitated (Laos is not a mere passing point).

Table 12: Cross-Border Trade Using the SMIB (Laos) (Unit: mil. USD)

FY in Laos	Export to Thailand (from Laos to Thailand)*	Import from Thailand (from Thailand to Laos)	Export and import through Laos border to Thailand and other countries		
			From third country to Thailand via Lao border	From Thailand to third country via Lao border	Total
2007	93.4	106.2	0.69	3.97	4.66
2008	232.4	208.4	19.10	7.16	26.26
2009	156.5	261.9	19.93	23.14	43.07
2010	311.5	198.9	33.03	7.66	40.70
2011	485.5	207.7	104.34	N.A.	N.A.

Source: Department of Industry and Commerce, Savannakhet, Laos
Note 1): The FY in Laos is from October of the previous year to September of the current year.
Note 2): Total figures do not coincide due to the rounding error.

* Major trade items from Laos to Thailand utilizing the SMIB are: 1. mineral substance (91%), 2. industrial products (3.8%), 3. lumber and wooden materials (0.8%). (Figures in parentheses are the actual percentages in FY 2011.)

3.3.1.2 Impact on Agricultural Production

While there have been a few fluctuations, the growth rate of agricultural production in

Mukdahan has exceeded that of the entire Northeastern provinces and the whole country, and production has been steadily increasing. There is no particular change worth noting after the opening of the bridge (from 2007 and afterward).

Table 13: Agricultural Production in Thailand (Unit: mil. Baht)

Province	2003	2004	2005	2006	2007	2008	2009	2010*
Mukdahan	2,071	2,117	2,089	2,525	2,987	3,203	3,792	4,526
Growth Rate %	19.8	2.2	-1.3	20.8	18.3	7.2	18.4	19.4
Entire Northeastern Provinces	129,680	134,803	143,469	157,518	184,283	191,580	226,609	229,615
Growth Rate %	21.7	4.0	6.4	9.8	17.0	4.0	18.3	1.3
Entire Eastern Provinces	58,035	59,623	70,294	73,062	84,895	97,105	93,166	95,574
Growth Rate %	13.1	2.7	17.9	3.9	16.2	14.4	-4.1	2.6
Whole Country	615,854	668,808	728,093	846,742	911,372	105,6838	105,2564	116,4642
Growth Rate %	19.8	8.6	8.9	16.3	7.6	16.0	-0.4	10.6

Source: National Economic Social Development Board (NESDB) 2011
Note 1): Tentative figures in 2010

When looking at the harvested areas and production outputs of rice culture, the major agricultural crop in Laos, steady growth has seen for irrigated rice for both figures. Production outputs of irrigated rice in Savannakhet take up one-quarter to one-third of the total production in the whole country. Statistically significant change cannot be seen for season rice, irrigated rice and upland rice respectively since the opening of the bridge (after 2007).

Table 14: Rice Culture in Savannakhet and the Whole Country in Laos

	2005	2006	2007	2008	2009	2010
Season Rice						
Savannakhet	128,075	150,540	135,449	161,354	160,030	153,078
	424,600	498,065	466,875	563,125	565,550	570,130
Whole Country	569,750	618,820	604,147	619,950	656,471	627,865
	2,082,100	2,161,400	2,193,400	2,321,110	2,468,750	2,331,330
Irrigated Rice						
Savannakhet	15,245	19,500	21,100	25,999	28,256	29,085
	66,500	85,200	97,520	118,035	136,000	126,120
Whole Country	61,030	68,500	71,400	94,072	94,309	108,410
	271,100	310,000	329,200	439,200	452,050	512,430
Upland Rice						
Savannakhet	2,050	1,570	1,050	570	735	935
	3,600	2,370	1,575	855	1,110	1,600
Whole Country	105,240	108,225	105,696	111,523	122,116	118,839
	214,800	192,300	187,450	209,600	224,000	226,880

Source: Laos Statistical Year Book
Note 1): Upper figures are harvested areas (ha) and lower figures are production outputs (ton)

3.3.1.3 Impact on Investment

Investment capital and permitted numbers of manufacturing establishments in Mukdahan Province has significantly increased in 2006 and 2007, around the opening of the SMIB. Since there are a number of factors other than the expansion of the

transportation network and enhancement of efficiency of logistics, the increase does not solely depend on the impact of the project. However, the project located at the physical bottleneck of logistics is deemed to contribute to increase of business activities and expansion of business opportunities in Mukdahan.

Table 15: Principal Data of Manufacturing Establishments in Mukdahan Province in Thailand

Item	2003	2004	2005	2006	2007	2008	2009	2010*
Capital (mil. Baht)	48	76	90	401	869	22	47	368
Permitted Number	26	41	14	18	22	8	11	15
Employees	103	124	343	127	417	43	77	182

Source: National Economic Social Development Board (NESDB) 2011
Note 1): Tentative figures in 2010

By the same token, since there are a number of factors behind the growth of domestic investment and FDI of Savannakhet Province, the increase does not solely depend on the impact of the project. However, the project is deemed to contribute to the attraction of enterprises and expansion of investment through improvement of business and investment climate of the Province.[21]

Table 16: Domestic Investment and Foreign Direct Investment (FDI) to Savannakhet (Unit: mil. Kip)

Item		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Domestic Investment	Total Investment	49,240.7	85,855.2	74,446.1	64,066.6	70,204.8	122,071.9
	Registered Capital	49,240.7	85,855.2	69,710.1	55,416.6	70,204.8	119,647.9
FDI	Total Investment	419.7	85.7	113.4	53.5	300.3	158.3
	Registered Capital	149.4	30.5	40.2	29.9	95.9	67.4

Source: Department of Investment and Planning, Savannakhet, Laos
Note 1): The FY in Laos is from October of the previous year to September of the current year.

3.3.1.4 Impact on Tourism Demand

The growth rates of the tourism industry in Mukdahan have exceeded those of the entire Northeastern provinces and the rest of Thailand every year except in 2004. In particular, the years 2009 and 2010 have recorded substantial growth rates of 32.4% and 8.4% respectively. While it is difficult to indicate quantitatively the extent to which the SMIB has contributed to the increase of tourism industry production from the statistical data, the passenger volume of the SMIB, as mentioned above, shows the facilitation of people's movements back and forth since the opening of the bridge and hence, the project is deemed to have made a substantial contribution.

[21] Although Savan Seno Special Economic Zone situated adjacent to the SMIB, along the National Road No.9 is the first SEZ in Laos, lack of infrastructure development (water supply system) remains an issue – many empty land was observed and the number of enterprises under operation were limited at the time of site survey.

Table 17: Tourism Industry Production in Thailand (Unit: million Baht)

	2003	2004	2005	2006	2007	2008	2009	2010*
Mukdahan	45	48	61	69	75	79	104	113
Growth Rate %	10.6	6.7	27.7	12.6	8.3	5.1	32.4	8.4
Entire Northeastern Provinces	12,080	13,267	14,685	16,450	17,751	18,641	20,636	21,557
Growth Rate %	2.6	9.8	10.7	12.0	7.9	5.0	10.7	4.5
Whole Country	299,567	334,22	346,865	386,063	416,764	437,705	438,514	471,867
Growth Rate %	-3.2	11.6	3.8	11.3	8.0	5.0	0.2	7.6

Source: National Economic Social Development Board (NESDB) 2011
Note 1): Tentative figures in 2010

The number of tourists in Savannakhet has increased 2.2 times between 2006 and 2007 since the bridge started operating, and a significant increase has been taking place since then. In addition, the ratios of tourists to Savannakhet utilizing the SMIB have been increasing year after year – the table shows 75 percent of tourists in 2010 and 91 percent of tourists in 2011 have visited Savannakhet, thus utilizing the SMIB. Along with the increase of tourists to Savannakhet, the amount of accommodation (hotels and guest houses), restaurants and travel companies has been increasing. The Department of Tourism in Savannakhet has been aggressively developing tourist attractions (natural, cultural and historical attractions), and a further increase of tourists in expected in the future.

Table 18: Number of Tourists Visiting Savannakhet (Unit: person)

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total number of tourists in Savannakhet	64,050	118,821	192,560	192,385	430,604	474,826	791,924	918,683	895,765
Of which number of tourists using SMIB	-	-	-	-	239,667	251,606	553,803	688,416	819,313

Source: Department of Tourism, Savannakhet, Laos
Note 1): Actual figures from January until September for 2011.

Table 19: Growth of Tourism Industry in Savannakhet

	2005	2006	2007	2008	2009	2010	2011
Hotel	8	10	13	15	17	20	21
Guest House	40	58	66	85	98	107	121
Restaurant	60	82	95	105	151	185	225
Travel Company	2	3	6	9	11	12	13
Tourist Attractions	55	64	89	105	110	112	119

Source: Department of Tourism, Savannakhet, Laos
Note 1): Actual figures from January until September for 2011.

3.3.1.5 Facilitation of River Crossing of Local Residents

The following responses were highlighted from the survey interviews with local residents and NGOs.

- Residents in Laos have entered Thailand (Mukdahan) as migrant workers seeking new employment opportunities.

- Access to education and health services has been facilitated in Mukdahan for local residents in Laos.
- Acceleration of local residents crossing the river for the purpose of tourism and shopping has taken place.
- The number of Thai tourists going to the casino (Savan Vegas) has been increasing (several thousands of Thai have been entering Laos every day), etc.

As mentioned above, the project has contributed to the acceleration of local residents crossing the river, and is considered to have brought about changes in livelihood for both Thai and Laotian citizens. While the external, macro-level effects such as the economic development of Laos and the development of globalization are likely to exist behind, the hurdle of crossing the river such as becoming possible to cross the river regardless of the weather conditions and becoming possible to cross the river until 22:00 at night seems to have decreased by the utilization of the bridge.

3.3.1.6 Impact on Local Economy and Regional Development

In periods prior to the project between 2003 and 2006, the GPP growth rates in Mukdahan Province under ran the growth rates in the entire Northeastern provinces as well as the whole country. However, after 2007 when the bridge started operation, the growth rates exceeded those in the entire Northeastern provinces and the whole country (Table 20). With regards industrial production in Mukdahan Province, its growth rates have exceeded those in the entire Northeastern provinces and the whole country after 2007 (Table 21). Since there are a number of factors behind the growth of GPP and industrial production of Mukdahan Province, the increase does not solely depend on the impact of the project. However, according to the executing agency in Thailand, the implementation and completion of the project was the most important occasion in Mukdahan Province during the data period, and showed its recognition that assuming were it not for the project, the economic performance in Mukdahan Province would have indicated the similar trend as those before the project implementation.

Table 20: Gross Provincial Product (GPP) in Mukdahan Province in Comparison with the Whole Country

(Unit: million Baht)

	2003	2004	2005	2006	2007	2008	2009	2010
Mukdahan	9,161	9,818	10,163	11,571	12,863	13,875	15,155	16,999
Growth Rate %	5.9	7.2	3.5	13.9	11.2	7.9	9.2	12.2
Nakhon Panom	16,614	18,414	18,203	20,270	21,840	24,073	26,895	29,065
Growth Rate %	4.1	10.8	-1.1	11.4	7.7	10.2	11.7	8.1
Khon Kaen	83,286	91,549	97,098	117,225	126,850	139,706	143,184	155,469
Growth Rate %	12.1	9.9	6.1	20.7	8.2	10.1	2.5	8.6
Entire Northeastern Provinces	633,687	682,192	715,520	809,402	904,604	973,293	1,039,736	1,123,153
Growth Rate %	10.0	7.7	4.9	13.1	11.8	7.6	6.8	8.0
Whole Country	5,917,369	6,489,476	7,092,893	7,850,193	8,529,836	9,075,493	9,050,715	10,104,822
Growth Rate %	8.6	9.7	9.3	10.7	8.7	6.4	-0.3	11.6

Source: National Economic Social Development Board (NESDB) 2011
Note 1): GPPS are in Current Price
Note 2): Tentative figures in 2010

Table 21: Industrial Production in Mukdahan Province in Comparison with the Whole Country

(Unit: mil. Baht)

	2003	2004	2005	2006	2007	2008	2009	2010*
Mukdahan	1,092	1,091	976	1,149	1,311	1,489	1,592	1,870
Growth Rate %	15.8	-0.0	-10.6	17.7	14.1	13.5	6.9	17.5
Nakhon Panom	1,180	468	374	409	638	635	688	702
Growth Rate %	20.1	-60.4	-20.0	9.4	55.9	-0.5	8.5	2.0
Khon Kaen	24,747	28,534	31,255	43,363	45,416	52,372	52,336	60,038
Growth Rate %	21.3	15.3	9.5	38.7	4.7	15.3	-0.1	14.7
Entire Northeastern Provinces	99,653	108,331	99,805	124,752	141,283	156,251	161,128	173,169
Growth Rate %	21.8	8.7	-7.9	25.0	13.3	10.6	3.1	7.5
Whole Country	2,061,572	2,235,573	2,461,294	2,748,211	3,034,106	3,169,629	3,084,057	3,487,313
Growth Rate %	12.3	8.4	10.1	11.7	10.4	4.5	-2.7	13.1

Source: National Economic Social Development Board (NESDB) 2011
Note 1): Industrial productions are in Current Price
Note 2): Tentative figures in 2010

The Laos government has a plan to develop Savannakhet, a second biggest city next to the capital Vientiane, as a base of industrial development. The GPP growth rates in Savannakhet Province continue to exceed ten percent since the year before the opening of the bridge, and the figures have been increasing annually.

Table 22: Gross Provincial Product (GPP) in Savannakhet Province (Unit: billion Kip)

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Savannakhet	3,508.6	3,859.4	4,258.9	4,706.1	5,211.9	5,785.3
Growth Rate %	9.4	10.00	10.35	10.50	10.75	11.00

Source: Department of Investment and Planning, Savannakhet, Laos
Note 1): GPP based on year 2000 price
Note 2): The FY in Laos is from October of the previous year to September of the current year.

As mentioned above, the project is deemed as to have yielded a number of positive impacts after the opening of the SMIB, including the generation of new economic activities, changes in land use, an increase in employment opportunities, increase in household income, etc. Therefore it can be assumed that the project has made certain contribution to the regional economic development.

BOX: Broad-Based Impacts

As one of impacts of the SMIB Construction Project, the analysis on broad-based impacts of large-scale infrastructure, the EWEC, where the project is located in, was conducted from following three aspects. In addition, the complementary institutional aspects which may affect the broad-based impacts of the project were also analyzed.

1. The outcome on trade facilitation: Currently, the project is deemed to have limited impact on trade in the Central Vietnam area. On the other hand, land transportation services between Bangkok and Hanoi utilizing the EWEC have initiated around 2008, and more than ten private companies are said to have entered into the business. Further business development is expected since competition on service and cost seems to have taken place.
2. The outcome on economic spillover effect: From the view point of industrial development and private sector investment, concrete impact cannot be confirmed in the industrial zones in the Central Vietnam area and the Savan Seno Special Economic Zone in Laos. Background factors seem to have relation with the slower growth of traffic volume of containers/trucks as well as an external factor related with fund shortage to develop the Savan Seno Special Economic Zone. From the view point of agricultural productivity, distinct project contribution to food-related business in Pakse, a city in southern Laos, could not be observed. Future traffic volume increase can be expected along with the changes in land use in Mukdahan and Savannakhet. From the view point of employment creation, household income and unemployment rate, the project is deemed to have contributed to diversify income earning opportunity and to activate regional economy in Savannakhet. The project is also regarded to have contributed to the increase of average household income in Northeastern provinces in Thailand and to bringing down unemployment rate in Mukdahan.
3. The outcome on social effect: The project is deemed to have greatly contributed to Laotian's access to social services in Savannakhet, especially the access to healthcare centers and education institutions. The project seems to have also contributed to the reduction of population in poverty in Mukdahan Province.

The interview survey results have indicated that motorbike spare parts manufactured in Thailand have began to be transported to Hanoi, Vietnam via the SMIB for assembly in Hanoi, after the opening of the SMIB. New business seems to have emerged through exploring new distribution routes from Thailand to Vietnam utilizing the EWEC after the opening of the SMIB. However, it is too early to mention the economic role-sharing among Mekong countries or economic-sharing among regions within a specific country since it is still about five years after the completion of the EWEC (except for a section in Myanmar), and the changes observed are not as salient as expected.

In order to further increase the utility value of the SMIB and the EWEC, and to activate logistics and enhance efficiency, it is indispensable to 1) shorten the lead time, 2) reduce transportation cost, and 3) improve distribution environment in order to secure quality of logistics. In addition to improving physical infrastructures, it is urgently necessary to develop relevant laws and institutions related with simplifying prior import-export procedures, realizing Single-Stop, Single-Inspection on cross-border procedures, facilitating reciprocal exchange of traffic rights for commercial cross-border for carriers and vehicles (resolving issues on reloading containers and one-sided

transportation). It is critical to overcome these issues under the cooperation of each Mekong country by utilizing the momentum toward the establishment of an ASEAN Community in 2015.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

The effects on the natural environment have not been observed during the construction and after the project completion, as a result of survey interviews from residents and local NGOs in Mukdahan. According to the executing agencies in both countries, no negative issue was observed during the project implementation. It was pointed out that proper monitoring was conducted according to the environmental management plan from the bidding stage, and guidance was provided to the contractors to give necessary environmental consideration during the implementation of the project. Since environmental indicators were not measured, and analysis according to the environmental criteria did not take place, abovementioned responses are not backed by data, however, it seems fair to consider no particular issues have occurred in the project area.

3.3.2.2 Land Acquisition and Resettlement

According to the executing agencies in both countries, no particular problem has been observed for land acquisition process – appropriate due process took place including public hearings and consultations with residents, based on the regulations of each country. The executing agencies gave consideration to minimize the effects on local residents and as a result, land acquisition, which was assumed to take place for twelve households on Lao side at the time of appraisal, did not take place. Since the acquired land was all rice growing area and relocation of local residents did not take place, no particular measure was conducted for livelihood restoration. That is – only a part of the land was affected for each resident and thus this was mitigated through financial compensation. The results of the interviews with the local residents indicate that sufficient explanation was provided through the implementation of public hearings and setting up information sign boards regarding the project. Prior explanation on compensation was also provided, and no particular problem was pointed out including its payment.

3.3.2.3 Impact on HIV/AIDS Infections (Thailand)

HIV/AIDS prevention activities (dissemination of appropriate knowledge about prevention and countermeasures) were included in the project component. This component was not included in the initial plan but since the project involves hiring large number of migrant workers and the project is conducive to the movement of people between areas of different HIV/AIDS infection rate, countermeasures were introduced

amid concerns about the HIV infection risk. With close coordination among the executing agencies from both countries, contractors, NGOs and the Regional Health Department, prevention activities were conducted regularly and monthly monitoring took place.

According to the table below, the number of people with HIV/AIDS (three year average) decreased by half after the opening of the SMIB, and same trend can be observed for other Northeastern provinces. It is difficult to make a judgment with limited information on the causal relationship between the HIV/AIDS prevention activities and the decrease in the number of infections, however, it can be assumed that certain contribution was made to the decreasing number.

Table 23: Number of People with HIV/AIDS per 1,000 population in Northeastern Thailand (three year average) (Unit: person)

Provinces	2004-2006	2007-2009	% Change
Mukdahan	30.3	16.1	-47
Adjacent provinces with major highway connectivity			
Amnat Charoen	50.2	22.0	-56
Kalasin	25.8	11.0	-57
Neighboring provinces with international cross-border points			
Loei	29.7	23.3	-21
Nong Khai	9.7	3.3	-66
Nakhon Panom	16.2	5.5	-66
Ubon Ratchathani	26.0	9.9	-62
Surin	23.9	3.3	-86
Si Sa Ket	29.8	25.1	-16
Other Northeastern provinces			
Nong Bua Lum Phu	28.0	14.2	-49
Udonthani	33.9	22.7	-33
Sakon Nakorn	11.6	3.6	-69
Roi Et	23.1	8.5	-63
Mahasarakham	16.3	11.1	-32
Khon Kaen	19.4	5.7	-70
Yasothorn	26.9	10.5	-61
Nakorn Ratchasima	18.8	5.0	-74
Chaiyaphum	22.9	7.6	-67
Buriram	24.4	10.3	-58
Entire Northeastern provinces	23.3	10.5	-55

Source: Thailand Department of Disease Control, Ministry of Public Health (obtained via DOH, Ministry of Transport)

This project has somewhat achieved its objectives, therefore its effectiveness and impact is fair.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

Comparison of planned and actual project outputs is summarized in the table below.

Table 24: Comparison of Planned and Actual Outputs

Planned Outputs (At Appraisal)	Actual Outputs (At Ex-Post Evaluation)	Comparison
① Civil Works 1) Main bridge: Entire length of 1,600m, width of 12m, two-lane road (double lane) 2) Approach bridge: Thai side: 250m Lao side: 200m Width of 12m, two-lane road (double lane) 3) Connecting road: Thai side: about 1.7km Lao side: about 2.0km 4) Border facilities: Both in Thai side and Lao side 5) Change-over facilities: Thai side only	① Civil Works 1) Main bridge: Entire length of 1,600m, width of 12m, two-lane road (double lane) 2) Approach bridge: Thai side: 250m Lao side: 200m Width of 12m, two-lane road (double lane) 3) Connecting road: Thai side: about 1.7km Lao side: about 2.0km 4) Border facilities: Both in Thai side and Lao side 5) Change-over facilities: Thai side only 6) Construction of Common Control Area (CCA) in Lao side 7) Provincial road improvement (about 27km) and bank protection in Lao side	① Civil Works 1) Main bridge: As planned 2) Approach bridge: As planned 3) Connecting road: As planned 4) Border facilities: Modification of the characteristic of the inspection roof from the simple space design structures to Thai architecture 5) Change-over facilities: As planned 6) CCA on Lao side: Additional scope 7) Provincial road improvement (about 27km) and bank protection in Lao side: Additional scope
②Consulting Services - Foreign Consultants: 136M/M - Local Consultants: 975.5M/M Total: 1,111.5M/M	② Consulting Services - Foreign Consultants: 142.5M/M - Local Consultants: 1,171M/M Total: 1,313.5M/M	② Consulting Services - Foreign Consultants: Increased by 6.5 M/M - Local Consultants: Increased by 195.5M/M Total: Increased by 202M/M

Regarding civil works, modification of design of border facilities (on the Thai side), construction of the CCA (on the Lao side), and the improvement of provincial roads and bank protection work (on the Lao side) were implemented as part of an additional scope.

As regards border facilities, based on the request from the Thai government, modification of the characteristics of the inspection roof took place in order to bring in traditional Thai architecture. The CCA was constructed on the Lao side utilizing the residual funds of the ODA loan for the purpose of realizing the Single Stop Inspection (SSI) for custom, quarantine and immigration at the SMIB and improving the efficiency of logistics. According to the executing agency in Laos, the Lao government requested the construction of the CCA as an additional scope taking into account the lessons learned

from the previous experience of the First Thai-Laos Friendship Bridge (connecting Vientiane in Laos and Nong Khai in Thailand) which opened in 1994. The CCA was not installed in the First Bridge then. However, as mentioned above, SSI is not yet realized at the CCA as the development of domestic legal system in Thai side is necessary for this to occur. Based on the request from the Laos government, in order to boost the use of the SMIB, improvements of provincial roads and bank protection were realized utilizing the residual funds of the ODA loan. The additional outputs are appropriate as the roads would contribute to expedite the access to the SMIB.

Because of the design change and additional project outputs, work volumes of 6.5M/M for foreign consultants and 195.5M/M for local consultants were added. It is considered that the provincial road improvement and bank protection in Lao side are appropriate as they are in line with the road development plan, recognized priorities, and are consistent with the objectives of this project. With regards to the CCA, the initial objective of SSI is not realized as mentioned above.[22] The CCA in Thai side has been constructed in 2010 with Thai government's own fund, however, it has not been utilized under the existing circumstances.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The actual project cost was 6,962 million yen[23] (of which the Japanese ODA loan was 6,713 million yen) against the planned cost of 10,136 million yen (of which the Japanese ODA loan was 8,090 million yen), which is equal to 69 percent of the planned cost and 83 percent of planned loan amount. The breakdown of project costs for Thailand and Laos are as follows.

- The project cost for Thailand: The actual project cost was 2,825 million yen[24] (of which the Japanese ODA loan was 2,736 million yen) against the planned cost of 5,145 million yen (of which the Japanese ODA loan was 4,079 million yen).
- The project cost for Laos: The actual project cost was 4,137 million yen[25] (of which the Japanese ODA loan was 3,977 million yen) against the planned cost of 4,991 million yen (of which the Japanese ODA loan was 4,011 million yen).

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[22] Usual inspection works for custom, quarantine and immigration are conducted in the CCA in Lao side.

[23] It should be noted that general administration cost and tax invested from Thai government and tax invested from Lao government are not included in this figure since there is no reliable evidence to confirm the actual project cost spent. However, because major portion of the project cost turn out to be evident, project cost comparison was made based on total cost with this explanatory note.

[24] Administration cost and tax are not included in this figure.

[25] Tax is not included in this figure.

Despite the increase in the outputs and the delay in the schedule, the amount of project cost was less than planned mainly because of 1) the cost reduction effects from a competitive bidding process which resulted in the lowering of actual construction costs (for both Thailand and Laos), and 2) the realization of cost savings as a result of a re-examination and revision of construction cost estimations in order to ensure the efficiency of the construction work, which led to decreases in the opening bid prices (Thailand). There was a low cost competition among the contractors who foresaw the order entry, as well as a decreased construction unit price due to lower prices for construction materials and wages since the currency crisis in Asia in 1997.

According to the executing agencies in Thailand and Laos, the bidding process for both construction work and consulting services were implemented under close coordination and cooperation between both organizations, and no particular issue was observed.[26]

3.4.2.2 Project Period

The overall project period was longer than planned. It was originally planned for 55 months as opposed to 61 months (Thailand) and 74 months (Laos) including the extended loan period (one time for both countries) in reality, representing an expansion to 110.9 percent (Thailand) and 134.5 percent (Laos) of the initial plan.[27] However, the delay was relevant considering that this project included the modification of the characteristic of the inspection roof (Thailand) and additional outputs (provincial road improvement and bank protection in Lao side). The table below shows a comparison of planned and actual project period.[28]

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[26] The bidding was jointly conducted for construction work, and contracts were concluded respectively in each country, dividing the work into half. The same method was introduced for consulting services as well.

[27] An accident occurred in July 2005 during construction. (Construction workers fell victim to the accident in the course of installing concrete bridge beams No.10 and 11.) In resuming the construction work, construction method was modified and safely measures were reexamined. The delay of work was mostly recovered as a result of cooperation from concerned parties including contractors.

[28] Although the final disbursement date is April 2009 for both Thailand and Laos, definition of project completion is different between the two countries. According to the executing agency in Thailand, all the construction work was completed in December 2006 and the SMIB was officially opened on December 20, 2006, and the general service started on January 9, 2007. Thus, it can be considered relevant to regard official opening of the bridge as the project completion date. In case of Laos, since the executing agency showed its recognition that the additional scope should be an integral part of the project and maintained its position to consider January 2008 as the project completion date, this opinion was respected.

Table 25: Comparison of Planned and Actual Project Period

Item	Planned Period (At Appraisal)	Actual Period in Thailand (At Ex-Post Evaluation)	Actual Period in Laos (At Ex-Post Evaluation)
Signing of Loan Agreement	Dec. 2001	Dec. 2001	Dec. 2001
Selection of Consultants	Dec. 2001 − Apr. 2002	Dec. 2001 − Jun. 2002	Jan. 2002 − Jun. 2002
Selection of Contractors	May 2002 − Jun. 2003	Mar. 2003 − Dec. 2003	Jun. 2002 − Mar. 2004
Civil Works	Jul. 2003 − Jun. 2006	Dec. 2003 − Dec. 2006	Dec. 2003 − Jan. 2008
Consulting Services	May 2002 − Jun. 2006	Jul. 2002 − Dec. 2006	Jul. 2002 − Jan. 2008
Overall Implementation Period	Dec. 2001 − Jun. 2006 (55 months in total)	Dec. 2001 − Dec. 2006* (61 months in total: 110.9% of the plan)	Dec. 2001 − Jan. 2008* (74 months in total: 134.5% of the plan)

Note): Definition of project completion differs between the two countries. While the official opening of the bridge (December 20, 2006) is regarded as project completion in Thailand, completion of all the construction work including the additional scope (CCA construction, provincial road improvement and bank protection) is considered as completion, that is on January 2008.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

Financial Internal Rate of Return (FIRR)

FIRR figures were recalculated with several conditions described in the table below as the base scenario. With the toll revenues as the parameter, two cases were assumed: a slightly more optimistic case than the base scenario (Scenario 1) and a pessimistic case (Scenario 2) to conduct sensitivity analysis of the recalculated FIRR. Table below shows the recalculation results.

Table 26: Recalculation of FIRR

Timing	Preconditions and Assumptions for Recalculation (Project Life: 30 years after the completion of the Project, 2007-2031)	FIRR
At the time of Appraisal	FIRR was not calculated at that time.	N.A.
At the time of Ex-Post Evaluation	Base Scenario Costs: Project cost, operation & maintenance cost Revenue: Toll revenue (assuming 5% increase every five years after the opening of the SMIB)	0.66%
	Scenario-1 (optimistic than base scenario) Costs: Project cost, operation & maintenance cost Revenue: Toll revenue (assuming 10% increase every five years after the opening of the SMIB)	1.41%
	Scenario-2 (pessimistic than base scenario) Costs: Project cost, operation & maintenance cost Revenue: Toll Revenue (assuming no increase after the opening of the SMIB)	Minus 0.13%

The recalculation resulted in positive figures by a narrow margin except for Scenario 2 (no increase of toll rate). The sensitivity analysis results were minus 1.41% in Scenario 1

(more optimistic than the base scenario) and minus 0.13% in Scenario 2 (more pessimistic than base scenario).

Economic Internal Rate of Return (EIRR)

Table below shows the recalculation result of EIRR. The figure is slightly bigger than that of the low growth scenario calculated in the SAPROF Study. This is mainly because the project cost savings were realized, and (even though traffic volume for trucks continued to lag) traffic volume as a whole slightly exceeded those of the low growth scenario.

Table 27: Recalculation of EIRR

Timing	Preconditions and Assumptions for Recalculation (Project Life: 30 years after the completion of the Project, 2007-2031)	EIRR
At the time of SAPROF Study	Economic Costs: Project cost, operation & maintenance cost Economic Benefits: Operation and maintenance cost savings, travel time savings, benefits from the regional economic development, and cost savings from abolishing ferry operation	10.0%* 3.0%**
At the time of Ex-Post Evaluation	Economic Costs: Project cost, operation & maintenance cost Economic Benefits: Operation and maintenance cost savings, travel time savings, benefits from the regional economic development, and cost savings from reducing ferry operation	5.38%

* Note): High growth scenario – a case where facilitation and liberalization of trade and investment in Mekong area is realized

** Note): Low growth scenario – a case where economic exchange does not proceed, and reliance on domestic demand and domestic investment takes place

Although the project cost was within the plan, the project period was (slightly) exceeded, therefore efficiency of the project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

The responsibility for the operation and maintenance of the bridge is physically divided into half – the mandate of Thailand is from the center of the bridge to the Mukdahan side, and the mandate of Laos is from the center of the bridge to the Savannakhet side. As an overall operation and maintenance framework, the Thai-Laos Joint Commission for the SMIB was established in December 2006, at the time of the official opening of the bridge, to be jointly responsible for bridge management and maintenance, following the signing of a Joint Agreement on the administration of the Second Thai-Laos Friendship Bridge (Mukdahan - Savannakhet) to deal with issues related to legal cooperation, management, and maintenance of the bridge. Joint meetings for operation and maintenance are

conducted basically every three months[29] (if issues arise, anytime as needed).

In Thailand, Thai Commission on Management and Maintenance was established in November, 2006 under the Ministry of Transport. The Commission is chaired by the Director General of the Department of Highway (DOH) with the Director of Bridge Construction Bureau working as a member of the Commission and the secretariat. The Commission consists of representatives from several government agencies including Ministry of Foreign Affairs, Ministry of Interior, Office of Mukdahan Governor, Custom Department, Land Transport Department, and Immigration Bureau. The major responsibilities include coordination and monitoring with Laos side on the procedures related with operation and maintenance of the bridge, reviewing regulations concerning management, operation and maintenance of the bridge, and examining and approving the bridge plan for repair and maintenance works, and setting up toll rates.

Under the Commission, the Bridge Management Unit and the Managerial Committee were established (March, 2008). Major duties of the Bridge Management Unit include collaboration with other government agencies, supervision of contractors, preparation of annual budget plans for maintenance and repair works, and preparation and submission of annual work plans to the Thai Commission. The key responsibilities of the Managerial Committee include providing management guidance of the bridge checkpoint, monitoring and evaluation of the operation, and providing advice and recommendations regarding procedures and regulations for the management, operation and maintenance of the bridge. The actual operation and maintenance work of the bridge and road, and toll collection work are managed directly by the operation section established under the Bridge Management Unit. Toll collection is manually conducted at the toll plaza established on the approach road of the Mukdahan side.

In Laos, the Administration Commission of SMIB was established in August 2006. The Commission is chaired by the Director General of the Department of Roads, Ministry of Public Works and Transport (MPWT), and consists of several parties such as Ministry of Foreign Affairs, Ministry of Justice, Department of Public Works and Transport of Savannakhet, and Department of Finance. The major responsibilities correspond to those of the Thai Commission on Management and Maintenance.

The operation and maintenance work of the bridge and road, and toll collection work are managed by the Bridge Management Unit established under the Bridge Management Committee. The Committee is under the control of Department of Public Works and Transport of Savannakhet established in December, 2006. In fact, the actual operation,

[29] According to the execution agency in Thailand, the first meeting after the opening of the bridge was conducted on February 26, 2007. The latest meeting as of the ex-post evaluation was September, 2011.

maintenance work and toll collection work are outsourced to the private sector, and the Bridge Management Unit is in charge of their supervision. According to the execution agency in Laos, the main reasons for outsourcing the work are 1) due to staff shortage of the Bridge Management Unit, 2) to secure transparency of work and 3) to enhance the efficiency of work.

The system for operation and maintenance is well established for both countries and periodic coordination takes place between them. Responsibility of work is clearly set for each country and thus, no particular problem is identified on the organizational setting for operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

Up to the point of ex-post evaluation, the operation and maintenance work are mostly relatively simple routine maintenance for both countries, including toll collection, cleaning, parking management, reparation of electric system, etc. In Thailand, these works are directly managed, whereas in Laos, they are outsourced to the private sector.

There are 18 operation and maintenance staff members in Thai side, and they have not received training related with the bridge. However, all of them have five to 10 years' work experience and have no problem in their technical capacity. As regards toll collection, manuals are in place and training has been given to the staff by the private company that developed the system.

There are four operation and maintenance staffs in Lao side, and their main role is to supervise the work that has been outsourced to private companies. So far, one operation and maintenance staff has participated in the training program provided by the MPWT. No particular issues were observed regarding technical aspects of operation and maintenance thus far.

As future points of concern, it is important to be prepared for expected large-scale repair works. It is recommended that in planning and preparation for bidding for such works, outside resources including special consultants be utilized to sort out envisioned technical problems as well as to strengthen technical capacity of operation and maintenance staffs under close coordination and cooperation between both countries.

3.5.3 Financial Aspects of Operation and Maintenance

As shown in the tables below, annual operation and maintenance expenditures of the SMIB have increased sharply both for Thailand and Laos. (The spending in FY2011 was 1.7 times as much as that in FY2009 for Thailand, and 1.9 times as much as that in FY2009 for Laos.) Major items of spending are 1) labor costs, 2) various expenses including fuel costs, and (iii) outsourcing costs for Lao side. However, a simple

comparison of operation and maintenance cost between the two countries is not relevant since specific items included in the cost are different.

In Thailand, the primary source of the annual budget for the operation and maintenance of the SMIB is toll revenues collected when vehicles cross the bridge from Mukdahan (Thai side) to Savannakhet (Lao side). Basically, all the revenues from the toll collection are sent to deposit in the bridge account at the Mukdahan Provincial Office of the Controller General. The annual operation and maintenance budget is subject to approval by the Thai Commission on Management and Maintenance of the SMIB placed under the Ministry of Transport, and all the transactions made through the Mukdahan Highway District Office. So far, the full amount of requested budget has been approved, and the toll revenue far outpaced the actual operation and maintenance cost as shown in the table below under the item “Allocation”. The residual amounts are kept in the bridge account mentioned above. Therefore it is concluded that there is no problem observed in the financial status for operation and maintenance for the project in Thai side.

Table 28: O&M budget for the SMIB in Thailand (Unit: Baht)

FY in Thailand	Allocation	Actual Amount Spent
2009	12,355,000	7,169,548
2010	12,880,000	9,359,285
2011	25,000,000	11,908,220
2012	13,542,000	N.A.

Source: Mukdahan Regional Office, Thailand Department of Highways (DOH), Ministry of Transport

In Laos, all the revenues from toll collection from vehicles crossing the bridge from Savannakhet (Lao side) to Mukdahan (Thai side) are sent into the Road Maintenance Fund (RMF), then necessary operation and maintenance budget for the SMIB are allocated from the RMF. Since the RMF is also utilized for operation and maintenance for other national roads in Laos, the entire amount of toll revenues are not allocated to the operation and maintenance for the SMIB. So far, the operation and maintenance budget for the SMIB is fully secured from the RMF because new investment for large repairs has not taken place. However, according to the execution agency in Laos, the actual allocation for operation and maintenance cost for national roads remains around 30 percent of the budget request on average, it is understandable that the toll revenues of the SMIB have become an important financial source for the operation and maintenance of other national roads in Laos. Therefore, securing a sufficient budget from the RMF for expected large-scale repair works in the future is critical, and must be achieved through taking measures to prioritize allocation to the SMIB.

Table 29: O&M budget for the SMIB in Laos (Unit: Kip)

FY in Laos	Budget Request	Allocation
2009	99,984,900	99,984,900
2010	137,135,000	137,135,000
2011	194,217,000	194,217,000
2012	234,744,700	N.A.

Source: Bridge Management Committee (BMC), Savannakhet, Laos
Note1): The FY in Laos is from October of the previous year to September of the current year.

Figure 9: Toll Plaza

3.5.4 Current Status of Operation and Maintenance

Generally speaking, there seems to be no problem with the operation and maintenance status, therefore, they can be judged as extremely good. There is no particular problem with the use and operation and maintenance of the facilities (bridge, border facilities, approach road, provincial road, etc.) that were constructed in the project. As for maintenance of the main body of the bridge, the pavement was in good condition when observed in the site survey.

With regards to safety control measures, it is prohibited to walk on and drop off from vehicles on the bridge as well as to cross the bridge using a motorbike, and these regulations have been enforced appropriately. In addition, the 200 meter zones both upstream and downstream of the bridge girder are set as restricted areas including fishing boats, and proper management has been taking place.

No major problems have been observed in the operation and maintenance system, technology and finance, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The relevance of the project is high due to the high consistency between the project objective and the GMS regional development policy as well as the national development policy and needs of Thailand and Laos. While the project outputs materialized as planned, and the project cost was within the plan, the efficiency of the project is fair because the project period was exceeded. Although a substantial increase of traffic volume was observed for cars, sluggish growth was seen for trucks in comparison with the expected traffic. On the other hand, the effectiveness of the project is fair since the project is deemed to have yielded a number of positive effects and impacts including an increase of number of tourists and activation of tourism demand, facilitation of agricultural production, increase of industrial production, facilitation of river crossing of local residents, and contribution to the regional economic development, etc. The sustainability of the project is high as no particular issue was observed for the operation and maintenance system, technology, and finance, and the state of operation and maintenance is maintained in good condition. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

With regard to operation and maintenance, the majority of work consists of daily routine maintenance up to now, and training has not been conducted with technical staff in a comprehensive manner. However, in preparation for expected large-scale repair works in future for planning and bidding, it is recommended that outside resources including special consultants be utilized to sort out envisioned technical problems as well as to strengthen technical capacity of operation and maintenance staffs. In addition, securing sufficient budget from the RMF is highly critical for Lao side to undertake the expected large-scale repair works in the future.

Giving careful consideration to institutional arrangements related with planning and development of cross-border transport for relevant countries is also critical. In this case, several bottlenecks were pointed out in Thailand, Laos and Vietnam related with mutual entry of traffic and reciprocal exchange of traffic rights for commercial cross-border trade, and issues related with custom transit to realize smoother logistics. In addition, it became clear that the CCA, constructed as an additional output to realize SSI, has not been utilized for its original purpose due to institutional barriers. Although the CBTA has been

signed by all member countries, and institutional development is underway for each country to establish an ASEAN Community in 2015, the development of domestic laws to comply with such international commitment is urgently necessary for each country. Therefore, it is essential to overcome such institutional issues in order to realize expected project effectiveness.

4.3 Lessons Learned

When estimating traffic volumes during project preparation and implementation stage, it is important to calculate more realistic figures based on the situation and future prospects for physical infrastructure and institutional matters. In this case, the traffic estimation made in the SAPROF Study has been downwardly revised in the SAPI Study, as the figures were too ambitious. Even so, traffic volume of trucks did not reach the expected volume due to the bottlenecks related with infrastructure development and institutional arrangements. Moreover, there exist limitations that cannot be resolved by one single country, especially for infrastructure projects that stride across countries. Therefore, it is important to carefully consider and make analysis when calculating baseline figures with due consideration of various situations.

When developing a missing link (=SMIB) as an integral part of a regional road network, paying due attention to integrated and consistent development with other road network/transport network becomes highly critical. This project consists of a critical part of the EWEC, as one of the most important road networks in Mekong Region. Therefore, in order to facilitate further volume of trucks which holds the key to the entire traffic volume of the SMIB and efficiency of logistics of the entire road network, improvement of the National Road No.9 (Laos) and National Road No.1 (Vietnam) is vital. Therefore, broad-based, comprehensive perspectives beyond national borders are important. In this regard, project preparation with thorough analysis and consideration not only for the road network that directly connects the SMIB, but also for other road and traffic networks, is critical.

[END]

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs	Civil Works 1) Main bridge: Entire length of 1,600m, width of 12m, two-lane road (double lane) 2) Approach bridge: Thai side: 250m Lao side: 200m Width of 12m, two-lane road (double lane) 3) Connecting road: Thai side: about 1.7km Lao side: about 2.0km 4) Border facilities: Both in Thai side and Lao side 5) Change-over facilities: Thai side only Consulting Services - Bidding support - Construction supervision - Vocational training, - Environmental and social monitoring - Foreign Consultants: 136M/M - Local Consultants: 975.5M/M Total: 1,111.5M/M	Civil Works 1) Main bridge: As planned 2) Approach bridge: As planned 3) Connecting road: As planned 4) Border facilities: Modification of the characteristic of the inspection roof from the simple space design structures to Thai architecture 5) Change-over facilities: As planned 6) Common Control Area on Lao side: Additional scope 7) Provincial road improvement (about 27km) and bank protection in Lao side: Additional scope Consulting Services As planned - Foreign Consultants: 142.5M/M - Local Consultants: 1,171M/M Total: 1,313.5M/M
2.Project Period	Dec. 2001 – Jun. 2006 (55 months)	Thailand Dec. 2001 – Dec. 2006 (61months) Laos Dec. 2001 – Jan. 2008 (74months)
3.Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 5,739 million yen 4,397 million yen (827 million baht, 353 billion kip) 10,136 million yen 8,090 million yen 1baht＝3.13 yen 1kip＝0.0512 yen (As of Jun. 1998)	 6,713 million yen 249 million yen * (30 million baht, 15.5 billion kip)* 6,962 million yen * 6,713 million yen 1baht＝2.92 yen (Average between Jan. 2002 and Dec. 2007) 1kip＝0.0103 yen (Average between Jan. 2005 and Dec. 2005) * Excluding administration cost and tax for Thailand and tax for Laos.

Cambodia

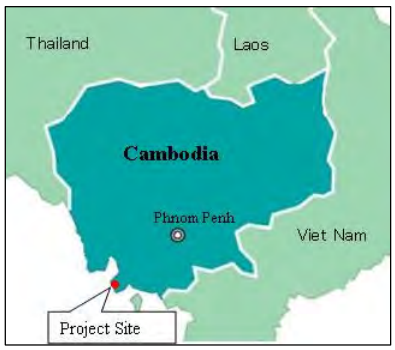
Sihanoukville Port Urgent Rehabilitation Project
Sihanoukville Port Urgent Expansion Project

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

At the time of the ex-post evaluation, it is confirmed that this project is relevant with the policy of Cambodia such as the transportation infrastructure development plan. It is also confirmed that the project is relevant with the development needs of the country such as port improvement and expansion. The project increased the container cargo handling volume increased at Sihanoukville Port. The project generally met its targets on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate. Both the efficiency and the safety of the operation of the cargo handling machinery have improved. Furthermore, the project is responding to the increasing demand for cargo transportation, thereby contributing to the vitalization of the hinterland economy. While the project period slightly exceeded the initial plan, the project cost was within the plan. No major problems have been observed in the structural, technical and financial aspects of the operation and maintenance by the Executing Agency. In light of above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location


Vessels Entering Sihanoukville Port

1.1 Project Outline

In Cambodia, peace was achieved in 1991, with the ending of the civil war. The country's only deep-water port, Sihanoukville Port, was built in 1960-70s. As the facilities became old, the cargo handling capacity of the port deteriorated. Cargo handling operation of the port was undermined with its weight limits. On the other hand, the cargo handling volume still increased

as the economic reconstruction progressed in the country. The port handled 130,000 tons in 1991, 560,000 tons in 1994, 880,000 tons in 1998, and 1,670,000 tons in 2002. While the containerization was becoming common, Sihanoukville Port was not equipped with any container berth. Container cargos were handled at the old pier, which was built for general freights, and consequently its cargo handling operation was inefficient. Therefore, there was a pressing need to construct a container terminal, improve the berth, carry out dredging work and install cargo handling machinery, thereby enabling Sihanoukville Port to respond to the increasing demand for the container transportation.

1.2 Project Outline

The purpose of the project is to improve the cargo handling capacity and the transport efficiency, by constructing a new container terminal, improving the container cargo berth and yard, and installing large cargo handling machinery at Sihanoukville Port; thereby contributing to the economic development in Cambodia.

Approved Loan Amount / Disbursed Loan Amount	(Urgent Rehabilitation Project) 4,142 million yen / 3,917 million yen
	(Urgent Expansion Project) 4,313 million yen / 3,921 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	(Urgent Rehabilitation Project) September 1999 / September 1999
	(Urgent Expansion Project) September 2004 / November 2004
Terms and Conditions: Interest Rate, Repayment Period, Conditions for Procurement, etc	(Urgent Rehabilitation Project) Interest Rate: 1.0% Repayment Period: 30 years Grace Period: 10 years The Consulting Services portion is subject to: Interest Rate of 0.75%; Repayment Period of 40 years; and Grace Period of 10 years. Condition for Procurement: General Untied
	(Urgent Expansion Project) Interest Rate: 0.9% Repayment Period: 30 years Grace Period: 10 year Condition for Procurement: General Untied
Borrower / Executing Agency	The Royal Government of Cambodia/ Port Authority of Sihanoukville (PAS)
Final Disbursement Date	Urgent Rehabilitation Project: January 2007
	Urgent Expansion Project: February 2011

Main Contractor (Over 1 billion yen)	Penta Ocean (Japan) and Italian Thai Development Public Company Limited (Thailand) (JV)
Main Consultant (Over 100 million yen)	Pacific Consultants International (Oriental Consultants Co., LTD.) (Japan)
Feasibility Studies, etc.	F/S[1] by JICA in 1997
Related Projects (if any)	"Sihanoukville Port SEZ Development Project" (3,651million yen, JICA loan approved in March 2008) "Sihanoukville Port Multipurpose Terminal Development Project" (7,176million yen, JICA loan approved in August 2009) "The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port" (Technical Cooperation Project of JICA, under implementation since June 2011)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: August, 2011 - June, 2012

Duration of the Field Study: November 28 - December 12, 2011 (1st study)

March 5 – 11, 2012 (2nd study)

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan of Cambodia

In 1990s, Cambodia was rebuilding the infrastructures that had been damaged during the civil war, such as roads, ports, and airports, with support of the international community. Aiming to become a traffic hub of the Greater Mekong Sub-region in the medium and long term,

[1] This F/S recommended: 1) construction of 400m berth for general cargos; 2) construction of 400m berth for containers; and 3) installation of large cargo handling machinery. The Urgent Rehabilitation Project covered 240m of the "2)", whereas the Urgent Expansion Project covered the remaining 160m of the "2)" and "3)." (The construction of the 400m berth for general cargos is ongoing under the "Sihanoukville Port Multipurpose Terminal Development Project" listed as one of the "Related Projects" in the same table.)

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ②: Fair, ①: Low

Cambodia was promoting the development of trans-frontier road network and other key infrastructures. The improvement of Sihanoukville Port, a gateway for international trades, was also given priority. In addition, the "Transport Sector Strategy Study" was prepared by the government of Cambodia in 2002, and it laid out policy proposals on the future transportation sector.

At the time of the ex-post evaluation, the government of Cambodia has continued to place emphasis on the development of basic infrastructures and transportation network such as ports and roads as stipulated in the National Strategic Development Plan (NSDP) 2009-2013. In relation to the port sector, the government has advocated for the "Open Sea Policy," which promotes free port entrance, trade and port management. Under such circumstances, Sihanoukville Port, the international trading port handling approximately 70%-80% of the country's cargo imports and exports, continues to be viewed as one of the key infrastructures for the national economy.

3.1.2 Relevance with the Development Needs of Cambodia

Before the project commencement, the piers built in 1960-70s were old at Sihanoukville Port. Weight limits had to be imposed on the cargos, and it undermined the cargo handling operation. Therefore, it was considered necessary to construct a new berth which replaces and expands the functions of the old piers. In addition, the expansion of the channel dredging was considered necessary because the loading capacities of the vessels entering the port kept increasing annually. There was also a need to install large cargo handling machinery in order to respond to the increasing demands for container cargos.

This project has enabled the port to respond to the increasing cargo demands by upgrading the berth and installing cargo handling machinery. In addition, another JICA loan project, the "Sihanoukville Port Multipurpose Terminal Development Project," is ongoing and the old general cargo terminal is being improved in response to: 1) the growing bulk and general cargo handling in recent years; and 2) a need to strengthen the supply base of the materials and equipment for the mining of oil and natural gas that is being developed around the port. Furthermore, the "Sihanoukville Port Special Economic Zone Development Plan" is ongoing[4] with the expectation that recent economic growth will attract foreign investments and enterprises. Based on the above, it is judged that the port continues to have great needs for development.

[4] The completion of this project is expected to bring businesses that import raw materials and re-export processed products into the SEZ. It is also expected to increase the cargo handling volume at the port.

3.1.3 Relevance with Japan's ODA Policy

The Japan's ODA Charter endorsed by the Cabinet in 1992 set a number of principles, one of which was to "urge attention to recipient accomplishments in democratizing, establishing market-oriented economic systems, and assuring basic human rights and freedoms." In addition, the Charter listed infrastructure building as a basic condition essential for socioeconomic development. This project provided assistance in the area of infrastructure building for Cambodia which had been reconstructing its economy and promoting reforms of the economic structure since the peace agreement in 1991. This project was thus in line with the principle of the ODA Charter. On the other hand, Japan's Assistance Policy for Cambodia developed in 2002 stated that the economic growth of Cambodia would contribute to the long-term economic vitalization of ASEAN and would eventually benefit Japanese economy. The policy also advocated for the advancement of the economic social capital and infrastructure as a means to achieve sustainable economic growth and stable society. This project was considered as contributing to the advancement of the economic industry of Cambodia, playing a role in advancing Cambodia's function as a transportation hub for the ASEAN economy. The project was thus in line with the principle. Therefore, the Project is relevant with the Japan's aid policy.

Based on the above, this project has been highly relevant with the development plan and needs of Cambodia as well as with the ODA policy of Japan. Therefore, its relevance is high.

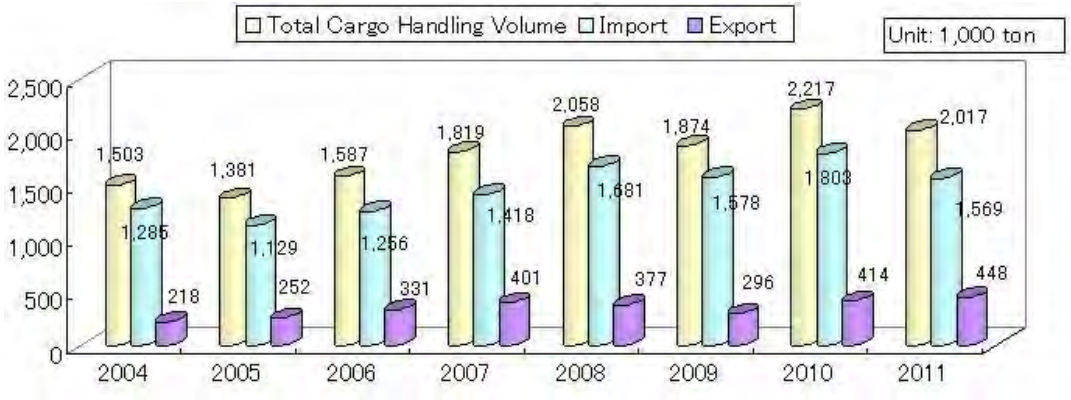
3.2 Effectiveness[5] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

1) Cargo Handling Volume

Figure 1 shows the trend in the total cargo handling volume at Sihanoukville Port.

[5] Sub-rating for Effectiveness is to be put with consideration of Impact.



Source: Answers on questionnaires.

Figure 1: Trends in the Total Cargo Handling Volume (in thousand tons)

At the time of the appraisal of the "Urgent Rehabilitation Project" in 1999, the total cargo handling capacity was estimated to be around 1,400 thousand tons upon completion in 2004. As shown in Figure 1, the actual volume was approximately 1,500 thousand tons. As for the container handling capacity, it was estimated to be around 1,140 thousand tons or 114,000-162,000 TEU[6] in 2004, whereas the actual handling volume was 214,000 TEU as shown in Figure 2. It is because the economic growth rate had been on the increase[7], which activated the exports and imports and increased the cargo demands.

At the time of the appraisal of the "Urgent Expansion Project" in 2004, the container handling volume (TEU) was estimated to reach 286,767 TEU in 2010. As shown in Figure 2, the actual volume in 2010 was 223,000 TEU, followed by 238,000 TEU in 2011. The actual volumes of 2010 and 2011 were slightly less than estimated because: 1) the cargo handing volume of Sihanoukville Port declined following the global financial crisis in 2008-2009, as it was the case for other ports, and the recovery is taking time though it has almost returned to the pre-crisis level since 2010; and 2) the river port of Phnom Penh is increasing its cargo handling and transportation volume by taking advantage of the feeder route network with Cai Mep-Thi Vai International Port opened in the southern Vietnam in 2009, and it has started to affect the cargo handling at Sihanoukville Port[8]. Cambodia is famous for its export-driven light industries, such as garment manufacturing and shoemaking. With a view to reducing time and cost, some companies with factories around Phnom Penh are beginning to export their products to the U.S.

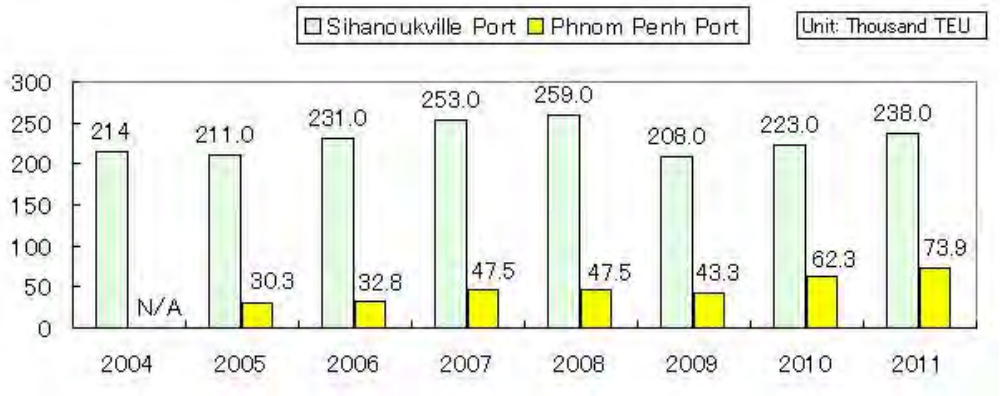
[6]According to the Project Completion Report, the Executing Agency estimated the average TEU level of 7-10 tons/TEU for the period of 2004-2015.

[7] Refer to the "trends in the Gross Domestic Product (GDP) of Cambodia" in the "Impact" section.

[8] Refer to Figure 3 for the positional relations among the ports. The route to transport with barges from Phnom Penh Port and transship at Cai Mep–Thi Vai Port (southern Vietnam) which has developed deepwater berth is becoming popular.

and other Asian countries using the combination of Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam. This is beginning to affect the cargo handling volume at Sihanoukville Port.

On the other hand, Sihanoukville Port's cargo handling volume is expected to continue growing along with the economic growth and industry expansion[9] on the ground that: 1) The ADB-financed "Sihanoukville - Phnom Penh Railway Development Project" will be completed shortly (the end of 2012 - mid 2013), and the railway container transportation to the Phnom Penh metropolitan area is expected to increase (= the railway transportation is not only faster but also cheaper by approximately 20% than road transportation in Cambodia, and the demand for the railway cargo transportation is expected to grow); and 2) the "Sihanoukville Port Special Economic Zone Development Plan" financed by JICA loan is almost completed as of the end of 2011. It is a promising factor that the port's cargo handling volume is likely to grow as the number of enterprises moving into the zone increases.



Source: Sihanoukville Port and Phnom Penh Port[10]

Figure 2: Comparison of the Container Handling Volume (Thousand TEU) at Sihanoukville Port and Phnom Penh Port

[9] The Executing Agency is estimating the port's container handling volume to be 300,000 TEU in 2017.
[10] No data was available for Phnom Penh Port in 2004, and the 2011 figure is an estimate.

Figure 3: Positional Relations of Sihanoukville Port and Other Ports
(The picture at the upper right shows serviced routes: dotted lines indicate land routes, and shaded lines indicate waterways.)

Figure 4: Transitions of Sihanoukville Port
Left: At the Time of the Opening of the Port in 1960, Center: Before the Project Implementation in 1996, Right: After the Project Completion in 2011

With regard to the exports/imports ratio of Sihanoukville Port, imports tend to exceed exports as shown in Figure 1. Taking the garment manufacturing industry as an example, many companies import raw materials from China and other countries, turn them into products at factories inside the country, and export them mainly in container loads. Domestic consumption is also strong; domestic demands for construction materials have increased along with the recent economic growth, and as a result, imports of steel, cement, oil, etc. have increased. As for

exports, general and bulk cargos are expected to increase in the future. The current direction of the government of Cambodia is to expand rice production and increase rice exports, and exports using this port are expected to grow[11]. Exports of papermaking wood chips are also expected to grow.

Based on the above factors, it is observed that Sihanoukville Port is driving the Cambodian economy as the international trading port, playing a key role in vitalizing the hinterland economy.

2）Number of Vessels Entering the Port, Gross Tonnage, Berth Occupancy Rate and Crane Operating Rate.

Table 1 shows the data on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate at Sihanoukville Port. In 2010, the actual values exceeded the targets set at the time of the appraisal, therefore it can be judged that the port is effectively utilized and efficiently operated as a port and harbor facility.

Table 1: Number of Vessels Entering the Port, Gross Tonnage, Berth Occupancy Rate and Crane Operating Rate at Sihanoukville Port

At the Time of the Appraisal (in 2004)	Actual Values in 2010
1. Number of Vessels Entering the Port: *Unknown	1. Number of Vessels Entering the Port: 427
2. Gross Tonnage: 1,352,144 GT (Actual in 2002) 2,198,144 GT (Target for 2010)	2. Gross Tonnage: 2,217,150 GT
3. Berth Occupancy Rate[12]: 46% (Actual in 2002) 55% (Target for 2010)	3. Berth Occupancy Rate: 65%
4. Average Waiting Time[13]: 2 hours (Actual in 2002) 1 hour (Target for 2010)	4. Average Waiting Time: 0 hour
5. Containerization Rate[14]: 59% (Actual in 2002) 68% (Target for 2010)	5. Containerization Rate: 86.83%

1. and 2. Number of Vessels Entering the Port and Gross Tonnage:

[11] In 2010, 44,000 tons of rice were exported, and approximately 110,000 tons in 2011. Rice is bagged and transported in the container loads.

[12] Berth Occupancy Rate = Duration that berth was occupied (hours) ÷ Duration that berth was operated (hours). It is used to judge the level of effective utilization of berths.

[13] Average Waiting Time for Vessels Entering the Port = Demurrage Hours ÷ Number of Vessels Entering the Port. It is used to judge whether or not the congestion is eased.

[14] Containerization rate = The amount of container cargos in tons ÷ Cargos that can be containerized in tons. This is used to judge whether or not the cargo handling efficiency is improving.

The number of vessels entering the port was unknown at the time of the appraisal. On a gross tonnage basis, the actual value was more or less the same in 2010 as the target figure.

3. Berth Occupancy Rate:

In 2010, the actual rate exceeded the target set at the time of the appraisal. According to the Executing Agency, they signed contracts with the shipping companies about the port facility use, which allowed strict management of the hours of berth use and the schedules of the container vessels entering the port. As a result, the facility utilization became more effective, and the berth occupancy rate exceeded the target.

4. Average Waiting Time:

Currently, there is no waiting time for the vessels entering and exiting Sihanoukville Port. According to the Executing Agency, vessels do not need to wait offshore because the contracts with the shipping companies allow better management of the schedules of the entering vessels. It is also because the cargo handling is thoroughly managed 24 hours a day. Another positive factor is that there are many staffs with ample experience in cargo handling and operation, as it will be discussed in the "Technical Aspects of the Operation and Maintenance" of the "Sustainability" section.

5. Containerization Rate:

Similarly, the actual containerization rate in 2010 is higher than the target set at the time of the appraisal. According to the Executing Agency, it is because the loading capacity of the container vessels entering the port has been increasing annually.

Figure 5: Truck Transporting a Container


Figure 6: Procured Gantry Crane

3.2.2 Qualitative Effects

1) Improved Safety in Cargo Handling and Port Operation

The incidences of accidents and container damages inside the facilities have decreased after the improvement of the old port facility. According to the Executing Agency, about 15 accidents

a year occurred on average before the project implementation, and now the number is down to about five a year. Most accidents have involved the mishandling of the cranes and minor injuries of the staff at the site. There has not been any serious case resulting in casualty during the project implementation. As for the damages on the container cargos during the loading and unloading, accidents occurred 10 times a year on average before the project implementation, and now the number is down to about three times a year. According to interviews with the top officials of the Executing Agency and the site staff, these improvements were possible thanks to: 1) the training course that was held on container operation during the project implementation; and 2) thorough instruction and supervision to ensure that the operational manual is strictly followed. With a goal of improving the operational safety, site staffs also participate in regular safety sessions twice a year.

2) Streamlining the Loading and Unloading

As a result of the introduction of the Container Terminal Management System (CTMS) under the "Urgent Expansion Project," the capacity to operate and manage the container berth has improved. Similarly, the capacity of the staffs in terminal operation has improved. According to the Executing Agency, they used to manage 10-12 boxes of loading/unloading per hour on average before the introduction of the CTMS. After the project implementation, the rate has improved greatly to 25-28 boxes per hour. It was commented that the training and advice given by the contractors at the time of the machinery installation were useful, resulting in the improvement of the operation and management capacity.

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

3.3 Impact

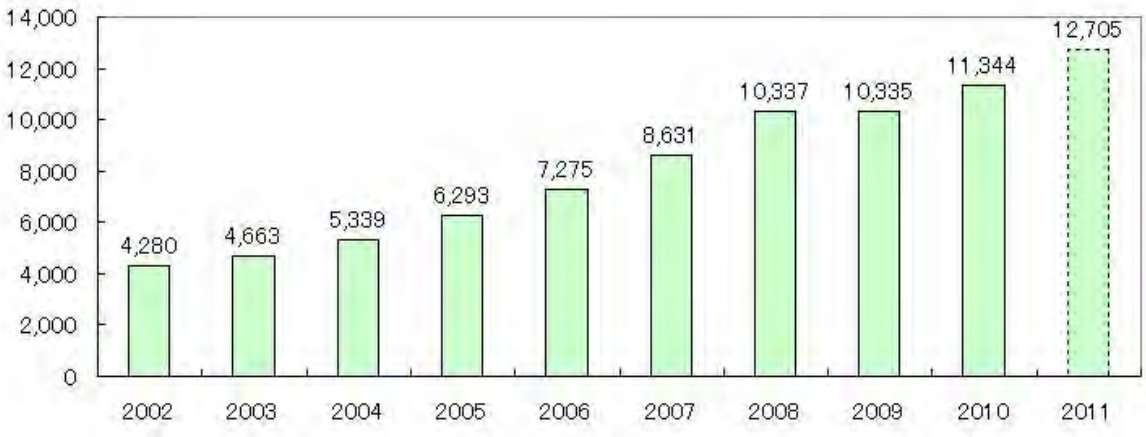
3.3.1 Intended Impacts

3.3.1.1 Economic Growth of Cambodia

Figure 7 shows the trend in the Gross Domestic Product (GDP) of Cambodia for the past 10 years. The growth rate has been high at 8% on average. Despite the slight decline in 2008-2009 influenced by the global financial crisis, the economy has been recovering since 2010. There are many factors other than this project contributing to the economic growth, and it is difficult to measure the exact economic impact of this project. Nevertheless, Sihanoukville Port is the only

deep-water port in the country, the international trading port handling 70%-80% of the country's total cargo, and one of the principal infrastructures driving the national economy. Therefore, it is judged that Sihanoukville Port is supporting the high economic growth.

(Unit: Million USD)



Source: Ministry of Economy and Finance of Cambodia
Note) The 2011 figure is an estimate.

Figure 7: Trends in the Gross Domestic Product (GDP) of Cambodia

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

1) Impacts on Water Quality during the Dredging

Before the project implementation, it was concerned that the removed soil left in the offing during the project implementation might have negative impacts on the water quality. According to the interviews with the Executing Agency through this evaluation study, the dredged soil was disposed in the offing far from the port (around 7km away), and there was no particular negative impact on the water quality in the surrounding ocean. In fact, the Executing Agency conducted regular water examinations during the project implementation and reported to the Ministry of Environment. There were no recommended corrective measures urged by the Ministry, and there was no major problem.

Currently, the Harbor Master Department is responsible for the environment monitoring within the Executing Agency. This department develops the "environment management plan," which measures solid and liquid waste and air pollutant emissions from the vessels entering the port, according to the standards. In case anything exceeds the standard level, it is reported to the Environmental Impact Assessment Department of the Ministry of Environment, and they

re-examine and advise on the corrective measures. There has not been any problem to date including the impacts on water quality.

The Environmental Impact Assessment (EIA) was approved in May 1999 for the "Urgent Rehabilitation Project" and in January 2003 for the "Urgent Expansion Project."

2) Noise and Congestion Caused by the Construction Vehicles

During the project implementation, courses were given to the drivers of the construction vehicles on traffic rule adherence. According to the Executing Agency, they made efforts to prevent accidents and reduce noise by requesting that the contractors ensure that their drivers drove safely. Similarly, they requested that the drivers not pass through residential areas and school zones as much as possible.

On the other hand, there are currently many trailers and trucks in front of the gate of the container terminal towards the weekends (refer to Figure 8),because vessels typically enter the port on weekends, and many manufacturing factories transport their products to the port by trailers near the weekends. Congestion also occurs at customs. The Executing Agency and the local police are trying to ease the congestion by guiding trailers and directing traffic in front of the gate. However, they have not been able to come up with any radical solution. The congestion is expected to worsen as the container cargo handling of the port increases, and so it is an urgent issue that needs to be addressed.[15]

Figure 8: Congestion in Front of the Gate of the Container Terminal

3.3.2.2 Land Acquisition and Resettlement

No land acquisition and resettlement was needed. This was confirmed by the interviews with

[15] A team of experts is currently exploring solutions to the problem of congestion under "the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port," which will be discussed in a box under the "Sustainability" section.

the Executing Agency and the site visits through this evaluation study.

3.3.2.3 Other impacts (Social Development Promotion and HIV/AIDS Prevention)

HIV/AIDS was a serious social issue in Cambodia around the time of the project appraisal. The HIV prevalence rate[16] for those aged between fifteen and forty-nine was high at 3.9% in 1997, 3.5% in 1998, and 2.8% in 1999[17] for a number of reasons including: (1) limited knowledge of people about HIV/AIDS; (2) difficulty in accessing HIV/AIDS related information; and (3) insufficient health and medical services. In such circumstances, the Project, as it dealt with construction of port facilities, required many construction workers, most of whom were migrant laborers from different parts of the country. As these workers needed to spend a certain period of time around the construction site where a number of prostitution houses existed, there was a considerable risk of HIV/AIDS infection among the workers. With a view to minimizing such negative social impact of the Project, i.e., HIV/AIDS prevalence worsening in the target area due to the Project, JICA implemented a HIV/AIDS program by supporting and cooperating with the Cambodian partners. The HIV/AIDS program and its effectiveness were reviewed and analyzed through this evaluation study, and the findings are summarized below.

1. HIV/AIDS Intervention and Its Effectiveness Concerning the "Urgent Rehabilitation Project"

JICA conducted a study called "Special Assistance for Project Implementation (SAPI) [18]" during the implementation of the "Urgent Rehabilitation Project[19]." It piloted three approaches: (1) advocacy[20]; (2) peer education and life skill[21] for the port construction workers; and (3) social marketing of condoms[22]. As a result, the advocacy work, which included issuance of newsletters, became a driving force for promoting the project. As for

[16] The prevalence rate refers to a proportion of individuals who have a certain disease among the general population at a certain point of time.
[17] Source is year 2000 statistics by National Center for HIV/AIDS, Dermatology and STD (NCHADS).
[18] Although the implementer of the project is the recipient country, JICA plays an advisory role as needed to ensure smooth implementation of the project. JICA conducts SAPI in some cases as a way of providing additional and supplementary inputs.
[19] The total number of construction workers was approximately 9,800 for the "Urgent Rehabilitation Project."
[20] This was necessary for the thorough implementation of the HIV/AIDS prevention activities. It was mainly about promoting HIV/AIDS prevention among different governmental organizations and creating mutual understanding among different stakeholders about the methods and structure used for the HIV intervention. The implementing partner was the Provincial AIDS Office of Sihanoukville.
[21] This aimed to equip construction workers with life skills and information about correct ways of preventing HIV/AIDS through peer education and training. The implementing partner was Cambodian Red Cross (CRC).
[22] It was considered important to promote condom use by selling/distributing good quality condoms at an affordable price as the Project was responsible for protecting its workers and their families from HIV/AIDS. Condoms were not distributed for free because it was feared that free distribution might reduce the chance of its use. Instead condoms were sold at an affordable price to encourage its use with a sense of responsibility. The implementing partner was "Population Service International (PSI)", a local NGO.

peer education and life skill, approximately 85% of the construction workers participated in a series of workshops and improved their knowledge about HIV/AIDS and sexually-transmitted infection. Following the social marketing of condoms, the number of sales base in Sihanoukville City increased from 55 to 142, which facilitated the purchasing of condoms by the workers. It is judged that the piloted approaches and activities facilitated the improvement of knowledge about HIV/AIDS while contributing to minimizing the risk of infection by promoting condom use among the construction workers. Therefore, its effectiveness is judged to be high.

2. HIV/AIDS Intervention and Its Effectiveness Concerning the "Urgent Expansion Project"

As for the "Urgent Expansion Project," interventions concerning HIV/AIDS and STI were implemented based on the results of the HIV/AIDS pilot project mentioned above. It began by including a clause about HIV/AIDS in the tendering document used for procurement of contractors. It reads: "The Contractor must provide HIV/AIDS clinical services as well as knowledge and education concerning HIV/AIDS for its staff and construction workers. As a part of the clinical service, the Contractor should distribute condoms." As per the clause, the Contractor implemented the following activities for its construction workers: (1) workshops on HIV/AIDS through peer education; (2) promotion of condom use (including condom distribution); (3) STI[23] testing and treatment; and (4) health counseling. The workshops on HIV/AIDS covered a wide range of topics[24] and attracted as many as 8,769[25] construction workers in total. In addition, the number of condoms the workers received increased in response to the increasing number of workshops. This implies that the workers successfully improved their knowledge about HIV/AIDS, realizing how crucial HIV/AIDS prevention was in order to protect their health. The Executing Agency conducted a health examination (end-line survey) at which the workers were tested for HIV/AIDS, and it detected no case of infection among the workers. This implies that the project controlled infection among the construction workers throughout the project implementation, that is to say, the project did not cause any new infection. Therefore, it can be judged that this HIV/AIDS intervention was

[23] It stands for Sexually Transmitted Infection.
[24] The workshops covered a wide range of topics from the basics, such as "What is HIV/AIDS?" to more specific cases of infections.
[25] As the "Urgent Expansion Project" required approximately 5,400 workers in total, each worker participated in workshops more than one time.
[26] The Executing Agency commented: "The workers greatly improved their knowledge about health, HIV/AIDS, and the necessity of condom use. They participated in a number of workshops during the construction period, exchanged and shared information with peers, and discussed what they learned with their families and friends after they returned to their hometowns. The intervention thus contributed to HIV/AIDS prevention."

highly effective[26].

In light of above, it can be concluded that the HIV/AIDS program by JICA was effective. It is now a common understanding of many international donors that HIV/AIDS consideration is necessary for large-scale infrastructure projects which require many migrant workers, particularly for centralized projects, such as port and airport construction, and for projects covering many intervals, such as road and railway construction. JICA was one of the pioneers who implemented HIV/AIDS intervention with a view to minimizing negative social impacts of infrastructure projects. It was an innovative and groundbreaking work, as it presented an exemplary assistance approach and implementation.

Figure 9: Clinic inside Sihanoukville Port[27]

Figure 10: Interview with a Sex Shop Owner around Sihanoukville Port

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

Table 2 compares the planned and actual outputs of the Project.

[27] It is a general clinic. Medical examinations and test were conducted for sexually transmitted diseases for the port construction workers during the project implementation.

Table 2: Planned and Actual Outputs of the Project

Plan (At the Time of the Appraisal)	Actual (At the Time of the Ex-Post Evaluation)
【Urgent Rehabilitation Project】 (appraised in 1999) 1. Civil Works ・Construction of Container Berth: 240m ・Construction of Container Yard (land reclamation): 60,000m^2 ・Dredging: 877,875m^3(Depth:-8.5m/-9.0m) 2. Consulting Services 166.5M/M (Foreign: 83.5M/M, Local: 83.0M/M, TOR: Supports related to the detail design, bidding documents development, bidding, supervision of civil works, technical training, and environmental monitoring.)	【Urgent Rehabilitation Project】 1. Civil Works ・Construction of Container Berth: As Planned ・Construction of Container Yard (land reclamation): 67,135m^2 ・Dredging: 833,836m^3(Depth:-9.0m/-10.0m) 2. Consulting Services M/M: As Planned
【Urgent Expansion Project】 (appraised in 2004) 1. Civil Works ・Expansion of Container Berth: 160m ・Dredging: 400,000m^3 2. Procurement Procurement of Cargo Handling Equipment: Two Gantry Cranes, five Transfer Cranes, Container Terminal Operating Management System (CTMS)[28] and others. 3. Consulting Services 247.0M/M (Foreign: 82.0M/M, Local: 165.0 M/M) It was expected that the above mentioned management consultants for the "Urgent Rehabilitation Project" would be contracted on the basis of a single tender. TOR: 1) Preparation of the management guideline; 2) Training on operation system; 3) On the job training; 4) Skill training for the cargo handling machine operators; and 5) Monitoring.	【Urgent Expansion Project】 1. Civil Works ・Expansion of Container Berth: As Planned ・Dredging: 588,000m^3 2. Procurement As Planned 3. Consulting Services 210.0M/M (Foreign: 70.0M/M, Local: 140.0M/M) As planned, the management consultants from the "Urgent Rehabilitation Project" were contracted on the basis of a single tender. However, all the tasks except for "1) Preparation of the management guideline" were taken out from the TOR. 【Additional Outputs】 Additional dredging work of 130,230m^3 was implemented in April-October 2006.

[28] CTMS is a system to manage and operate the basic information in the container terminal.

The reasons for the discrepancies between the plan and actual values will be discussed below. It appears that all changes were made for reasons that are justifiable.

【Urgent Rehabilitation Project】

1. Civil Works

There is a discrepancy between the plan and actual container yard constructed because the area of the apron[29] (30m x 240m = 7,200m^2) was unknown in the planning stage. The total area including that of the apron was calculated at the time of the detail design, based on which the construction was executed. For this reason, the actual container yard constructed was 67,135m^2.

A small discrepancy is found between the plan and actual dredge volume because the volume was re-estimated in the detail design stage and adjusted downwards. The actual depth was -9.0 m/-10.0m[30] because there was a design change as a result of the F/S review.

【Urgent Expansion Project】

1. Civil Works

There is a discrepancy between the planned and actual dredge volume because a need arose to increase the dredge volume so that the basins could accommodate large-size vessels. In 2004-2008, the number of large-size vessels entering Sihanoukville Port was increasing, and it was necessary to take the safety aspects into consideration.

2. Consulting Services

The actual M/M was less than planned because most tasks were taken out from the Consultants' TOR except for the "1) Preparation of the management guideline" found in the table above. According to the Executing Agency, TOR 2)-5) were removed because the Executing Agency considered that they had gained enough knowledge and experience from the "Urgent Rehabilitation Project" to carry out these tasks themselves without the support of the consultants, as long as they received some guidance and advice from the suppliers of the machinery.

【Additional Outputs】

The additional dredging work of 130,230m^3 was implemented because of the same reason given on the dredge volume and the basins under the "Civil Works" above.[31]

[29] The apron is an anterior boundary of a berth, a tip of the quay facing the ocean. In case of container berths, rails for gantry cranes are laid on the apron.
[30] It was -9.0m for the quay and port/harbor zone, and -10.0m for the waterway zone.
[31] The remaining budget from the "Urgent Rehabilitation Project" in the amount of approximately 78 million yen

3.4.2 Project Inputs

3.4.2.1 Project Cost

For the “Urgent Rehabilitation Project,” the planned cost was 5,050 million yen (out of which 4,142 million yen by JICA loan), and the actual cost was 4,739 million yen (out of which 3,917 million yen by JICA loan), which was within the plan (94% of the plan). It is mainly because of the contingency budget which was not needed, while the remaining balance from the loan was allocated for the additional output mentioned above.

As for the “Urgent Expansion Project,” the planned cost was 5,489 million yen (out of which 4,313 million yen by JICA loan), and the actual cost was 4,919 million yen (out of which 3,921 million yen by JICA loan), which was within the plan (90% of the plan). It is because of the saving on the consulting services as explained in the “Project Outputs” section above.

3.4.2.2 Project Period

The planned project period for the “Urgent Rehabilitation Project” was 4 years and 7 months or 55 months from September 1999 to March 2004. However, it actually took 7 years and 2 moths or 86 months from September 1999 to October 2006, which is 156% longer than planned. The project completion was delayed because it was the first JICA loan for the Executing Agency and that it took long for the selection and recruitment of the consultants and the detail design. The delay was also caused by the internal procedures of the government of Cambodia such as the budget allocations for the local currency portion.

As for the “Urgent Expansion Project,” the planned project period was 4 years and 1 month or 49 months from November 2004 to November 2008. In reality, it took 5 years and 5 months or 65 months from November 2004 to March 2010, which is 133% longer than planned. The main reasons are: 1) the bid selection and contract signing for the cargo handling machinery were delayed; 2) the review of the machinery procurement plan required time; and 3) the installation of the Container Terminal Management System (CTMS) took longer than expected.

Based on the above, although the project cost was within the plan, the project period slightly exceeded the plan, therefore efficiency of the project is fair.

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was utilized for this additional construction.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

(1) Financial Internal Rate of Return (FIRR)

Recalculating the financial internal rate of return with the cargo handling income as the benefits, with the project construction cost and operation and maintenance expenses as the costs, and with assumed project life of 30 years, the result is 16.83%. The result is slightly higher than 14.90%, the estimate at the time of the appraisal, because the initial investment cost (construction cost) and operation and maintenance expenses were lower than initially estimated.

(2) Economic Internal Rate of Return (EIRR)

Recalculation the economic internal rate of return with the reduction in the vessels' waiting time and the reduction in the alternative transportation cost as the benefits, with the construction cost and operation and maintenance expenses as the costs, and with assumed project life of 30 years, the result is 17.20%, which is more or less the same as 17.80%, the rate estimated at the time of the appraisal. As discussed earlier, the container cargo handling volume was slightly less than expected while the actual project cost was less than planned, therefore the EIRR did not rise.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

The Executing Agency of this project is Port Authority of Sihanoukville (PAS). PAS is a financially independent public corporation supervised by the Ministry of Public Works and Transport as well as the Ministry of Economy and Finance. PAS is mandated to operate and manage Sihanoukville Port and Sihanoukville Economic Zone (SEZ). As for the organizational structure, there is one Port Head supported by three Deputy Heads. Under these positions, there are eight departments namely the Technical Material Department, the Machinery Department, the Phnom Penh Dry Port Department, the Container Yard Operation Department, the General Cargo Operation Department, the Business Department, the Admin-Personnel Department, and the Harbor Master Department. In addition, there are four departments directly under the Port Head, namely the Marketing and SEZ Department, the Internal Audit Department, the Statistic-Planning Department, and the Account-Finance Department. PAS has 1,065 staff in total.

The departments responsible for the operation and maintenance of this project are listed below with information on their areas of responsibility and the staffing level.

1) Container Yard Operation Department (269 staff):

Mainly responsible for the operation and maintenance of the container terminal, container yard and cargo handling machinery.

2) Harbor Master Department (85 staff):

Mainly responsible for the operation and maintenance of the container berth.

3) Technical Material Department (126 staff):

Mainly responsible for the purchase, storage, maintenance and repair of cargo handing machinery and others.

3.5.2 Technical Aspects of Operation and Maintenance

The Admin-Personnel Department of the Executing Agency is responsible for staff training. In fact, many employees participate in trainings held inside and outside Cambodia. In 2010-2011 alone, 118 people participated in the oversea trainings. In addition, many staff participated in the training held inside the country though the exact number is unknown. Training courses are given on various subjects such as human resource management, crane operation, investment promotion and so on. In addition to these courses, on-the-job (OJT) training is provided as needed by experienced staff.

The departments responsible for the operation and maintenance such as 1), 2) and 3) above have many staff with sufficient qualifications including the license for the operation of cargo handing machinery. According to the Executing Agency, they intend to make further efforts to recruit outstanding people with good qualifications and specialized technical skills, for example, asking domestic universities.

3.5.3 Financial Aspects of Operation and Maintenance

Table 3 shows the trends in the budget allocated for the operation and maintenance of Sihanoukville Port over the past four years. In a view of the Executing Agency, the budget is sufficient to carry out the work related to the operation and maintenance. The operation cost was high in 2008 because of the global hike in the diesel fuel price.[32] According to the Executing Agency, sufficient budget is also available for the purchase of spare parts.

Table 3: Operation and Maintenance Budget of the Executing Agency

(Unit: Thousand USD)

Year	2007	2008	2009	2010	2011
Operation Budget	5,670	7,853	4,357	4,715	5,154

[32] The expense was especially high in 2008 because they purchased fuel not only for that year but also for the next few years.

Maintenance Budget	1,724	2,085	2,054	2,364	2,151
Total	7,394	9,938	6,411	7,079	7,665

Source: Answers on questionnaires.

Table 4 is the Profit-and-Loss statement (P/L) of the Executing Agency for the past three years.

Table 4: P/L of the Executing Agency

(Unit: Million Riel*)

	2008	2009	2010
Operating revenue	109,583	91,672	107,394
Non-operating income	2,834	1,946	1,878
Operating cost	98,416	74,873	88,052
Operating profit or loss	14,001	18,745	21,220
Finance cost and repayment of debt	6,115	8,034	8,993
Pretax profit or loss	7,886	10,711	12,228
Tax	1,557	2,143	2,446
Current term net profit or loss	6,309	8,568	9,782

Source: Documents provided by the Executing Agency.

Note) The currency exchange rate is approximately 4,000 Riel for 1 USD.

The financial reports have ended in the black for the past three years. The main revenue of the Executing Agency comes from the port usage fees and cargo handling fees. Other revenues come from the land lease, water supply for the vessels, warehouse rent and so on. With regard to the operating cost, the expenditure on diesel fuel accounts for a big proportion.[33] In fact, as the expenses on fuel increase, operation of the cranes and trailers inside the facilities become more costly, and it will be added to the port usage fees collected from the shipping companies. The Executing Agency is exploring a way to shift to a direct purchase of electricity by 2013 instead of purchasing diesel to generate power necessary for the operation of the cranes and others. There is a prospect that the country's hydroelectric power generation facility and power network will be developed in the near future. It will reduce the electricity price, making it reasonable for the port operation.[34] Of the operating cost, salaries also account for a relatively big proportion, and there seems to be room for improvement. If the Executing Agency implemented these cost cuts, their financial situation would improve further, and the port usage fees would be reduced.

[33] There is a diesel power generation facility inside the port. Its maximum power output is 3MW, and it generates and supplies electricity for the different facilities. The purchase of diesel fuel is for the power generation within the facilities.

[34] While it would cost the Executing Agency 0.38USD/kW to purchase electricity from the power company today, the price is projected to be 0.20USD/kW in the near future. In fact, the "Greater Mekong Power Network Development Project" co-financed by ADB and JICA is ongoing, which is building the electric power transmission line and building/upgrading the electric power substation and electricity distribution lines around Sihanoukville Province. The installation of the transmission network is expected to be completed around Sihanoukville Province by 2013.

Ultimately, it could lead to the improved service delivery for the clients or shipping companies. Then, Sihanoukville Port would be well-positioned to compete with other ports such as Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam.

In any case, the Executing Agency has been able to secure net profits after expending operation and maintenance cost of Table 3 from the operation cost in Table 4. Therefore, no major problems are observed in the financial management of the Executing Agency at the time of the ex-post evaluation. It is worth noting that there is no subsidy and such from the Ministry of Public Works and Transport and the Ministry of Economy and Finance.

【JICA's Approach to Enhancing Competitiveness of Sihanoukville Port】

Currently, JICA is implementing the "Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port" (a Technical Cooperation Project to be completed in June 2012) in order to develop key strategies for the port development with the objective of enhancing competitiveness of Sihanoukville Port. As discussed in the "Quantitative Effects" section earlier, Sihanoukville Port needs to compete with other ports, such as Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam, and there is a need to further reinforce the organizational structure and deliver more efficient port services. Considering such circumstances, JICA has dispatched a project team consisted of several experts, with the objectives of improving the port management capacity, streamlining cargo handing works, and increasing transparency in the financial management. The project team will present a set of recommended measures to the Executing Agency in order to improve and enhance competitiveness of the port. The Executing Agency intends to make further efforts to improve their organizational structure and port services based on the recommendations.

3.5.4 Current Status of Operation and Maintenance

As discussed above, the operation and maintenance of the project is carried out by the Container Yard Operation Department (responsible for the operation and maintenance of the container terminal, container yard and cargo handling machinery), the Harbor Master Department (responsible for the operation and maintenance of the container berth), the Technical Material Department and the Machinery Department (responsible for purchase and storage of spare parts, maintenance and repair of cargo handling machinery and others). No

problems have been observed in the operation and management through the field study and interviews conducted during this evaluation study.

The port operation is manned 24 hours a day. Maintenance and repair workshops are available inside the facilities, and they can handle the maintenance and repair by themselves. In addition, sufficient spare parts are reserved.

Figure 11: Repair Workshop inside the Port

Figure 12: Inside the Port

In line with the above, no major problems have been observed in operation and maintenance of the project in terms of its structure, technical and financial aspects, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

At the time of the ex-post evaluation, it is confirmed that this project is relevant with the policy of Cambodia such as the transportation infrastructure development plan. It is also confirmed that the project is relevant with the development needs of the country such as port improvement and expansion. The project increased the container cargo handling volume increased at Sihanoukville Port. The project generally met its targets on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate. Both the efficiency and the safety of the operation of the cargo handling machinery have improved. Furthermore, the project is responding to the increasing demand for cargo transportation, thereby contributing to the vitalization of the hinterland economy. While the project period slightly exceeded the initial plan, the project cost was within the plan. No major problems have been observed in the structural, technical and financial aspects of the operation and maintenance by the Executing Agency. In light of above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

(Recommendations to the Cambodian Side)

■ High cost of diesel is an issue that needs to be addressed with regard to the operation and utilization of the cargo handling machinery and other port facilities. It is desirable for the Executing Agency to improve its productivity by taking further steps to reduce costs, such as shifting to inexpensive power supply as soon as possible. By improving productivity, the port usage fees will be reduced for the shipping companies, and the Executing Agency will be able to enhance its organizational structure that ultimately attracts cargo demands.

■ Many trucks and trailers are found in front of the gate of the container terminal on weekends, and congestion is serious for the transportation and customs-related works for the container cargos. This is mainly because many vessels enter the port on weekends, requiring loads to be brought to the port near the weekends. The vehicles carrying the loads in fact disturb the traffics in the neighboring areas during some hours. Since there is limitation about traffic control and vehicle guidance, it is worth considering the possibility of widening the roads near the terminal gate, while making efforts to streamline the customs-related works and improve the operational efficiency of the staff.

4.3 Lessons Learned

■ The HIV/AIDS prevalence rate was high around the time of the project commencement in 1999. On the other hand, the condom use rate was low, and there was insufficient knowledge about HIV/AIDS among the general population in Cambodia. Efforts were made to prevent the HIV/AIDS infections from increasing among the port construction workers, such as implementing a pilot initiative, adding sub-clause on HIV/AIDS in the contractor's contract, holding sessions, implementing advocacy work, and promoting condom use. As a result, there was no infection as far as the Executing Agency could detect. It is judged that these initiatives minimized the negative social impacts of the project such as HIV/AIDS infections among the port construction workers and worsening of their health. In addition, negative impact on the construction was minimized, and it is judged that the implementation of the HIV/AIDS program was beneficial considering its future impacts on the local society.

Comparison of the Plan and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	【Urgent Rehabilitation Project】 [Civil Works] 1) Construction of Container Berth: 240m 2) Construction of Container Yard (land reclamation): 60,000m^2 3) Dredging: 877,875m^3 (Depth: -8.5m/-9.0m) [Consulting Services] 166.5M/M (Foreign: 83.5M/M, Local: 83.0M/M) 【Urgent Expansion Project】 [Civil Works] 1) Expansion of Container Berth: 160m 2) Dredging: 400,000m^3 [Procurement] Procurement of Cargo Handling Equipment: two Gantry Cranes; five Transfer Cranes; Container Terminal Operating Management System (CTMS); and others. [Consulting Services] 247.0M/M (Foreign: 82.0M/M, Local: 165.0M/M)	【Urgent Rehabilitation Project】 [Civil Works] 1) As planned. 2) 67,135m^2 3) 833,836m^3 (-9.0m/-10.0m) [Consulting Services] As planned. 【Urgent Expansion Project】 [Civil Works] 1) As planned. 2) 588,000m^3 [Procurement] As planned. [Consulting Services] 210.0M/M (Foreign: 70.0M/M, Local: 140.0M/M) 【Additional Output】 Dredging: 130,230m^3 (dredge volume)
2. Project Period	【Urgent Rehabilitation Project】 September 1999 – March 2004 (55 months) 【Urgent Expansion Project】 November 2004 – November 2008 (49 months)	【Urgent Rehabilitation Project】 September 1999 – October 2006 (86 months) 【Urgent Expansion Project】 November 2004 – March 2010 (65 months)
3. Project Cost Amount paid in Foreign Currency Amount paid in Local Currency Total	【Urgent Rehabilitation Project】 3,253 million yen 1,817 million yen 5,070 million yen	【Urgent Rehabilitation Project】 2,656 million yen 2,083 million yen 4,739 million yen

Japanese ODA Loan portion	4,142 million yen	3,917 million yen
Exchange Rate	1USD = 119 yen (As of September 1999)	1USD = 118.26 yen (Average over the project period)
	【Urgent Expansion Project】	【Urgent Expansion Project】
Amount paid in Foreign Currency	3,798 million yen	3,927 million yen
Amount paid in Local Currency	1,691 million yen	992 million yen
Total	5,489 million yen	4,919 million yen
Japanese ODA Loan portion	4,313 million yen	3,921 million yen
Exchange Rate	1USD = 124 yen (As of November 2004)	1USD = 114.90 yen (Average over the project period)

Bangladesh

Ex-Post Evaluation of Japanese ODA Loan Project

Jamuna Bridge Access Road Project

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

At the time of the ex-post evaluation, it is confirmed that the project is relevant with the country's policy such as the transportation development plan. It is also confirmed that the project is relevant with the development needs of the country such as to develop and expand road networks. This project has allowed Bangladesh to better respond to the recent increase in transport demands between Dhaka the capital and Jamuna Bridge. It has helped the country to manage the transportation of agricultural products that are on the increase. In addition, it is judged that the project is contributing to the improvement of living environment for local residents as well as to the vitalization of economic activities in Bangladesh. The project period substantially exceeded the original plan because the construction was delayed due to a large-scale flood which occurred in 1998, etc, and the project cost was slightly exceeded the plan. However, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Road Developed by the Project

1.1 Background

Road network of Bangladesh was not sufficiently developed. Several points on the main corridors were often separated by rivers, while some roads and bridges were not strong enough to tolerate the heavy load of large cargos and buses. Roads were narrow in some places, causing

traffic congestions. One of the five major corridors of the country, "Dhaka - Northwest Area[1]", was no exception. The road width was a major issue; there were many places where the road width was below the national standard of 7.3m. The road had damages, and vehicles had to pass alternatively on some bridges. Therefore, it was a pressing issue for Bangladesh to ensure safe and smooth transportation by improving the existing roads and bridges. Furthermore, this project would improve and connect the road section to Jamuna Multipurpose Bridge, which was completed in 1998 with JICA loan assistance. It was anticipated that the improvement of the road conditions in the project sections was essential for realizing smooth transportation between Dhaka and the Northwest Area.

1.2 Project Outline

The purpose of the project is to improve the transportation efficiency and to secure the safety between Joydepur and Tangail of National Highway No. 4 (N4: approximately 64km), by implementing civil works such as road pavements, etc; thereby contributing to improve the promotion of distribution and the economic activities in Bangladesh.

Approved Amount / Disbursed Amount	6,206 million yen / 6,164 million yen
Exchange of Notes Date / Loan Agreement Signing Date	June 1997 / July 1997
Terms and Conditions	Interest Rate: 1.0% Repayment Period: 30 years (Grace Period: 10 years) Condition for Procurement: General Untied
Borrower / Executing Agency(ies)	The President of the People's Republic of Bangladesh / Roads and Highways Department (RHD), Ministry of Communication
Final Disbursement Date	June 2009
Main Contractor (Over 1 billion yen)	Sungjee Construction Co., LTD. (South Korea), Abdul Monem Limited (Bangladesh)
Main Consultant (Over 100 million yen)	Japan Overseas Consultants Co., Ltd (Japan)
Feasibility Studies, etc.	F/S prepared by ADB "2nd Road Improvement Project"

[1] This refers to the west and north west area of Jamuna Bridge.

	(1991-92)
Related Projects (if any)	"Jamuna Multipurpose Bridge Project" (JICA Loan / Approved amount: 21,290 million yen). "Jamuna Bridge Access Roads Project[2]" (ADB: approximately 72 million USD).

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: August, 2011-June, 2012

Duration of the Field Study: November 12-25, 2011 (1st study)

February, 25-March, 2 2012 (2nd study)

3. Results of the Evaluation（Overall Rating: B[3]）

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance with the Development Plan of Bangladesh

At the time of the appraisal, Bangladesh was under the government plan of "Fifth Five-Year Plan 1997-2002", which set poverty alleviation as the ultimate development goal, aiming for an annual economic growth of 7% level on average. It placed emphasis on transportation sector as well as agriculture, rural development, industry..International donors also placed importance on the transportation sector as Asian Development Bank (ADB), for example, prepared their recommendations on the direction of the road sector development in 1991.

At the time of the ex-post evaluation, the government of Bangladesh has developed the "Sixth Five-Year Plan 2011-2015", which recognizes the importance of transportation system improvement for economic development and market expansion. The plan prioritizes the development of transportation network of the five main corridors: Dhaka-Chittagong; Dhaka-Northwest; Dhaka-Khulna; Dhaka-Sylhet; and Khulna-Northwest.

[2] This project was financed by Japan in parallel with ADB. The sections covered by this project differ from those covered by the ADB-financed project. Therefore, this ex-post evaluation will not cover the sections of the ADB-financed project. At the time of the appraisal of this project, ADB was providing finance for a part of Route 1 (Dhaka-Chittagong) and Route 4; Feni-Chittagong on Route 1, and Demra-Daudkandi, Mirpur-Savar and Nabinagar-Chandra on Route 4.

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ③: High, ②: Fair, ①: Low

In light of the above, the transportation sector continues to be a priority at the time of the ex-post evaluation, and it is judged that the project is relevant with the development policy of Bangladesh both at the time of the appraisal and the ex-post evaluation.

3.1.2 Relevance with the Development Needs of Bangladesh

At the time of the appraisal, transportation system in Bangladesh was not reliable. Some roads and bridges were not structurally strong enough to bear the heavy load of big freight vehicles and buses. The project sections were no exception. There were places where the road width did not meet the national standard of 7.3m, forcing vehicles to pass alternately. Furthermore, the project in combination with the completion of Jamuna Multipurpose Bridge was expected to improve road network and goods movement between Dhaka and the Northwest Area, leading to revitalization of economic activities. In light of the above, there was a clear need for road improvements in the target sections.

At the time of the ex-post evaluation, it has been observed that the project is contributing to the increase in goods movement particularly from the Northwest Area to the Dhaka metropolitan area. Traffic volume is recently on the increase between the Northwest Area and Dhaka[5], and ADB is planning to conduct a feasibility study to look into the possibility of two lanes in each direction. This suggests that Bangladesh has a clear development need to respond to increasing traffic volume.

In light of the above, the project sections are responding to the increase in traffic volume, and it is judged that the project is relevant with the development needs of Bangladesh both at the time of the appraisal and the ex-post evaluation.

3.1.3 Relevance with Japan's ODA Policy

The Japan's ODA Charter endorsed by the Cabinet in 1992 set a number of principles, one of which was to "urge attention to recipient accomplishments in democratizing, establishing market-oriented economic systems, and assuring basic human rights and freedoms." In addition, the Charter listed infrastructure building as a basic condition essential for socioeconomic development. This project is to provide assistance in the area of infrastructure building for Bangladesh who had promoted economic reforms such as state enterprise reforms, achieving an average GDP growth of above 5% since FY 1996/7[6]. Therefore, the project is relevant with the principles of the ODA Charter and thus relevant with Japan's development aid policy.

[5] Refer to the effectiveness/operation and effect indicator, "Annual Average Daily Traffic Volume."
[6] Bangladesh's fiscal year begins in July and ends in June.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

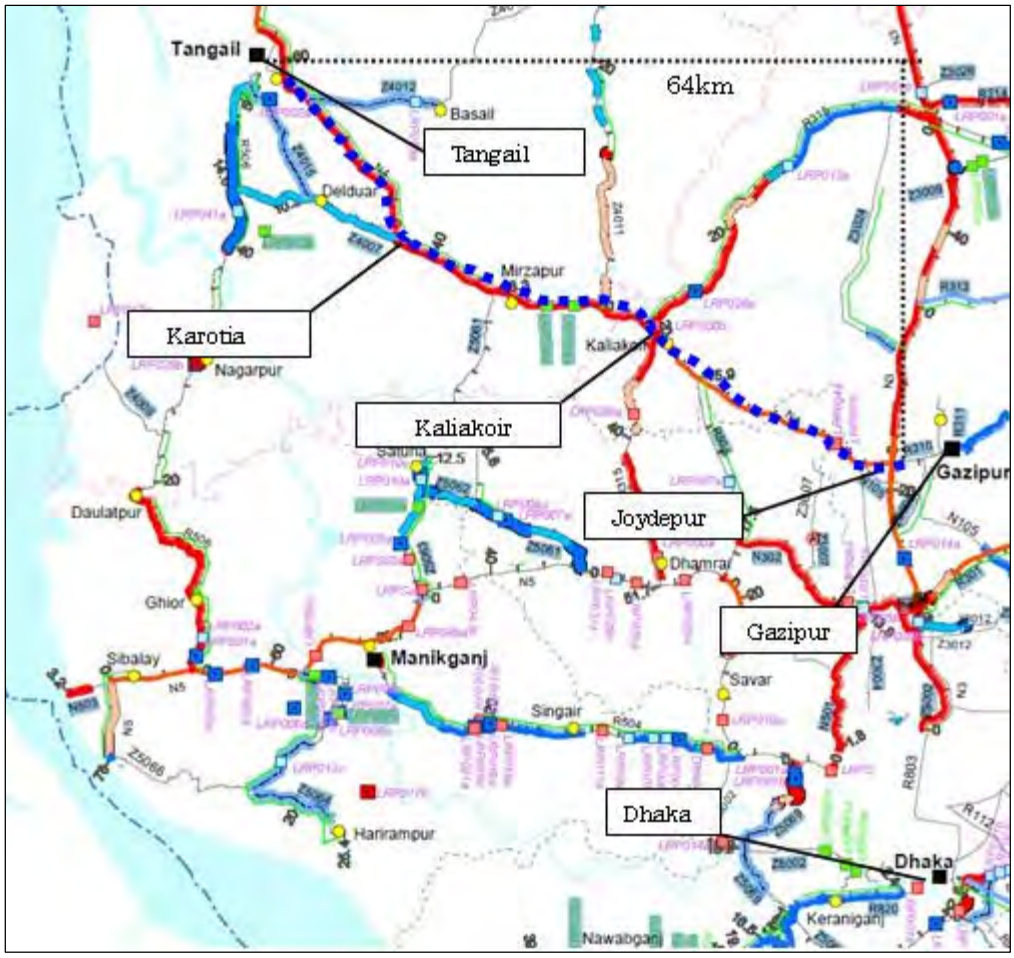


Figure 1: Project Site
(Between Joydevpur and Tangail: approximately 64km)

3.2 Effectiveness[7] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

Table 1 shows the annual average daily traffic volume in relation to the quantitative effectiveness of the project.

[7] Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1: Annual Average Daily Traffic Volume within the Project Section (Joydevpur-Tangail)

(Unit: Number of vehicles per day)

1995 (Before the Project Implementation)	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
4,087	11,315	N/A	13,660	17,275	N/A	16,333

1) Annual Average Daily Traffic Volume

As shown in Table 1, the average traffic volume was 16,333 vehicles per day in 2009/10.[8] In the project section, the traffic volume of trucks and buses increased along with the rapid economic growth. Traffic congestion is already a serious problem in some places. Among others, Gazipur area near Joydevpur has seen an increasing number of factory constructions and new businesses.[9] At the time of the appraisal in 1997, traffic volume was projected at 11,258 vehicles per day in 2010, and the actual figures indicate that the project section is accommodating higher demands than planned. However, it is necessary to consider the changes in external environment.[10] The Project built a two-lane road from the Dhaka metropolitan area towards the Jamuna Bridge, and as mentioned earlier, ADB is currently conducting a feasibility study for upgrading to a four-lane road to further respond to traffic that continues to grow year after year. Judging from traffic congestion as shown in Figure 2, the Executing Agency also sees the importance of the lane increase and a creation of a bypass in the surrounding area.

2) and 3) Reduction of Travel Time / Faster Average Driving Speed of Vehicles

Before the project completion, many roads did not meet the national standard width of 7.3m. In addition, there were many damaged spots, and vehicles could pass only alternatively on some bridges. The roads were widened by the project which secured one lane each throughout the

[8] This is the most recent data available as the Executing Agency does not collect data every year. The agency subcontracts out to local consultants for data collection on traffic volume. However, budget constraints prevent annual monitoring.

[9] Gazipur is located in the northern suburb of Dhaka the capital. It is an important traffic hub close to the metropolitan area. Gazipur attracts many factories and companies because flat land is available with a modest elevation, which makes the area resistant to floods.

[10] Presumptively, the actual daily traffic volume in 2009/10 exceeded the projected figure of 11,258 because this area has seen higher level of industrialization than expectations; the country as a whole has achieved economic growth at a faster pace than expected. Predicted figures at the time of appraisal were based on data presented in the ADB's feasibility study conducted in 1991–1992. The main factors of economic growth and expansion of the country are strong private consumption and steady agricultural growth, supported by strong garment exports and remittances from overseas workers, based on the trade and investment deregulation as well as a series of economic reforms.

sections to ease congestion. As a result, travel time has been reduced, and the average driving speed improved. Unfortunately, there is no existing data on travel time and average driving speed. However, according to the beneficiary survey results, a majority of drivers and local residents along the routes responded that the travel time has been reduced by approximately 30 minutes[11] on average between Joydevpur and Tangail; it used to take 149 minutes on average before the project completion whereas it takes 115 minutes at present. Based on the above, it can be judged that the average travel time has been reduced in the project sections.


Figure 2: Congestion on the Project Road (around Joydevpur)

3.2.2 Qualitative Effects (Poverty Alleviation in the Regional Towns and Improved Living Environment for Local Residents)

During this evaluation survey, a questionnaire-based survey was conducted covering 121 truck drivers and local people residing along the three project sections: Joydevpur-Kaliakoir; Kaliakoir-Karotia; and Karotia-Tangail. The survey results are summarized below.

[11] The figure is an average of the respondents' answers and may not be as accurate as measured time.

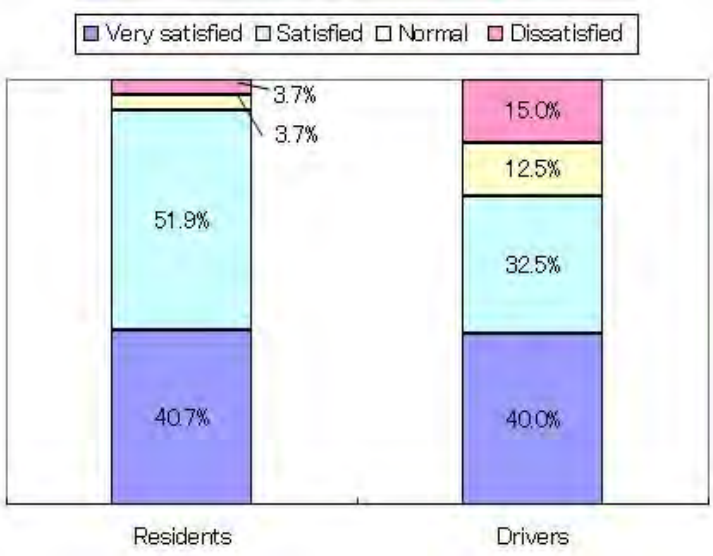


Figure 3: Results from the Beneficiary Survey (Level of Satisfaction)

Figure 3 shows that the level of satisfaction is high among the beneficiaries; a majority of the drivers and local residents responded that they were "Very satisfied" or "Satisfied" with the Project. While they admit that the traffic volume has increased, they see reduced travel time as a positive effect of the project. This is mainly because they were faced with more serious congestions before the Project; many places were damaged, and roads width did not meet the national standard of 7.3m. Vehicles had to pass alternatively in some places. In addition, the trip between Joydevpur and Tangail takes approximately 30 minutes less now[12], according to those who responded that the travel time had reduced. On the other hand, the respondents indicated that incidence of traffic accidents has increased. It might be inevitable that traffic accidents somewhat increase along with the traffic volume, despite efforts made by the local police to promote traffic safety and prevent accidents, which will be discussed in the "Impact" section. Furthermore, vehicles such as rickshaws[13] often obstruct traffic, as will be discussed later. This indicates that there is room for improvement in the area of traffic manners and rules.

[12] For those who responded that travel time had reduced, the average travel time was 149 minutes before the project commencement as compared to 115 minutes after the project implementation.

[13] Rickshaws are a common taxi business that can be started with relatively small capital. Whether it is a national or local road, rickshaws often obstruct traffic. Although they are the main cause of traffic congestions, in reality, there is no strict control.

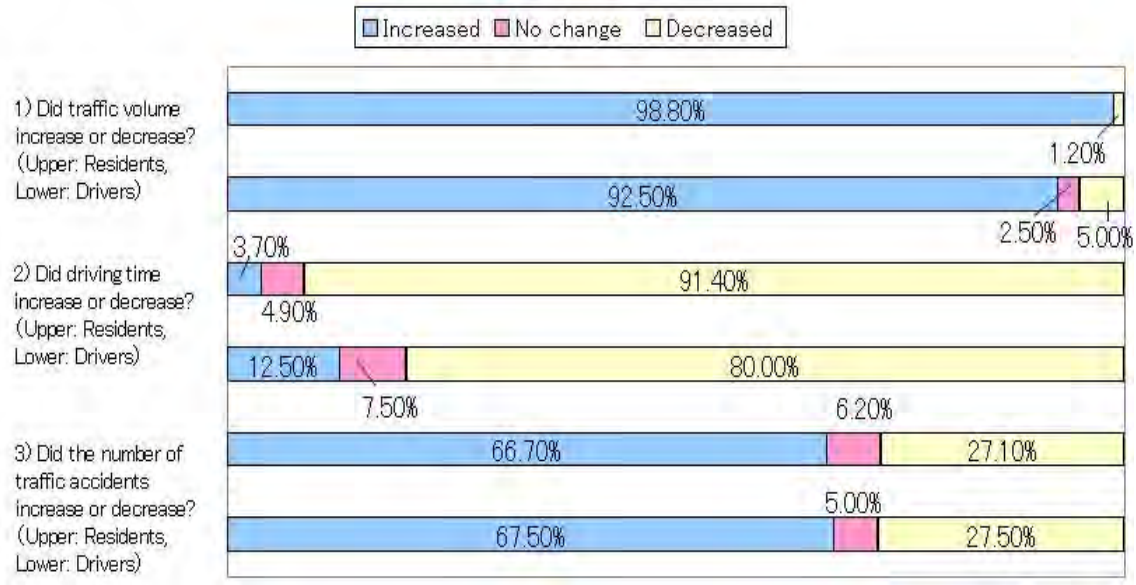


Figure 4: Result from Beneficiary Survey (Direct Effect)
(Sample Size: Local Residents N=81, Drivers N=40)

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

3.3 Impact

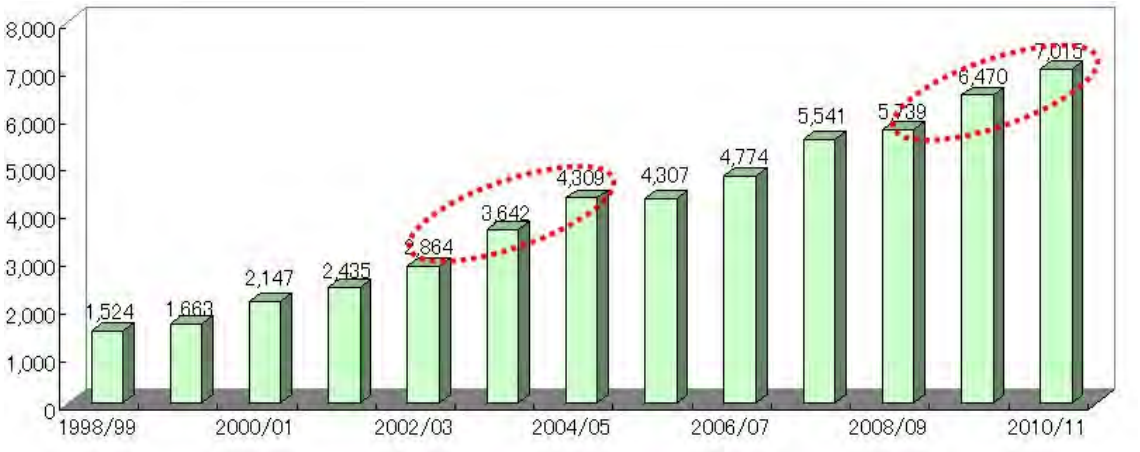
3.3.1 Intended Impacts

3.3.1.1 Contribution to the Logistics Improvement

Figure 5 shows changes in the volumes of agricultural products transported, measured adjacent to the project sections.[14]

[14] This data was collected on N405. N405 extends up to Tangail via Jamuna Bridge, which connects to the target section. One can interpret this data as indications of volumes transported on the project road because trucks carrying agricultural produce typically depart the Northwest Area, cross the Jamuna Bridge, and pass through N405 and the project road before arriving in Dhaka.

(Unit: Daily Average in Tons)



Source: Bangladesh Bridge Authority

Figure 5: Changes in Volumes of Agricultural Products Transported Adjacent to the Project Section
(Dotted circles indicate that the growth rates are particularly high in keeping with the completions of each project component[15])

The transportation volume grew approximately 4.6-fold in 2010/11 compared to 1998/99, immediately after project commencement. In particular, the growth rates are high in 2002–2004 in keeping with the completion of Contract 2 and 3 (2,864→3,642→4,309 tons per day) and in 2009 in keeping with the completion of Contract 1 (5,739→6,470→7,015 tons per day). As shown by the data, it can be said that this project has played a role in assisting the steady expansion of transportation and revitalization, resulting in a remarkable increase in transportation demand, preventing the occurrence of transporting bottleneck.

(Reference) Table 2 shows the estimated values[16] of five main agricultural products in Hili, located in the northwest part of Bangladesh near the Indian border. Trucks that transport agricultural products typically start their journeys in India and drive through Hili, the Northwest Highway, Jamuna Bridge, and the target section before reaching Dhaka the capital. While the products vary from year to year, the total estimated value of the five main agricultural products increased dramatically from 4,820,097 thousand Taka in 2004/5 to 7,406,286 thousand Taka in 2010/11.

[15] The completion period will be discussed in the Efficiency/Output section.
[16] Values converted to market price

Table 2: Change in the Estimated Value of the Main Agricultural Products Coming from India to the Northwest Area of Bangladesh (Top 5 Products)

(Unit: Thousand Taka)

2004/05		2010/11	
Rice	1,793,080	Corn	3,105,157
Wheat	833,242	Fertilizer/ Oil cake	1,170,068
Lentils	645,122	Onions	811,665
Onions	328,253	Rice Vermicelli	543,698
Corn	295,684	Snack Food	429,820
Others ↓	… ↓	Others ↓	… ↓
Total	4,820,097	Total	**7,406,286**

Source: Hili Customs Authority (Indian Border)

3.3.1.2 Impact on the Living Environment and Social Economy

Figure 6 shows that an overall result was positive with regard to the living environment and social economy. Among all, great improvements are observed on "1) Employment" and "6) Income from Agriculture." In addition to the rapid economic growth, the Project is believed to have brought the employment and income-generating opportunities for the local people. One shop owner,[17] for example, increased his income approximately 2.5-fold. Further, one farmer explained that he was able to expand his markets and improve his profitability because the road access was improved following the project, which enabled those engaged in food processing businesses to purchase directly from him and other farmers. Also, the time and cost reduction realized for those engaged in the businesses. Based on the above, it is judged that the project has contributed to improvement of the local people's livelihood.

[17] The shop mainly sells daily products.

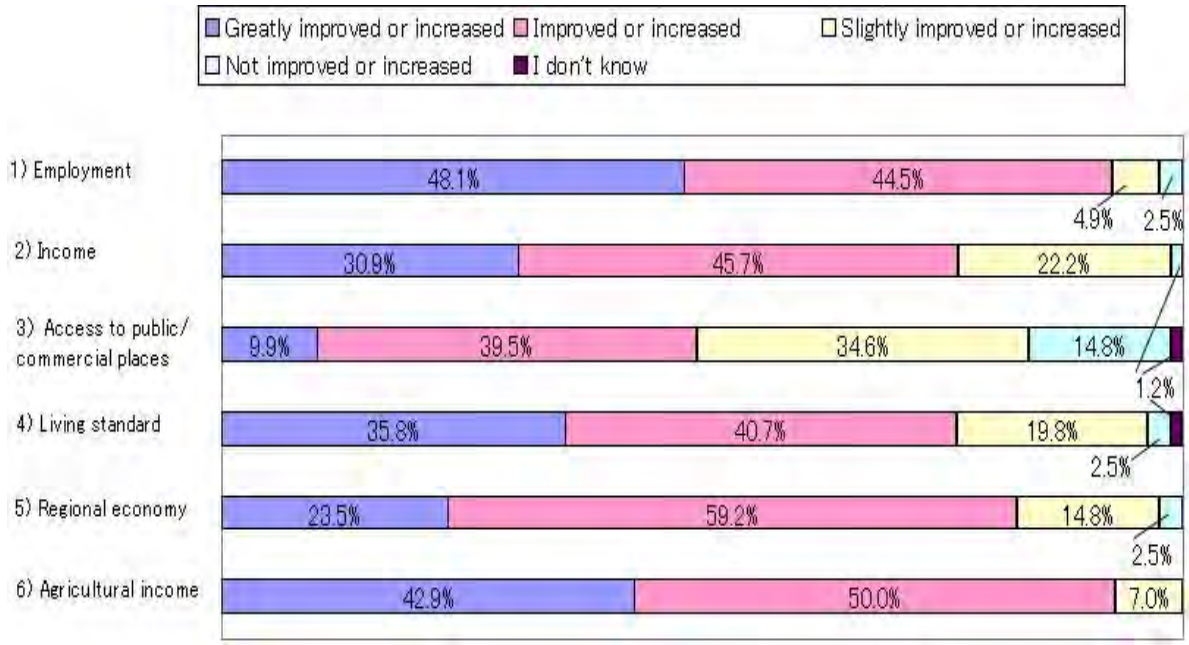


Figure 6: Beneficiary Survey (Questions related to Living Environment / Social Economy) (Sample Size: N=81 except for 6) which had a sample size of N=42 as it was meant only for farmers along the project sections)

3.3.2 Other Impacts

3.3.2.1 Incidents of Traffic Accidents

Incidents of traffic accidents in the project sections[18] are shown in Table 3. According to the Executing Agency and the local police, incidents of accidents, number of injuries, and the death toll had been on the increase up to 2010, although it finally declined in 2011 as compared to the previous year. They explained that traffic accidents had increased in proportion to: 1) the rapid economic growth; 2) the increasing inflow of population and goods into Dhaka; and 3) the increase in traffic volume. In addition, rickshaws obstruct traffic in some places, and it is essential to improve traffic rules adherence.

According to the Executing Agency and local police, they have been strengthening their promotional work in recent years, targeting local residents and children through workshops and communication materials such as flyers and DVD. The police are enforcing tighter controls on illegal passing. However, it is clear that these efforts should continue because many interviewed residents and drivers responded that accidents increased after the project implementation.

[18] The table shows total figures of three years (2008-2010) as annual figures are not available.

Table 3: Incidents of Traffic Accidents in the Project Sections

	2008-2010 (Total for 3 years)	2011 *Note 1
Incidents of Accidents	383(127.6)*Note 2	45
Number of Injuries	877(292.3)	105
Death Toll	437(145.6)	73

Source: Police stations covering the project sections (six total)
Note 1: The 2011 figure represents data up to the end of October.
Note 2: The figures in parentheses are annually averages.

Figure 7: Rickshaws

Figure 8: Long Distance Bus

3.3.2.2 Impacts on the Natural Environment

According to the Executing Agency, no major negative impacts were observed on the natural environment such as pollutions and noises, during the project implementation. It was also the case during this field survey. However, some beneficiaries responded that they thought the air pollution, noise and vibration increased as shown in Figure 9. When the respondents were interviewed, they associated the problems with the continuous increase of the traffic volume and congestion. They also explained that respiratory diseases such as asthma, cough and cold somewhat increased, though they did not observe any environmental destruction nor negative impacts on the ecosystem. In Joydevpur near Dhaka in particular, relatively more respondents expressed their concerns about the environmental impacts as the area is densely populated and has severe traffic congestions. However, there were also comments from the respondents whether it was directly caused by the Project or not.[19] There is no quick remedy as this area is extremely densely populated and that the traffic volume continues to increase. Therefore, the effective measurements are not expected. Meanwhile, for example, if the city planning and the related projects are formulated, such environmental considerations are also to be necessary.[20]

[19] It can be considered that these comments exist, because there are influences such as the vehicle's performance and parking, etc.
[20] In addition, the government of Bangladesh has made it mandatory for taxis and imported used cars to use

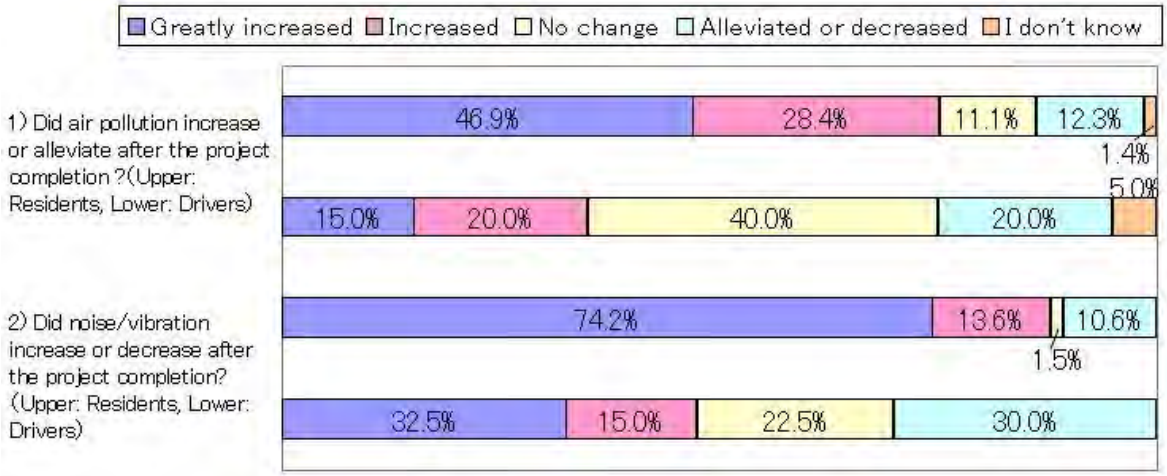


Figure 9: Beneficiary Survey on Environment
(Sample size: Local people residing along the roads N= 66, Drivers N＝40)

3.3.2.3 Land Acquisition and Resettlement

Table 4 shows a comparison between the planned and actual figures with regard to land acquisition and resettlement. Residents subject to resettlements are mainly categorized into PAP and SREP.[21] The difference between the planned and actual ones occurred as which the necessary land, PAP and SREP were decided, through the detail design implemented after the project commencement.[22] Normally resettlements are carried out based on Resettlement Action Plans (RAP), however, the RAP of this project did not have accurate numbers of PAP and the others before the project commencement; it was difficult to identify the numbers. The same was true for the land acquisition, which explains the discrepancy between the planned and actual figures. According to the Executing Agency and the local NGO, it was after the detailed design that the precise areas subject to land acquisition were identified.

compressed national gas or CNG. The transition to CNC was smooth as it is produced domestically and cheaper than fossil fuels.

[21] Project Affected People (PAP) and Socially Recognized Entitled People (SREP) such as illegal residents who are not counted as PAP.

[22] Land co-owners were also identified at this stage. It is judged that the planned figures identified before the project commencement are not accurate and unsuitable for a baseline. Therefore there is no point in comparing the planned and actual figures.

Table 4: Resettlement and Land Acquisition

		Plan	Actual
Resettlement (Unit: person)	a) PAP	10,620	18,310
	b) SREP	586	772
Land Acquisition (Unit: ha)		87.0	93.2

Source: CCDB (local NGO)

Table 5 shows a comparison between the planned and actual amounts of compensation related to the resettlement and land acquisition. The compensations were paid either by the Local Authority called the "Deputy Commissioner (DC)" or the Executing Agency through the local NGO (CCDB). The actual amounts were less than planned, because the DC could not make sufficient payment available for the PAP and SREP due to budget shortage and others (It seems that the amount estimated before the project commencement was a rough figure. Therefore it is presumably not possible to compare the estimated amount with the actual amount.).[23] This was influenced by a lack of clarity in the land-related law, the legal basis of the resettlement. According to a socioeconomic professor at Dhaka University, the problem happened because there was defect and ambiguity in the legal basis used at the time of the appraisal: "Acquisition and Requisition of Immovable Property Ordinance, 1982." To site a few examples, 1) there is no clarity in the process of calculating the land value; and 2) objections are not heard and taken into consideration sufficiently. Although it is impossible to judge at this point of time what went on in reality, it is considered that there was a problem with the ways in which the scale of resettlement and land acquisition were estimated. In fact, the land law and land acquisition process are under further validation, and it is expected that the system and implementation will be improved in the future.

According to the beneficiary survey, some target residents expressed their dissatisfaction with the compensation. They explained that "we did not receive satisfactory compensation. The actual compensation was less than what we were told initially."

In fact, the local NGO processed complaints from the target residents (total 24 cases). However, none of these complaints made it to court because the residents assumed that it would be difficult to win the case in light of the defect and ambiguity of the land law. On the other hand, it was not necessarily a loss for some target residents who had land except the scope of this project because land prices went up after the project, so their land became more profitable whether it is for a sale or running business.

[23] In fact, the DC could not make money available for sufficient compensation.

Table 5: Compensation for Resettlement and Land Acquisition

(Unit: Taka)

Payer of Compensation	Plan	Actual
Local Government	266,123,771	169,740,000
Executing Agency / NGO	173,734,953	137,194,427

Source: CCDB (local NGO)

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

Table 6 is a comparison between the planned and actual outputs of the project.

Table 6: Planned and Actual Outputs of the Project

Planned (At the Time of the Appraisal)	Actual (At the Time of the Ex-post Evaluation)
a) Engineering Work ・Road Improvement Works: Approximately 67.00km in Total - Contract 1: 26.60km (Joydevpur- Kaliakoir) - Contract 2: 21.40km (Kaliakoir-Karotia) - Contract 3: 19.09km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 51.50km ・Construction of Bypass: 15.50km ・Improvement of Culverts: 59nos. ・Improvement of Bridges: 27nos.	a) Engineering Work ・Road Improvement Works: 63.50km - Contract 1: 26.40km (Joydevpur- Kaliakoir) - Contract 2: 21.00km (Kaliakoir-Karotia) - Contract 3: 16.10km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 48.19km ・Construction of Bypass: 15.33km ・Improvement of Culverts: 81nos. ・Improvement of Bridges: 14nos.
b) Consulting Services M/M: 520M/M (International: 100M/M, Local: 420M/M, TOR: Supports of bidding evaluation for civil works, Supervision of civil works, Technical education providing for staff of Roads and Highways)	b) Consulting Services M/M: 2,552M/M (International: 188M/M, Local: 2,364M/M, TOR: Supports of bidding evaluation for civil works, Supervision of civil works, Technical education providing for staff of Roads and Highways as planned)

The reason behind the underachievement of the Contract 3[24] is that some 3km interval were excluded from the project scope following a large-scale flood[25] in 1998. The flood raised concerns that the project fund would fall short, and consequently the detail design was reviewed. As a result of the review, a section of 3km was excluded from the project scope[26] based on its level of urgency and significance. Similarly, this review of the detail design brought about the

[24] The excluded interval is around 3km, from Tangail (final point) to the city center.

[25] The flood occurred from July to September 1998. It flooded more than 70% of the nation and was responsible for killing more than 700 people.

[26] The current condition of this interval was checked during this evaluation survey, and it was found that no major repair or overlay would be needed at this time.

discrepancy between the plan and actual outputs for the improvement of the earthworks, pavement, linear, culverts and bridges.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The original project budget was 9,056 million yen (out of which 6,206 million yen was to be financed by JICA loans) as compared to the actual project cost of 9,123 million yen (out of which 6,164 million yen was financed by JICA loans). Therefore, the actual project cost slightly exceeded the plan (101% of the plan). The reasons are summarized below:

1) Bangladesh had the large-scale flood in July-September 1998, which caused massive damage to the foundation work. This led to a decision to change the construction method to make the structures more resistant to floods. Similarly, the leveling and culverts improvement works were strengthened. Such modifications increased the construction costs.

2) During the detail design, soft ground was found in the Contract 1 target area (Kaliakoir Bypass construction section). In response to this, ground improvement construction was added, which increased the construction costs.

3) An Iranian company contracted for the Contract 1 section had objections to the changes in their contact based on the abovementioned changes. They refused to cover the cost for recover work on the foundation damaged by the flood. Furthermore, they caused a dispute with the Executing Agency, seeking a relocation of underground gas pipelines in the project area[27]. They finally ceased the engineering work in November 2000, followed by a cancellation of the construction contract in September 2001. The Executing Agency performed a re-bid and signed a new contract with another company, a local company contracted in April 2003 onwards. As a result, the project period was greatly extended, and the cost related to consulting services and administration increased.

In spite of these three factors, the actual project cost became higher than the planned, because there has been a difference of the exchange rate between at the time of the appraisal and the ex-post evaluation (1 taka = 2.9 JPY at the appraisal, 1 Taka = 1.97 JPY at the ex-post evaluation applying the average exchange rate during the project implementation). In other words, although the total actual project cost greatly increased due to these factors, it actually remained as 101% because of the currency depriciation. Considering this point, the efficiency

[27] This issue was not assumed at the time of the appraisal, and the pipelines were found after the project commencement.

evaluation needs to be judged.

3.4.2.2 Project Period

As shown in Table 7, the project period was initially set for 3 years and 3 months, or 39 months. However, it actually took 12 years or 144 months from July 1997 to June 2009 (369% of the plan). Major reasons for the delay were:

1) Changes in the construction method following the flood of 1998.

2) Work stoppage on the Kaliakoir Bypass construction section (2.9 km) when there was anticipation that project funds would fall short following the flood. However, it turned out that the country did come up with the funds needed for the bypass, and construction resumed after some time.

3) The contractor of Contract 1 suspended construction, forcing the Executing Agency to cancel the contract and re-bid for a new contractor.

In addition, as shown in Table 7, the Contract 2 and 3 were completed during 2002, however the Contract 1 continued its construction until 2009. Under these circumstances, it is necessary to consider the delay of the total project period with 105 months.

Table 7: Plan and Actual of the Project Period

	Plan	Actual
1. Civil works	Oct. 1997 – Sep. 2000	Contract 1: March 1998 – June 2009
		Contract 2:March 1998 – Dec. 2002
		Contract 3:March 1998 – Jan. 2002
2. Land Acquisition	July 1997 – June 2000	July 1997 – June 2000
3. Consulting Service	July 1997 – Sep. 2000	March 1998 – June 2009

To sum up, the project period was longer than planned (however it became slightly longer due to the exchange rates' decrease), and the project cost was slightly higher than planned. Therefore, efficiency of the project is low.

3.4.3 Results of Calculations of Internal Rates of Return (IRR) (Reference)

Economic Internal Rate of Return (EIRR)

At the time of the appraisal, the financial analysis was made based on: 1) reduction in

mileage and travel time as benefits; 2) investment cost (project cost) and expenses related to operation and maintenance as costs; and 3) an assumed project life of 20 years. As a result, the Economic Internal Rate of Return (EIRR) was calculated at 14.5%. It was attempted to recalculate the EIRR at the time of the ex-post evaluation. However, there were unclear points on the method of calculation used at the appraisal. Furthermore, data needed for benefits calculation were not available through this evaluation survey. Therefore, analysis for the internal rate of return was not possible.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

The Executing Agency at the time of the ex-post evaluation is the Roads and Highways Department, Ministry of Communication. Headed by the Chief Engineer, the department has five wings (Planning and Maintenance, Technical and Bridge Management, Technical Services, Management Services and Mechanical Services), under which many divisions exist. They have 2,805 employees, 392 of which are technical staff. On the other hand, it is the Local Road Divisions that are responsible for the Operation and Maintenance (O&M) of project components such as the roads, bridges and culverts. Gazipur Road Division with 15 staff is responsible for the Joydevpur-Kaliakoir section (26.40km). Similarly, the Tangail Road Division with nine staff is responsible for the Kaliakoir-Karotia section (21.00km) and the Karotia-Tangail sections (16.10km). Their main duty is to maintain roads and bridges.

The O&M of the project roads can be categorized into the “routine” work and “periodic” work in principle. The routine work is about local divisions conducting day-to-day checks and repairs[28], whereas the periodic work is about more extensive inspections and repairs. As for extensive repairs, it is often the case that big construction companies based in Dhaka are commissioned by the Executing Agency.

3.5.2 Technical Aspects of Operation and Maintenance

Gazipur and Tangail Road Divisions are staffed with experts who have rich experience in O&M. In particular, these offices have many staff with years of experience in the “routine” O&M. Training courses are conducted at the Training Center located in the Head Office of the Executing Agency; staff from local offices also attend the trainings. They have various courses

[28] Road maintenance is contacted out to local construction companies as needed. The local Divisions play a supervising and monitoring role in the maintenance.

such as on management, procurement and computer skills among others.[29] 56 staff were trained in 2009/10 and 28 staff in 2010/11. In addition, induction courses are held for new recruits every year.

3.5.3 Financial Aspects of Operation and Maintenance

Table 8 shows the O&M budgets of the project in the past three years (Gazipur and Tangail Road Divisions together). As mentioned, O&M is categorized into "routine" and "periodic" works, and they are budged separately. Budgets for day-to-day maintenance are prepared annually by local Road Divisions and submitted to the Head Office of the Executing Agency. The Head Office allocates budgets in order of priority, considering the road conditions, traffic volume, and others. As for the periodic maintenance, the Head Office identifies sections that require extensive repairs and allocates budget to local Road Divisions accordingly.[30] When interviewed, Gazipur and Tangail Road Divisions expressed that "minimum budget required for the day-today O&M had been allocated in recent years, although it rarely matches the requested amounts (as shown in Table 8)." In addition, 390 million Taka has been allocated and is under execution for "periodic" maintenance in 2011/12.[31] The budget is geared mainly towards the Kaliakoir-Karotia section and the Karotia-Tangail section under the jurisdiction of Tangail Road Division[32], and repair works are expected to take place going forward. In light of the above, no major problems have been observed in the financial aspects of the O&M.

[29] According to the Executing Agency, their training budget is on the decrease in recent years, therefore they are trying to streamline.
[30] Therefore, there are some years with no budget allocation.
[31] Especially, the budget has been executed for the O&M of Kaliakoir – Karotia and Karotia – Tangail, which are under the control of Tangil Road Division. As one of the reasons, these two sections were completed about 10 years ago, which has already passed much time, and it has judged that large scale repair is necessary on these sections.
[32] Among all, it is because these two intervals were completed in 2002, almost nine years ago, and naturally they require more extensive repairs.

Table 8: O&M Budget of
Gazipur and Tagail Local Division (Total Amount)

(Unit: Million Taka)

Fiscal Year	Routine Maintenance Budget		Periodic Maintenance Budget (Actual)	(Reference) Total O&M Budget of the Executing Agency
	Required	Actual		
2008/09	23.10	15.95	40.72	5,143.84
2009/10	30.35	21.55	18.04	6,094.74
2010/11	35.59	24.67	N/A *Note	6,678.00

Source: Documents provided by the Executing Agency
Note) Although there was no budget allocated for the periodic maintenance in 2010/11, 390 million Taka has been allocated and under execution in 2011/12.

3.5.4 Current Status of Operation and Maintenance

Gazipur and Tangail Road Divisions contract local construction companies as needed to undertake the day-today maintenance such as asphalt repair and cleaning. The divisions supervise technical aspects and monitor the works of the construction companies. As for the current condition, although no damage significant enough to undermine the project effect was observed during the field survey, cracks were found on the surface of some sections (around Kaliakoir and Tangil bypass)[33]. As seen in Figure 10, a high proportion of the drivers made positive comments about the road conditions and maintenance such as "comfort improved while driving" and "maintenance condition improved."

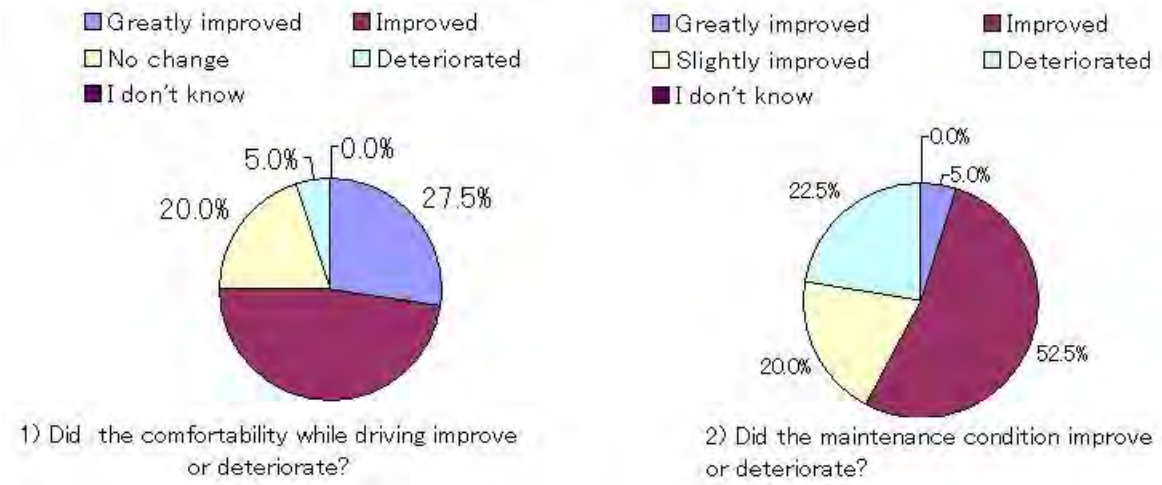


Figure 10: Results from the Beneficiary Survey on the Road Conditions and Maintenance
(Sample Size: N = 40)

[33] According to the report that a road expert who belongs to the Executing Agency made in February 2012, these cracks occurred because many over-loading vehicles pass on the sections, damaging the pavements.

Gazipur Road Division carries out their maintenance work around the clock. On the other hand, Tangail Road Division does its maintenance work during daytime only. This is because the traffic volume is high day and night in the Gazipur area while it is not the case in sections under Tangail Road Division. The machines needed for O&M such as loaders and haul trucks are utilized sufficiently. Although some machines are getting old, they are not out of order, and it does not affect the maintenance works. Manuals and checklists are also in order.

Figure 11: Machines used for Maintenance

Figure 12: Maintenance Work

In relation to the above, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

It is confirmed that the project is relevant with the country's policy such as the transportation development plan. It is also confirmed that the project is relevant with the development needs of the country such as to develop and expand road networks. This project has allowed Bangladesh to better respond to the recent increase in transport demands between Dhaka the capital and Jamuna Bridge. It has helped the country to manage the transportation of agricultural products that are on the increase. In addition, it is judged that the project is contributing to the improvement of living environment for local residents as well as to the vitalization of economic activities in Bangladesh. The project period substantially exceeded the original plan because the construction was delayed due to a large-scale flood which occurred in 1998, etc, and the project cost was slightly exceeded the plan. However, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

(Recommendations to Bangladesh side)

■ It is recommended that the Executing Agency, in cooperation with the local police, promote adherence to traffic rules. It is also recommended that have tighter controls on illegal passing judged from the fact that traffic accidents are on the increase in the project sections. In addition to the on-going promotions for traffic safety, it would be effective to have exclusive lanes for pedestrians and rickshaws. It is also reccomended to upgrade various safety measures such as traffic strips, lane separators, blocks, and protection walls.[34]

■ With regard to payment of compensations related to the resettlement and land acquisition, some residents expressed their discontent. This was due to the budget shortage and lack of clarity in the land law. As Bangladesh has other road improvement projects that are either on-going or planned to be implemented, it is thus recommended that the government make efforts to consolidate the land law and ensure fair and sufficient compensation payment related to resettlements and land acquisitions.

4.3 Lessons Learned

■ The historically large-scale flood occurred after the project commencement in July-September 1998. Following the flood, the project design and construction method were modified, and road leveling was added. In Bangladesh, natural disasters[35] of unpredictably large scale such as cyclones and floods have occurred since then, and these modifications have proven to be effective in times of floods (e.g., the project sections have not been severed by floods since its completion.). Therefore it was good judgment that Bangladesh side took early actions on the preventative measures against natural disasters and applied them to the design change while JICA flexisibly accepted their actions.

[34] According to the Executing Agency, there are no exclusive lanes for rickshaws in Bangladesh to date. However, they are considering building such lanes along the national roads in the future. There is an opportunity to add exclusive lanes for rickshaws if it is decided to upgrade the target roads to four lanes.

[35] To site one example, Cyclone Sidr occurred in November 2007 brought widespread damage with the death toll of over 4000, around 9 million victims, and 1.5 million damaged buildings.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	(Engineering Work) ・Road Improvement Works: approximately 67.00km - Contract 1: 26.60km (Joydevpur- Kaliakoir) - Contract 2: 21.40km (Kaliakoir-Karotia) - Contract 3: 19.09km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 51.50km ・Construction of Bypass: 15.50km ・Improvement of Culverts: 59nos. ・Improvement of Bridges: 27nos.	(Engineering Work) ・Road Improvement Works: 63.50km - Contract 1: 26.40km (Joydevpur- Kaliakoir) - Contract 2: 21.00km (Kaliakoir-Karotia) - Contract 3: 16.10km (Karotia-Tangail) ・Earthworks, Pavement and Linear Improvement: 48.19km ・Construction of Bypass: 15.33km ・Improvement of Culverts: 81nos. ・Improvement of Bridges: 14nos.
	(Consulting Services) 520M/M (International: 100M/M, Local: 420M/M)	(Consulting Services) 2,552M/M (International: 188M/M, Local: 2,364M/M)
2. Project Period	July 1997-September 2000 (39 months)	July 1997-June 2009 (144 months)
3. Project Cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 2,681 million yen 6,375 million yen 9,056 million yen 6,206 million yen 1Taka = 2.9yen (July 1997)	 5,689 million yen 3,434 million yen 9,123 million yen 6,164 million yen 1 Taka = 1.97 yen (Average over July 1997 - June 2009)