Ex-Post Project Evaluation 2010: Package IV -1
Viet Nam

November 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

IC NET LIMITED

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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 2008, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2007. 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.

November 2011
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.

Ex-Post Project Evaluation 2010:

Package IV -1 (Viet Nam)

Table of contents

Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project

Cai Lan Port Expansion Project

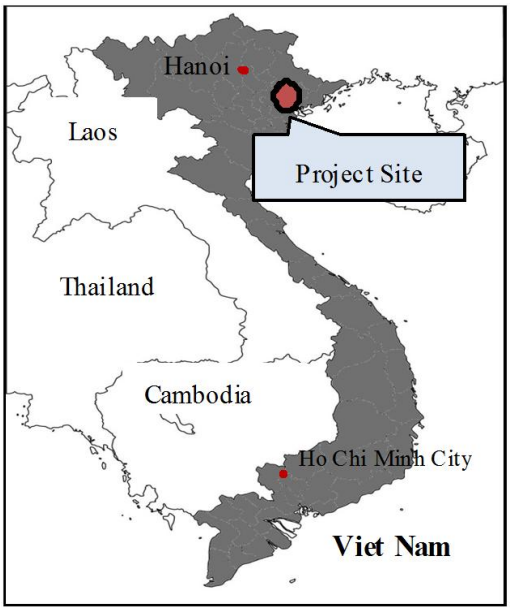
External Evaluator: Ryujiro Sasao, IC Net Limited

0. Summary

This project, the objective of which is to improve the basic maritime transport infrastructure in northern Viet Nam through expansion of the Cai Lan Port in Bai Chay Bay, Quang Ninh Province, is in agreement with the aid policies of the Japanese government as well as being in alignment with the development policies and development needs of Viet Nam. Thus it has a high degree of relevance. The volume of freight handled at this port grew steadily and the project is having an impact of contributing to the regional economy through increasing supply of materials to industrial parks and export of Vietnamese products.

However, this project has been evaluated to have a somewhat insufficient degree of efficiency since the project period has lengthened. There are also some technical issues requiring improvements in operation and maintenance as well. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Project location

Cranes installed at Cai Lan Port

1.1 Background

At the time of appraisal in 1995, nationwide, Viet Nam was interspersed with about 60 ports. Of these, 33 ports were suited to maritime shipping activities, while seven major ports were equipped to

function as international ports[1]. In the 1994 fiscal year, the total volume of cargo handled by the seven major ports was 11.81 million tons. The two ports of Saigon and Hai Phong together accounted for 82% of the cargo handled at all seven major ports, with Saigon handling 6.44 million tons and Hai Phong 3.25 million tons.

Berth no.1 at Cai Lan Port was completed in June 1995 and has been in operation since then. The volume of cargo handled at Cai Lan in 1995 was about 700,000 tons.

Problems in the port sector included insufficient investment in port as well as silting of routes and obsolescence of port facilities and cargo-handling equipment. These tendencies were particularly pronounced in the northern Viet Nam region. The scale of port facilities serving southern Viet Nam, centered on Ho Chi Minh City, was more than 3,000 meters when measured in total berth length and the volume of cargo handled reached 9 million tons[2]. The major part of these facilities in southern Viet Nam consists of container berths and general cargo berths, which were much bigger than northern Viet Nam in terms of the infrastructure functions of distribution ports and commercial ports[3]. It was necessary to expand the port infrastructure in northern Viet Nam as one means of achieving balanced development in Viet Nam and rectifying the disparity between north and south. At the time of appraisal Hai Phong Port was the only international port in northern Viet Nam and an urgent improvement project was conducted with the support of JICA's yen loan. In order to respond to the needs of population in the hinterland of northern Viet Nam of about 26 million people, however, port capacities were definitely in shortage.

1.2 Project Outline

The objective of this project is to improve the basic maritime transport infrastructure in northern Viet Nam by expanding the Cai Lan Port in Bai Chay Bay, in the city of Ha Long, Quang Ninh Province, thereby contributing to the promotion of socio-economic activity in northern Viet Nam.

Loan Approved Amount/ Disbursed Amount	10,273 million yen/9,335 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1996/March 1996
Terms and Conditions	Interest Rate: 2.3% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General untied aid (General untied aid for consultants as well)
Borrower/Executing Agency(ies)	Government of the Socialist Republic of Viet Nam/Viet Nam Maritime Administration

[1] Ports in northern Viet Nam are Hai Phong, Quang Ninh, Nghe Tinh, Da Nang, Quy Nhon, Nha Tran. There is Sai Gon port in southern Viet Nam.

[2] Source: "Report on the Development Plan of Port Development in Southern Viet Nam " (1994)

[3] According to the appraisal document, the number of container berths was 8 in northern Viet Nam (Cargo handled : 4 million tons in 1992) and zero in southern Viet Nam (Cargo handled only at general cargo berth: 0.75 million tons)

Final Disbursement Date	July 2008
Main Contractors	Civil engineering: Penta-Ocean Construction Co., Ltd. (Japan) Supply of facilities: Kanematsu Corp. (Japan)
Main Consultants	Nippon Koei Co., Ltd. (Japan), Netherlands Engineering Consultants (Netherlands), Port and Waterway Engineering Consultants (Viet Nam) (JV)
Feasibility Studies, etc. (if any)	JICA conducted the following feasibility study: Cai Lan Port Expansion Project Feasibility Study (February 1995, Overseas Coastal Area Development Institute of Japan/Nippon Koei)
Related Projects (if any)	National Highway No. 18 Improvement Project (I) (II), Bai Chay Bridge Construction Project and others

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: December 2010 – November 2011

Duration of the Field Study: March 5 - 22, July 10 - 30, 2011

2.3 Constraints during the Evaluation Study

Information obtained from the O&M agency related to finance is limited and it was difficult to conduct detailed analysis of finance.

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

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance with the Development Plan of Viet Nam

At the time of the appraisal, the Five-Year Socio-Economic Development Plan (1996 - 2000) mentioned the importance of improvements to and augmentation of the transportation infrastructure including development of port facilities, and the Vietnamese government's planned amount of investment in the transport sector was approximately US$Four billion, corresponding to one-quarter of total planned public investment plan (1996 - 2000).

At the time of the Ex-Post Evaluation, it was confirmed that, according to the Five-Year Socio-Economic Development Plan (2006 - 2010), 27.5% of the national budget was invested in the transport and telecommunications sector over the five-year period 2000 - 2005. This plan included an objective for the transport sector of "to be able to handle domestic freight and passenger transportation demand" and, regarding the maritime transport sector in particular, it calls for promotion of investment in the sector and expansion of international maritime transport services.

[4] A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory
[5] ③: High; ②: Fair; ①: Low

"The Master Plan on Development of Viet Nam's Seaport System Through 2020, With Orientations Toward 2030" announced in December 2009 describes development objectives including "development of a comprehensive system of ports while putting Viet Nam's strengths to maximum use, in cooperation with neighboring countries that have advanced maritime transport sectors, with the goal of effecting the industrialization and modernization of the nation."

As part of the above objective, the plan also mentions that "importance will be placed on development of deep-see ports (such as this port) in all regions." Within the six groups of ports across Viet Nam, Cai Lan Port belongs to Group 1 (the northern Viet Nam group) and is one of the important ports in that group.

Thus, the transport sector, including ports, remained important in national development plans both at the time of the appraisal and at the time of the Ex-Post Evaluation. As mentioned in the above master plan as well, at present Viet Nam places importance on development of deep-see ports such as Cai Lan Port, and in this sense as well the importance of this project remains unabated.

3.1.2 Relevance with the Development Needs of Viet Nam

Despite a forecast of 8.1 million tons in port cargo handled in the northern region by the year 2000[6], under current conditions Hai Phong Port would have had the capacity to handle only about 6.2 million tons in the year 2000, even taking the urgent improvement project into consideration. For this reason, it was necessary to secure quickly a supplemental port to handle the projected excess of cargo over capacity in the year 2000. Although cargo handled in Hai Phong Port has increased by expanding container berths[7], Cai Lan Port's supplementary role to Hai Phong Port is significant currently[8].

Since the project's execution, for the most part the volume of cargo handled at Cai Lan Port has grown steadily (see "Effectiveness" below), so that it has been confirmed on an ex-post-facto basis as well that there was a high level of development needs.

3.1.3 Relevance with Japan's ODA Policy

According to data at the time of the appraisal, since resumption of ODA project lending to Viet Nam in fiscal 1993, JICA had been providing aid centered on infrastructure improvements, and JICA's country program for Viet Nam identified the transport sector as one of the most important aid fields, together with the electric power sector.

In Japan's ODA Annual Report 1997 of the Ministry of Foreign Affairs of Japan, part "6. Country ODA Policies for Main Countries" identifies the transport field as a key field in Viet Nam. Thus, at the time of appraisal, Viet Nam's transport sector was seen to be important in Japan's ODA policy, and this project has a high degree of relevance with Japan's ODA policy.

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[6] JICA feasibility study (F/S) on Hai Phong Port

[7] A look at the volume of freight handled in port at Hai Phong Port since the time of appraisal shows that, as forecast, the volume reached 8.6 million tons in 2001. Since Hai Phong Port too has advanced the expansion of container berths, the volume of freight handled at that port had reached 27 million tons as of 2008.

[8] About 80% of cargo arriving at Cai Lan Port is reloaded into smaller ships and transported to Hai Phong Port. (As Hai Phong Port is not a deep-see port, large vessels cannot enter.)

In light of the above, this project has been highly relevant with Viet Nam's development plan and development needs as well as Japan's ODA policy, therefore, its relevance is high.

3.2. Efficiency (Rating: ②)

3.2.1. Project Outputs

(1) Content of Construction, Procurement of Machinery, etc.

While minor changes have been made in route dredging and quay construction, there have been no major changes in other areas. Overall, changes in scope have had no particular negative effects on project objectives.

In route dredging, since the maximum size of vessels using the port was modified from the figure of 50,000 DWT anticipated during the feasibility study to 40,000 DWT in the detailed design (D/D)[9], the depth of dredging of routes and of the turning circle decreased. However, in contrast, the dredging of berths in front of quays was standardized at a deeper depth because of the improved construction technologies[10]. In quay construction, each of the three new berths is capable of handling larger vessels[11]. There were no major changes in procurement of cargo-handling machinery, procurement of tugboats and tenders, or other infrastructure improvements. Details are shown in the Table 1.

[9] DWT stands for dead weight tonnage, the maximum weight of freight (including the vessel's own fuel and other supplies) that can be loaded on a vessel. The berth development at Cai Lan port was assumed to be conducted in two phases and the 1st phase (this project) was only for three berths. It was judged that it was more economical to limit the route depth, assuming the maximum scale of vessels at 40,000DWT based on expected frequency of arrival of vessels. Accordingly, the route depth was decided at 10m. It is planned to increase the maximum scale of vessels to be received up to 50,000DWT and to conduct further dredging in order to make the route depth deeper in 2nd phase.

[10] About 2 years passed since appraisal to D/D.

[11] Original plan was that 2 berths' depth was 12 m corresponding to 30,000DWT vessels and 1 berth depth 13m corresponding to 40,000DWT vessels. But now all the 3 berths are 13m deep and can receive 40,000DWT vessels.

Table 1: Comparison of Scope (Original vs. Actual)

Item	Original	Actual	Reasons for Changes
1. Route Dredging			
Routes	11.0 m depth X 130 m width X 9 km total dredging length	10.0 m depth X 130 m width X 2 km total dredging length	・ Route depth decreased because the anticipated maximum size of vessels using the port was reduced. ・ Total dredging length was shortened because there were concerns about the impact of this project on the environment of Ha Long Bay prior to implementing the project. The remaining portions were dredged by Viet Nam side later, as a separate project.
Turning circle	13.0 m depth X 300 m diameter (2 circles)	11.0 m depth X 350 m diameter (1 circle)	Depth decreased because the anticipated maximum size of vessels using the port was reduced.
Berths in front of quays (three berths)	・ 12.0 m depth X 40 m width X 240 m total dredging length (B-2, B-3) ・ 13.0 m depth X 50 m width X 260 m total dredging length (B-4) (Water depth at time of appraisal: 7 - 8.4 m)	・ 13.0 m depth X 50 m width X 220 m total dredging length (B-5)* ・ 13.0 m depth X 50 m width X 200 m total dredging length (B-6) ・ 13.0 m depth X 50 m width X 200 m total dredging length (B-7) *Note: Berth numbers have been changed from original plans.	・ The depth of the three berths in front of the quays was standardized at 13 m because design changes made it possible to accommodate even larger vessels (40,000 DWT) in all three berths. ・ The total dredging length of the berths in front of the quays was shortened because the three berths were laid out in a straight line instead of having berths B-6 and B-7 project out into the bay as originally planned, as a result of design changes to the berths' shapes.
Volume of earth and sand dredged	8.49 million cubic meters	Approx. 2.61 million cubic meters	Due to shortening of total dredging length, the volume of earth and sand decreased.
Method of disposal of earth and sand dredged	・ Dumping: 5.6 million cubic meters (planned for dumping in waters near Cai Lan Port) ・ Use in land reclamation: 2.4 million cubic meters	The earth and sand were dumped in the sea in two locations away from Cai Lan Bay. (One location is about 30 km to the south, while the other is located about 20 km to the southeast of the port.)	Waters near Cai Lan Bay were chosen as dumping locations based on recommendations in the environmental impact report study conducted for the project, out of consideration for effects on the environment. To ensure there would be no impact on Ha Long Bay, earth and soil later dredged by Viet Nam government itself were dumped at a point approximately 47 km off the coast, with the permission of the relevant authorities.
2. Quay Construction			
New berths			
B-5	Public berth: 30,000 DWT	Public berth: 40,000 DWT	Because design changes made it possible to accommodate even larger vessels (40,000 DWT) in every berth.
B-6	Public berth: 30,000 DWT	Public berth: 40,000 DWT	
B-7	Public berth: 40,000 DWT	Public berth: 40,000 DWT	No change from plans
3. Procurement of cargo-handling machinery	Cranes, forklifts, various lifters, etc.	Cranes, forklifts, various lifters, etc.(Changes to details of cargo-handling machinery)	・ Berth shapes changed from original plans. ・ A number of machinery units were replaced with state-of-the-art models.
4. Procurement of tugboats and tenders	Three vessels in total	Three vessels in total	No change from plans
5. Other infrastructure improvements			
Roads inside port	18,612 m	Almost same	
Warehouses, container freight services, water- and power-supply facilities, office buildings/administration buildings (including machinery, materials, etc.)	1 set	1 set	In power-supply facilities, number of substations increased from one to two, corresponding to the actual demand.

Processing facilities for wastes such as ballast water discharge, waste oil, and solid wastes from vessels using the port	1 set (1 installed on land, 1 installed on sea)	1 set (2 installed on land, 1 special-purpose vessel to transport wastes from vessels calling on the port)	To enable overall cost savings

While equipment items such as cargo-handling machinery are being put to effective use, a typhoon in November 2006 caused two large cranes to overturn, resulting in serious damage. For budgetary reasons, these were replaced with used cranes of the same type. (This is not replacement of an entire set but assembling of separate parts.)As a result, crane processing capacity has decreased. The capacity would have been bigger, if the original cranes had been in use.

The layout of Cai Lan Port is shown in Figure 1.

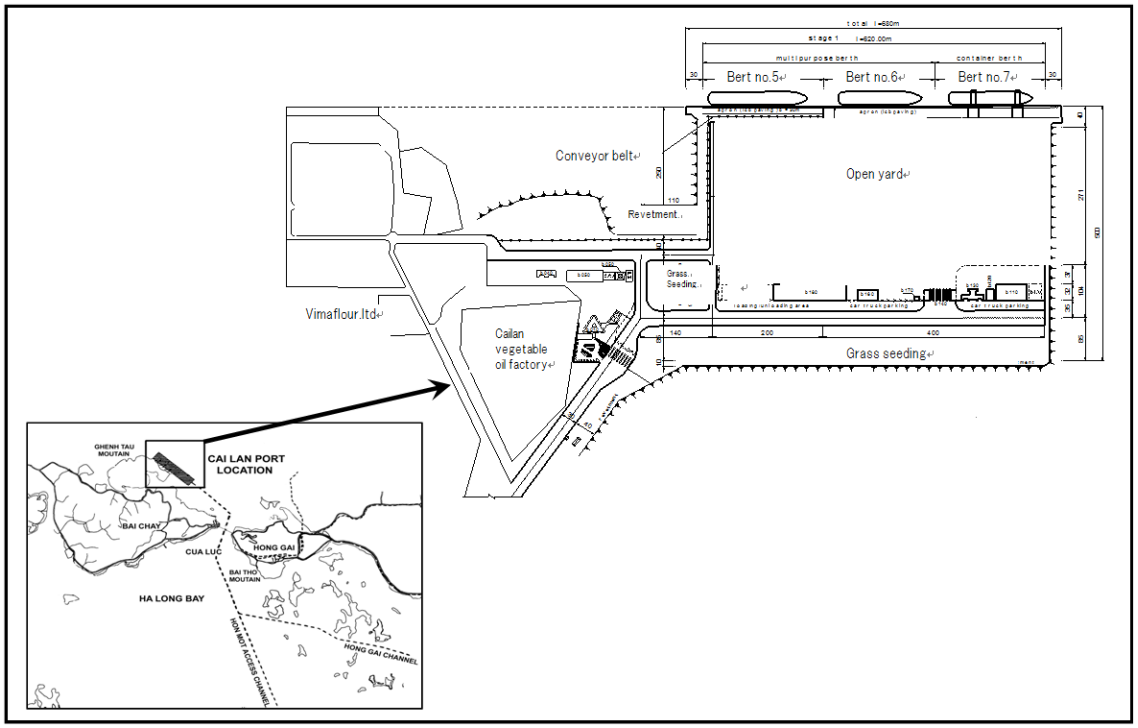


Figure 1: Layout of Cai Lan Port (Portions Covered in this Project)

2) Consultants

Activities planned originally were a review of the feasibility study, detailed design, assistance in bidding, and construction management and environmental studies (i.e., review of EIA[12], simulation of water quality after port construction, study of dredging methods (and disposal methods for dredged earth and sand), and detailed design of waste- and wastewater-processing facilities in the port). Results

[12] EIA stands for environmental impact assessment

show no particular changes in the content of activities anticipated.

Overall, the implementing agency evaluated contractors' and consultants' ways of working and senses of responsibility. However, as one point for improvement, there were problems in process control in connection with port civil-engineering construction. Frankly, the main contractor was not necessarily able to monitor the construction progress of subcontractors, resulting in delays in the progress of construction.[13] Subcontractors were financially weak and there were delays in mobilization of personnel and other activities.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost was planned originally at 9,227 million yen in foreign currency and 286,700 million Vietnamese dong (2,867 million yen*) in local currency, for a total of 12,094 million yen. Of this, plans called for arranging 10,273 million yen in yen loans and the balance of 1,821 million yen from the Vietnamese government budget.

* Exchange rate: 1 Vietnamese dong = 0.01 yen

The actual project cost was 6,342 million yen in foreign currency and 499,868 million Vietnamese dong (3,774 million yen*) in local currency, for a total of 10,116 million yen. Of this, 9,335 million yen was arranged in yen loans and the balance of 781 million yen came from the Vietnamese government budget.

* Exchange rate: 1 Vietnamese dong = 0.00755 yen

In Japanese yen terms, the actual project cost was 83.6% of the planned cost. Thus the cost was lower than planned (Sub-rating: ③).

This resulted from the fact that tough competition among the 11 companies that tendered bids on the construction led to decreased costs (the bid amount was about 20% less than planned) and the fact that the exchange rate of the Vietnamese dong against the Japanese yen decreased by about 30%, even though expenditures did increase mainly due to extension of the construction period.

When adjusting for the portion of route dredging included in the original plans that was eliminated from the project, the overall cost decreases to 10,575 million yen. Using this amount as the revised planned figure, recalculation of the comparison between actual and planned costs results in a ratio of 95.7% (with no change in the sub-rating).

3.2.2.2 Project Period

For this project, the period from the signing of the Loan Agreement (L/A) (March 1996) until the

[13] According to JICA documents, the consultants made a similar point. One cause may be the fact that construction was carried out in a multi-tiered structure, including subcontractors and further sub-subcontractors.

completion of the civil-engineering construction (August 2000) was planned to be four years and six months. Actually, while the L/A was signed as planned in March 1996, the civil-engineering construction was completed in June 2004. That is, the project period planned to last four years and six months in fact lasted eight years and four months, significantly longer than planned, at 185.2% of the planned period (Sub-rating: ①).

The main reasons for the lengthening of the project period were a longer time spent on "P/Q,[14] bidding, and contracts" (18 months or 64% longer than originally planned) and a longer time spent on construction, particularly berth construction and dredging work in front of berths (12 months or 38% longer than originally planned).

In the case of the former, "a longer time spent on pre-qualification, bidding, and contracts," the reason was that a diverse range of proposals was made by bidding firms concerning construction methods, requiring a very long time to consider them. In the case of the latter, a longer time spent on "berth construction and dredging work in front of berths," the reasons included the time consuming procedures for approval of a change in berth construction methods (from excavation to blasting), additional construction, and inadequate process control by contractors. While the extended construction period was a main cause of cost increases in terms of construction costs and consultant MM, the overall project cost was lower than originally planned.

3.2.2.3 Consulting Services

The plan and results of consultants' MM are as follows.

Table 2: Consultant MM

Item	Plan	Results	Reasons for Changes
Phase 1 (feasibility study review and detailed design)			
- Foreign experts	123	123	
- Local consultants	52	52	
Phase 2 (bidding assistance and construction management)			
- Foreign experts	118	149.9	Phase 2 consultant MM increased due to an increase in supervisory activities in connection with extension of the construction period for package 1 (berth construction and dredging in front of berths) and an increase in supervisory activities for construction of the office building and administration building, which was added to the original scope of the project.
- Local consultants	73	181.4	

In light of the above, although the project cost was within the plan, the project period significantly exceeded the plan. Therefore, the efficiency of the project is fair.

[14] P/Q stands for pre-qualification.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

Table 3: Forecast and Actual Volumes of Freight Handled etc.

Unit: thousand tons

	1994 (Actual)	2000 (Forecast)*1	2000 (Actual)	2005 (Actual)	2006 (Actual)	2007 (Actual)	2008 (Actual)	2009 (Actual)	2010 (Actual)
Cai Lan Port freight volume	n.a.	1,978	1,533	3,185	3,499	2,805	2,903	4,736	5,853
(Container freight included in above figure*2)	n.a.	610	n.a.	119	133	34	33	185	204
Passengers (large tourist vessels arriving from overseas)	n.a.	n.a.	n.a.	n.a.	10,472	17,735	22,101	2,155	5,288
Number of vessels arriving	n.a.	n.a.	n.a.	322	481	493	509	421	428
Reference: Hai Phong Port freight volume	3,280	6,200	n.a.	15,147	18,015	22,632	27,067	n.a.	n.a.

Sources: Materials from the appraisal, the operation and maintenance company, Quang Ninh Port Limited Liability Company (LLC), and the Viet Nam Maritime Administration

*1 The originally planned date of completion of civil-engineering construction was August 2000. Actual civil-engineering construction was completed in June 2004.

*2 Actual figures on container freight volume are measured in units of thousand TEU, which differs from the unit of tons used in forecast values.

As seen in the table above, the volume of freight handled at Cai Lan Port is increasing steadily. While the actual figure for 2000 is lower than the forecast figure, the volume of freight in 2005 had reached the level of 3.185 million tons. Taking into consideration the fact that completion of the civil-engineering construction was delayed by about four years, the project can be said to have generated sufficient results. According to the operation and maintenance company, the decrease in freight handled in 2007 and 2008 was due to the fact that two cranes were overturned and badly damaged in a typhoon in November 2006, requiring two years for their replacement. The decrease in the number of passengers in 2009 appears to represent a decrease in tourists as a result of the global economic slowdown following the so-called Lehman Brothers shock.

Comparison of trends in the volume of freight handled at Cai Lan Port with those at other ports in Viet Nam shows that the port's rate of increase largely was the same as the national average over the years 2000 - 2008. However, comparison of the two periods of the years 2000 - 2004 prior to port expansion and the years 2004 - 2010 after expansion shows marked growth after expansion, with an annual average rate of growth in freight volume of 12.1% in the former period as opposed to a rate of 20.4% in the latter.

Among the originally anticipated indicators, those such as berth occupancy rates and average waiting time are not available because the operation and maintenance company does not collect or measure such data. However, from interviews with a number of firms using the port, it appears that "waiting time" is relatively short and users do not feel inconvenienced.

It is conceivable that the growth in freight handled at Cai Lan Port is an effect of improvements in

road conditions resulting from the National Highway No. 18 Improvement Project along with improvements in access roads from National Highway No. 18 to Cai Lan Port[15]. That is, movement of freight from within and outside Quang Ninh Province using National Highway No. 18 is increasing. The average annual rate of increase in traffic (annual average daily traffic) between Bieu Nghi and Bai Chay[16] on National Highway No. 18 over the years 2005 - 2010 is 24.7%, and even among firms located in the Thang Long Industrial Park in suburban Hanoi, about 130 km from the port, 14.3% use Cai Lan Port (according to the results of the Ex-Post Evaluation of Japanese ODA Loan Aid Project conducted this fiscal year). In the vicinity of Cai Lan Port is the Cai Lan Industrial Park, which has an occupancy rate of 100 percent. Firms located in this industrial park use the port for import and export of materials and products.

Among the main products exported from Cai Lan Port in recent years, coal, lumber, and ore are products of the local Quang Ninh Province, exported to markets such as Japan and China. A Japan-affiliated firm producing wood chips for use in papermaking is located in the Cai Lan Industrial Park as well.

Among imported products, vegetable oil and livestock feed are undergoing marked growth. Vegetable oil is a raw material used in foodstuffs, and it is consumed in the Cai Lan Industrial Park. The growth of import of livestock feed is thought to be a response to the development of the livestock industry in Quang Ninh Province and northern Viet Nam. The annual rate of growth in number of livestock over the years 2000 - 2008 was 8.2% in Quang Ninh Province and 7.3% in northern Viet Nam.[17]

There are reasons to expect both positive and negative movements in the future when forecasting business performance at Cai Lan Port. A negative factor is the planned construction beginning in 2015 of a separate deep-sea port (Lach Huyen) in the vicinity of the existing Hai Phong Port[18]. There are concerns that over the long term large vessels that cannot enter Hai Phong port and use Cai Lan Port could shift to the new port. A positive factor is the plan for construction of a railway between Hanoi and Cai Lan, currently targeted for completion in 2014. It is anticipated that this would increase the volume of freight handled at Cai Lan Port. In addition to the above, in consideration of the fact that at present the volume of freight handled at Hai Phong Port is approaching the maximum limit[19] and the presence of logistics needs resulting from future expansion of industrial parks near Cai Lan Port, it is likely that the importance of Cai Lan Port will remain unshaken.[20] As a future strategy for the port, it

[15] The following paragraphs are written based on the information collected in other ex-post evaluation researches in transport sector in north Viet Nam conducted this year as well.
[16] Bai Chay is adjacent to Cai Lan Port.
[17] Source: General Statistics Office of Viet Nam
[18] Assistance by yen loan is expected.
[19] According to related parties, physically there is no room for future expansion in Hai Phong Port.
[20] In northern Viet Nam, the route connecting National Highway No. 5 to Hai Phong Port and the route connecting National Highway No. 18 to Cai Lan Port are in competition with each other as the two major logistics routes. Comparison of the routes in terms of traffic volume and volume of freight handled shows that the former is far and away the larger of the two. The following information shows a possible further advantage for Cai Lan Port. Viet Nam currently has set up truck weighing checkpoints in just two locations, including National Highway No. 18, on a pilot basis as an effort to prevent overloading. According to related parties on the Viet Nam side, including the operation and maintenance company, this is an important factor encouraging use of National Highway No. 5 and Hai Phong Port in comparison with National Highway No. 18 and Cai Lan Port. According to the Ministry of Transport, plans call for installation of 41 checkpoints nationwide, and at present the

is thought that it would be desirable to increase the port's independence through decreasing somewhat the relative importance of its functioning as a supplemental port to the existing Hai Phong Port, with an eye toward the opening of Lach Huyen Port a few years from now.[21]

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

Financial Internal Rate of Return (FIRR)

Table 4: Comparison of FIRR between Plan and Actual

	At appraisal (Plan)	Actual at Ex-post evaluation (Re-calculation)
FIRR	4.11%	7.81%
(Grounds)		
Project life	36years	Same as left
Cost	Construction cost, O&M expense and renewal investment	
Benefit	Revenue from port services	

Table 4 compares FIRR before and after the project. Financial profitability is higher than at appraisal, as smooth increase of cargo handled exceeds initially expected benefit in spite of project cost which is higher than plan. (based on Vietnamese dong)

Economic Internal Rate of Return (EIRR)

Table 5: Comparison of EIRR between Plan and Actual

	At appraisal (Plan)	Actual at Ex-post evaluation (Re-calculation)
EIRR	19.10%	25.04%
(Grounds)		
Project life	31years	Same as left
Cost	Construction cost, O&M expense and renewal investment	
Benefit	Additional value added by Cai Lan port	

Table 5 compares EIRR before and after the project. Economic profitability is higher than at appraisal, as smooth increase of cargo handled exceeds initially expected benefit in spite of project cost which is higher than plan. (based on Vietnamese dong)

ministry is in the middle of closely examining lessons learned from the pilot checkpoint on National Highway No. 18. In the future, similar checkpoints will be installed on National Highway No. 5 as well, and there is a possibility that flow of goods then could shift to National Highway No. 18 and Cai Lan Port.

[21] Measures needed for this purpose are touched on in the "Recommendations" section.

3.3.2 Qualitative Effects

As part of analysis of the process of realization of port functions, ten (10) companies (including freight shipping companies and maritime companies) using the port and having offices in the vicinity of the port were interviewed concerning whether there were any bottlenecks in use of the port.

To summarize the results, these firms were unanimous in identifying as a strength of the port its water depth. Other strengths identified were its affordable usage charges and the fact that the port is not crowded. However, multiple firms identified as weaknesses of the port its shortage of facilities for logistics operations after unloading cargo (i.e., warehouses and parking lots) and its insufficient facilities (functions) for use in loading and unloading of cargo.

When asked their overall evaluation of this project (five grades)[22], six of these interviewed firms said it was "good," three said it was "neither good nor bad," and one said it had "some problems."
In light of the above, this project has largely achieved its objectives, and its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

The anticipated impact of this project at the appraisal stage was "promotion of socio-economic activities in northern Viet Nam." On this point, the impact of the project on Quang Ninh Province, where it is thought that this project would have a significant direct impact for geographical reasons, was confirmed.

Objectives largely have been achieved for the main indicators to be achieved by 2010 in Quang Ninh Province's long-term socio-economic development plan, shown below.

Table 6: Main Indicators in Quang Ninh Province's Long-Term Socio-economic Development Plan

	2005 (Actual) *1	2006 - 2010 Annual average growth rate (Forecast) *1	2006 - 2010 Annual average growth rate (Actual) *2
Population growth rate (Annual average %)	1,070,000	1.00%	1.74%
Annual average regional GDP growth rate (Prices fixed at 1994 levels)	6,229 (VND 1 billion)	13%	12.13%

Sources:

*1 Quang Ninh Province Master Plan

*2 Quang Ninh Province Statistics Office

Also taking into consideration the other economic indicators and information shown below, this project is surmised to have made a certain contribution to the development of the northern economic zone of Viet Nam, centered on Quang Ninh Province. According to appraisal documents, four expected effect/impacts are mentioned as follows. 1.Efficient distribution of goods, 2. Effect of

[22] Five grades: "very good," "good," "neither good nor bad," "some problems," "many problems"

investment promotion, 3. Increase of employment opportunities, 4. Promotion of regional economic development. Item 1 is confirmed by the realization of both qualitative and quantitative effect. Item 4 is verified to a certain degree by the Table 7, for example. With regard to the remaining item 2 and 3, promotion of distribution by the expansion of the port is estimated to have contributed to the increase of investment and employment by logistics companies and manufacturers who use the port. Contribution to Cai Lan industrial park which is located closely to the port (only 1.5 km away) is evident[23].

Table 7: Other Main Economic Indicators in Quang Ninh Province

Indicator	2005	2006	2007	2008	2009	2010
Business sales (billion VND)	10,172	11,782	15,942	18,765	21,593	n.a.
Volume of freight transported (thousand tons)	9,034	9,976	13,238	14,346	15,984	n.a
Volume of freight handled at Cai Lan Port (thousand tons)	**3,185**	**3,499**	**2,805**	**2,903**	**4,736**	**5,853**
Agricultural production (tons)	1,782,150	1,720,870	2,616,525	3,382,815	3,444,379	n.a
Industrial production (billion VND)	23,451	29,118	39,393	53,623	64,818	n.a
Per-capita income (USD/month)	721.7	887.1	1043.5	1,134.9	1,158.4	1,293.9

Sources: Quang Ninh Province Statistics Office, project office (PMU)

This project's civil-engineering construction was completed in June 2004, and Quang Ninh Province's economic indicators show steady growth after that date. While a simple numerical comparison is not possible, the fact that the volume of freight handled at Cai Lan Port has grown to nearly one-third the volume of freight transported in Quang Ninh Province shows the importance of the port.

As a contribution of the port to industrial production, as mentioned above products of the local Quang Ninh Province such as coal, lumber, and ore are among the main products exported from Cai Lan Port to markets such as Japan and China. Cai Lan Port contributes to the promotion of industrial parks in Quang Ninh Province in the areas of purchasing (raw-material procurement), distribution, and sales, and a Japan-affiliated firm producing wood chips for use in papermaking is located inside the nearby Cai Lan Industrial Park.

Results of a survey concerning the impact of this project on recipients (residents) are described below.

The total number of resident respondents was 110 people, sampled from the vicinity of the port in a manner intended to avoid concentration on specific locations as much as possible. Respondents consisted of roughly even numbers of males and females, and their main occupations were company employees, business people (e.g., store managers), and public employees. Nearly 60% of respondents

[23] According to the developer of Cai Lan industrial park, the major reason of enterprises' investment in Cai Lan industrial park is its location near the port. The lots for enterprises (Phase 1) were sold out in 2010 and about 5 thousand people are employed in the park.

went to the port at least twice a month (for work reasons, strolling, or other reasons). 35 respondents said that they worked at the port.

Specific responses concerning the impact of this project are listed below.

(1) Employment opportunities — Have new employment opportunities become available or has business grown since this project? Yes (40.9%); No (59.1%)

(2) Changes in income — Has household income increased since this project? Yes (50.0%)[24]; No (50.0%)

(3) Impact on business land or houses — Has the project had any impacts such as forcing you to sell land or relocating your residence? Yes[25](2.7%); No (97.3%)

(4) Environmental changes since the project (only main items excerpted below, with percentages of respondents giving each answer):

Item	Worsened	No change	Improved
Air*	39.1	60.9	0
Noise*	33.6	66.4	0
Water quality	7.3	91.8	0.9

* Due to noise or exhaust from trucks and trailers entering and exiting the port

(5) Overall evaluation of project benefits:

Item	Percentage of Respondents (%)
Excellent	11.8
Good	58.2
Fair	30.0
Poor	0
Very poor	0

Although economic impact is confirmed in the above questionnaire survey, this is due to the fact that respondents live near the port and the impact does not necessarily mean the similar impact in the entire province. While some local residents were conscious of negative effects on the environment, these were not severe in degree.

3.4.2 Other Impacts

(1) Impacts on the natural environment

Ecosystems: At the time of the appraisal, it was confirmed that there was a mangrove forest important to preservation of ecosystems on the project site, and it was necessary to give consideration

[24] Specific examples of increased income include increased sales at stores, bars, and restaurants near the port due to an increased number of workers at the port, increased sales for shipping companies, and new employment at the port (such as port workers and security guards).

[25] While this 2.7% (three persons) had to sell their land, they are generally satisfied with the level of compensation.

to making it possible to protect the mangrove forest as much as possible. While the mangrove forest was cut where unavoidable, a mangrove reforestation project was conducted by the Quang Ninh Department of Natural Resources and Environment (QN DONRE), planting new mangroves in multiple adjoining areas.

Dredging the route and other places was conducted under the supervison of Quang Ninh Department of Nature Resource and Environment. The operation and maintenance company of the port conducts environment monitoring in the vicinity of the port every six months.[26] According to its report[27] for December 2010, the project has cleared government standards in all areas, including air, noise, water quality, and drainage. To prevent illegal dumping in the sea by voyaging vessels, in cooperation with the VMA, navy and environmental police carry out activities including patrolling, monitoring, and penalizing all acts that could bring about sea pollution.

Furthermore, no particular problems regarding the natural environment were identified. The external evaluator visited the site several times but did not feel any inconvenience. When asked about the environment impact of the project in the survey of recipients (residents), more than 60% of the respondents said that the situation of environment had not changed after the project.

Scenery: Ha Long Bay is a valuable scenic spot that was named a UNESCO World Heritage Site in December 1994. In construction at Cai Lan Port, it was necessary to pay attention to the impact on scenery. While originally there were concerns about negative impacts on the activities of tourist craft and on the scenery due to increased cargo-vessel traffic, since completion of the project traffic has been roughly 2 - 3 vessels per day[28], presenting no particular problems.

(2) Land Acquisition and Resettlement

Originally, this project was not expected to result in any resettlement. In the end, it did have the following impacts on residents and existing facilities and the compensation based on the Vietnamese law[29] was paid as follows.

- Since 12 households needed to be moved, they were paid compensation.
- Two temples were asked to relocate, and they were compensated for the costs of moving and rebuilding.
- One berth owned by an oil company was relocated, and the cost of its relocation was paid to the company.

The amounts of compensation totaled about 700 million dong to the 12 households and two

[26] Pursuant to Viet Nam's Law On Environmental Protection. The purpose is to implement necessary measures, if any pollution was identified by environment monitoring.
[27] Title is "Report on periodical environmental monitoring".
[28] Prior to this project, the number of cargo vessels landing was 2 - 3 per month.
[29] Decree 22/ND-CP dated April 24, 1998, on Compensation policy for affected people, bodies when their land is used by Government for public purposes.

temples and about 6,100 million dong for the cost of berth relocation.

(3) Other Positive/Negative Impacts

Since the ferries that could be obstacles to passage of large vessels in maritime transportation on the Cua Luc Straits ceased operation in March 2007 with completion of the Bai Chay Bridge, one anticipated concern has been swept away.

In the survey of recipients (residents) conducted during the Ex-Post Evaluation, in addition to the already stated economic effects, a number of respondents identified improvements to scenery and positive tourism effects (increased numbers of tourists) as well.[30]

As described above, generally the anticipated impact has been realized. According to the beneficiary survey, interviews and the evaluator's own observation, no particular negative impacts are apparent.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

Management and operation of the port following completion of the facilities is conducted by Quang Ninh Port LLC, a subordinate organization of the VMA. The VMA owns the port facilities at Cai Lan Port, and Quang Ninh Port pays leasing fees to the VMA as the port facility operator[31], while at the same time collecting fees from the businesses it conducts, such as freight loading and unloading, arrangement of freight in the port, storage of freight (on and off port premises), transfer and transport of freight, and buying and selling of petroleum. Quang Ninh Port has 1,036 employees.

The organization of Quang Ninh Port LLC is divided into three main bureaus: the Operation, Economics, and Technique bureaus. In operation and maintenance of the port facilities at Cai Lan Port, the Infrastructure and Environment Dept., part of the Technique Bureau, plans and monitors maintenance for the facilities as a whole. The Technique Dept., also part of the Technique Bureau, handles repairs to vehicles and equipment. Berths (1, 5, 6, 7) are operated individually by three subsidiaries of Quang Ninh Port LLC, under the supervision of the head of the Operation Bureau.[32] According to Quang Ninh Port LLC, in general it has a sufficient number of employees employed in maintenance and management, and the structure is a stable one with a high employee retention rate.

3.5.2 Technical Aspects of Operation and Maintenance

The state of operation and maintenance conducted by Quang Ninh Port LLC of the main facilities and equipment is outlined below.

1) Subject facilities and equipment: various cranes, trucks, bulldozers, forklifts, etc.

[30] In this survey there is a possibility that some answers include the impact of the neighboring Bai Chay Bridge, which actually is a separate project.
[31] Both parties have concluded a 25-year lease agreement.
[32] The total number of employees of the three companies is 570 persons.

2) Specific operation and maintenance tasks: Tasks common to all facilities and equipment include replacement of lubricants, checking the functions of individual components and replacing components that have problems, filter cleaning and replacement, and checking cooling systems (e.g., checking whether sufficient cooling water is maintained).

3) Frequency of tasks: Some tasks are conducted upon completion of loading and unloading for a single vessel, while others are conducted periodically. (Details depend on the type of equipment.)

4) Use of manuals: Manuals issued by product manufacturers and Cai Lan Port's own manuals are used.

5) Securing spare parts: While in some cases it is difficult to procure parts for gantry cranes, there are no problems for other equipment.

Employees in the Infrastructure and Environment Dept., which handles planning and monitoring of maintenance for facilities as a whole, possess appropriate skills and knowledge. However, the skill level of employees still cannot be described as flawless concerning repairs to facilities and vehicles, since state-of-the-art models are used. For this reason, about four employees involved in site operations and repairs are sent to the Port of Ho Chi Minh City for roughly three months of on-the-job training per year. A manual prepared by a consultant to this project is used in port operations.

Interviews with port users in the recipient survey identified the following issues concerning the port's cargo-handling equipment and operation by workers. The problems below need to be resolved in order to grow Cai Lan Port's business in the future under conditions of competition with other ports.

- It still takes longer to process a container than at Hai Phong Port (problems in skills and efficiency for group work).
- The capacity of the equipment used in handling general freight is insufficient and work takes too long (problems with equipment).
- The quality of the container terminal management system (CTMS[33]) is poor, so that it cannot adequately handle tasks such as identification of the current locations of freight to be handled (problems with facilities).

3.5.3 Financial Aspects of Operation and Maintenance

Financial situation of operation and maintenance company, Quang Ninh Port LLC is shown below. Financial situation has been improving over time and is in the desirable condition.

[33] While the CTMS is a standardized system, detailed specifications vary by port.

Table 8: Financial situation of Cai Lan Port (Berth 5, 6 and 7)

Unit: Million VND

Year	Total revenue	Profit and loss*
2010	150,013.12	1,784.80
2009	121,008.98	1,210.13
2008	77,612.56	-3,996.23
2007	57,724.49	-3,542.85
2006	63,427.88	678.89
2005	48,738.78	n.a.

*Note: + means profit and – means loss.

3.5.4 Current Status of Operation and Maintenance

According to the operation and maintenance company, overall the state of facilities and equipment is good. Actually the evaluator confirmed that main equipment is functioning at the time of site visit. However, some facilities have what appear to be water leaks (in the water-supply facilities) and fine cracks (in the roads in front of berths). These will need to be repaired in the future.

Also, to secure a certain level of water depth, continual dredging is underway in the port, conducted by Quang Ninh Port LLC in front of the berths and by the VMA in routes.

In light of the above, some minor technical problems have been observed in terms of operation and maintenance, and therefore sustainability of the project's effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project has the objective of improving basic maritime transport infrastructure in northern Viet Nam through expanding Cai Lan Port. Since it is in alignment with the development plans and development needs of Viet Nam and is in agreement with Japan's ODA policy, it has a high degree of relevance. The volume of freight handled at this port grew steadily and the project is having an impact of contributing to the regional economy through increasing supply of materials to industrial parks and export of Vietnamese products.

However, since the project period was lengthened, the project is evaluated to have a somewhat insufficient level of efficiency. There also are some technical issues that need improvement in the areas of operation and maintenance.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Based on comprehensive consideration of the port's strengths and weaknesses and external opportunities and threats, as touched on under section 3.3 (Effectiveness) of this report, considering the opening of a new deep-sea port planned to open a few years from now in particular to be the greatest threat, it is thought that the port should aim to raise the level of port services overall, so that at the time the new port opens Cai Lan Port will have a more independent role instead of just serving in a

role supplemental to Hai Phong Port. For this reason, the following relatively less costly measures are recommended over the short term and the measures below involving greater capital expenditure are recommended over the long term.

Short-term recommendations:

In interviews with logistics companies and other related parties, matters such as unsatisfactory container processing efficiency and inadequate CTMS performance were identified as this port's weaknesses. To respond to these problems, measures such as training of port employees and improvements to the CTMS are proposed. In implementing such measures, it also is important to identify the detailed needs of multiple clients.

Medium and long-term recommendations:

Enhancement of facilities through the following measures is recommended to improve port services.

- Strengthening crane capacity (The operation and maintenance company already has plans to strengthen crane facilities by 2015. Steady implementation of those plans would be desirable.)
- Development of facilities for logistics operations after unloading freight (i.e., warehouses and parking lots).

4.2.2 Recommendations to JICA

No particular recommendations

4.3 Lessons Learned

Nothing in particular to report

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
(1) Project Outputs		
1. Route dredging		
Routes	11.0 m depth X 130 m width X 9 km total dredging length	10.0 m depth X 130 m width X 2 km total dredging length
Turning circle	13.0 m depth X 300 m diameter	11.0 m depth X 350 m diameter
Berths in front of quays (three berths)	・ 12.0 m depth X 40 m width X 240 m total dredging length (B-2) ・ 12.0 m depth X 40 m width X 240 m total dredging length (B-3) ・ 13.0 m depth X 50 m width X 260 m total dredging length (B-4) (Water depth at time of appraisal: 7 - 8.4 m)	・ 13.0 m depth X 50 m width X 220 m total dredging length (B-5)* ・ 13.0 m depth X 50 m width X 200 m total dredging length (B-6) ・ 13.0 m depth X 50 m width X 200 m total dredging length (B-7) *Note: Berth numbers have been changed from original plans. B-2, B-3, and B-4 are now used as the numbers of berths planned for construction in the future on currently unoccupied land.
Volume of earth and sand dredged	8.49 million cubic meters	2.61 million cubic meters
Method of disposal of earth and sand dredged	・ Dumping: 5.6 million cubic meters (planned for dumping in waters near Cai Lan Port) ・ Use in land reclamation: 2.4 million cubic meters	The earth and sand were dumped in the sea in two locations away from Cai Lan Bay. (One location is located about 30 km to the south, while the other is located about 20 km to the southeast of the port.)
2. Quay construction		
New berths		
B-5	Public berth: 30,000 DWT	Public berth: 40,000 DWT
B-6	Public berth: 30,000 DWT	Public berth: 40,000 DWT
B-7	Public berth: 40,000 DWT	As planned
3. Procurement of cargo-handling machinery	Cranes, forklifts, various lifters, etc.	Cranes, forklifts, various lifters, etc. (changes to details)
4. Procurement of tugboats and tenders	Three vessels in total	As planned
5. Other infrastructure improvements		
Roads inside port	18,612 m	Almost same
Buildings	Warehouses, container freight services	As planned
Construction of water- and power-supply facilities (including machinery, materials, etc.)	1 set	1 set
Office building/administration and management building (including machinery, materials, etc.)	1 set	1 set
Processing facilities for wastes such as ballast water discharge, waste oil, and solid wastes from vessels using the port	1 set (1 installed on land, 1 installed on sea)	1 set (2 installed on land, 1 special-purpose vessel to transport wastes from vessels calling on the port)
(2) Project Period	March 1996 - August 2000 (54 months)	March 1996 - June 2004 (100 months)
(3) Project Cost Foreign currency Local currency Total Japanese ODA loan portion Exchange rate	 9,227 million yen 2,867 million yen (Local currency: 286,700 million Vietnamese dong) 12,094 million yen 10,273 million yen 1 Vietnamese dong = 0.01 yen (At time of appraisal)	 6,342 million yen 3,774 million yen (Local currency: 499,868 million Vietnamese dong) 10,116 million yen 9,335 million yen 1 Vietnamese dong = 0.00755 yen (Average between January 1998 and December 2008)

Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project
Bai Chay Bridge Construction Project

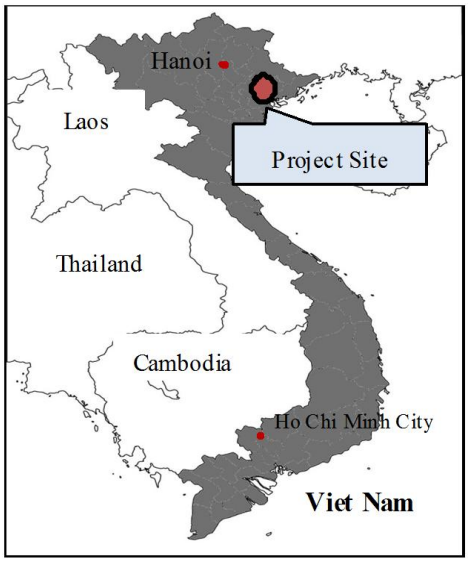
External Evaluator: Ryujiro Sasao, IC Net Limited

0. Summary

The objective of this project is to promote smooth distribution of goods along the National Highway No. 18 by constructing a new bridge together with an approach road across the Cua Luc Strait in Ha Long City of Quang Ninh Province, which is in line with Viet Nam's development plan and development needs as well as Japan's ODA policy. Therefore, the relevance of the project is high. The volume of traffic on the bridge and approach road has steadily been increasing, benefiting the local residents in various ways. A positive impact on the local economy has also been appearing.

Although the efficiency of the project is slightly low due to the prolonged project period, there appears no material problem in terms of operational status, management system, etc. The effectiveness of the project is expected to be maintained from this point onward.

1. Project Description



Project Location

Bai Chay Bridge

1.1 Background

The triangle linking Hanoi, Hai Phong and Ha Long (Quang Ninh Province) is positioned by the Vietnamese government as a key area of the northern region for development. The National Highway No. 18, an arterial road in northern Viet Nam with a total length of about 320 km

which runs from the capital city, Hanoi (Noi Bai Airport), goes across the northern part of Red River Delta, and reaches Bac Lung on the Sino-Viet Nam border by way of Ha Long City in Quang Ninh Province, is a vital transport route for the triangle. The region along the National Highway No. 18 includes Red River Delta, which is the major rice production area in Viet Nam, neighborhood of Noi Bai Airport where there was a plan of the construction of industrial parks and also tourism industries centered on Cai Lan port under construction (at appraisal in 2001) and Halon bay. Hence it was very important to improve the National Highway No. 18 in the industrial development of northern region.

Although the National Highway No. 18 plays the critical role in realizing the development plan of northern region, the road condition was poor. The road surface was damaged, bridges were aging and some sections were river or bay and had to be passed by ferry, which makes smooth traffic very difficult. Considering the above situation, the government of Japan provided the National Highway No. 18 Improvement Project with 11,863 million yen in the fiscal year 1997 and 11,586 million yen in 1999, based on the request of Vietnamese government.

This project is to construct a new bridge across the Cua Luc Strait at the entrance of Bai Chay bay located near the middle of the National Highway No. 18.

1.2 Project Outline

The objective of this project is to promote smooth distribution of goods along the National Highway No. 18 by constructing a new bridge together with an approach road across the Cua Luc Strait in Ha Long City of Quang Ninh Province, thereby contributing to the development of the Northern Economic Region as well as safe passage of large vessels in the Cua Luc Strait.

Loan Approved Amount / Disbursed Amount[1]	6,804 million yen / 6,710 million yen
Exchange of Notes Date / Loan Agreement Signing Date	June 2001 / July 2001
Terms and Conditions	Interest Rate: 0.95% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: Tied (Special yen loan project[2])
Borrower / Executing Agency	Government of the Socialist Republic of Viet Nam / Ministry of Transport of Viet Nam
Final Disbursement Date	May 2008
Main Contractor	Sumitomo Mitsui Construction Co., Ltd. (Japan) and Shimizu Corporation (Japan) (JV)
Main Consultant	None (Consultants were hired through "National Highway No. 18 Improvement Project (II)".)
Feasibility Studies, etc.	Feasibility studies were conducted by Trafalgar House Corporate (July 1995).
Related Projects	(Technical cooperation) "National Transport Development Strategy Study in the Socialist Republic of Viet Nam" (JICA, July 2000) and "The Study on Environmental Management for Ha Long Bay" (JICA, 1999) (Yen loan) "National Highway No. 18 Improvement Project (I) (II)" and "Cai Lan Port Expansion Project"

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: December 2010-November 2011

Duration of the Field Study: March 5-22, 2011 and July 10-30, 2011

2.3 Constraints during the Evaluation Study

None

[1] The funds of 2 yen loans are used for the construction of bridge and roads in the project. They are "Bai Chay Bridge Construction Project (VNIX-1)" and the part of "National Highway No. 18 Improvement Project (I) (II) (VNV-6, VNVII-6)". The amount shown here is only that of "Bai Chay Bridge Construction Project (VNIX-1)". The bridge portion of the project was funded by "Bai Chay Bridge Construction Project (VNIX-1)" and approach roads and consulting service were funded by "National Highway No. 18 Improvement Project (I) (II) (VNV-6, VNVII-6)".

[2] Special Yen Loan (SYL) was applied for this project. SYL was originally introduced by the government of Japan in 1998. It is a scheme to support Asian countries for the purpose of quick recovery from Asia Currency Crisis and to provide funds to establish infrastructure in the fields of efficient distribution of goods, strengthening production basis, large scale disaster control and so on. Under this scheme generous loan condition of interest and repayment period is applied. In addition, the contractor is limited to Japanese corporations and procurement of products and services is limited to Japanese (share of other countries' should be less than 50% of the entire loan amount), by which rule expansion of the Japanese corporations' participation is also encouraged.

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

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance with the Development Plan of Viet Nam

At the time of the appraisal, the road development plan of the Vietnamese government attached a great importance to establishment of road networks (including improvement of regional roads) factoring into increasing future transport demand, while a top priority was put on maintenance and repair of existing roads. The amount scheduled to be invested into the transport sector stood at around Four billion dollars, or accounted for 25% of total public investment plan of Viet Nam (1996-2000). Of this amount, about 2.5 billion dollars were earmarked for the road sector, indicating that roads absorbed the lion's share of the development investment the government made in the transport sector.

As of the ex-post evaluation, the Five-Year Socio-Economic Development Plan (2006-2010) has confirmed that 27.5% of the national budget was invested in the transport and telecommunications sectors during the five years from 2000 through 2005. The Plan has set "to meet the goods and passenger transportation demand in the country" as a goal for the transport sector. The goal for the road sector in particular is specified as "to complete communication axes on the North-South lines, by connecting important economic areas, focus on the development of roads in mountainous regions, the Central Highland and the Mekong Delta."

Making a part of the National Highway No. 18, Bai Chay Bridge is closely linked with the importance of the route. The National Transport Development Strategy Study in the Socialist Republic of Viet Nam (2000), which was developed into a transport sector strategy and approved by the government in 2004 as the "Strategy of Transport Development in Viet Nam to 2020," focused on the improvement of the National Highway No. 18 as one of the most important projects aiming at the improvement of primary highways.

As described above, the development of road networks was a task of utmost importance not only for the national development plan at the time of the appraisal, but has remained so also for that at the time of the ex-post evaluation. The importance of this bridge, a part of a major highway, has been maintained as well.

3.1.2 Relevance with the Development Needs of Viet Nam

This project was aimed at the construction of a new bridge across the Cua Luc Strait located near the middle of the National Highway No. 18. At the time of appraisal, there was no bridge over the strait and transport was done by ferry. However, ferry transport had reached nearly maximum capacity backed by growing traffic volume in recent years, thus disturbing smooth distribution of goods along the National Highway No. 18. Meanwhile, the expansion of Cai Lan Port of Bai Chay Bay was expected to increase the number of large vessels shipping across the

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[4] ③: High, ② Fair, ① Low

Cua Luc Strait and the traffic risk of crossing shipping routes of large vessels and ferries became an impending safety issue to tackle. Because of these reasons, it was critical to construct a bridge over the strait and an approach road to it (including access roads).

In fact, the trend of traffic volume on the bridge after the completion of the project shows that the volume surged more rapidly than previously estimated, and gives an ex-post verification of the existence of the development needs. In addition, the importance of the National Highway No. 18 extending to the Sino-Viet Nam border seems to have further been strengthened on the back of the recent sharp rise in trade with China. Had it not been for the bridge, the road would not have reached the border without being interrupted by the strait. It can be said that the bridge is in great need in this sense as well.

3.1.3 Relevance with Japan's ODA Policy

JICA has offered support to Viet Nam centering on infrastructure development, since it resumed project loans to the country in fiscal 1993. JICA's country assistance program has placed a greatest importance on the transport sector as a target field along with the electricity sector.

"Japan's ODA Annual Report (1997)," published by the Economic Cooperation Bureau of the Ministry of Foreign Affairs of Japan positioned Viet Nam's transport sector as one of key fields for assistance in its chapter, "6. ODA Policy by Major Country," mentioning that "Japan will develop infrastructure in the country that facilitates inward foreign investments for export-oriented economic growth (cooperation in the electricity sector to cope with future increase in demand, cooperation in the transport sector tailored to characteristics of each transportation mode)."

These indicate that Japan's ODA policy focused on Viet Nam's transport sector at the time of the appraisal. Therefore, this project has been highly relevant to Japan's ODA policy.

As examined so far, this project has been highly relevant with Viet Nam's development plan, development needs, as well as Japan's ODA policy. Thus its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

(1) Construction works

Major parts of the bridge have been constructed within the planned scope of works. Both length and width of the approach road have slightly been revised from the initial plan, details of which are described below. As a whole, changes in the scope have had no detrimental impact on the objective of the project.

Table 1: Comparison of Scopes (Plan and Results)

Item	Initial plan	Actual results	Major changes and reasons
1.Main bridge			
Length	903 m	903 m	Unchanged
Traffic lane	4 lanes (2 lanes each way)	4 lanes (2 lanes each way)	Unchanged
Width	25.3 m	25.3 m	Unchanged
Height limit for navigation	50 m	50 m	Unchanged
Type	PC cable-stayed bridge	PC cable-stayed bridge	Unchanged
2.Approach bridge			
Length	99 m	99 m	Unchanged
Traffic lane	4 lanes (2 lanes each way)	4 lanes (2 lanes each way)	Unchanged
Width	23 m	23 m	Unchanged
Type	PC box-girder bridge	PC box-girder bridge	Unchanged
3.Approach road			
Length	Bai Chay side: 3,292 km (including 4 bridges) Hong Gai side: 4,594 km (including 3 bridges)	Bai Chay side: 4,318 km (including 4 bridges) Hong Gai side: 4,700 km (including 3 bridges)	Adjustment was made through D/D taking the actual land form into consideration. The approach road on the Bai Chay side was particularly lengthened because of the addition of a 600m road linking Bai Chay and Cai Lan Port, etc.
Traffic lane	Bridge and approach road: 4 lanes (2 lanes each way), access roads: 2 lanes (1 lane each way)	Bridge and approach road: 4 lanes (2 lanes each way), access roads: 2 lanes (1 lane each way)	Unchanged
Width	29 m (9 m in case of access roads)	23.3 m (bridge, 23.3 m; approach road, 23 m; there are 2 access roads on each of Bai Chay and Hong Gai sides, of which one is 5.5 m wide with 2 lanes each way, and the other is 3m wide with 1 lane each way)	The width was revised to be in line with the width of the National Highway No. 18 (24 m). Access roads have got narrowed due presumably to less traffic volume on those roads estimated at the time of D/D than initially projected.

The key feature of the bridge is that as Ha Long Bay is one of the most scenic areas in Viet Nam and designated as UNESCO's World Heritage site, it has employed a single plane cable

system and single column towers so that it blends in the surrounding scenery[5]. In addition, groundwork for the bridge has not been placed in the Cua Luc Strait to reduce burdens on the surrounding environment. The map of the project site is shown in the f 1

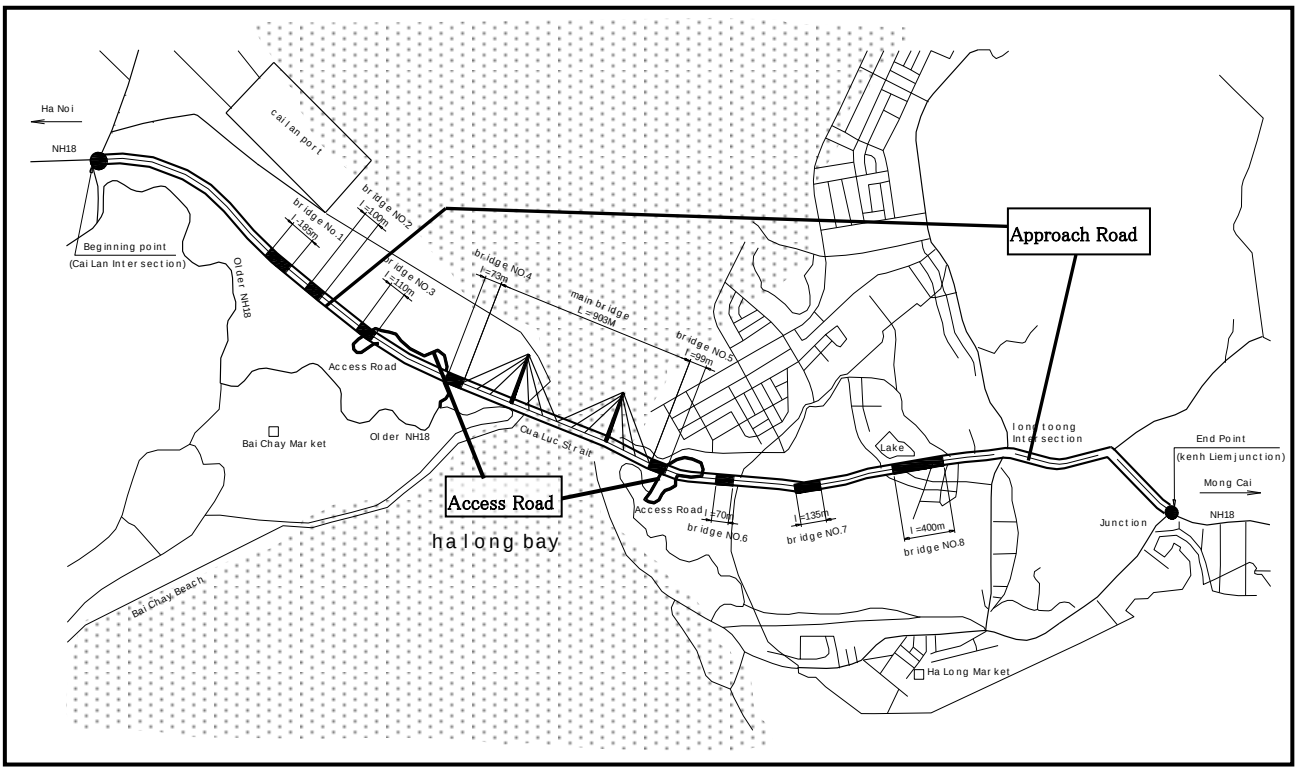


Figure 1: Location of Bai Chay bridge

At the time of the appraisal, systems to monitor maintenance and management of the bridge as well as traffic volume were planned to be introduced with budget allocated for that purpose. However, due to the difference in rules on the procurement of these systems applied to JICA and those to Viet Nam[6], introduction has significantly been delayed up to the present date[7]. (As a result, a portion of scope of yen loan project was cancelled.)

The bridge under this project was designed to withstand wind speed of 50 m/s. In fact, when a gust of wind with intensity scale of 12[8] or more occurred twice and blew down large cranes in

[5] The distance between two columns of the bridge of 435m is the longest in the world as a PC cable-stayed bridge adopting a single plane cable system (as of 2006).

[6] In JICA's rule contractors are allowed to procure the system at their own discretion but the rule of Vietnamese government required to conduct separate competitive bidding for the procurement of the system.

[7] In order to confirm the safety in the course of construction, the bridge had been equipped with a monitoring system consisting of 2,500 m of optical fiber, which the contractors had developed and installed to measure vertical inclinations of major towers and girders. Even after the construction was completed, the system continued to be utilized by courtesy of the contractors to monitor bridge conditions for a while. The delay in introducing above-mentioned systems is considered due partly to functioning of this optical fiber monitoring system for a certain timeframe.

[8] Scale 12 means wind speed of 32.7-36.9 m/s, 'a strong destructive wind' under Viet Nam's standards. According to the contractors, the aerovane installed in the bridge actually recorded the maximum speed of 48.1 m/s.

Cai Lan Port in November 2006, the bridge itself was not damaged at all.

(2) Consulting service

Expected tasks of consultants are detailed design review, bid and contract assistance and construction management (including environmental measures). These were conducted as planned. Technical guidance was also planned in and outside Viet Nam and it was also conducted.

The executing agency has assessed highly performance of the contractors (including quality of facilities) and quality of consulting services across the board. In particular, Japanese contractors and consultants have highly been praised. Favorable performance of the contractors is due partly to the fact that, even though it was a special yen loan project, the number of bidders, i.e., five, was not smaller than that for usual cases and there was good competition.

According to the executing agency's responses to questionnaire on the special yen loan, prime contractors smoothly transferred technologies[9] to local contractors, which have been utilized in other construction works. It is also reported that engineers who have acquired the technologies were promoted within their respective companies.

3.2.2 Project Inputs

3.2.2.1 Project Cost

This project consisted of three major components: the main bridge, the approach roads and consulting service. (Of these, construction of the main bridge was covered by yen loan for the project, while that of the approach roads and consulting service was financed by yen loan for another project, "National Highway No. 18 Improvement Project (I) (II).") The project cost mentioned below means the total amount spent for the three components.

The project cost was initially estimated at 18,003 million yen, i.e. the total of 10,384 million yen and 973,052 million Vietnamese dong (or 7,619 million yen*).

*Exchange rate: 1 Vietnamese dong = 0.00783 yen

The actual project cost stood at 11,954 million yen, i.e. the total of 7,294 million yen and 610,747 million Vietnamese dong (or 4,660 million yen*).

*Exchange rate: 1 Vietnamese dong = 0.00763 yen

The following table shows the plan and results of the project cost.

[9] To be more precise, these include "caisson pile method," "pneumatic caisson engineering," "cantilever system for cable-stayed bridge construction," etc.

Project cost	Plan	Results
Amount paid in foreign currency	10,384 million yen	7,294 million yen
Amount paid in local currency	7,619 million yen (Local currency: 973,052 million VND)	4,660 million yen (Local currency: 610,747 million VND)
Total	18,003 million yen	11,954 million yen
Japanese ODA loan portion	13,241 million yen	9,298 million yen
Exchange rate	1 VND = 0.00783 yen (As of February 2001)	1 VND = 0.00763 yen (Weighted average rate)

In terms of yen, the actual project cost was 66.4% of the initial estimate, lower than planned. (Sub-rating: ③)

Here are the reasons behind this:

- Thanks to public tender bid, contract price for approach road construction[10] remained low at about 50% of the projected amount[11].
- Due to lower construction cost for the approach road, related management cost and tax spending decreased significantly.
- Some payment to the contractors has yet to be done[12].
- Interest payment during the construction period is not included in the above-mentioned project cost (actual results)[13].
- Of the initially planned cost, those set for maintenance and management system and traffic volume monitoring system have not actually been spent.

"Planned cost set for maintenance and management system and traffic volume monitoring system have not actually been spent" mentioned above was a change in the construction scope. When this portion is subtracted from the initial cost estimate, the ratio of actual cost to planned cost is recalculated at 66.7%, but the sub-rating remains unchanged.

[10] Accounting for about 50% of the total construction cost under this project, this was done under a different package from that for the bridge and financed by another yen loan (National Highway No. 18 Improvement Project).

[11] Although the portion of bridge was funded by special yen loan, 5 companies participated in P/Q, which is not smaller than that for usual public projects in Viet Nam (4 companies participated in bidding). According to the implementing agency, bidding prices were not particularly expensive as compared with other ordinary cases, too. An audit on procurement procedure was conducted by an auditing firm, KPMG, which found that there was no special problem.

[12] It was reported that about 70 billion VND (about 530 million JPY at actual exchange rate) is not paid yet. This is due to the fact that the payment amount was not fixed by the deadline of yen loan disbursement and eventually necessary funds were decided to be managed by Vietnamese side. However, even if the unpaid portion had fully been paid, the ratio of the actual cost to the planned cost mentioned in the text would not exceed 100%.

[13] The executing agency did not disclose the amount.

3.2.2.2 Project Period

This project was scheduled to take five years and five months from execution of L/A (loan agreement) in June 2001 to completion of civil works in October 2006. In fact, L/A was executed in July 2001, while civil works were completed in March 2008. This indicates that the actual project period lasted 81 months compared with the initial projection of 65 months; it was 24.6% longer than planned. (Sub-rating:②)

The prolonged project period was due primarily to delay in constructing the approach road, not the main bridge. The approach road was to be built by cutting into gently undulating hills. The slope angle of the road turned out to be too steep and by the time nearly half of construction works had been done, several landslides occurred at both sides of the bridge. This has led to redesign of the road to revise the slope flat along with acquisition of additional land required for the new design.

It is reported that: about 14 months, a half of the period initially planned, had passed when the above-described problem arose; then around 15 months was required for redesign of the road and land acquisition, which was not initially factored into; and it took another 16 months to complete the construction work.

3.2.2.3 Consulting Service

Table 2 compares plan and actual results of consultants involved in the project in terms of MM. The increase in MM in actual results was due to larger volume of construction management tasks caused by the prolonged project period described in "3.2.2.2 Project Period" above.

Table 2: Comparison of Consultants' MM between plan and the results

Post	Tasks	Plan	Results
Japanese experts	Detailed design review	9	21.17
	Bid and contract assistance	12	
	Construction management (including environmental measures)	197	209.76
	Total	218	230.93
Vietnamese experts	Detailed design review	13	33.96
	Bid and contract assistance	11	
	Construction management (including environmental measures)	651	881.75
	Total	675	915.71
Local supporting staff	Detailed design review	21	67
	Bid and contract assistance	40	
	Construction management (including environmental measures)	490	479.87
	Total	551	546.87

Accordingly, although the project cost was within the plan, the project period was exceeded. Therefore the efficiency of the project is fair.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

Table 3: Trend of Traffic Volume on Bai Chay Bridge

Indicator	2006	2007	2008	2009	2010
Traffic volume target (PCU/day) *1	11,195	n.a.	n.a.	n.a.	21,512
Traffic volume results (PCU/day) *2	(Opened in December, 2006)	16,770	17,011	22,764	21,723
Traffic volume results (cars/day) *3	(Opened in December, 2006)	10,940	10,368	13,515	12,918

*1: From materials for the appraisal.

*2: Response from the executing agency to questionnaire.

*3: Response from the executing agency to questionnaire.

The table above shows a steady increase in traffic volume after the bridge was built[14]. Although the work was actually completed about one and half years behind schedule, traffic volume results (PCU/day) in 2010 were more or less in line with the target (PCU/day) for 2010 set at the time of the appraisal.

Monetary effects of shortened transport time as a result of this project were not recomputed (because data was not available from the operation and maintenance company). However, according to the study on beneficiaries, around 70% of residents in the neighborhood, who use the bridge, responded that transport time was shortened by 20 minutes or more, indicating that a situation more or less in line with the pre-project estimate, i.e. "the project will enable transport time to be shortened by 25 minutes," has been realized.

Table shows a drop in traffic volume in 2010. According to reports from the operation and maintenance company, this appears due to improvement works carried out at two locations along the National Highway No. 18 since 2008[15].

Previously, a limited number of special ferries carrying containers and heavy trucks were in service only in the evening. The new bridge has enabled such containers and heavy trucks to be transported at any time, which is believed to be bringing another enormous benefit.

[14] The bridge was opened to traffic on December 2, 2006.

[15] To be more precise, construction works were implemented between Mong Duong and Mong Cai from 2008 through 2010, and also between Cuaong and Mong Duong from 2009 through 2010. Both construction sites are located on the Hong Gai side of Bai Chay Bridge. Traffic volume from these areas to Bai Chay Bridge is considered to have decreased because of closure of the road for the work.

3.3.1.2 Results of Calculations of Internal Rates of Return (IRR)[16]

Economic Internal Rate of Return (EIRR)

Table 4: Comparison of Pre- and Post-Project EIRR

	At the time of appraisal	At the time of ex-post evaluation (recalculated)*
EIRR	16.73%	11.67%
(Calculation basis)		
Project life	25 years	25 years
Cost	Construction cost, operation and maintenance cost	Construction cost, operation and maintenance cost
Benefit	Increasing benefits in terms of time and travel, decreasing ferry operation cost, increasing benefits for commercial ships	Increasing benefits in terms of time and travel, decreasing ferry operation cost (increasing benefits for commercial ships is not included*)

* Since appraisal materials did not provide detailed description on computing process of benefits for commercial ships, they are not included in the calculation.

The economic rate of return is slightly lower than that at the time of appraisal. However, as noted above, this appears due to the fact that some benefits factored into the calculation at the time of appraisal are excluded from that at the time of ex-post evaluation.

3.3.2 Qualitative Effects

Results of the study on beneficiaries (residents living near of Bai Chay Bridge and the approach road) are described below and clearly indicate that the project has promoted smooth distribution of goods.

Resident respondents (total 110) consist of almost equal numbers of males and females. They are mainly office clerks, business operators (store managers, etc.), and civil servants. 46 of them, or more than 40% of the total, use the bridge every day.

Some responses have identified direct benefits from the project such as follows:

- Smooth transport as a result of the project has enabled goods to be delivered to areas further away than previously, or from areas further away than previously (the former, more than 80% of the total respondents, while the latter, more than 90%). Thanks to the project, shipping volume of goods (agricultural product, processed product, craftwork, etc.) has increased (91 respondents, or more than 80% of the total)[17].
- Transport time has been shortened compared with that of ferry transport before the project (100% of the respondents, of which 70%, or 81 respondents, said that transport time was

[16] Although tolls are charged on the bridge, several entities are in charge of management of the bridge. For this reason, calculation of FIRR (financial internal rate of return) has been omitted.

[17] It is estimated that influence of the road improvement of National Highway 18 is also significant for this effect.

shortened by 20 minutes or more).

- Improvement of access has also been identified as follows:

Destination	Ratio of respondents identifying access improvement (%)
Markets/stores	61.8
Social services (schools, etc.)	65.5
Hospitals	82.7
Administrative institutions	76.4
NGO offices*	44.5
Other	37.3

* Associations of military veterans, women, the youth, etc.

As thus far seen, this project has largely achieved its objective. Therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

Impacts of the project that were expected during the appraisal are the development of an economic zone in the northern part of Viet Nam and the safety of large vessel routes in the Cua Luc passage. Here, we found impacts on Quang Ninh Province, which are considered to be largely affected by this project in terms of geography.

In the "Long-Term Socio-Economic Development Plan" of Quang Ninh Province, the target levels have generally been achieved in the major indices by 2010 shown below.

Table 5: Major Indices of the "Long-Term Socio-Economic Development Plan"

	2005 (Results) *1	2006-2010 Annual average growth (Estimate) *1	2006-2010 Annual average growth (Results) *2
Population growth (Annual average percentage)	1,070,000	1.00%	1.74%
Annual average regional GDP growth (Fixed value in 1994)	6,229 (1 billion VND)	13%	12.13%

Source:

*1. Department of Planning & Investment, Quang Ninh Province, "Master Plan for Socio-Economic Development of Quang Ninh Province up to 2010 and orientation to 2020"

*2. Statistics Office, Quang Ninh

Changes in other major economic indices concerning Quang Ninh Province are as follows.

Table 6: Other Major Economic Indices Concerning Quang Ninh Province

Indices	2005	2006	2007	2008	2009	2010
Business sales (1 billion VND)	10,172	11,782	15,942	18,765	21,593	n.a.
Freight transport volume (tons)	9,034,000	9,976,000	13,238,000	14,346,000	15,984,000	n.a.
Agricultural production volume (tons)	1,782,150	1,720,870	2,616,525	3,382,815	3,444,379	n.a.
Industrial production (1billion VND)	23,451	29,118	39,393	53,623	64,818	n.a.
Number of visitors (in the whole province)	2,485,000	3,110,000	3,600,200	4,514,541	4,800,800	5,417,000
Number of visitors (in the Ha Long Bay district)	1,472,000	1,489,820	1,790,289	2,622,130	2,352,934	2,800,000
Income per capita (US dollars/month)	721.7	887.1	1,043.5	1,134.9	1,158.4	1,293.9

Source: Statistics Office, Quang Ninh

Bai Chay Bridge opened on December 2, 2006. After its opening, economic indices of Quang Ninh Province grew significantly in 2007 and each index has continued to grow steadily. Various factors are considered to have led to the improvement of major economic indices. However, it is estimated that the project has made a certain contribution to the development of the economic zone in northern Viet Nam, together with the relevant upgrading of the National Highway No. 18, through the smoother transportation of goods. This is based on qualitative impacts found through the following interviews and beneficiary survey.

The following is the summary of qualitative impacts found through various types of interviews.

1) Increase in the means of transportation: At the time of the interim review in March 2007, two routes that go through the bridge were operated by a bus company under the provincial government. In addition, the third and the fourth bus routes were operated at the time of the ex-post evaluation.

2) Tourism: In the above-mentioned beneficiary survey, all respondents said that the design of the bridge matches the landscape of Ha Long Bay. The bridge received good reviews by tourists in the on-site interview with tourists and tour guide/interpreters[18]. As shown in Table 6, the number of tourists in Ha Long district, Quang Ninh Province is rapidly increasing after 2006.

   Previously, tourists only visited Ha Long Bay. After the completion of the Bai Chay Bridge, the number of tourists who go to Van Don Island near the Viet Nam-China border, located about an hour by car from the bridge, has been increasing. (Note: the upgrading of

[18] Bai Chay Bridge is extensively advertised in tourism brochures of Ha Long Bay.

the National Highway No. 18 is considered to have also contributed to this increase.) As seen in the above Table, the number of tourists in the entire Quang Ninh Province is also steadily increasing after 2006.

3) Industrial development: The bridge is considered to contribute to the promotion of industrial parks in Quang Ninh Province in purchase (raw procurement), distribution and sales. For example, the occupancy rate of the neighboring Cai Lan Industrial Park is 100%[19].

4) Health of local residents: The level of medical care in districts around Bai Chay is not always high. After the upgrading of the National Highway No. 18 and the construction of bridge, it became easy for doctors in Hanoi to access the districts. On the contrary, patients in the districts gained easy access to Hanoi (Note: According to the beneficiary survey, many people in the districts answered that access to hospitals has improved).

According to the beneficiary survey (on residents), the results concerning the impact of the project are as follows. These results of the beneficiary survey confirm the economic effect of the project.

On the whole, although the project is highly evaluated, many local residents are concerned about the increasing number of traffic accidents and some call for a corrective measure. When an interview with the local police was conducted in the secondary site visit, the situation of traffic accidents was as shown in the following Table 7 and the main causes of traffic accidents are vehicles running on an inappropriate lane, careless driving, pedestrians going through a red light, vehicles with excessive speeds and so on. The number of people who had traffic accidents around Bai Chay Bridge decreased from that in the previous year. However, this is still at a relatively high level compared to those in other areas. It is therefore preferable that some improvement measure is conducted in cooperation with relevant organizations.

Table 7: Status of Traffic Accidents around Bai Chay Bridge in Recent Years

Year	Total number of accidents	Number of deaths	Number of people injured
2007	7	2	8
2008	16	4	16
2009	15	12	19
2010	8	5	9

Source: Police station that administers Bai Chay Bridge

[19] According to the developper of Cai Lan industrial park, one of the strong motivation factors of companies to enter is the existence of Cai Lan port.

Detailed answers concerning the impact of the project by the residents (beneficiary survey, 110 replies)are as follows:

1) Employment opportunities: gained new employment opportunities or expanded business after the project[20]: Yes (39.1%); No (60.9%)

2) Change in income: Household income increased after the project: Yes (5%); No (35.5%); no answer (0%)[21]

3) Change in the number of traffic accidents: Increased (59.1%); Decreased (20.0%); Unclear (20.9%)

4) Impacts on business-owned land and houses: Affected (28.2%)[22]

5) Changes in the environment after bridge construction (only major categories abstracted, percentage of respondents)

Category	Worsened	Not changed	Improved
Air	73.6	18.2	8.2
Noise	80.9	10.9	8.2
Water quality	4.5	93.6	1.8

6) Comprehensive evaluation of the benefits of the project

Category	Percentage of respondents (%)
Excellent	60.9
Good	38.2
Neutral	0
Slightly negative	0
Very negative	0
No Answer	0.9

3.4.2 Other Impacts

Measures that had been originally assumed were comprehensively taken for matters of concern. It is therefore considered that there were no negative impacts.

[20] Examples are opening a shop (restaurant) near the bridge, starting transport business such as taxi, tourism related jobs and so on.
[21] Owing to the above gained new employment opportunities
[22] Most of these are the cases where they sold their private land to the government for the project.

1) Impacts on the natural environment

Ha Long Bay, in which the bridge is located, has a unique landscape with almost 2,000 large and small islands and oddly-shaped rocks. It was registered as a UNESCO World Heritage site in 1994. As the location of the project is in the buffer zone between the designated areas for the Ha Long Bay World Heritage site, implementation of the following environment conservation measures was called for as part of the project: 1) tree plantation along approach roads as a landscape measure; and 2) implementation of continuous monitoring concerning air pollution and noise during and after construction.

After the implementation of the project, at the time of the interim review, it was confirmed that the Environmental Impact Assessment (EIA) was conducted before implementing the project and environmental measures were taken under EIA based on the comments of UNESCO. The executing agency set up an environmental monitoring unit, took environment conservation measures based on EIA results and conducted monitoring during the construction period[23]. To compensate for the area of vegetation that was cut down for businesses, mangrove trees are planted in the area equivalent to or larger than deforested area in Cua Luc Bay. Trees are also being planted around the main bridge piers.

At the time of the ex-post evaluation, the implementation state of five categories of environment conservation measures[24] that were identified during the appraisal was confirmed and they were all implemented as planned.

According to interviews with the operation and maintenance company using a concise environment check list that was used in the past appraisal of this project, it was confirmed that there was no problem concerning air, noise and so on[25].

On the other hand, the beneficiary survey shows that many people said air pollution and noise became worse compared to the natural environment before and after construction. However, according to the overall survey results, it is fair to say that these environmental impacts are not so serious[26].

2) Land Acquisition and Resettlement

The number of households affected directly by the project was 478, and 162 households had to move their houses. Resettlement of residents completed before bidding in compliance with

[23] There is no adverse impact on the environment according to the "Environmental Management Final Report" (formulated by a consultant in 2006).

[24] Submission of project completion chart (plan) before construction, conducting vegetation, assistance to the implementation of EIA content, conducting environment monitoring and so on

[25] In 3 grade evaluation on the impact on environment (Big, Small and None), most of items were regarded as "None".

[26] There are following reasons. 1. The answer options on questionnaire were "worsened," "remained the same" and "improved," and the level of worsening was not clear. If there are any serious problems, respondents would usually write down problems in the "opinion" space for improvement on questionnaire. No opinions about air pollution and noise were written down. (About 20 respondents out of 110 wrote down some opinion). 2. The evaluators themselves did not feel that there was a problem when they actually conducted exploratory investigation around Bai Chay Bridge.

Vietnamese laws and the land was acquired without any problems. Residents who had to move was provided an average of 67.5 m^2 of land per house in the Yet Kieu district in Ha Long City (developed by Quang Ninh Province), which is located approximately 1.5 km north from the previous residences of most of relocatees[27]. A certain amount of compensation was paid to the remaining 316 households. All compensation details were accepted by the Quang Ninh Province People's Committee.

3) Other Positive/Negative Impacts

Among approximately 600 employees who were working in the company at that time, about 220 left in a few years and about 100 moved to An Sinh Company that currently collects toll fares. Other 280 are employed by Quang Ninh Bridge & Ferry Management Company.

As mentioned above, in general, there were realized impacts that were assumed at the time of appraisal such as the development of the Northern Economic Region as well as safe passage of large vessels in the Cua Luc Strait.

In 2011, a comprehensive analysis was conducted on the roles that the five yen loan projects played in improving distribution systems and reducing poverty in the northern region of Viet Nam. The five projects include three out of the six projects subject to the Fiscal Year (FY) 2010 Package of Ex-Post Evaluation IV-1 (Viet Nam) such as the "Cai Lan Port Expansion Project," "Bai Chay Bridge Construction Project" and "National Highway No. 18 Improvement Project (I) (II)" and the "National Highway No. 10 Improvement Project (I) (II)" and the "Binh Bridge Construction Project" for which ex-post evaluations were conducted in FY 2009.

The results of the analysis are summarized as follows.

- To understand the current distribution situation throughout Viet Nam, the changes in two indicators, i.e., the volume of passenger traffic and that of freight traffic, from 2000 to 2008 in all the regions were researched. In both indicators, the growth of northern Viet Nam was the highest. The above mentioned five projects cover eight out of the 12 provinces in the northern region. The shares of the eight provinces in the northern region are 87.3% of land passenger traffic and 89.5% of land freight traffic[28]. Therefore, it is estimated that five evaluation projects have contributed to the growth of passenger traffic and freight traffic in the northern region to a certain extent. As for the aid amount, JICA's contribution is the largest of all the donors in Viet Nam's transport sector[29].
- In particular, with regard to the "Cai Lan Port Expansion Project," "Bai Chay Bridge

[27] Their residences were near the 8th bridge on Hong Gai side of the project road (approach road).
[28] Not all the traffic is through the roads constructed with Japan's loan assistance.
[29] The share of JICA in the total invest amount of all the ODA projects (including the funds provided by the Vietnamese government) conducted from 1993 to 2011 is 36%. Those of the Asian Development Bank and the World Bank are 14% and 11%, respectively.

Construction Project" and "National Highway No. 18 Improvement Project (I) (II)" which are strongly related to one another because of close locations, a certain synergy effect was confirmed quantitatively.

- The annual growth rate of the entire Viet Nam industrial outputs from 2000 to 2008 is 16.4%. The annual growth rate of northern Viet Nam is 19.9% which exceeds the national average. One of the likely background factors for the high growth rate is the increase in foreign direct investment since the late 1990s. Businesses that chose to invest in northern Viet Nam regarded transport improvements as a factor of paramount importance in their decision. Most of the major industrial parks are actually located along the National Highways No. 18, 10, and 5, all of which JICA provided assistance for improvement. In addition, the agriculture sector has enjoyed the benefit of expanded distribution coverage and reduced damage to agricultural products by the reduction of transport time owing to the improvement of roads.
- The poverty ratio in Viet Nam as a whole has been declining steadily since the late 1990s. The poverty ratio of the northern region, whose poverty ratio had already been lower than most of the country, decreased to a single digit level as of the year 2008. In the northern region, both industrial and agricultural production increased in the 2000s, led to the income increase of people engaged in these industries as well as general poverty reduction. In summary, the improvement in the roads and the port created smooth traffic of goods and people and contributed to the development of industries and poverty reduction in the region.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

At the time of appraisal, the Regional Road Management Unit (RRMU) under the Ministry of Transport was supposed to be in charge of operation, maintenance and management after the completion of the facility. The company that had previously been operating ferries was reorganized as Quang Ninh Bridge & Ferry Management Company. The government approved and decided to let the company[30] manage the facility under the Department of Transportation, Quang Ninh Province[31]. Now the same company still manages the facility.

Currently, the company has 282 employees. In addition to the management of Bai Chay Bridge, it manages three other facilities that provide ferry service and other several small-scale bridges. Total 70 staff members are engaged in the management of Bai Chay Bridge including

[30] There are two reasons why the bridge was not managed by RRMU as originally assumed: 1) Although it is best if local staff who know situations of the area are in charge taking into account the safety of the bridge, RRMU did not have an office at the site. 2) It was deemed that the Department of Transportation of Quang Ninh Province and Quang Ninh Bridge & Ferry Management Company have sufficient capacity to manage (Transfer of facility management authority to local companies is common nationwide).

[31] The owner of this company is the Quang Ninh Province People's Committee.

the following 35[32].

Table 8: Maintenance Oraganization of Bai Chay Bridge

Responsible staff	Facility	Major responsibilities of management
・ Department chief (1) ・ Professional staff (4) ・ Engineers and employees (30)	Bridge	(Main responsibility) – Daily patrol and check – Daily cleaning of bridge surface – Cleaning of bridge surface and parapets (monthly) – Check of box girder, cables, bridge piers and towers (weekly)[33] (Manuals used) – "Sector Standards of Road Maintenance" – "Bai Chay Bridge Maintenance Manual" (Obtaining spare parts) – Some parts are imported as they are unavailable in Viet Nam.
	Approach roads	(Main responsibility) – Daily patrol and check – Daily cleaning of road surface – Cleaning of road surface and guard rails (monthly) (Manuals used) – "Sector Standards of Road Maintenance" – "Bai Chay Bridge Maintenance Manual" (Obtaining spare parts) – No problem

3.5.2 Technical Aspects of Operation and Maintenance

There are no problems in the technical aspect of operation and maintenance.

The maintenance personnel are the department chief (top of department), who is an engineer and has 23-year working experience in the field, and the assistant chief of department, who possesses an engineering degree and has worked in the field for 11 years. These staff members have worked on other bridges and also received training from the contractor before the transfer of authority when the bridge was completed. As shown in Paragraph 3.5.1, maintenance manuals are available and utilized.

3.5.3 Financial Aspects of Operation and Maintenance

Budgets that are necessary for the maintenance of the bridge are requested to the central Department of Road Management of the Ministry of Transportation by Quang Ninh Bridge & Ferry Management Company through the Quang Ninh provincial government, and allocated by the Ministry of Finance to Quang Ninh Province from the government budget via the Ministry

[32] Other staff members belong to administration and traffic control departments.
[33] According to JICA Hanoi office, in October which is after the second site visit by the evaluator, the contractor of the project reported that the cable of the bridge seemed not to be cleaned properly (rusty parts were found).

of Transportation.

Recent situation of initial budgets of maintenance costs and final results are shown in the Table 9.

Table 9: Budgets and Results of Maintenance Costs

Unit: million VND

Fiscal year	Initial budgets	Results
2007	4,200	4,030
2008	7,113	7,052
2009	8,126	8,125
2010	9,900	9,900

According to the operation and maintenance company, the budget scales shown in the above table are basically enough for necessary personnel costs and purchasing spare parts.

A toll fare is collected at Bai Chay Bridge. The fare was collected previously by the operation and maintenance company but the service was separated from other maintenance services. Instead, it was carried out by another private company (An Sinh Company) from January 2010, which won a bid for a five-year contract with the government for the fare collection service.

The contract allows the winner to take all collected fares as its income if it pays a certain amount of money to the government[34]. Changes in income from the bridge toll are shown in the following table. Collection of fare in 2007 started around May 20.

Table 10: Changes in Income from the Bridge Toll

Unit: VND

Fiscal year	Total income
2007	23,147,833,000
2008	44,601,013,000
2009	45,911,295,000
2010*	65,052,056,000

*Note: The amount of traffic on the bridge in 2009 and 2010 is almost at the same level. According to the operation and maintenance company that had been collecting toll fare until 2009, there is a difference in incomes between these years because they actively issued weekly/monthly discount tickets (frequent users gain more discounts) but An Sinh Company preferred not to. However, details are unclear.

Therefore, collected fares are not used for the maintenance of the bridge. The profit ability

[34] 332 billion VND is paid to the government by An Sinh Company for the five-year contract. The amount is approximately five times that of the toll fare collected by the company in 2010.

status of main services by An Sinh Company is basically good[35].

3.5.4 Current Status of Operation and Maintenance

The state of the main bridge and approach roads is basically good except for the issue of landslides on the roadside slope of the approach roads mentioned below. Although there are minor problems such as asphalt coming off, this is not the state where repair is urgently needed. As for approach roads and bridges, an expansion joint of Bridge No. 4 was damaged but has already been repaired.

Imported spare parts are used for the bridge, although they are costly. There is no problem with approach roads on spare parts.

There was no serious problem on facilities when evaluators actually conducted site visit, either. However, traces of landslides were found in some areas on the roadside slope of approach roads to Bai Chay Bridge after construction[36].

According to the beneficiary survey, 95.5% of 110 residents answered that they were satisfied with the maintenance state of the bridge.

Therefore, no major problems have been observed in the system, technology and financial state concerning maintenance for the project and the sustainability of the effects emerged from the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project is to promote smooth distribution of goods along the National Highway No. 18 by constructing a new bridge together with an approach road across the Cua Luc Strait, which is in line with Viet Nam's development plan and development needs as well as Japan's ODA policy. Therefore, the relevance of the project is high. The volume of traffic on the bridge and approach road has steadily been increasing, benefiting the local residents in various ways. A positive impact on the local economy has also been appearing.

Although the efficiency of the project is slightly low due to the prolonged project period, there appears no material problem in terms of operational status, management system, etc. The effectiveness of the project is expected to be maintained from this point onward.
Therefore, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Countermeasures to traffic accidents

[35] Interview was conducted on recent financial situation but financial documents were not obtained.
[36] According to the site inspection conducted by Infrastructure Development Institute-Japan, it seems that landslide continues and the situation is getting serious.

On the whole, the beneficiary survey shows high reputations of the project. However, 60% of the respondents are aware of the increase of traffic accidents and some call for corrective measures. The local police department also thinks that there are not a few traffic accidents. It is preferable that people concerned conduct on-site inspections to discuss detailed improvement measures.

(2) Protection of slopes on approach roads

It was found that landslides occurred in some areas on the roadside slope of approach roads to Bai Chay Bridge after construction. And it seems the landslide still continues[37]. It is preferable that corrective works to strengthen the slope are conducted, preventive measures for landslides are taken and the state of slopes is carefully monitored. In addition, operation and maintenance of the bridge such as cleaning of cable should be conducted thoroughly.

(3) Full-scale introduction of bridge monitoring system

During construction, the contractor installed a 2,500m optical fiber to build a monitoring system that enables to measure gaps in main towers and girders in order to check safety. Although the system had been operated for a while after the completion of the bridge, it is no longer used, as this system was not installed in the project. Such system uses a cutting-edge technology and the technology was not used as a standard facility for similar-scale bridges that had previously been built. However, during the survey period, it was confirmed that the Ministry of Transportation of Viet Nam feels the need of such system and is considering introducing it in the future. It is expected that the maintenance of the bridge will be enhanced by introducing the system immediately.

Although it is not a problem concerning the project facility itself, payment to the contractor has not completed even though the construction has finished. It is preferable that debt will be paid off as soon as possible.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The ex-post evaluation results of the "National Highway No. 18 Improvement Project (I) (II)" and the "Cai Lan Port Expansion Project," which are associated with the bridge project, show that each project had realized expected effects and impacts. These three projects are included in the Master Plan that was developed with the support of JICA. As these projects were planned and implemented at around the same time, they contributed greatly to the improvement

[37] See footnote 36.

of transportation situation in northern part of Viet Nam. Synergistic effects between the three projects seemed high. This series of projects will be good models for creating and implementing future projects with a programmatic approach.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1) Project Outputs		
1. Main bridge		
Length	903 m	As planned
Lane	4 lanes (2 lanes on one side)	As planned
Total width	25.3 m	As planned
Limit of navigation height	50 m	As planned
Style	PC cable-stayed bridge	As planned
2. Approach bridge		
Length	99 m	As planned
Lane	4 lanes (2 lanes on one side)	As planned
Total width	23 m	As planned
Style	PC box-girder bridge	As planned
3. Approach road		
Length	Bai Chay side: 3,292 km (including 4 bridges) Hon Gay side: 4,594 km (including 3 bridges)	Bai Chay side: 4,318 km (including 4 bridges) Hon Gay side: 4,700 km (including 3 bridges)
Lane	Bridge and approach road: 4 lanes (2 lanes on one side) Access road: 2 lanes (1 lane on one side)	Bridge and approach road: 4 lanes (2 lanes on one side) Access road: 2 lanes (1 lane on one side)
Total width	29 m (Access road: 9 m)	23.3 m (Bridge: 23.3 m, approach road: 23 m, there are two access roads on each of both sides (Bai Chay, Hon Gay) and the widths of the two roads are 5.5 m (2 lanes on one side) and 3 m (one lane on one side)
2) Project Period	June 2001 - October 2006 (65 months)	July 2001 - March 2008 (81 months)
3) Project Cost Amount paid in foreign currency Amount paid in local currency Total Japanese ODA loan portion Exchange rate	 10,384 million yen 7,619 million yen (Local currency: 973,052 million VND) 18,003 million yen 13,241 million yen 1 VND = 0.00783 yen (As of February 2001)	 7,294 million yen 4,660 million yen (Local currency: 610,747million VND) 11,954 million yen 9,298 million yen 1 VND = 0.00763 yen (Weighted average rate)

Note: The funds of 2 yen loans are used for the project. They are "Bai Chay Bridge Construction Project (VNIX-1)" and the part of "National Highway No. 18 Improvement Project (I) (II) (VNV-6, VNVII-6)". The amount shown here is only that of "Bai Chay Bridge Construction Project (VNIX-1)".

Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project
National Highway No. 18 Improvement Project (I) (II)

External Evaluator: Atsushi Tokura, IC Net Limited

0. Summary

The objective of this project is to promote traffic safety and facilitate efficient logistics and distribution of goods by improving a part of National Highway No. 18, from Noi Bai near the international airport to Cua Ong in Quang Ninh Province (approximately 135 km), which had to be improved urgently. Relevance of the project is high, as the project objective is relevant with Vietnamese development policy and needs and Japan's ODA policy. After the improvement of the highway, traffic amount has increased and various benefits have been realized for the residents along the highway. Some positive impacts have already realized on social and economic development. The efficiency of the project is just fair, as the project period was longer than planned. It is expected that achievement of the project will be sustained, as the project has no problem in terms of organizational and technical aspects, although the project has an issue in terms of financial aspects besides road safety issues. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project location

National Highway No. 18

1.1 Background

The road sub-sector was very important in the transportation sector of Viet Nam at the appraisal time. The sub-sector accounted for 70% of all passenger and cargo transport in the country on a weight basis. However, the road network in Viet Nam was damaged by the war and

had not been well maintained due to budget constraints, so that the deterioration of the road network became serious. In the northern part of Viet Nam, most highways were constructed before 1954 and very few roads had been built since then. In the 1990s, deterioration of the road network became more serious, as transport volume had significantly increased due to economic growth.

National Highway No. 18 is approximately 319 km arterial road, crossing the northern region from Noi Bai near the international airport, via Ha Long Bay and the coastal area, to Bac Luan town, which is close to the border with China. The highway is a road for the Hanoi-Hai Phong-Ha Long triangle zone, where the Government has promoted economic growth intensively. Several industrial zones have been developed near Noi Bai international airport and Cai Lan port in Ha Long area, which is the only deep-water port in the northern region, was expanded by Japanese yen loan in 2006. The highway No. 18, along with the highways No. 5 and 10 that were also improved by Japanese yen loan, is an important road to promote the socio-economic development in the northern region. It was necessary to rehabilitate and widen the road, because deterioration of the road and aging of the road surface became serious. In addition, the construction of new bridge was necessary, as cars and passengers had to use a ferry boat to cross a river. Rehabilitation of the existing bridges was also necessary, as some bridges were deteriorated.

1.2 Project Outline

The objective of the project is to facilitate smooth logistics and distribution of goods through the promotion of traffic safety and efficiency, by improving the 133 km of National Highway No. 18, which is a major arterial road in the northern region of Viet Nam, thereby contributing to socio-economic development in the northern region of Viet Nam.

	Phase I	Phase II
Approved Amount / Disbursed Amount	11,863 million yen / 11,644 million yen	11,586 million yen / 9,741 million yen
Exchange of Notes Date / Loan Agreement Signing Date	March 1998 / March 1998	March 2000 / March 2000
Terms and Conditions	Interest Rate: 1.8% p.a. (Goods & Services) 0.75% p.a. (Consulting Services) Repayment Period/Grace Period: 30 years/10 years (Goods & Services), 40 years/10 years (Consulting Services) Conditions for Procurement: Partially Untied	Interest Rate: 1.8% p.a. Repayment Period/Grace Period: 30 years/10 years Conditions for Procurement: General Untied
Borrower / Executing Agency	The Government of the Socialist Republic of Viet Nam / Ministry of Transport, Project Management Unit 2[1],	
Final Disbursement Date	July 2008	

[1] The executing agency was called Project Management Unit 18 at the time of project implementation. It was renamed on July 15, 2008.

Major Contractor (Over 1 billion yen)	【Package 1】Northern Engineering Construction Corporation(Viet Nam)・Song Da Construction Corporation(Viet Nam)・Than Long Construction Corporation(Viet Nam) (JV) 【Package 2】Bach Dang Construction Corporation(Viet Nam)・Samwhan Corporation(Korea) (JV) 【Package 3】China State Construction Engineering Corporation(China)・Transport Material & Construction Company(Viet Nam) (JV) 【Package 4】Trung Son Construction Corporation(Viet Nam)・Lung Lo Construction Corporation(Viet Nam) (JV) 【Package 5】China Shenyang International Economic & Technical Cooperation(China) 【Package 6】Investment and Construction Jsc. Company No4(Viet Nam)/Ha Noi Construction Corporation(Viet Nam) 【Package 1a】CIENCO1(Viet Nam)・ Thang Long Corp(Viet Nam) (JV) 【Package 3a】Construction Company 319(Viet Nam)/ Ministry of Defense(Viet Nam) 【Package 4a】Construction Company 319 (Viet Nam)/ Ministry of Defense(Viet Nam))
Main Consultant (Over 100 million yen)	<National Highway No. 18 Improvement> Pacific Consultants International (Japan)/Oriental Consultants (Japan)/Asia Pacific Engineering Consultants (Viet Nam) <Bai Chay Bridge Engineering Services> Hyder Consulting-CDG LTD (U.K.)/Transport Engineering Design Incorporation (Viet Nam)/Japan Bridge & Structure Institute, Inc. (Japan)/Pacific Consultants International (Japan)
Feasibility Studies, etc	The Feasibility Study on the Highway No.18 Improvement, Government of Viet Nam, March 1996
Related Projects	JICA "Northern Viet Nam Traffic Master Plan," 1994 JICA "Northern Viet Nam National Roads Traffic Safety Improvement Project," 2007 - 2013 Chi Linh – Bieu Nghi Section was improved with loan from the South Korean Government: May 1999

2. Outline of the Evaluation Study

2.1 External Evaluator

Atsushi Tokura, IC Net Limited

2.2 Duration of the Evaluation Study

Duration of the Study: December 2010-November 2011

Duration of the Field Study: March 5 - 18, 2011 and July 21 - 27, 2011

2.3 Constraints during the Evaluation Study

None.

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

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Policies of Viet Nam

At the time of the appraisal, the Government of Viet Nam had focused on investment in the transport sector, especially the road sub-sector. Under the Public Sector Investment Plan 1996 -

[2] A: Highly satisfactory; B: Satisfactory; C: Fairly Satisfactory; D: Unsatisfactory

[3] ③: High; ②: Fair; ①: Low

2000, approximately four billion USD, a quarter of total public investment, was to be invested in the transport sector. Of the nearly four billion USD, 2.2 - 2.5 billion USD was to be allocated to the road sub-sector. The importance of the transport sector has not changed since then. Between 2000 and 2005, 27.5% of the national budget was allocated to the transport and telecommunication sector[4].

The Socio-Economic Development Strategy (2000-10) and the five-year Socio-Economic Development Plan (2006-10) regard National Highway No. 18 as well as the highways No. 1, 5 and 10 as major arterial roads for the economic corridor in the northern region to contribute to economic development.

The Study on the National Transport Development Strategy in the Socialist Republic of Viet Nam in 2000, which was the basement of the National Transport Development Strategy for 2020, considered the improvement the highway No. 18 as one of the most important projects among the primary road[5] improvement projects. The Comprehensive Study on the Sustainable Development of Transport System in Viet Nam in 2010 also considered the highway as one of the major transport corridors. Under the Kunming-Hai Phong Transport Corridor Project, which is being implemented with the support of the Asian Development Bank (ADB), the highway No. 18, as well as the highways No. 5 and 10, is considered as the critical infrastructure of the Kunming-Hai Phong Corridor.

In summary, relevance of the project to Viet Nam's development policy is still high, as the road sub-sector has remained important and National Highway No. 18 is still regarded as a major arterial road in the region.

3.1.2 Relevance with the Development Needs of Viet Nam

The Government of Viet Nam has positioned the Hanoi-Hai Phong-Ha Long triangle zone as the major development area in Viet Nam and tried to develop industrial zones along National Highway No. 18. Tourism development was also anticipated by utilizing natural environment in the Ha Long Bay area. However, the traffic flow of the highway No. 18 was disturbed by deteriorated surface of the road and aging bridges. In addition, cars and passengers had to use a ferry boat to cross a river and bay at some part of the highway.

Since the improvement of the highway, several industrial parks were found to be developed along the highway at the ex-post evaluation time and the number of tourists in Quang Ninh Province, where Ha Long Bay is located, has increased at an average of 13.7% per year (See "3.4 Impact"). After the improvement of Cai Lan Port in Quang Ninh Province in 2006, the cargo volume of the port has increased and the role of the highway has increased, as the highway directly connects the port and Hanoi.

[4] The five-year Socio-Economic Development Plan (2006-10). Allocation amount exclusively to the transport sector was not mentioned.

[5] Primary road meant the most important arterial road. Others are called the secondary road and the tertiary road (the third level, rural road)

Passenger and freight traffic volume by road has been continuously high in the transport sector in Viet Nam. Growth rates of passenger and freight traffic of Hanoi City, Bach Ninh, Hai Doung, and Quang Ninh provinces along the highway are higher than the national average.

Table 1: Growth Rate of Passenger and Freight Traffic by Province

Unit: %

	Average growth rate between 2001and 2008	
	Passenger traffic	Freight traffic
Hanoi City	25.7	30.5
Bach Ninh	12.4	26.6
Hai Doung	24.7	21.5
Quang Ninh	13.6	23.8
National average	11.0	18.2

Source: General Statistics Office of Viet Nam

The project's relevance with development needs is high. In the city and provinces along the highway, both passenger traffic and freight traffic have steadily increased compared to the time of the appraisal, due in large part to the development of several industrial parks and the increase of cargo volume of the Cai Lan port.

3.1.3 Relevance with Japan's ODA Policy

The Japan International Cooperation Agency (JICA) has been focusing its assistance to Viet Nam on economic infrastructure development for its yen loan assistance. Especially the transport sector including the road sub-sector, as well as power sector, is the most important sector for JICA's assistance[6]. JICA has continuously supported the transport sector. For instance, the development studies titled The Study on the National Transport Development Strategy in the Socialist Republic of Viet Nam in 2000 and The Comprehensive Study on the Sustainable Development of Transport System in Viet Nam in 2010 were implemented. Thus the project is consistent with Japan's ODA policy in Viet Nam.

In conclusion, this project has been highly relevant with Viet Nam's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The project improved the road and bridges in approximately 133 km from the Hanoi side: Noi Bai - Chi Linh section (68 km) and Biue Nghi-Cua Ong section (65 km), both of which needed urgently upgrading. The 35 km-long, four-lane motorway from Noi Bai to Bach Ninh was newly constructed and the existing road was expanded and improved in other parts of the highway. Moreover, new toll gates and buildings for road management were built, and equipment for operation and management was provided under the project. The road in Chi

[6] Yen Loan Country Assistance Implementation Plan for Viet Nam

Linh-Biue Nghi section was improved with loan from the South Korean Government in 1999.

(1) Construction works

Construction works were completed nearly as planned with some adjustments and additional works (See Table 2). To reduce necessary land for construction, some culverts were constructed instead of bridges, as the height of embankment for culverts is lower than that of embankment for bridges and culverts need less land. The number of the toll gates was reduced from four to two. This change was caused by the Government's policy change, which required any two toll gates to be 70 km apart at the minimum. The number of buildings for road management was considered to be reduced, as the number of the toll gates was reduced. However, the project constructed a building for the newly constructed motorway between Noi Bai and Bach Ninh, due to the request from the Project Management Unit No. 2 (PMU2). In total, three buildings for road management were built.

Figure 1: Overall Picture of the Project

Table 2: Changes and Additional Outputs

Package	Section	Distance	Design changes	Additional outputs
1	Noi Bai-Bach Ninh	31.3 km	Beginning point of the highway was moved to the intersection with National Highway No. 2	・Additional interchange with National Highway No. 1 bypass and 295 ・Additional flying over at the east side of ・the intersection with National Highway No. 2 ・One additional bridge (from 22 to 23) ・Additional culverts for pedestrians and waterways ・Soft soil treatment
2	Bach Ninh-Chi Linh	36.4 km	・Reducing number of the bridges from 7 to 3 ・Design changes of some bridges	・Four additional culverts for pedestrians and waterways instead of bridges ・Soft soil treatment
3	Pha Lai Bridge	579 m		・Soft soil treatment
4	Bieu Nghi-Bai Chay	26.0 km	・Widening some parts of road beds and roads ・Reducing number of the bridges from 7 to 4	・Replacement of Dai Yen Bridge ・Three additional culverts instead of bridges ・Construction of access road to Cai Lan port ・Construction of access road to Bai Chay bridge

5	Hon Gai-Cua Ong	38.7 km	·Reducing number of bridges from 14 to 4 ·Design change of the three bridges	·Increasing lanes from 2 to 4 in Hon Gai (8 km) and Cua On (11 km) ·Construction of culverts for pedestrians instead of bridges ·Construction of access road to Bai Chay Bridge
6	Toll gates and buildings		· Reducing number of toll gates from 4 to 2 · Reducing number of buildings for road management from 4 to 3	

The design changes and additional outputs shown in Table 2 were caused by requests from the city and provinces along the highway when the detailed design was developed. Those changes delayed the project activities. However, to increase the effectiveness of the project, those changes and additional outputs were appropriate.

The project decided to produce additional outputs using the residual project fund and other resources in 2002 as follows.

- Package 1a: Widening Noi Bai-Bach Ninh Section to four lanes (32.7 km)
- Package 3a: Improvement of Bieu Nghi-Pha Rung section (14.6 km)
- Package 4a: Construction of Cua Ong bypass (3.5 km)

Package 1a, construction of four-lane motorway in Noi Bai-Bach Ninh Section, was already considered at the time of the appraisal in 1997. However, it was decided to construct a two-lane highway first and widen it to four lanes after assessing the increase of the traffic volume of the section and the progress of urbanization in the area. It was decided to widen the road in 2002, as the traffic volume had increased more than expected. However, the first 1.5 km from the beginning point in the Noi Bai area still remains as two-lane road. The highway also becomes two lanes just before the intersection with National Highway No. 1.

Fig. 2: Motorway in the Noi Bai -Bach Ninh section

The reason why the beginning part of the highway remains as two-lane road is that the PMU2 was unable to secure financial resources[7]. This part will be widened to four lanes when the intersection with the National Expressway No. 2 is constructed with the financially assistance of the ADB. As of July 2011, the two-lane part of the No. 18 was closed for the construction of the interchange with the expressway No. 2. After completing the intersection, the first 600 m of 1.5 km will be widened to four lanes. There is, however, no plan to widen the

[7] According to the PMU2, the actual project cost was more than planned in Vietnamese dong terms but lower than planned in yen terms, due to the appreciation of the Japanese yen. Value of Vietnamese dong has dropped approximately 33% since the project started.

remaining 900 m. The PMU2 explained that another two-lane part of the highway at the intersection with the highway No. 1 will be widened when the expressway between Bach Ninh and Ha Long is constructed.

Besides the above additional three outputs, by utilizing the residual project fund, it was approved to improve roads in Chi Linh City in 2002, to construct the approach and access roads to Bai Chay Bridge in 2003, to improve roads in Bach Ninh City and protected the slope of the approach road to Bai Chay Bridge in 2005, and to improve the Provincial Road No. 295 in 2005 and 2007.

(2) Consulting services

The project provided consulting services not only to National Highway No. 18 project but also engineering services such as detailed design to Bai Chay Bridge construction project. In addition, consulting service for bidding and contract support and supervision of the construction were provided to Bai Chay Bridge project. Regarding the consulting service for No. 18 project, inputs for supervision consulting were increased, as the project period was extended due to the scope changes (See Table 4). The PMU2 tried not to increase the cost by using the Vietnamese consultants instead of foreign ones. It can be determined that quality of construction was maintained, although the service was managed mainly by the Vietnamese consultants, as the PMU2 is satisfied with the consulting service for National Highway No. 18 project.

(3) Equipment for operation and maintenance

32 types of equipment[8] were provided by the project (Package 6) and delivered to the PMU2, the Directorate for Roads of Viet Nam (DRVN), the Department of Transport in Quang Ninh Province (PDOT-QN) and the Institute of Transport Science and Technology (ITST). According to the PMU2, the equipment was provided as planned.

3.2.2 Project Inputs

(1) Project cost

The total project cost was originally 27,868 million yen and revised to 28,775 million yen after the detailed design. The actual cost was 25,367 million yen[9], which was 88.2% of the revised cost. The original cost includes consulting fee for Bai Chay Bridge project and the actual cost includes construction fees for approach and access roads for Bai Chay Bridge, construction fee for the slope protection of the approach road and consulting fee for Bai Chay Bridge project[10]. If these costs for Bai Chay Bridge project were excluded, the revised original

[8] Asphalt and concrete saw cutter, air compressor, vibratory roller, centrifugal water pump, pick-up truck, road patrol car, etc.

[9] The exchange rate applied is 1 yen =131.77 Vietnamese dong, which is the average rate during the project period.

[10] At the appraisal time for the Bai Chay Bridge project, it was decided that National Highway No. 18 project covers the cost for the consulting service for Bai Chay Bridge and construction of the approach and access roads to the bridge.

cost and actual cost were 28,220 and 22,934 million yen, respectively, and the actual cost was 81.3 % of the revised original cost. Therefore, the sub-rating for the project cost is ③, as the actual cost was lower than planned.

The main reasons why the actual cost was lower than the planned cost were as follows: (i) efficient order by the open bidding system, and (ii) depreciation of the Vietnamese dong against the Japanese yen.

(2) Project period

The project was scheduled for 53 months from March 1998 to July 2002 at the times of appraisal. However, it took 123 months to complete the project, including additional packages (Please see Table 3). This was 232% of the planned period. The sub-rating for the project period is ①, as it was significantly longer than planned.

Table 3: Comparison of Planned and Actual Project Period

	Plan[11]		Actual		Comparison (%)
	Period	Months	Period	Months	
Selection of consultants	Nov. 1997- Apr. 1998	6	Jan. 1997 - Apr. 1998	6	100
Detailed design	Jul. 1998 - Feb. 1999	8	Jul. 1998 - Nov. 1999	17	213
P/Q, bidding, contracts	Mar. 1999 - Jul. 2000	17	Mar. 1999 - Nov. 2004 (including additional packages)	69	406
Land acquisition and reallocation	Oct. 1998 - Jun. 2000	21	Apr. 1999 - Jun. 2003 (including additional packages)	51	243
Public works	Sep. 1999 - Jul. 2002	35	Sep. 1999 - Aug. 2007 (Package 1-7) Apr. 2004 - May 2008 (Package 1a、3a、4a)	95 (including additional packages)	271
Total[12]	Mar. 1998 - Jul. 2002	53	Mar. 1998 - May 2008	123	232

The reasons for extension of the project period before the public works were as follows.

- It took more time to complete the detailed design. The consultant team received many requests from the city and the provinces along the highway, so that the team had to change the original design and add the outputs after the negotiation with the city and provinces.
- It took more time to complete the land acquisition and resettlement. It was time-consuming to deal with requests from the affected people. The actual number of affected households increased from 4,017 in the feasibility study (F/S) to 5,415[13]. Details are explained in "3.4.2 Other Impacts."

The substantial extension of the period for "Pre-qualification, Bidding, Contracts" was caused mainly by output changes of the toll gates under Package 6, in addition to the delay of activities for other packages.

The period of construction works took more than planned except Packages 4, 3a, and 4a (Please see Table 4). The major reasons for delays of construction works were as follows.

[11] Total project period of Phases I and II
[12] From the loan agreement signing date
[13] Including the households compensated under Package 1a, 3a and 4a.

- Changes and additional project scopes such as soft soil treatment
- The project was unable to obtain permission to use soil form the provinces. Thus the contractors had to use sand instead. It took time to get approval for the material change from the Ministry of Transport.
- Some contractors were unable to continue the construction works due to the steep rise of fuel and material prices. The contractors did not have enough financial capacity to absorb such cost increase.

Construction works for Package 6 were significantly delayed, as the government regulations of toll gates were revised, as explained above. In addition, according to the PMU2, lack of management capacity of the contractors for Package 6 had caused delays in works.

Table 4: Comparison of Planned and Actual Construction works

PKG	Construction works	Plan		Actual		Comparison
		Start	*End*	*Start*	*End*	(%)
1	Noi Bai-Bach Ninh	Oct. 2000	Oct. 2002	Feb. 2001	Dec. 2003	140.0
2	Bach Ninh-Chi Linh	May 2000	Oct. 2002	Jul. 2000	Feb. 2003	106.7
3	Pha Lai Bridge	Sep. 1999	Oct. 2001	Mar. 2000	Jul. 2002	111.5
4	Bieu Nghi-Bai Chay	Sep. 1999	Oct. 2001	Oct. 1999	Sep. 2001	88.5
5	Hon Gai-Cua Ong	Nov. 2000	Nov. 2002	Mar. 2001	Jul. 2003	116.0
6	Construction of toll gates and buildings for road management	May 2002	Oct. 2003	Sep. 2005	Aug. 2007	133.3
7	Equipment for O&M	Jan. 2000	Jul.2001	Mar. 2003	Oct. 2004	105.3
1a	Noi Bai-Bach Ninh (four lanes)	Apr. 2005	May 2007	Apr. 2005	May 2008	158.3
3a	Bieu Nhhi-Pha Rung	Jun. 2005	Nov. 2006	Jun. 2005	Aug. 2006	89.0
4a	Cua Ong bypass	Jun. 2005	May 2006	Jun. 2005	Aug. 2006	83.3

Note 1: Comparison means actual period / planned period

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

3.3 Effectiveness[14] (Rating: ③)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Annual average daily traffic (AADT)[15]

a) Noi Bai-Bach Ninh

This section is a newly-built four-lane motorway, completed in 2008. The traffic amount of trucks in 2010 was four times more than the amount forecasted by the F/S in 1996 (Please see Table 5). A major reason could be that Yen Phone Industrial Park was developed along the motorway. In addition, the Vietnamese government instructs truck drivers to bypass Chuong Duong Bridge and use the National Highway No. 18. On the other hand, the traffic amount of

[14] Achievement of promotion of traffic safety, one of the project objectives, is stated in "3.3 Impact"

[15] AADT is calculated based on 12-hour traffic count on the 5th and 6th calendar day of every month and 24-hour traffic count on the 7th calendar day of every month.

cars and buses in 2010 was more than the forecast, but it was less increased compared to that of trucks. Cars and motorbikes can access this motorway section only through interchanges. The Regional Road Management Unit 2 (RRMU2) of the Ministry of Transport, being in charge of operation and maintenance, explained the reason why the traffic amount of cars and buses was less increased that local residents in the section cannot access the interchanges of the motorway smoothly, as the feeder roads along the motorway are not well developed.

Table 5: Annual Average Daily Traffic of Each Section

Unit: number/day

	Achievement					2005 forecast at F/S	Comparison (Achievement/Plan, Note 1)
	1995	2005	2008	2009	2010		
Noi Bai-Bach Ninh							
Total			4,995	5,331	6,254	2,853	219.2%
Car, Bus			2,339	1,896	2,559	1,965	130.2%
Truck			2,616	3,425	3,659	888	412.0%
Bach Ninh-Chi Linh							
Total		2,443	3,744	4,556	5,219	5,260	99.2%
Car, Bus		1,287	2,104	2,261	2,843	2,582	110.1%
Truck		1,156	1,640	2,295	2,376	2,678	88.7%
Bieu Nghi-Bai Chay							
Total	1,747	3,275	7,241	7,609	9,877	4,748	208.0%
Car, Bus	936	1,619	3,334	3,617	5,466	2,153	253.9%
Truck	811	1,656	3,907	3,992	4,411	2,595	170.0%
Hon Gai-Cam Pha							
Total	2,419	9,327	9,110	7,662	8,447	6,535	129.3%
Car, Bus	1,282	3,222	3,973	4,225	5,252	2,893	181.5%
Truck	1,137	6,105	5,137	3,407	3,195	3,642	87.7%

Source: The figures in achievement are from the RRMU2 and the PDOT-QN.
Note 1: The figures in 2010 (2 years after the project completion) are compared to the figures of 2005 in F/S (3 years after the expected project completion in F/S)

b) Bach Ninh-Chi Linh

The traffic amount of this section has steady increased since 2005, however, the amount in 2010 was less than the forecast in 2005. It should be noted, however, the forecast was estimated based on the premise of four lanes. The RRMU2 explained that the traffic flow shifted from No. 18 to No. 5, because National Highway No. 38, connecting No. 18 and 5, was improved.

c) Bieu Nghi-Bai Chay

The traffic amount has significantly increased, and the actual traffic amount in 2010 was 208% of the forecast in 2005. The construction of Bai Chay Bridge in 2006 has also contributed to the increase, beside the improvement of the highway. The level of increase of trucks is lower than that of cars and buses. Some trucks may bypass this section to avoid the tall gate and the checkpoint for over-weighted trucks in the section.

d) Hon Gai-Cam Pha

The traffic amount of trucks has decreased since 2005, while those of cars and buses have

increased more than the forecast. This could be explained by the following reasons: i) it is not easy for trucks to drive through the residential area in Hon Gai town, ii) some trucks, driving from Hon Gai to Hanoi, bypass the section and use the improved Provincial Road No. 326 because of the existence of the tall gate and checkpoint for over-weighted trucks after Bai Chay Bridge, and iii) there have been road maintenance works between Cua On and Mon Cai, where is far north of the project location, from 2008 to 2010.

(2) Saving time

The RRMU2 and the PDOT-QN, both of which are in charge of operation and maintenance, have got no data how much the traveling time has been decreased due to the project, as they have not been supervising travel time. Staff members of PDOT-QN generally acknowledge that it takes three hours now from Ha Long to Hanoi; it was six hours before the improvement. Staff members of the Departments of Transport in Bach Ninh Province and Hai Doung Province also confirmed that the travel time to Ha Long became less than half after the improvement. Reduction of travel time was caused by improvement of the road surface, widened road and construction of the bridge over Pha Lai River, where vehicles and motorbikes had to cross by a ferry boat. In the east part of Bai Chay Bridge, construction of Bai Chay Bridge has also helped reduce the travel time.

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

Economic Internal Rate of Return (EIRR)

Results of recalculation[16] of (EIRR) show that EIRR for Bach Ninh-Chi Linh section and that for Hon Gai-Cua Ong setion are 11.4% and 15.5%, respectively[17]. Those figures are lower than 15.5% for Bach Ninh-Chi Linh section and 20.6% for Hon Gai-Cua Ong section at the appraisal time. The followings are reasons why the recalculated EIRR are lower.

- Fees for consulting and land acquisition and resettlement might not be included in the project cost at the appraisal time.
- Year 2008 is set as a base year for recalculation. Cost and benefit before 2008 are converted to the present value by applying the consumer price index of Viet Nam. Costs figures before 2008 after the conversion are higher than the cost figures expected at the appraisal time.
- The benefit forecast for Bach Ninh-Chi Linh section at the appraisal time was estimated

[16] Economic cost was recalculated based on the costs for civil works, consulting service, operation and maintenance and land acquisition and resettlement. Economic benefit was recalculated based on the benefits of saving in vehicle operating costs and saving in passenger time costs. Necessary data for recalculation of Pha Lai Ferry investment cost saving is not available, so that the estimate benefit at the appraisal time is used.

[17] Recalculation was not conducted for Noi Bai-Bach Ninh section. Cost estimation for the section can be misled, as two-lane motorway was constructed at first and widened to four lanes later. Recalculation for Bieu Nhi-Bai Chay section was not conducted, because it is impossible to compare the recalculated EIRR to one at the appraisal time. The latter was copied from the data when South Korea considered its support for Chi Linh-Bai Chay section. It is not clear the calculation method at that time.

based on the premise of four lanes.

- For the recalculation, cost for Cua Ong bypass (Package 4a) is included for cost for Hon Gai-Cua Ong section.

3.3.2 Qualitative Effects

(1) Travel time and cost

In the beneficiary survey[18], all respondents including the residents, agriculture, industry and commerce personnel and transport service providers answered that travel time was shortened by the road improvement. Regarding the traveling cost, 97% of the residents and 96% of agriculture, industry and commerce personnel and transport service providers responded that fuel cost and vehicle maintenance cost were reduced by the road improvement.

(2) Improvement of access

80% of the residents along the highway responded that access to markets improved by the road improvement, while 14% mentioned improved access to hospitals and 6% improved access to schools (Please see Table 6). Interviews with staff members of the PDOT-QN revealed that residents in the province had better access to medical services in Hanoi through improvement of the highway and construction of Bai Chay Bridge.

Table 6: Improvement of Access by Road Improvement (Residents)

(N=125)

Question	Improved	
	Count	%
Market, business center	100	80.0
Hospitals	17	13.6
Schools	8	6.4

The beneficiary survey found that 96% of the agriculture, industry and commerce personnel thought that the project made it easier to acquire necessary materials for their business, and 84% thought that access to new markets in the distance, to where they could not bring their products before the improvement of the highway, became easier (Please see Table 7). 63% of them answered that access to the markets in Hanoi became easier.

Table 7: Improvement of Access to Markets by the Project
(Agriculture, industry and commerce personnel)

(N=25)

Question	Become easier		Not easier	
	Count	%	Count	%
Acquiring necessary materials for business	24	96	1	4
Access to new markets	21	84	4	16

In conclusion, this project has largely achieved its objectives, therefore its effectiveness is

[18] A beneficiary survey was conducted in the form of one-on-one interviews with 175 people including 125 local residents, 25 farmers and personnel from shops and companies, and 25 transport service providers along the highway.

high.

3.4 Impact

3.4.1 Intended Impacts

This section examines the project's contribution to socio-economic development such aspects as growth of industrial output, retail sales, agriculture output, foreign direct investment, and poverty reduction in the northern region. It also looks into whether or not the project has had any negative impact such aspects as traffic accident, environment deterioration and resettlement.

(1) Industry and trade

a) Industrial output

As shown in Table 8, the proportion of the industrial output in Hanoi City, Bach Ninh, Hai Doung and Quang Ninh Provinces to the industrial output of Viet Nam as a whole has increased. The proportion of the industrial output in Bach Ninh has increased the most. It is assumed that the development of Yen Phone and Que Vo industrial parks after the improvement of the highway has contributed to the increase. The occupancy rate of both industrial parks is high, such as Cannon Inc. in Que Vo industrial park[19]. It is fair to say that the improvement of the highway has contributed to the development of new industrial parks and increase of investment in the parks.

In Quang Ninh province, the construction works for the highway were completed in July 2003. The proportion of the industrial output in the province to the industrial output of Viet Nam has increased since 2004. It is assumed that the project has contributed to increasing the industrial output in the province. However, it should be noted that the expansion of Cai Lan Port and the construction of Bai Chay Bridge in 2006 also contributed to industrial output growth in Quang Ninh Province.

Table 8: Shares of Provinces in Terms of Industrial Output

Unit: %

	Year 2000	2001	2002	2003	2004	2005	2006	2007	2008
Hanoi City	8.19	7.84	8.98	9.40	9.32	9.18	9.33	9.43	9.21
Bach Ninh Province	0.80	0.87	0.95	1.10	1.08	1.31	1.35	1.42	1.55
Hai Doung Province	1.10	1.06	1.18	1.18	1.10	1.18	1.21	1.39	1.35
Quang Ninh Province	1.95	1.77	2.05	1.95	2.09	2.13	2.27	2.59	2.89

Source: General Statistics Office of Viet Nam

Growth rates in Hanoi City and Hai Doung province are not high as in Bach Ninh and Quang Ninh Provinces. National Highway No. 18 passes through just a part of Hanoi City and Hai Doung province. Thus the improvement of the highway might not have an impact so much on industrial output in the city and the province.

[19] JETRO "Data of industrial parks in Northern and Central Viet Nam"

b) Commerce

As shown in Table 9, the average growth rates of retail sales in Hanoi City and Bach Ninh Province from 2001 to 2009 are higher than that of the country. As the highway is the major road in Bach Ninh Province, the improvement of the highway might have contributed to invigorating commercial activities in the province.

Table 9: Annual Growth Rate of Retail Sales

Unit: %

	YEAR 2001	2002	2003	2004	2005	2006	2007	2008	2009	AVERAGE GROWTH RATE		
										2001- 09	-2003	2004-
Hanoi	8.5	17.3	19.0	20.6	22.1	35.4	23.9	44.1	18.1	24.8	14.8	28.4
Bach Ninh	19.4	17.5	27.5	27.6	21.0	22.7	32.3	48.0	16.2	26.3	21.4	27.6
Hai Doung	-1.6	17.8	9.7	9.1	12.6	15.8	21.6	33.0	10.5	18.5	25.3	20.1
Quang Ninh	58.5	12.4	10.0	25.2	20.4	14.2	19.6	31.7	15.3	16.0	8.7	18.5
National average	11.3	14.5	18.8	19.4	20.5	24.1	25.2	35.0	20.6	22.1	14.8	25.0

Source: General Statistics Office of Viet Nam
Note 1: Growth rate means increase versus previous year.
Note 2: Figures in 2009 are forecast.
Note 3: The growth rate of Hanoi includes former Ha Tay Province from 2008.

The beneficially survey also shows that 22 of 24 interviewees (92%) involved in commercial activities in Bach Ninh Province answered that their business opportunities were enhanced after the project. Among them, 19 of 24 interviewees (79%) answered that their business opportunities were enhanced due to the project (See Table 10). This ratio is higher than total in the city and provinces along the highway. It is thus fair to say that there is a linkage between the project and growth of commercial activities in Bach Ninh Province.

Table 10: Linkage between the Project and Commercial Activities

	Business opportunities increased after the project		The project increased opportunities	
	Count	%	Count	%
Bach Ninh (n=24)	22	92	19	79 (19 of 24)
Total in the city and provinces along the highway (n=54)	45	83	38	70 (38 of 54)

c) Agriculture

As indicated in Table 11, the average growth rate of agriculture output in Bach Ninh, Hai Doung and Quang Ninh Provinces from 2001 to 2009 has been lower than that of Viet Nam as a whole. It is contrary to the trends in industrial output[20]. The growth rate has low especially since 2003, although this is the general phenomenon in Viet Nam.

According to the beneficiary survey, many interviewees knew people who stopped farming and started working in the industrial and/or commercial sectors during and after the project[21].

[20] The growth rate of Hanoi includes former Ha Tay Province from 2008.
[21] 97 interviewees answered that they know somebody who stopped farming and started working in the industrial and/or commercial sectors during and after the project. When the 97 interviewees were asked how many such former farmers they know, they answered that they knew 3,733 former farmers in total.

On the other hand, the project did enhance business opportunities among the farmers along the highway. 57% of the interviewees[22] in the agriculture sector answered that their opportunities were enhanced after the improvement of the highway and 43% of them answered that their business opportunities were enhanced due to the improvement of the highway.

Along the highway, the workforce has shifted from the agriculture sector to the industry and commercial sectors. However, the agricultural output has increased, although the growth rate is lower than that of Viet Nam as a whole. There are cases that the improved highway has enhanced opportunities among farmers. It is thus fair to say that the project has not negatively affected agriculture so far.

Table 11: Annual Growth Rate of Agriculture Output

Unit: %

	YEAR 2001	2002	2003	2004	2005	2006	2007	2008	2009	AVERAGE GROWTH RATE		
										2001- 09	-2003	2004-
Hanoi	2.1	3.7	5.8	3.6	2.4	2.8	2.3	14.9	0.5	4.4	3.8	4.5
Bach Ninh	2.4	6.4	4.2	3.3	3.0	0.3	-0.9	4.7	5.0	3.2	4.3	2.4
Hai Doung	0.4	7.7	1.2	3.6	0.0	1.4	2.4	3.4	-3.0	2.0	7.1	2.0
Quang Ninh	6.8	5.6	8.8	6.0	11.4	-10.6	10.7	0.1	0.1	3.8	3.1	0.8
National average	2.6	6.2	4.5	4.1	3.2	4.1	3.6	6.9	2.2	4.3	4.4	4.0

Source: General Statistics Office of Viet Nam
Note 1: The Output is calculated based on the 1994 output as a base year.
Note 2: Figures in 2009 are forecast.
Note 3: The growth rate of Hanoi includes former Ha Tay Province from 2008.

d) Foreign direct investment

As shown in Table 12, the provincial portion to the country as a whole in terms of the number of foreign direct investment projects in Hanoi City and Bach Ninh Province has increased from 2005 to 2009. In fact, several industrial parks among 23 parks, located in the northern region, were developed along National Highway No. 18 in Hanoi and Bach Ninh after the improvement of the highway. The improvement of highway has promoted the development of industrial parks and attracted foreign direct investment in the parks.

Table 12: Number of Foreign Direct Investment Projects and Provincial Portion to Viet Nam as a Whole

	Year 2005	2006	2007	2008	2009	Total
Hanoi	116	150	255	218	298	1,037
	12.0%	15.2%	16.5%	18.6%	24.7%	
Bach Ninh	14	18	35	31	32	130
	1.4%	1.8%	2.3%	2.6%	2.6%	
Hai Doung	11	46	45	40	9	151
	1.1%	4.7%	2.9%	3.4%	0.7%	
Quang Ninh	13	10	12	11	6	52
	1.3%	1.0%	0.8%	0.9%	0.5%	
Viet Nam as a whole	970	987	1,544	1,171	1,208	5,880

Source: General Statistics Office of Viet Nam
Note 1: Upper row is number of projects; lower row is portion to Viet Nam as a whole.
Note 2: Figures in 2009 are forecast.

[22] 8 of 14

e) Tourism

The improvement of the highway seems to be making a positive impact on tourism in Quang Ninh Province, where there are several tourist spots such as Ha Long Bay, a UNESCO World Heritage site. In fact, the number of tourists to the province has increased annually 14% since 2000[23].

(2) Poverty reduction

Table 13 shows that the poverty ratios in all the city and provinces along National Highway No. 18 have decreased more than the national average. In the beneficiary survey, 87% of the residents answered that their household income improved after the improvement of the highway.

Table 13: Poverty Rate

Unit: %

	Year 2006	2007	2008	Annual reduction rate
Hanoi	3.0	2.9	2.4	-11.0
Bach Ninh	8.6	8.2	7.5	-7.0
Hai Doung	12.7	12.1	10.1	-11.0
Quang Ninh	7.9	7.5	6.4	-10.0
National average	15.5	14.8	13.4	-7.0

Source: General Statistics Office of Viet Nam

In the city and provinces along the highway, industry and commerce have developed, while agriculture output has increased. In addition, urbanization has progressed along the highway and the population in the urban areas has increased more than in the rural areas.[24] Such facts have contributed to poverty reduction along the highway[25].

3.4.2 Other Impacts

(1) Number of traffic accidents

The number of traffic accidents along National Highway No. 18 in Hai Doung Province has decreased, while the number in Bach Ninh Province significantly increased in 2010 (See Table 14). In Quang Ninh Province, the number was decreased in 2010, compared to 2000. The reason for the significant increase in Bach Ninh Province is unclear. It is necessary to assess what impact a new four-lane motorway in the province has had on the number of the accidents.

In Hai Doung province, some measures to prevent a traffic accident have been introduced under the JICA yen loan project, "Northern Vietnam National Roads Traffic Safety Improvement Project," The project above has tried to raise awareness of local people on how best to reduce accidents at governmental organizations, schools, and factories along National Highway No. 18. Meanwhile, Hai Doung Province has also introduced its own measures to

[23] Quang Ninh Province
[24] General Statistics Office of Viet Nam
[25] In Vietnam, it is assumed that poverty reduction is in direct proportion with urbanization. In 2008, the poverty rate was 3.3% in the urban areas and 18.7% in the rural areas.

reduce traffic accidents such as speed limits in the residential areas and speed bumps at the access roads to the highway26. Those measures may have had a positive effect on reduction of traffic accidents in Hai Doung Province, as the number of accidents has decreased since 2008 along the highway No. 18. While the project constructed a bypass road in Cua Ong, Quang Ninh Province has also introduced measures such as improvement of intersections, constructing bypass roads, installation of traffic lights and signs and pavement maintenance. So far, the project has had no negative impact on increase of traffic accidents.

Table 14: Number of Traffic Accidents along National Highway No. 18

Unit: number of accidents

	2000	2003	2004	2005	2006	2007	2008	2009	2010
Bach Ninh Province									
No. of accidents		27	19	25	33	33	33	34	87
No. of deaths			19	33	37	35	35	38	60
No. of casualties				13	16	12	4	10	69
Hai Doung Province									
No. of accidents				36	40	44	35	26	23
No. of deaths				26	24	27	19	21	19
No. of casualties				52	55	41	30	21	14
Qunag Ninh Province									
No. of accidents	215			77					97
No. of deaths									
No. of casualties									

Source: Department of Transport in Bach Ninh, Hai Doung and Quang Ninh Provinces

(2) Impacts on the natural environment

Improving the road surface under the project was expected to reduce dust. Some measures were also introduced to improve the environment and safety. For instance, it was prohibited to build a house within 3 m from the edge of the road (5 m for Noi Bai-Bach Ninh section) and 7 m from the embankment of the bridge. Moreover, several meetings for the residents were held to explain the countermeasures for land acquisition and resettlement.

During the construction period, environment monitoring was regularly conducted by the PMU2, the Provincial People's Committee, consultants and construction companies.

Since the construction was finished, no regular environment monitoring has been conducted. The Department of Transport in Bach Ninh and Hai Doung Provinces have not received complaints about the environment from the residents. The Department of Transport in Quang Ninh Province gave some instructions to truck companies to cover the truck bed, as some complaints were raised from the residents along National Highway No. 18. However, staff members of the department admitted that the effectiveness of their instructions is uncertain, as the instructions do not have means of enforcement with punishment[27].

As shown in Table 15, many residents answered in the beneficiary survey that air and noise pollution worsened during and after the project. It should be noted that, however, air and noise

[26] Department of Transport, Hai Doung Province
[27] PDOT-QN

pollution could have become worse even without the project, as the traffic volume has increased and urbanization has occurred. In fact, 98% of the residents answered in the survey that they received benefits from the project, and the residents, who complained about air and noise pollution in the survey, did not answer their specific problems. In addition, the number of complaints about environment deterioration is not many in the provinces. Thus it is fair to say that the project has not given a significant negative impact on the environment.

Table 15: Consciousness among the Residents about the Environment

	During the construction						After the construction					
	Worse		No change		Improved		Worse		No change		Improved	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Air	94	75.2	31	24.8	0	0.0	91	72.8	27	21.6	7	6.0
Noise	103	82.4	21	16.8	1	0.8	101	80.8	23	18.4	1	0.8

(3) Land acquisition and resettlement

4017 households were expected to receive financial compensation for land acquisition in the F/S[28]. 2288 among them were expected to move in newly developed areas by the Government and rebuilt their houses. In the detailed design, 4,017 households were expected to receive financial compensation and 663 among them were to move in newly developed area. In actual, 5415 households received financial compensation and 1,278 among them moved to newly developed area by the Government and rebuilt their houses. The number of compensated and reallocated households significantly increased more than planned in Noi Bai-Bach Ninh section. The reason was that an additional intersection was built in the section.

The cost of land acquisition and reallocation was approximately four times the planned amount: 148.5 billion dong was planned but the actual cost was 627.3 billion dong. The reasons for such increase were that the number of households affected increased and the unit price of financial compensation increased due to an increase in land prices.

29 among 125 interviewees in the beneficiary survey were compensated. 27 of the 29 answered that they were dissatisfied with the compensation and reallocation scheme. The result was contrary to that of the ex-post evaluation for National Highway No. 10 Improvement Project in 2010 in which few interviewees were dissatisfied with the compensation and reallocation scheme[29]. The PMU2 explained that many residents along National Highway No. 18 complained about the scheme because land prices had increased significantly recently. They think that they should have received more compensation in light of the higher market prices. The scheme is the same for both the No. 10 and No. 18 projects. The difference is that land prices increased along the No. 18 more than the No. 10, as urbanization is more progressed

[28] The households are those whose houses are affected, not their land and fields. The number of 4,017 in the F/S did not include the households in Bieu Nhi - Bai Chay section. In the F/S, the number was estimated based on the plan that Hon Gai-Cua Ong section would be widened to four lanes.

[29] "Ex-post Evaluation Report of Japanese ODA Loan Projects 2009 (Vietnam II ・ China II)", June 2010

along the No. 18. It is assumed that the residents along No. 18 tended to complain more about the scheme they received, because they looked at the rising land price.

(4) Capacity enhancement among engineers

Technical training was provided to the Vietnamese engineers as a part of consulting service (Overseas/Domestic). According to PMU2, new technologies were introduced under the project such as compacted sand piles and hard pre-beam girder reinforcement and these newly acquired technologies have been utilized by other projects.

(5) Others

- As mentioned in qualitative effects under Effectiveness, a positive impact on health condition for residents along the highway is expected, as the access to the medical institutions in Hanoi is improved.
- Pha Lai Ferry was abolished after the construction of the bridge. Among the staff members of the ferry company, some chose early retirement and nearly all others got a position at the RRMU2 and have engaged in road operation and maintenance and toll fee collection. No negative impact such as increase of unemployment has been seen from the abolishment of the ferry.

This project had given a positive impact on socio-economic development in northern Viet Nam, while no significant negative impact is found in the field of traffic accident, environment and resettlement.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

The Directorate of Roads in Viet Nam (DRVN) of the Ministry of Transport is responsible for overall road operation and maintenance (O&M). The RRMU2, which is a subordinate organization under the DRVN, is in charge of O&M activities between Noi Bai and Chi Linh, while the PDOT-QN is responsible for the section between Chi Linh and Cua Ong. Actual O&M activities are outsourced to two companies: Management and Road Construction Company 248 (contracted with the RRMU2) and Transport Management and Construction Limited Company (contracted with the PDOT-QN). Those state companies had been organizations under the DRVN and became companies after the revision of the Company Law in Viet Nam.

Those companies report their O&M activities to the RRMU2 and the PDOT-QN on a regular basis. Then the RRMU2 and the PDOT-QN are to submit the progress report of O&M activities to the DRVN.

As mentioned above, the PDOT-QN is in charge of O&M activities for certain sections of the highway, although that is a provincial organization. There was a question on how effective it

is for the provincial organization to work under the DRVN. However, according to RRMU2, the PDOT-QN and the RRMU2 conduct the same O&M activities under the direction of the DRVN with a budget from the DRVN. Thus there is little problem to maintain organizational coordination among the stakeholders. In fact, O&M activities of half the national highways in Viet Nam are conducted by a provincial organization such as the PDOT-QN under the direction of the DRVN.

Management and Road Construction Company 248 is conducting O&M activities for National Highway No. 38 and Transport Management and Construction Limited Company does for National Highway No. 279. Both companies have been also involved in bridge management, ferry operation and toll fee collection activities. Such experiences enable those companies to carry out O&M activities efficiently.

3.5.2 Technical Aspects of Operation and Maintenance

Management and Road Construction Company 248 has 323 staff members in total and 77 of them are engineers with university degrees. Transport Management and Construction Limited Company has 169 staff members in total and 16 of them are engineers with university degrees. Both companies have enough engineers and personnel to conduct necessary O&M activities. Both companies provide training opportunities to their staff members responsible for O&M activities every two years inside the companies. They also dispatch their staff members to the training courses organized by the DRVN. Staff members conduct O&M activities by following the national standard specification, although there is no specific O&M manual for National Highway No. 18.

3.5.3 Financial Aspects of Operation and Maintenance

There are three types of O&M activities: regular maintenance, periodic maintenance and emergency maintenance. Budgets for all types of maintenance are lacking. The RRMU2 just secures 50% of the necessary cost for a regular maintenance and 30-40% of that for periodic maintenance. The PDOT-QN also secures only half the necessary cost (Please see Table 16).

Table 16: Necessary Cost and Budget Allocation for PDOT-QN

Unit: million Vietnamese dong

Year	Necessary cost (A)	Actual budget allocation (B)	Gap (B/A)
2008	12,000	5,988	49.9%
2009	9,000	4,484	49.8%
2010	12,000	5,798	48.3%

Source: PDOT-QN

There are two toll gates along National Highway No. 18. 15% of toll fees collected can be used for operation fees such as salary of the personnel of the companies which conduct toll fee

collection and the collection related activities. 5% and 80% of them are submitted to the DRVN and the national account, respectively.

The road maintenance fund was decided to be established in November 2008 to secure financial resources for O&M. However, details of fund mechanism are not yet decided and the fund is not effective at the time of the ex-post evaluation. It will be difficult to secure fully enough financial resources for O&M activities from now on.

3.5.4 Current Status of Operation and Maintenance

Under the project, 32 kinds of machines and equipment for O&M were provided to the DRVN, RRMU2, PDOT-QN and ITST. All of them were still being used except personal computers, whose version is outdated.

Regular maintenance activities include installing guard rails, maintenance of pavement, repair of road surface and roadbed, and installation of street gutters.

Some road sunk parts are found in Noi Bai-Bach Ninh section, although soft soil treatment to prevent road sinking was conducted. There are also some sunk parts around the Pha Lai Bridge and in the Bieu Nghi-Bai Chay sections. The PMU2 and the RRMU2 explained the reasons as follows.

- Adoption of the Prefabricated Vertical Drain (PVD)[30]was not adequate for the sections.
- Sufficient time was not secured for consolidation settlement[31].
- The number of drains was not enough.

Both the PMU2 and the RRMU2 proposed that an intensive investigation be carried out to find out reasons for road sinking and to prevent further sinking, as the sinking is caused by multiple and complex reasons. It is also heard that the sinking may be caused in the motorway section, because the embankment is too high. Some maintenance works have been already conducted. The DRVN approved a project to cover the sunken parts with pavement.

It is found that safety measures are not followed adequately in Noi Bai-Bach Ninh section. This section is a four-lane motorway only for cars, buses, trucks and motorcycles. However, some pedestrians and bicycle riders use the motorway. The acceleration lane from Yen Phone Industry Park is not long enough and cars and trucks from the industrial park have to pull into traffic without increasing the speed sufficiently. PMU2 explained that the industrial park was developed after the

Fig. 3: The acceleration lane from Yen Phone Industrial Park.
The motorbike is trying to cross the motorway.

[30] A method used for the settlement and consolidation of clay ground by sticking up numbers of vertical drains
[31] The process in which reduction in volume takes place by expulsion of water under long term static loads

completion of the motorway and such intersection with the park was built by following the request from Bach Ninh Province. Local people cross the motorway by removing the guard rail of the center divider in front of Yen Phone Industrial Park.

The new expressway No. 3 is under construction along Noi Bay-Bach Ninh Section. Guard rail of No. 18 was removed and trucks from the construction site pull into traffic without increasing the speed[32].

As mentioned in "3.2 Efficiency," the first 1.5 km of the motorway from the Noi Bai point remains a temporary structure and one bridge is also still a temporary one. The embankment of the temporary bridge is protected from erosion by a gabion structure[33]. However, wires to hold stones are rusted and do not look strong enough to hold stones for a long time.

Fig. 4: Condition of the temporary

According to the PDOT-QN, over-weighted trucks are a major cause of road deterioration. There had been 27 checkpoints in the country to weight a truck. They were abolished to smooth the traffic flow, but one checkpoint remains now as a pilot only along the National Highway No. 18[34]. The DRVN has been gathering data from the pilot checkpoint and analyzing how effective the checkpoint should be. The result of the study will be released within the Ministry of Transport in early 2012 and utilized when the Ministry formulates a detailed plan for the checkpoints installation. 41 checkpoints in total will be installed nationwide in the future.

Chi Linh-Bieu Nghi Section, financially supported by the South Korean Government, is narrower than the other parts of the highway. It was found that the surface of the road was cracked[35].

In conclusion, no issue is found in terms of structural and technical aspects of O&M, while road safety is not fully assured in Noi Bai-Bach Ninh section. Continuous countermeasures for road sinking will be necessary, although some measures have been already taken. There is a slight issue in terms of financial aspects. Therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project is to promote traffic safety and facilitate efficient logistics and distribution of goods by improving a part of National Highway No. 18, from Noi Bai near the

[32] As of July 2011. Such intersection is also found along the National Highway No. 1.
[33] Cages filled with stones to prevent erosion of embankment
[34] The other checkpoint is installed in the southern region.
[35] JICA Vietnam Office pointed out the possibility that deterioration of Korean supported section may negatively affected the effectiveness of the highway.

international airport to Cua Ong in Quang Ninh Province (approximately 135 km), which had to be improved urgently. Relevance of the project is high, as the project objective is relevant with Vietnamese development policy and needs and Japan's ODA policy. After the improvement of the highway, traffic amount has increased and various benefits have been realized for the residents along the highway. Some positive impacts have already realized on social and economic development. The efficiency of the project is just fair, as the project period was longer than planned. It is expected that achievement of the project will be sustained, as the project has no problem in terms of organizational and technical aspects, although the project has an issue in terms of financial aspects besides road safety issues. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing and O&M Agencies

(1) Measures to secure safety at motorway

As mentioned in "3.5 Sustainability," safety measures are not followed adequately in Noi Bai-Bach Ninh section. Some pedestrians and bicycle riders use the motorway, although the section is the motorway only for cars, buses, trucks and motorcycles. Local people are crossing the motorway by removing the guard rail of the center divider. The acceleration lane from Yen Phone Industry Park is not long enough. Countermeasures at the hardware side, such as construction of an additional culvert for pedestrians and an intersection at the industrial park, are necessary, while awareness of local people and drivers on traffic safety must be raised.

(2) Early completion of temporary part of the motorway

The temporary part of the motorway at Noi Bai is to be completed promptly. The temporary part is closed now, as the intersection with National Expressway No. 2 has been under construction. Necessary measures to widen the temporary part should be taken soon, as the temporary part is going to be re-opened after the completion of the intersection. At least, even when the necessary budget is not secured, emergency measures should be taken for the gabion structure of the temporary bridge.

(3) Countermeasures for road sinking

As mentioned above in "Sustainability", some countermeasures have already been introduced for the sunken parts. Research on effective measures to prevent sinking should be conducted among the stakeholders, as road sinking is expected to be continuously occurred. Necessary budget should be secured to conduct countermeasures for road sinking from now on, assuming that the sunk will not stop.

(4) Countermeasures for over-weighted trucks

As mentioned above in "Sustainability", over-weighted truck is a major cause of road deterioration. The DRVN should study lessons learned from the pilot checkpoints and share the result of the study within the Ministry early next year as planned. Then, the detailed plan for the installation of checkpoints is to be formulated.

4.2.2 Recommendations to JICA

(1) Confirming the effectiveness of project activities under the "Northern Viet Nam National Roads Traffic Safety Improvement Project" and dissemination.

As mentioned in "3.3 Effectiveness," the activities implemented under the JICA project "Northern Viet Nam National Roads Traffic Safety Improvement Project" may contribute to decreasing traffic accidents along the highway No. 18 in Hai Doung Province. The effectiveness of project activities should be examined, although the project is still ongoing. Lessons learned from the project could be applied to other parts of National Highway No. 18 and other highways as good practices.

4.3 Lessons Learned

If the checkpoint for over-weighted trucks is installed without considering regional traffic flows, the traffic flow may be negatively affected in the region, as some trucks may bypass the checkpoints. The pilot checkpoint along National Highway No. 18 might have affected the achievement of the project, as the traffic volume was distorted by the traffic bypassing the checkpoint. It is necessary to decide the location of the checkpoints in consideration of the regional road network to avoid disturbing smooth logistics and distribution of goods in the region.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1) Project Outputs	Construction of two-lane Motorway in Noi Bai-Bach Ninh section	Construction of four-lane motorway
	Road improvement in Bach Ninh section and Bieu Nghi-Cua Ong section	As planned, however, some parts of the road were widened to four lanes. Culverts were built instead of bridges.
	Construction of Pha Lay Bridge	As planned
	Construction of four toll gates and buildings for road management	Construction of two toll gates and three buildings for road management
	Construction of the approach and access roads to Bai Chay Bridge.	As planned
		Additional outputs (Improvement of Bieu Nghi-Pha Rung section, Construction of Cua Ong bypass, improvement of roads in Chi Linh City and Bach Ninh City, and National Highway No. 295, protection of the slope of the approach road to Bai Chay Bridge.
	Procurement of 32 types equipment	As planned
	Consulting service for National Highway No. 18 improvement project	As planned
	Consulting service for Bai Chay Bridge construction project	As Planned
		Additional consulting service (Supervision for Bai Chay Bridge construction)
2) Project Period	March 1998 – July 2002 (53 months)	Original scope March 1998 – May 2007 (111 months) Original and additional scope March 1998 – May 2008 (123 months)
3) Project Cost[36] Amount paid in foreign currency Amount paid in local currency Total Japanese ODA loan portion Exchange rate	 11,693 million yen 17,082 million yen (1,708,200 million VND) 28,775 million yen 23,449 million yen 1 VND = 0.01 yen (As of October 1997)	 7,365 million yen 17,981 million yen (2,371,919 million VND) 25,367 million yen 21,385 million yen 1 VND = 0.0076 yen (Average rate from March 1998 to July 2008)

[36] Original project cost was estimated at the appraisal time for National Highway No. 18 project phase II. Original project cost includes the consulting service for Bai Chay Bridge construction project. Actual project cost includes the consulting service for Bai Chay Bridge construction project and the construction of approach and access roads to Bai Chay Bridge.

Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project

Hanoi Urban Infrastructure Development Project

(Phase I: Public Sector Support to Thang Long North Area)

External Evaluator: Noriyo Aoki, IC Net Limited

0. Summary

The project aims to promote industrial and regional development by infrastructure improvement. The evaluation shows the project's high relevance to Viet Nam's development policy and needs as well as the Japanese government's development aid policy. The project facilities in general are effectively used, leading to such impacts as creating jobs and meeting the demand for infrastructure of the people in the vicinity.

Although the project has been relatively inefficient as its duration has been prolonged, it faces no serious problem in the current operation and management system, and is expected to be managed appropriately in the future.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Road in front of Thang Long Industrial Park

1.1 Background

Viet Nam has achieved a favorable economic growth since the Doi Moi reform and the policy of socialist-oriented market economy were adopted. On the other hand, Hanoi, the capital, began to suffer from such negative aspects of the rapid economic growth as serious congestion in residential and industrial areas due to a population increase and heavy traffic jam on the roads. The Hanoi People's Committee formulated the Hanoi City Urban Development Plan in 1996 to address such negative effects and promote industrialization, while aiming to develop the suburbs

of Hanoi in a systematic and comprehensive fashion. As part of such undertaking, Hanoi City made a plan to thoroughly develop the Thang Long North Area. Since a private developer had already decided to invest in the Thang Long Industrial Park based on Master Plan of Industrial Development in the Hanoi Area by the Development Study, it was decided to conduct a public infrastructure development project.

1.2 Project Outline

The objective of this project is to secure fundamental infrastructure for industrial park and housing development in the Thang Long North Area by constructing basic facilities such as roads, water supply, sewage, waste water treatment, and power supply as Hanoi Urban Infrastructure Development Project (Phase I: Public Sector Support to Thang Long North Area), thereby contributing to increase of industrial production, expansion of employment, increase of export, acquisition of foreign currency, and reducing the congestion in the central part of Hanoi City.

Loan Approved Amount / Disbursed Amount	11,433 million yen / 10,591 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	January 1997 / March 1997
Terms and Conditions	・Interest Rate for Roads, Sewage, Power Supply: 2.3% (Interest Rate for Water Supply and Waste Water Treatment: 2.1%) ・Repayment Period: 30 years (Grace Period: 10 years) ・Conditions for Procurement: General Untied
Borrower / Executing Agency	The Government of the Socialist Republic of Viet Nam/Hanoi People's Committee
Final Disbursement Date	January 5, 2009
Main Contractor (Over 1 billion yen)	Taisei Corporation (Japan), Ebara Corporation (Japan) , Sumitomo Mitsui Construction Co., Ltd. (JV)
Main Consultant (Over 100 million yen)	Nippon Koei Co., Ltd. (Japan)
Feasibility Studies, etc.	Development Study "Master Plan of Industrial Development in the Hanoi Area "
Related projects (if any)	Overseas Investment Loan " Industrial Park Construction Project in Viet Nam"

2. Outline of the Evaluation Study

2.1 External Evaluator

Noriyo Aoki, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: December 2010 – November 2011

Duration of the Field Study: April 1 - 15, 2011; June 1 - 7, 2011

2.3 Constraints during the Evaluation Study

At the time of the project appraisal, not only the industrial estate but also a large distribution center, commercial complex and residential complex for foreigners were to be covered by the infrastructure services of the project. For a while, the F/S was formulated to change infrastructure development in order to improve the local people's residential area as well as the industrial estate. Then the revised F/S was adopted by the Prime Minister's Office and implemented for infrastructure development.

Since comparison between the revised F/S and the actual achievement would result in the most accurate evaluation, a comparison between the value in appraisal documents/the revised F/S and the actual achievement was done to analyze the project cost. However, it was difficult to do the same on the project duration due to the limited information on the revised F/S. The comparison between the revised F/S and the actual achievement was primarily used for the evaluation of the effectiveness. Since the description of the planned and target values in the appraisal documents was insufficient, the data on the use of facilities and the satisfaction of their users were also used for the purpose of reference.

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance with the Development Plan of Viet Nam

(1) Development of Plan at Appraisal

The Government of Viet Nam adopted the "Socio-Economic Stabilization and Development Strategy to the Year 1991-2000," which aimed to double income in the next decade, increase investments in infrastructure, gain high efficiency by creating a conducive employment environment, and promote foreign direct investment. Following this development policy, the plan of the project was made based on the "Master Plan of Industrial Development in the Hanoi Area" which was formulated by JICA and the Hanoi People's Committee.

Hanoi City proposed to disperse the growth poles in the vicinity of the central Hanoi in the "Hanoi City Urban Development Plan" in 1996 and the "Hanoi City New Urban Development Plan" in 1998.

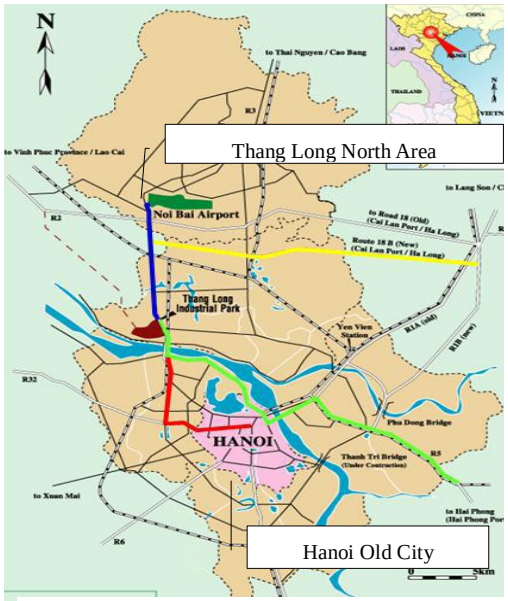
The project is relevant to the socio-economic development plan, industrialization plan and urban planning of the Government of Viet Nam.

[1] A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

[2] ③: High; ② Fair; ① Low

(2) Development Policy at Ex-Post Evaluation

The Government of Viet Nam aims to promote industrialization, development of an export-oriented industry, and introduction of foreign investment, expecting that rapid industry development would be brought by expansion of both the international and domestic markets as stated in the "Five-Year Socio-Economic Development Plan (2006-2010)". Furthermore, the "Hanoi Industrial Development Master Plan by 2030 with a vision for 2050"[3] contains a plan to develop industrial estates in Dong Anh District. The "Master Plan for Hanoi Comprehensive Development by 2030 with vision to 2050" has a plan to develop the Thang Long North Area as an industrial area of high technology and improve livelihood-related infrastructure, such as water supply, waste water treatment, and electric supply for the vicinity of the industrial estate.



Source: Map of Thang Long Industrial Park

Even at the time of the ex-post evaluation, the project has remained significant for industrial development and improving people's livelihoods. The project is consistent with the Vietnamese government's socio-economic strategy, industrialization plan, and city planning.

Therefore, the relevance of the project is high at the time of the appraisal as well as the ex-post evaluation.

3.1.2 Relevance with the Development Needs

3.1.2.1 Needs of Investment Environment

The Thang Long North Area, located 14 km from the Noi Bai International Airport and 16 km from central Hanoi, is able to avoid the congestion. It has favorable site conditions to ensure efficient distribution with a high investment value.

The environment for foreign direct investment in Hanoi and Northern Viet Nam has improved by the development of laws on investment, needs for risk hedge against investments in China, and future possibilities to export products to China.

From the viewpoint of international trade balance, Viet Nam has been suffering from the excessive amount of import since the time of the appraisal. Export-oriented industrial production has been required to address the serious trade imbalance.

[3] Although it was under discussion in the parliament as of April 2011, it was approved by the Prime Minister (Decision Ref1259/QD-TTg) in July.

3.1.2.2 Needs of Infrastructure Development in Suburban Area

The regional development of the residential area around the Thang Long Industrial Park has been promoted. Therefore, the importance of water supply, roads, and electricity supply as basic infrastructure is high even at present. In accordance with the demand of the infrastructure in the rapidly developing suburbs, the project has revised the scope of work in a flexible manner and proceeded to meet the needs accordingly.

3.1.3 Relevance with Japan's ODA Policy

Japan made the Country Assistance Policy for Viet Nam (1994-1999) at the time of the appraisal. The policy set one of the priorities in the assistance to Viet Nam as the promotion of foreign investment for an export-oriented economic growth. The policy also emphasized the assistance for a market-oriented economy. With regard to yen loan projects, the policy placed importance on cooperation to the electricity, transport and environment areas. As the project includes the electricity, road, sewage and waste water management components, it is consistent with the policy.

The project has been highly relevant to Viet Nam's development plan, development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The revised F/S changed the original scope of work. The major outputs and the points that were changed are summarized below.

1. Road: The major outputs are a road in front of the industrial park and one leading to the housing area in the eastern part of the highway. The interchange that had been originally planned was changed to an overpass because motorbike and pedestrian traffic needed to pass the road. This improved traffic under the overpass.
2. Water Supply: The original planned capacity of the water purification plant at 60,000 m^3/day was changed to 51,360 m^3/day due to a low projected demand at the time of the revised F/S. The major reason is that the initially planned large-scale facilities to serve as a growth pole were not expected to be built.
3. Waste Water Treatment: The demand forecasting was below the planned capacity of 66.000 m^3/day at the appraisal, and the capacity was reduced to 38,000 m^3/day because the large-scale facilities were not expected to be built.
4. Sewage: The major outputs are a pumping station and sewage canals. The flood adjustment pond was added to the new plan to control floods in the area. This is considered to be a proper change of scope which reflects the local needs.

5. Electricity: The original plan was to build two (110 kV/22 kV) 80-MW power transmission stations. However, the project built only one for residences and waste water treatment plant because the industrial park's developer constructed a power transmission station inside the park at its own expense.

As stated above, the original plan was properly revised based on accurately projected demand. The final outputs were completed in line with the revisions, contributing to the achievement of the Project Purpose. After the project's completion, Hanoi City took over the construction of the part of the road in the eastern part of the highway and flood control ponds, both of which were delayed due to land acquisition, and is continuing the work with its own budget.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The planned cost at the appraisal was 13,463 million yen in total (7,547 million yen in foreign currency, 5,916 million yen in domestic currency).[4] Of the planned total cost, 11,433 million yen was a Yen Loan.[5]

The actual cost was a total of 14,283 million yen (7,377 million yen in foreign currency, 6,906 million yen in domestic currency[6]), of which the Yen Loan accounted for 10,591 million yen. This was 106.1% of the cost at the initial appraisal. The cost in the revised F/S was 16,625 million yen.[7]

Since new construction work was added to the revised F/S, the cost of the land acquisition increased so that the planned cost was higher than the cost at appraisal. The actual cost was lower than the revised cost (85.9% of the planned cost).

Table 1: Comparison between Planned and Actual Costs (Unit: Million Yen)

	At appraisal			Revised F/S[8]	Ex-post evaluation		
Items	Foreign	Domestic	Total	Total	Foreign	Domestic	Total
Road	453	2,161	2,614	2,205	1,227	1,180	2,407
Water Supply	1,764	479	2,243	2,411	1,716	465	2,181
Sewage	679	773	1,452	1,882	1,424	598	2,022
Waste Water	2,341	631	2,972	2,770	1,232	480	1,712
Electric Supply	1,053	60	1,113	790	259	100	359
Land Acquisition	0	286	286	1,128	0	2,794	2794
Price Escalation	257	173	430	860	-	-	-
Contingency	503	351	854	2,203	-	291	291
Consulting Service	496	361	857	1,375	1,519	391	1,910

[4] Exchange rate in the appraisal document: 1 yen＝100.2 VND
[5] The project cost in the appraisal document
[6] Exchange rate: 1 yen = 132.89 VND, based on the simple average during the payment period
[7] Exchange rate: 1 yen＝116.13 VND, based on the simple average rate of all the months of 2002
[8] Only the total cost was described in the revised F/S, which was not segregated by foreign and domestic currency.

	At appraisal			Revised F/S[8]	Ex-post evaluation		
Taxes and Administrative Costs	0	641	641	1,001	0	607	607
Total	7,547	5,916	13,463	16,625	7,377	6,906	14,283

While the actual cost exceeded the planned cost at the appraisal, it is lower than the revised budget (Sub-rating: ③).

3.2.2.2 Project Period

The project required 147 months as opposed to the planned 42 months. Thus the actual project period was 286% of the original plan (Sub-rating: ①).

One of the reasons for the prolonged duration was that the revised F/S was implemented in accordance with the new regional development plan. Before the detailed plan began, it took six months to select a consulting firm to formulate the F/S and revise the original plan. In the detailed plan, approval from Hanoi City or relevant government departments was required to ensure compliance with regulations and standards, which took considerable time. Therefore, it took 37 months instead of the 13 months estimated at the appraisal. Furthermore, since Hanoi City and the consulting firm used different cost calculation methods when bids were prepared, it was time-consuming to prepare estimates. Moreover, estimates had to be adjusted whenever the cost of materials soared drastically.[9] As Table 2 shows, this meant that the bidding process and selection of construction firms took a great deal of time, requiring 54 months rather than the seven months estimated in the plan. In addition to delays in the construction itself, the prolonged land acquisition influenced the progress of construction. Initially, the land acquisition had been planned to take 15 months. However, it actually took 120 months from December 1998 to December 2008.

Table 2: Comparison between the Planned and Actual Project Period

	Original	Month	Actual	Month
L/A	Feb. 1997		March 1997	
Contract with Consulting Firm	July 1997		Aug. 1999	
Detailed Design				
Road	Nov. 1997 - Nov. 1998	13	Oct. 2000 - Nov. 2003 [10]	37
Water Supply	Dec. 1997 - Sep. 1998	10	Oct. 2000 - Jan. 2002	16
Waste Water Treatment	Jan. 1998 - Oct. 1998	10	Oct. 2000 - Nov. 2003	37
Sewage	Jan. 1998 - Oct. 1998	10	Oct. 2000 - Nov. 2003	37
Electricity	Jan. 1998 - Sep. 1998	9	Oct. 2000 - Oct. 2002	25
Selection of Construction Firms	Nov. 1998 - May 1999	7		54
Road	-	-	Apr. 2002 - Sep. 2005	40
Water Supply	-	-	Apr. 2001 - Mar. 2002	12
Waste Water Treatment	-	-	Apr. 2001 - Jul. 2002	16

[9] The content of F/S, Detailed Design and other documents must be approved by an unanimous decision of the People's Committee.

[10] Since the road and sewage facility were treated as one package, the period of construction for both was the same.

	Original	Month	Actual	Month
Sewage	-	-	Apr. 2002 - Sep. 2005	40
Electricity	-	-	Apr. 2002 - Nov. 2003	18
Land Acquisition	May 1996 - Jul. 1997	15	Dec. 1998 - Nov. 2008	120
Bidding and Construction Period	Jun. 1999 - Jul. 2000	14		
Road	-		Nov. 2005 - Jan. 2009	39
Water Supply	-		April. 2002 – Sep. 2004	30
Waste Water Treatment	-		Sep. 2003 - Sep. 2005	25
Sewage	-		Nov. 2005 - Jan. 2009	39
Electricity	-		Dec. 2003 – Sep. 2005	22
Completion	July 2000		May 2009	
Project Period	42 Month		147 Month	

Source: Appraisal document and information provided by the implementing agency.

As stated above, while the project costs were within the plan, the project period was considerably longer than planned. Therefore, the efficiency of the project is fair.

3.3 Effectiveness (Rating: ②)

Effectiveness has been comprehensively evaluated in terms of the operating rate and facility use, taking into account the users' satisfaction with the facility. The users of the facilities are divided into two types: industrial park and surrounding residents.

First, 3.3.1 examines the operational situation and the extent to which the effect was realized at each of the facilities both qualitatively and quantitatively. Second, 3.3.2 describes as a general statement the outcome at the higher level in the industrial park and surrounding residential area.

Table 3-1 summarizes the evaluation results in accordance with the operating rate and use rate.

Table 3-1: Evaluation in Accordance with Operating Rate and Use of Facility

Facility	Indicator	Planned Value	Achievement Value	Three-Point Scale*
Road	Annual Average Daily Traffic	27,840	58,751	3
Water Supply	Amount of Water Supply (m³/day)	51,360	29,662	2
Waste Water Treatment[11]	Waste Water Treatment (m³/day)	38,000	6,295	1
Electricity	Amount of Transmission	N/A[12]	N/A[13]	-
Sewage	Difficult to set indicator[14]	N/A[15]	N/A[16]	-

*Here are the ratings according to the JICA Yen Loan Evaluation Training Textbook: 3: more than 80% of the planned value; 2: less than 80% and more than 50% of the planned value; and 1: less than 50% of the planned value.

[11] In relation to waste water treatment management, the revised F/S did not clearly refer to the housing area as a target beneficiary. The revised F/S targeted the industrial estate and included other future demand.
[12] There is no description in the appraisal document and the revised F/S.
[13] Despite the availability of the annual amount of electrical transmission, it is difficult to judge the extent of operation from it. The reason is that an operation of electrical transmissions depends on external factors such as the operation of electric power station and composition of transmission networks.
[14] The pressure pumping stations have been set up to prevent flood in case of increase in rainfall. It is difficult to set an indicator because the frequency of use rests on this need.
[15] There is no description in the appraisal document and the revised F/S.
[16] In accordance with the footnote 14, it is difficult to set the actual value.

Table 3-2 summarizes the facilities' ratio of use and user satisfaction.

Table 3-2: Evaluation of User Satisfaction based on Ratio of Facility Use[17]

Facility	Ratio of Use		User Satisfaction		User Satisfaction based on the Weighted Average of Ratio of Use
	Industrial Park	Surrounding Area	Industrial Park	Surrounding Area	
Road	5	5	3	3	3
Water Supply	4	6	3	2.5	2.7
Waste Water Treatment	10	0	1	N/A	1
Electricity	1[18]	9	1	2	1.9
Sewage	2	8	3	3	3

＜Rating Methods＞

1. Evaluate the sub-rating on the basis of a three-point scale according to the user's satisfaction.
   3: High (The users' needs are fully met both qualitatively and quantitatively.)
   2: Fair (The users' needs are fairly met both qualitatively and quantitatively.)
   1: Low (The users' needs are not fully met either qualitatively or quantitatively.)
2. Calculate the user's satisfaction by the weighted average based on the user's ratio.

Table 3-3 shows the final evaluation as the result of the ratings above.

Table 3-3: User Satisfaction based on the Ratio of Use

Facility	Evaluation in accordance with Operation Rate and Use of Facility*	Evaluation by User Satisfaction **	Final Evaluation***
Road	3	3	3
Water Supply	2	2.7	2.2
Waste Water Treatment	1	1	1
Electricity	N/A	1.9	1.9
Sewage	N/A	3	3
Average	-	2.3	**2.2**

* The rating in accordance with the operation rate and use of facility in Table 3-1.

** The rating following evaluation by user satisfaction based on the ratio of facility use in Table 3-2.

*** The rating by weighted average of the two left-hand columns.

Therefore, the rating of effectiveness is judged as ②, i.e., fair.

3.3.1 Operation and Effect of Facilities

(1) Road

Table 4 shows that the actual amount of traffic on the highway overpass exceeded the planned value. Thus the roads that were built in the project are effectively utilized.[19]

[17] The ratio of facility use was calculated based on the operating situation and the interviews conducted in the study.

[18] Before the project, the developer of the industrial estate built the power transmission station at its own expense and continued to use it. The waste water treatment plant uses the electricity generated by the power station that the project built for the plant's operations.

[19] There was no planned value in the revised F/S. Since the scope of work was not changed much, the value at the appraisal was used.

Table 4: Annual Average Daily Traffic on Highway Overpass

(Unit: Number of vehicles)

	Value at Appraisal	Actual in 2008
Annual Average Daily Traffic	27,840	58,751
(Breakdown)		
Automobile	1,530	7,894
Motorbike	22,900	36,172
Truck	2,860	6,152
Bus	550	8,533

Source: Documents of Appraisal and Results of the Study

【Industrial Park】

The improved road in front of the industrial park and the road leading to the highway earned a good reputation owing to the convenience for the traffic of truck and large-scale containers (Fig. 2). People in the vicinity and employees of the industrial estate can safely cross the road under the highway overpass (Fig. 1). 64.3% of the firms in the industrial park rated the road improvement as "Satisfactory" and 35.7% as "Partly Satisfactory"[20].

【Surrounding Residential Area】

Similarly, 89% of the residents in the vicinity responded that "Without the overpass, traffic accidents would frequently occur."[21] The roads provide easy access from the vicinity to the highway and are effectively utilized.

The roads built by the project in the residential area in the eastern part of the highway lead to other areas, which helps to improve the quality of life in the vicinity. 89% of the respondents stated that the roads built by the project were "Very Satisfactory" and 11% "More or Less Useful."[22]

Fig.1: Highway Overpass and Cross Road

Fig. 2: Road in Front of Thang Long Industrial Park

[20] Results of the beneficiary survey given to firms in the industrial estate. The survey had four ratings: "Satisfactory," "Partially Satisfactory," "Less Satisfactory" and "Very Unsatisfactory."

[21] Results of the survey given to residents in the vicinity.

[22] Results of the beneficiary survey given to the residents. The beneficiary survey given to residents in the vicinity had three ratings: "Satisfactory", "Not Satisfactory" and "I do not know." Respondents in the questionnaire were asked to rate the roads as "Very Useful," "Partly Useful," or "Not Useful At All."

(2) Water Supply

The water purification plant has been operating without any trouble. As Table 5 shows, the amount of the water supply has been increasing. The reason for the increase is that the water supply to the central part of Hanoi City across the Red River has been expanded, in addition to the supply to the area surrounding Thang Long. Since the intake of water from the borehole decreased year by year[23], Hanoi City increases the number of boreholes to solve the issues. Although the revised F/S was modified to reduce the capacity, Table 6 shows that the operation rate is still 57.6%. To increase the operation rate, Hanoi City plans to supply water to the city area across the Red River.

As Table 5 shows, the leakage rate increased to 0.56% in 2009 and 1.3% in 2010. Since a leakage rate less than 5% complies with the standards of Hanoi City, it does not pose a problem in terms of operation and maintenance.

Table 5: Water Supply Indicators

	2005	2006	2007	2008	2009	2010
Amount of Water (m^3/year)	167,414	1,717,867	6,867,576	7,725,226	7,364,795	10,826,583
Leakage Rate (%)*	0	0	0	0	0.56	1.3
Water Quality	Complying with Viet Nam Water Quality Standard[24]					

Source: Information from Hanoi Water Works, April 2011

Table 6: Comparison between the Planned and Actual Water Supply Indicator

	Plan of Revised F/S	Actual[25]	Operation Rate
Amount of Water (m^3/Year)	51,360	29,662	57.6%

Source: Information from Hanoi Water Works, April 2011

【Industrial Park】

The water supply plant is able to supply up to 17,000 m^3/day for the industrial estate. Out of the companies in the industrial park, 78.6% replied that it was "Satisfactory" and 21.4% "Partly Satisfactory."[26]

[23] Results of the interview of an O&M organization at a water purification plant (April 2011).

[24] Turbidity 0.28 (standard value <2), pH 7.8 (standard value 6.5-8.5), Ammonia 0 mg/l (standard value <3mg/l), Nitrite compound 0 mg/l (standard value <3 mg/l), chlorite 19.88 mg/l (standard value <250 mg/l), hardness 138 mg/l (standard value<300 mg/l), magnesium 0.187 mg/l (standard value <0.3 mg/l), Iron 0.01 (standard value<0.3 mg/l). The water quality after purification in July 2011 was from the Hanoi Water Works.

[25] This was the actual value in 2010.

[26] Results of the Beneficiary Survey given to companies in the industrial estate

Fig. 3: Water Purification Plant

Fig. 4: Water Tank

【Surrounding Residential Area】

Up to 20,000 m^3/day of water is supplied to the vicinity.[27] In addition to 16,000 households in Thang Long, 15,000 households in the districts across the Red River are covered. A total of 54,000 people get benefit. The result of the Beneficiary Survey shows that 54% responded "Satisfactory" and 46% "Not Satisfactory". Among the reasons are periodical turbidity[28] and water outage.[29] (These reasons may be related to the state of electricity in Hanoi City and the prolonged water outage due to the shortage of underground water.)

(3) Waste Water Treatment Plant

The amount of waste water treatment and BOD_5[30] were adopted as the indicators for the operation of the waste water treatment plant. Table 7 shows those indicators. BOD_5 (mg/l) is less than 30 (mg/l) of the Hanoi City Sewage Standards. Table 8 indicates that the amount of waste treatment water is lower than the plan.

Table 7: Indicators for the Waste Water Treatment Plant

	2008	2009	2010
Amount of Waste Water Treatment /Year (m^3)	307,388	1,220,181	1,888,505
BOD_5 (mg/l)	12	11.5	8.5

Source: Hanoi Sewage and Drainage State Owned Limited Company, April 2011

[27] Results of interviews conducted with O&M organization in April 2011

[28] Hanoi Water Works has concluded that the turbidity often occurs during weekends, which is when the industrial park does not use water, because of the water pressure of the distribution system.

[29] Results of the Beneficiary Survey to the residents

[30] BOD stands for Biochemical Oxygen Demand. It is an indicator of water pollution and particularly important for measuring the quality of industrial sewage. BOD is the amount of oxygen that microbes consume when they dissolve organic matters in water. The larger the BOD, the dirtier the water. BOD_5 is the amount of oxygen consumed when microbes are cultivated in water at 20℃ for five days.

Table 8: Comparison of Planned and Actual Indicators for Waste Water Treatment Plant

	Plan in Revised F/S	Actual at Ex-post Evaluation	Operating Rate
Amount of Waste Water Treatment /day (m^3)	38,000	6,295[31]	16.6%

Source: Hanoi Sewage and Drainage State Owned Limited Company, April 2011

【Industrial Park】

Although the construction of the waste treatment facility was completed in September 2005, it took two years to complete the construction of sewage pipeline between the industrial park and the waste water treatment plant, which should have been done by Hanoi City. The facility began actual operation in 2008. The developer of the industrial park and the companies that entered the park have used the waste water treatment facility built by the developer. At present, they use their own plant as well as the project's plant. Therefore, the operating rate is only 16.6%. However, in the Beneficiary Survey, 78.6% of the companies of the industrial park replied that operations were "Satisfactory" and 21.4% that they were "More or Less Satisfactory"[32].

【Surrounding Residential Area】

In the residential area, households are left to conduct their own sewage treatment. A natural filtration drainage system is used for the sewage of the surrounding residential area. As of 2011, Hanoi City does not have a budget to construct a drainpipe for the residential area. Despite the needs of the area, the residents are unable to use the waste water treatment facility.[33]

(4) Electricity

As shown in the indicators in Table 9, the power transmission station has been appropriately operating, and power outages have been brief.

Table 9: Indicators for Power Transmission Station

	2006	2007	2008	2009	2010
Amount of Power Transmission (MWh/Year)	-	-	90,804	90,696	129,955
Time of Power Outage (Time/Year)	15.2	16	16	17	15
Voltage Drop at Peak Hour	+/-5%	+/-5%	+/-5%	+/-5%	+/-5%

Source: Hanoi EVN April and July, 2011

【Industrial Park】

Before the project started, the developer had constructed a power transmission station at its own cost for building the industrial park and preparing for companies that were to operate in the

[31] The total annual amount of waste water treatment divided by the number of working days of factories except Sundays and holidays

[32] Results of the Beneficiary Survey given to companies in the industrial estate. There were four ratings: "Satisfactory," "Partially Satisfactory," "Less Satisfactory," and "Very Unsatisfactory."

[33] The sewerage pipeline has connected southern Hanoi City to the Red River since 2011 to prevent natural filtration of household waste. This waste water is discharged into the Red River. The project's waste water treatment plant does not treat household waste. In the future, Hanoi City will have a plan for this matter.

park. The developer still uses the station.[34] This has occurred because the developer's construction of the power transmission station proceeded faster than the land acquisition and approval in the project, which took much longer than planned. As stated in "3.2 Efficiency," in the revised F/S, the power transmission station for the industrial park planned at the time of appraisal was deleted, and only the one for people's livelihoods remained. Thus the companies that entered the industrial park do not use the project's power transmission station while the waste water treatment plant does.[35]

【Surrounding Residential Area】

The power transmission station built in the project covers one-third of the population of Dong Anh district, or 0.1 million people[36]. According to the Beneficiary Survey, 36.4% of the respondents believe that it is "Satisfactory" and 63.6% "Not Satisfactory[37]." The reasons for the dissatisfaction include unplanned power outages, dropdown of voltage and others. The unplanned power outage is due to problems with the electricity supply in Hanoi City overall and is not directly related to the project.[38] This was taken into consideration when judging the effectiveness.

(5) Sewage

The sewage canal from the industrial park to the surrounding residential area and the ponds for flood control[39] are operated properly to discharge the water and contribute to prevention of floods when rainfall increases. They function without any problems.

【Industrial Park】

Out of the companies in the industrial park, 71.4% rate the sewage and rain water drainage as "Satisfactory" and 28.6% "Partly Satisfactory[40]."

【Surrounding Residential Area】

76.2% of the people in the surrounding residential area were satisfied with the sewage and flood control adjustment pond and 23.8% were partly satisfied. This shows that the sewage and rain water systems have a good reputation in the vicinity.[41]

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[34] The power transmission station belongs to Hanoi EVN, which also implements O&M of the facility.

[35] 1,238 MWh/year was used in 2010.

[36] Results of interviews with Hanoi EVN (April 2011).

[37] Results of the Beneficiary Survey given to the residents. The Beneficiary Survey given to the residents in the vicinity was conducted with three ratings for evaluation: "Satisfactory," "Not Satisfactory," and "I do not know."

[38] Results of the questionnaire survey to the residents as Beneficiary Survey

[39] The sewage canal and flood adjustment pond were completed within the period. They refer to the sewage canal connecting the industrial park and the surrounding residential area and flood control pond located near the residential area of the vicinity.

[40] Results of the Beneficiary Survey given to the companies in the industrial estate. The evaluation was based on four ratings: "Satisfactory," "Partially Satisfactory," "Less Satisfactory," and "Very Unsatisfactory."

[41] Results of the Beneficiary Survey given to the residents. The evaluation in relation to the sewage and flood control was based on four ratings:"Satisfactory," "Partly Satisfactory," "Partly Unsatisfactory," and "Very Unsatisfactory."

3.3.2 Outcome at Higher Level

Since the developer developed the industrial estate, it was in charge of sales and inviting companies to the estate. As a result, the project's contribution to the outcome at a higher level is indirect and limited. However, the basic infrastructure development of the project to spur private investment has contributed to various achievements of the companies that entered industrial estates. Below is a description of the state of the outcome.

(1) Industrial Park

Out of the total capital of US$290 million for the 274-ha industrial park, the developer, a Japanese firm, invested 58%, and a Viet Nam state-owned company 42%. The construction period was divided into three phases. All the plots for all the construction phases were sold out in 2008. The project proceeded while companies were buying plots in the park and preparing to start operating their factories.

Table 10: Construction Period for Industrial Park by Developer

	Area of Industrial Estate	Construction Period	Sold-Out Period
First Phase	121 ha	July 1998 –July 2000	2007
Second Phase	74 ha	March 2003 -December 2004	2008
Third Phase	79 ha	January 2006-September 2007	2008

Source: Information of the Developers

Table 11: Achievement of Company Entry into Thang Long Industrial Park

	December 2006	December 2010
Number of Entry Companies[42]	63	88
Japanese Companies	57	82

Source: Information of the Developers (Figures for each year were not available)

The companies' reasons for entering the Thang Long Industrial Park included the following: good geographical location; good access to the Noi Bai Airport as well as the surrounding roads; tax privileges for the companies in the industrial park by the Vietnamese government; and services and reputation of the developer. 14.3% of the companies in the industrial estate replied that one of the reasons for entry was public infrastructure development.[43] The interviews with the developer also revealed that public support in the form of infrastructure development gave a sense of security to companies that invested in Viet Nam for the first time.[44]

[42] "Entry company" refers to the start of operations in the case of factories and the start of business in the case of offices.

[43] Results of the Beneficiary Survey given to companies in the industrial estate (Multiple answers were possible) (April 2011)

[44] Results of interviews with the developer (April 2011)

(2) Surrounding Residential Area

At the appraisal, there was a plan to develop large-scale commercial facilities and a housing complex. However, only the housing complex for workers was built by Hanoi City.[45] People from the outside moved in and built houses in the vicinity. The influx of people into the area has accelerated partly due in infrastructure development. According to the Dong Anh District Office, the population of the Thang Long North Area, which consists of six communes, has quadrupled in the last decade.

3.3.3 Results of Calculations of Internal Rate of Return (IRR)

The Economic Internal Rate of Return (EIRR) is basically calculated in the same way as the one at the time of the appraisal. It was recalculated by replacing the projected construction cost and benefits with the actual value.

Here are the items used for calculation.

1) Expenditure Cost: Construction costs of the Thang Long Industrial Park and the project cost, factory construction cost and operation costs of the Thang Long Industrial Park, loss of agriculture products in the developed area.

2) Benefit Cost: Value-added industrial production in the Thang Long Industrial Park.

3) Project Life: 20 years

EIRR was 16.44% at the appraisal and 37.04% at the ex-post evaluation.

The EIRR calculation at the appraisal was an economic analysis mainly targeting the industrial estate. Since the revised F/S includes the water supply and electricity supply for the vicinity, there are limits to the accuracy of any variation analysis when using the calculation method at the appraisal. However, to ensure consistency in the premises behind the comparison, EIRR was recalculated based on the method used with the appraisal. The cost items were the same as the planned ones. On the other hand, the benefits increased largely because the developer invited mainly export-oriented companies that produced high value-added industrial products, and the total added value of industrial products was much more than the planned one. Consequently, the EIRR turned out to be more than double the planned value.

The Financial Internal Rate of Return (FIRR) was not calculated because the project included development of such public infrastructure items as roads, which do not generate income.

In light of the above, this project has been effective to a certain extent. Therefore its effectiveness is fair.

3.4 Impact

3.4.1 Current Situation of Impact

[45] Results of interviews with the Hanoi People's Committee (April 2011)

(1) Impact that has been brought by basic infrastructure development for industrial estate

The project's contribution to the impact is more indirect than the one to the outcome. The current situation of the impact is described below according to the items that were expected at the appraisal.

1) Increase of industrial production and export, and acquisition of foreign currency

As of December 2010, out of the 88 enterprises in the Thang Long Industrial Park, 80, or 90%, are export-oriented.[46] The total annual export amount of the 88 enterprises is US$2.3 billion in 2010, which amounts to 3.2% of the total export of Viet Nam. The total investment amount by the enterprises in the Thang Long Industrial Park is US$1.58 billion in 2010.

Table 12: Indicators on Thang Long Industrial Park

	2006	2010
Number of Enterprises	63	88
Number of Export-Oriented Enterprises	58	80
Total Investment Amount by Enterprises	US$1.08 billion	US$1.58 billion
Number of Employees	26,374	56,000
Annual Export Amount	US$1.2 billion	US$2.3 billion
Percentage of Total Export Amount in Viet Nam	2.2%	3.2%

Sources: Information from the developer (The actual figures of each year are not available), JETRO statistics, Viet Nam statistics

2) Employment Creation

The Thang Long Industrial Park generated 26,374 jobs as of December 2006 and 56,000 as of December 2010. Thus the park generated more jobs than expected[47]as the Development Study in 1995 had forecasted 40,000 jobs in the park.

According to the beneficiary survey on the workers of the Thang Long Industrial Park, 90.4% of the interviewed workers replied that the income of their household increased after they started working in the park. 82.3% of the respondents answered their income increased by more than 30%.[48]

5% of the potential workforce in Dong Anh District was employed in factories in the Thang Long Industrial Park.[49]

3) Other Economic Impacts

The rural villages around the Thang Long Industrial Park have become commercial areas due to the increase of workers and population with urbanization. The areas' commercial activities have increased. The positive impact on people in those areas is evident, particularly in the eastern area of the highway. The market keeps growing as thousands of workers buy goods there on a

[46] It refers to enterprises whose main business is production of goods to export to foreign countries.
[47] Based on interviews
[48] Based on the beneficiary survey of workers
[49] Interviews with the Dong Anh District

daily basis. The living standards in the areas have improved.[50]

(2) Impact which has been brought by housing development in the vicinity

While the population of Dong Anh was 0.24 million in 1997, it was 0.35 million in 2010[51]. With the development of infrastructure, the traffic network has expanded to the vicinity, which induces influx of people.[52]

(3) Decrease of Density of Hanoi City

As the old town of Hanoi is a densely populated area with many historical buildings, Hanoi City plans to keep the administrative functions in the old town, and transfer the residential area to the suburbs. Since the congestion has been controlled by the policy of traffic control on entry into the old town and promotion of residential area transfer to the suburbs, it is not clear to what extent the project has helped reduce congestion. However, for Hanoi City whose old town was packed with shops, residences, and factories in a disorderly fashion, it is fair to say that the development with infrastructure upgrading in the suburbs has prevented congestion in the old town from worsening[53].

3.4.2 Other Impacts

(1) Impact on Natural Environment

The Ministry of Science and Technology (MOSTE) approved the EIA of this project in May 1999. The project had no collateral condition of the EIA.[54] As for environmental consideration during the construction, the contractor reached an agreement on construction time[55] with people in the vicinity to prevent noise and dust by construction vehicles. Expanding the farm road and making it wider ensured the safety of the passersby and vehicles.[56] The developer and the project surveyed surface water and underground water before the construction started. In relation to embankment materials, a survey was conducted to check whether or not it had heavy metal and chlorine organic compound. The construction has been done with consideration to the impact on the surface water, underground water and soil.[57]

According to the interviews with people in the vicinity[58], there are no serious negative

[50] Interviews with community people and the Dong Anh District
[51] Information of Dong Anh District
[52] The results of interviews with the Dong Anh District and people in the vicinity. (July 2011)
[53] With the exception of an increase in a limited area due to a municipal merger, the population of the old town in Hanoi City has been stable for the last decade without any increase or decrease. (Source: Hanoi Statistical Yearbook)
[54] Interviews with a consulting firm
[55] If the surrounding land is farmland, the construction was continued at night. If it is a housing area, the construction was done in daytime.
[56] Interviews with a consulting firm
[57] Interviews with a consulting firm
[58] The residents of three areas, i.e., the industrial estate, the eastern side of highway, and the surrounding highway were sampled. Eventually, 42 people were interviewed.

impacts on the natural environment.

(2) Resident Transfer and Land Acquisition

In addition to the land acquisition at the time of the appraisal, the revised F/S required acquisition of a new land. The land acquisition proceeded based on the Prime Minister's approval. The transfer of residents was done in accordance with the Resettlement Action Plan (RAP).

The number of households that required the compensation is 6,400. Out of them, 6,120 needed compensation for farmland, and 280 for residences. The transferred households are 170. The total amount of land for resident transfer and land acquisition is 1,938,738 m^2.[59]

Land acquisition requires the standard procedures such as planning, appraisal survey, notice, approval of residents, and decision-making. The acquisition of land was done in accordance with the normal procedures. However, it took considerable time to complete these procedures and obtain an official approval.[60] Along with prolonged construction, illegal occupation in public land occurred. Due to the soaring land price, it was necessary to adjust the amount of the compensation to the landowner. Although the initial plan stipulated that only landowners with a land title were eligible for compensation, compensation was required for people who did not have land titles. In flood adjustment ponds, fisherpersons who had been fishing in a customary way were compensated. Some residents rejected cash compensation and demanded compensation by land.

Laws and regulations had to be revised and formulated to compensate various types of people since the existing laws and regulations were unable to meet diverse demands.[61]

In general, the impacts that were expected in the appraisal documents have been successfully achieved.

3.5 Sustainability (Rating: ③)[62]

The Hanoi People's Committee supervises the project while other agencies are in charge of its Operation and Maintenance (O&M). To evaluate the sustainability of the project's impact, the sustainability for each component is assessed, and then all the results are comprehensively analyzed as shown in the Appendix 2. It is fair to say that the effect of the project has high sustainability because there is no problem on O&M.

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[59] The flood adjustment pond needed the acquisition of 35-ha land. In addition, the expansion of the roads in the eastern side of highway and the connection canals for flood adjustment pond required the additional land.

[60] As a result, whereas the plan was to take one year and three months at the appraisal, it took ten years.

[61] Results of interviews with the Hanoi People's Committee. Residents who object to the compensation price have the right to file complaints against the compensation committee of the District People's Committee. Residents who still have objection on the revised price of compensation have the right to appeal complaints against Hanoi City. If necessary, Hanoi City addressed such complaints by revising the existing rules and regulations or formulation new ones. Decree No.197/2005/ND-CP 24/1/2005 and Decision No.108/2009/QD-UBND 29/9/2009 of HPC are newly formulated laws and regulations.

[62] See the Appendix 2 in relation to the rating standard for each component and the rating results

3.5.1 Organizational Aspect of Operation and Maintenance

(1) Hanoi People's Committee (Supervising Agency)

The agencies in charge of O&M are the Department of Construction (DOC) and the Department of Transport (DOT). The division of labor between the DOC and the DOT is clear. The DOT is in charge of roads while the DOC is responsible for other facilities. At the time of the ex-post evaluation, both the DOC and the DOT have relevant coordination and cooperation with the Hanoi People's Committee. It is fair to say that, as the supervising agency, the Hanoi People's Committee is managing its functions and personnel properly.

(2) Roads

The O&M agency is Transport Construction Joint Stock Company, a former state-owned company that was converted to a joint stock corporation in 2005. The company has the duty to report to the DOT quarterly. The company employs 350 people and manages O&M of roads in Hanoi City and the vicinity of the Red River area. The roads of the project are managed by the company's Thang Long-Noi Bai O&M Office which has 15 staff members.

(3) Water Supply

The O&M agency is Hanoi Water Works which has seven affiliated companies. At present, Hanoi Water Works is state-owned and will be privatized in accordance with the privatization plan. Two of the affiliated companies have been privatized, and the rest will be privatized by 2015. Hanoi Water Works employs about 2,400 people in total. The Department of Construction of the Hanoi People's Committee is its supervising organization. Hanoi Water Works receives a budget from the Hanoi People's Committee while submitting technical reports to the Department of Construction four times annually, including a financial report once a year. The O&M office for the project is located in the Water Supply facility compound, which has 57 personnel working on O&M 24 hours a day.

(4) Sewage and Waste Water Treatment

Hanoi Sewage and Drainage State Owned Limited Company of the Hanoi People's Committee is in charge of O&M of sewage and waste water treatment. Although the budget is allocated by the Hanoi People's Committee, Hanoi Sewage and Drainage State Owned Limited Company technically reports to the Department of Construction and Finance. The company employs about 1,700 people and covers Hanoi City and the suburbs that had been outside the jurisdiction of Hanoi City before the municipal merger. There are three waste treatment plants in Hanoi. The waste treatment plant of the project is the largest among them.

The O&M team of the waste water treatment plant has 60 personnel working 24 hours a day. The personnel conduct a periodic water quality test involving sampling and analysis and send analysis results to the central institute of the company.

(5) Electricity Supply

Hanoi High Voltage Network Management Company, No. 30, is an O&M company which belongs to Hanoi Electricity of Viet Nam. Hanoi Electricity of Viet Nam is a state-owned company under Electricity of Viet Nam (EVN). Hanoi Electricity of Viet Nam has 30 electrical power transmission stations. The power station of the project is one of them. The O&M company sends a monthly activity and monitoring record to Hanoi Electricity of Viet Nam.

3.5.2 Technical Aspect of Operation and Maintenance

(1) Roads

The staff members of Transport Construction Joint Stock Company use the O&M manual of the Department of Transportation and maintain the roads properly. The O&M technical level of the staff members poses no problem. The company conducts training for the staff members on its own. The daily maintenance activities are to repair dents of pavement, manage weeds, clear road shoulders, clean the bridge surface and drain outlet, and check bridge columns and abutments. The regular maintenance activities are to put leading marks on the road, install signals, and check parapets.

(2) Water Supply

At the time of the handover, Hanoi Water Works received the O&M manual from the consulting firm and OJT training. The personnel of Hanoi Water Works take training to maintain the technical standards. Their daily maintenance duties are to confirm untreated water, observe all the facilities, and check the grids and water quality. Their periodic maintenance activities are to verify the quality of underground water, and check materials and machines every three to six months. They also check boreholes, pumping stations and purifying facilities and clean the purification facilities once a year.

(3) Sewage and Waste Water Treatment

The lecturers of the Institute of Environmental Technology at the Viet Nam Academy of Science and Technology are periodically invited to conduct training in order to upgrade the maintenance ability and technical standards of the personnel of Hanoi Sewage and Drainage State Owned Limited Company. The company also recruits new young staff members from the academy. The company receives OJT training at the handover from the consulting firm, and utilizes the O&M manual. The company’s periodic maintenance duties for the waste water treatment facility are to change parts, replenish oil, and clean bearings. At present, it is not necessary to change parts since the operation started three years ago. The company carries out disposing garbage, checking the canals and repairing the faulty parts as O&M activities.

(4) Electricity Supply

The personnel of Hanoi High Voltage Network Management Company, No. 30, have a satisfactory technical level. They use the manual of Electricity of Viet Nam (EVN) and follow the EVN standards. Hanoi High Voltage Network Management Company implements staff training courses as necessary. The company personnel check facilities and equipment daily, and test the facilities once a year. They also check all the equipment parts twice a year.

3.5.3 Financial Aspect of Operation and Maintenance

(1) Hanoi People's Committee (Supervising Agency)

The technical supervising department of the Hanoi People's Committee receives financial reports from each O&M agency. The state-owned company submits budget requests to the finance division of the Hanoi People's Committee. The non-state company submits a financial report and is subject to the audit.

(2) Roads

The expenditure budget is disbursed according to the O&M plan that was explained at the handover. The budget itself is sufficient to maintain the roads of the project. The future budget is also expected to be confirmed.[63]

Budget and Expenditure for Roads (Unit: VND)

Year	Plan	Actual
2010	45,000,000	45,000,000
2011	70,000,000	-

Source: Transport Construction Joint Stock Company, April 2011

(3) Water Supply

The cost requirements have been increasing because the costs of sterilization of turbid water caused by decrease in ground water and electricity for purifying the water. The budget is disbursed according to the O&M plan that was explained at the handover. The budget itself is sufficient to maintain water supply at the current level. The future budget is also expected to be confirmed.[64]

Budget and Expenditure for Water Supply (Unit: VND)

Year	Requested Budget	Actual
2007	6,418,140,200	6,484,893,700
2008	8,214,536,800	8,510,847,000
2009	17,032,444,400	18,201,165,600
2010	36,633,837,700	37,331,598,030

Source: Hanoi Water Works, April 2011

[63] Interview with Transport Construction Joint Stock Company
[64] Interview with Hanoi Water Works

(4) Sewage, Waste Water Treatment

In relation to the cost of waste water treatment, the Hanoi People's Committee collects the waste water treatment fee only from the companies of the Thang Long Industrial Park. It needs the cost for replacing parts, oil replenishment, and maintenance of bearings. The waste water treatment budget by the financial department of the Hanoi People's Committee is replenished for the insufficient budget.

Budget and Expenditure for Sewage and Waste Water Treatment (Unit: VND)

Year	Requested Budget	Actual
2010	9.000,000,000	9.600,000,000
2011	9.000,000,000	-

Source: HSDC, June 2011

(5) Electricity Supply

Since Hanoi Electricity of Viet Nam is state-owned, the financial condition is fairly good. The firm is expected to have the same amount of budget in the future to maintain electricity supply at the current level. The actual expenditure on electricity supply in the last few years has varied from year to year due to the costs of maintaining items.

Budget and Expenditure for Electricity Supply (Unit: VND)

Year	Plan	Actual
2007	N/A	4,806,256,303
2008	N/A	6,449,682,324
2009	N/A	5,340,314,463
2010	N/A	4,837,619,309

Source: Hanoi EVN, April 2011

3.5.4 Current Status of Operation and Maintenance

The current status of O&M is evaluated on the basis of observations by a local infrastructure expert, interviews with the personnel, and confirmation of the O&M records.

The facilities of the roads, electricity and water supply are in a fairly good condition. However, people often dump garbage near the flood control adjustment ponds. This might damage the sewage system in the future. Thus people in the communities and the company related with the garbage disposal must be aware of how to dispose waste properly. The outlet of the dewatering channel has been eroded since 2009.[65] Although the outlet faces no serious problem at this point, it must be repaired sooner or later.

The sustainability of the O&M of the project is high because the O&M faces no problem in organizational, technical and financial aspects.

[65] When the water level of Red River is low, the outlet has been easily eroded due to the water pressure. The other reason of erosion is that the type of soil in the vicinity of the outlet is sand. At present, the training of O&M gives the guidance to the technical officers regarding this point.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project aims to promote industrial and regional development by infrastructure improvement. The evaluation shows the project's high relevance to Viet Nam's development policy and needs as well as the Japanese government's development aid policy. The project facilities in general are effectively used, leading to such impacts as creating jobs and meeting the demand for infrastructure of the people in the vicinity.

Although the project has been relatively inefficient as its duration has been prolonged, it faces no serious problem in the current operation and management system, and is expected to be managed appropriately in the future.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the executing agency

(1) In relation to the low operation rate of the waste water treatment facility, Hanoi City should make mid-term and long-term plans for full utilization of the facility including the domestic waste water treatment in the future.

(2) For O&M for canals and flood adjustment ponds, the project must gain communities' cooperation to enhance awareness in order not to dump garbage and waste in those areas. If the present situation continues, the dumping will harm the operation of the facilities and cause a serious problem in terms of sustainability.

4.2.2 Recommendations to JICA

None in particular

4.3 Lessons Learned

(1) The project is a good example of functional collaboration with the private sector and the public sector, as well as utilization of the JICA schemes of Development Study, and Yen Loan. The project was developed to support a private sector project right after a company decided to invest in industrial estate development based on the results of the Master Plan. The project also began to develop the infrastructure for the surrounding residential area. The project has achieved the intended economic effect. The successful factors of the project in a broad sense, including impact, are implementation of the qualified Development Study (JICA project), development by a private firm which has know-how on industrial estate (private sector's efforts), and support to the private sector by Yen Loan in the form of infrastructure development (JICA project).

(2) It is important to flexibly change the content and size of plans in industrial and regional development. The project had a good start in developing an industrial estate in a timely manner. However, Hanoi City has rapidly developed suburbs, requiring changes to the original plan of the project. The plan was subsequently revised.

Comparison of the Original and Actual Scope of the Project

	Original	Actual
1.Project Output Road Water Supply Sewage Waste Water Treatment Electricity Supply	As stated in Appendix 1	As stated in Appendix 1
2.Project Period	February 1997 - July 2001 (42 Months)	March 1997 - May 2009 (147 Months)
3. Project Cost Foreign Currency Local Currency Total Yen Loan Portion Exchange Rate	 7,547 million yen 5,916 million yen (651,943 million VND) 13,463 million yen 11,433 million yen 1 yen ＝ 100.2 VND (As of October 1996)	 7,377 million yen 6,906 million yen (917,738 million VND) 14,283 million yen 10,591 million yen 1 yen = 132.89 VND (January 2000 - December 2008, weighted average)

Appendix 1: Output Changes

At Appraisal	At Completion in July 2009	Changes of Scope of Work
1. Road ・Road (W = 50 m, L=4.0 km) ・One (1) interchange ・Collector, urban area (W = 40 m) 3.0km ・Embankment/road for irrigation. canal (30 m) 2.5 km ・Eastside of highway (W = 40 m) 1.0 km	1. Road ・Main Road A1 1.8 km, 1 Bridge ・Main Road B1 1.2 km ・Main Road B2 0.7 km ・Overpass 0.7 km ・Two Connection Roads: 2.4 km and 0.9 km ・Collector, 2,643 m, one (1) Bridge	・Road under overpass of highway was changed into main road A1, B1, and B2 due to higher material costs and the difficulty of land acquisition, for a total of 3.7 km. ・Interchange was changed into an overpass to allow for traffic by pedestrians and motorbikes ・The frontage road for the highway was changed into a connection road. ・The frontage road for irrigation canal was changed into a 2,643-m collector road and 1 bridge. ・Road on the eastern side of the highway was changed into a connection road.
2. Water Supply ・Water purification plant with capacity of 60,000 m^3/day ・one 4,000 m^3-reservoir ・7 Boreholes ・10.5 km piping system from plant	2. Water Supply ・Water purification plant with capacity of 51,360 m^3/day ・a 4,000 m^3-reservoir ・2.4 km pipeline ・Borehole in 8 places ・2-km pipeline to the purification plant	・Water purification plant treating 60,000 m^3/day was changed into 51,360 m^3/day. ・One borehole was added to increase the amount of water due to the shortage of intake water. ・Pipeline from well to purification plant was changed from 10 km to 2 km because a well near the purification plant was available. ・A pipeline for the water supply was added for the vicinity.
3. Sewage ・Pumping station with capacity of 900 m^3/minute ・Drainage canal: 8.0 km ・4.0-km canal embankment (height: 2.2 m)	3. Sewage ・Pumping station with capacity of 1,200 m^3/minutes ・Two (2) pressure pumping stations ・Canal for flood control 1.0 km ・0.37-km Canal (3m×3m×2 cells) ・4.95-km Viet Thang canal , 6 Bridges ・2.7-m pipeline ・0.9-km pipeline ・Intake 0.62 km ・0.46-km drainage outlet, one (1) Bridge ・23.9-km communication cable ・17.9-km electrical cable ・Flood control pond	・The 900 m^3/minute capacity of the pumping station was increased into 1200 m^3/minute due to the difficulties of land acquisition for flood control pond, and two pressure pumping stations was added. ・Sewage canal was improved as 4.95 km Viet Thang canal, canal for flood control 1.0 km with 7 bridges ・4.0 km canal embankment (height of 2.2 m) was used for canal construction. ・Pipeline was needed in other places except the pipeline for sewage canal. ・Intake was added and the place itself was changed due to the low level of underground water, which is fluctuating with the level of the Red River.

At Appraisal	At Completion in July 2009	Changes of Scope of Work
		・Sewage outlet with bridge is added due to their necessity ・Electrical cable was added for the facility operation. ・The flood control pond was renovated by using existing pond.
4. Waste Water Treatment ・Waste water treatment plant with capacity of 66,000 m^3/day	4. Waste Water Treatment ・Waste water treatment plant with capacity of 38,000 m^3/day	・The capacity was reduced to 38,000 m^3/day because demand projection was lower than that of appraisal.
5. Electricity ・Two power transmission stations (110 kV/22 kV) 80 MW ・Transfer of existing distribution line (110 kV) ・22 kV new distribution line: 6.0km	5. Electricity ・One (1) power transmission station (110 kV/22 kV)80 MW ・Power transmission line (110 kV) 4.8 m ・Removal of existing power transmission line (110 kV) 3.5 km	・The two power transmission station was changed into one place, because the developer constructed the power transmission station on their own. One power transmission station was built for the residential area and waste water treatment plant.

Sources: Technical Completion Report, July 2009; Appraisal Document; survey results

Appendix 2: Sustainability Rating Results

(1) Rating Criteria

Supervising Agency	Criteria
Institutional Aspect	・Are the supervisory system and personnel appointment appropriate? ・Have the related organizations developed relationships enabling them to report and contact each other at any time? ・Has a monitoring system based on environment-related rules and regulations been established?
Technical Aspect	・Have technical skills reached the level enabling operations to be supervised appropriately?
Financial Aspect	・Has the necessary financing been arranged to carry out the above activities?
O/M Agency	**Criteria**
Institutional Aspect	・Has an organization for O&M (and decision-making) been built? ・Is there a possibility of privatization? If so, would it affect the project's continuation?
Technical Aspect	・Are there enough O&M staff members? ・Have personnel with the expertise needed to operate the facilities been appointed, such as specialized technicians? ・Has a training system been organized for O&M? What is the status of the actual training implementation? ・Has an operational manual been devised and is it actually utilized? ・Have the O&M activities been recorded appropriately?
Financial Aspect	・Are revenues and expenditures balanced? ・Has a system to collect user fees been established with an eye on cost recovery? ・If a deficit continues, would government subsidies be provided and are finances being managed appropriately?
Maintenance	・Have the facilities been maintained so that the planned functions can be carried out? ・Has the maintenance environment been established so that, for example, spare parts can be procured? ・Do regular maintenance activities cover the necessary activities? ・Are problems addressed appropriately?

(2) Rating Results (③)

		Institution	Technical	Financial	O/M	Results
Supervising Agency: HPC		3	3	-	-	3
	Road	3	3	2	3	2.75
	Water Supply	3	3	3	2	2.75
	Waste Water Treatment	2	2	2	2	2
	Electricity	3	3	3	3	3
	Sewage	2	2	2	2	2
Results		2.7	2.7	2.4	2.4	**2.58**

＜Method of Rating Calculation＞

1. Put sub-rating described below based on the comparison and actual achievement for each component.
2. 3: Highly satisfactory
   2: Small concern, no major problem at evaluation
   1: Major concern at evaluation
3. Calculate simple average according to the result of sub-ratings

Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project
Rural Infrastructure Development and Living Standard Improvement Project (III)

External Evaluator: Kumiko Shuto, IC Net Limited

0. Summary

A total of 246 subprojects throughout Viet Nam were implemented in the five sectors, namely, the road, electrification, water supply, irrigation and afforestation sectors, under the project (The subprojects in the afforestation sector were undertaken in 53 communes in five provinces). Relevance of the project which promoted local development is very high. Effectiveness is also high because the project prompted local industry development, improved rural living conditions, and ameliorated the local natural environment. Efficiency is fair mainly because the project period was longer than planned. Sustainability of the project has challenges including budget constraints in the road, water supply and afforestation sectors and partially insufficient operation and maintenance status of the water supply sector.

Therefore, the project is evaluated to be satisfactory.

1. Project Description

Project Location

People traveling by motorcycle and bicycle on the provincial road constructed by the project in Quang Tri Province

1.1 Background

Viet Nam, which has a population of about 86 million[1] in an area equal to 87% of Japan, has seen a steady economic growth since 1986 under the Doi Moi economic reforms which promoted market economy. The growth of the country's gross domestic product (GDP) was as high as eight to nine percent per annum between 1992 and 1996, owing to the increased foreign direct investment and export. However, the economic growth was concentrated on the urban areas and the poverty rate of the rural areas, where 70 percent of the country's total population lived[2], was nearly five times that of the urban areas[3]. The widening urban-rural economic gap had become a serious issue as rural areas were left behind by development. Under these circumstances, the Government of Japan provided loans to Viet Nam for the development of rural infrastructure including rural roads, electricity, and water supply. The loan also covered the irrigation and afforestation sectors, which aimed at agricultural development and environmental conservation.

1.2 Project Outline

The objective of the project is to promote rural livelihoods, local industries, and the natural environment by constructing/ improving rural infrastructure, such as road networks, electricity distribution systems, water supply systems, irrigation systems and afforestation, thereby contributing to the improved living standards of rural residents.

Approved Amount/ Disbursed Amount	12,000 million yen/ 11,547 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1999/ March 1999
Terms and Conditions	Interest Rate: 1.8% (Road, Electrification, and Irrigation Sectors), 1.3% (Water Supply Sector), 0.75% (Afforestation Sector) Repayment Period: 30 years (Road, Electrification, Water Supply and Irrigation Sectors), 40 years (Afforestation Sector and Consulting services) (Grace Period: 10 years) Conditions for Procurement: Multiple conditions
Borrower/ Executing Agency	The Government of the Socialist Republic of Viet Nam/

[1] According to the 2009 data by the General Statistics Office of Viet Nam (http://www.gso.gov.vn), Viet Nam's population was around 77 million in 1999.
[2] According to the 2009 data by the General Statistics Office of Viet Nam (http://www.gso.gov.vn), the rural population represented 76% of the total population in 1999 and the corresponding figure for 2009 was 70%.
[3] The data in Statistical Year Book of Viet Nam 2009 by the General Statistics Office of Viet Nam show that the poverty rates in the urban and rural areas are 9.0% and 44.9%, respectively, in 1998. In 2008, they were 3.3% and 18.7%, respectively.

	The Ministry of Planning and Investment (MPI)
Final Disbursement Date	December 2008
Main Contractor (Over 1 billion yen)	―
Main Consultant (Over 100 million yen)	Nippon Koei Co., Ltd./ OPMAC Corporation/ NTC International Co., Ltd./ KATAHIRA & ENGINEERS Inc./ JAVIDEC International
Feasibility Studies, etc.	OECF "Special Assistance for Project Sustainability (SAPS) on Rehabilitation Loan (I)", July-October 1998
Related Projects	JICA "Rehabilitation Loan (I), (II)" JICA "Rural Infrastructure Development and Living Standard Improvement Project (I)(II)"

2. Outline of the Evaluation Study

2.1 External Evaluator

Kumiko Shuto, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: December 2010 – October 2011

Duration of the Field Study: March 6 – 26, 2011 and June 25 – July 3, 2011

2.3 Constraints during the Evaluation Study

The project covers Viet Nam as a whole and the subprojects were implemented in most of the rural provinces. The number of subprojects in each sector was as follows: 94 in the road sector, 109 in the electrification sector, 27 in the water supply sector, 16 in the irrigation sector, and five provinces (17 districts and 53 communes)[4] in the afforestation sector, which makes the total of 246 subprojects in the four sectors and five provinces covered in the afforestation sector. Thus it was not possible to visit all the project sites due to time and resource constraints. Field visits were made to some sample project sites in seven provinces for an in-depth study. Document analysis[5], interviews with, and questionnaire survey to, the executing agency were conducted to elicit comprehensive information on all the subprojects implemented. The locations of the field visits and data collection methods are as shown in Table 1.

[4] The administrative units in Viet Nam are provinces, districts, and communes, in descending order.

[5] Some of the primary data on each sector except for the afforestation sector were already gathered by a survey entitled "Asset Survey for Small Scale Pro-Poor Infrastructure in Viet Nam" commissioned by JICA in 2010. This study made use of the relevant data collected in this survey.

Table 1: Locations of the field visits and data collection methods

Region	Province	Sector	Data collection method
North	Dien Bien	Road, Water supply	Interview, Observation, Beneficiary survey
Central	Quang Tri	Road, Afforestation	Interview, Observation
Central	Thua Thien Hue	Irrigation, Afforestation	Interview, Observation, Beneficiary survey
Central	Quang Nam	Electrification, Afforestation	Interview, Observation
Central	Quang Ngai	Water supply, Afforestation	Interview, Observation
Central	Phu Yen	Afforestation	Interview, Observation
South	Tien Giang	Road, Electrification	Interview, Observation, Beneficiary survey

The sample sizes and the numbers of subprojects[6] covered in the beneficiary surveys conducted in the three provinces are shown in the following table.

Table 2: Sample sizes and numbers of subprojects in the beneficiary surveys

Province	Sector Upper row: No. of people; Lower row in parenthesis: No. of subprojects					
	Road	Electrification	Water supply	Irrigation	Afforestation	Total
Dien Bien	71 (3)	–	47 (1)	–	–	118 (4)
Thua Thien Hue	–	–	49 (1)	104 (2)	93 (3 districts)	246 (3+3 districts)
Tien Giang	24 (1)	102 (3)	–	–	–	126 (4)
Total	95 (4)	102 (3)	96 (2)	104 (2)	93 (3 districts)	490 (11+3 districts)

3. Results of the Evaluation (Overall Rating: B[7])

3.1 Relevance (Rating: ③[8])

3.1.1 Relevance with the Development Plan of Viet Nam

At the time of the appraisal, the Government of Viet Nam regarded rural development as the priority issue for the realization of social stability in the Five-year Socio-economic Development Plan for 1996 to 2000. The Five-year Socio-Economic Development Plan for 2006 to 2010 analyzes that the government's efforts to improve rural infrastructure typified by the development of rural roads, irrigation and electricity has led to the improvement of living standards of rural residents. The Plan further aims at strengthening the rural economy by continuing the policies on rural development adopted in the Plan for 1996 to 2000.

These government policies indicate that the national development plans in Viet Nam

[6] As for the afforestation sector, the unit of "subproject" was not used. Instead, district was used to account for the areas covered. Thus, the number of districts is shown in the table.
[7] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[8] ③: High, ②: Fair, ①: Low

have consistently focused on rural development since the time of the appraisal to the time of the ex-post evaluation. The project, which tried to promote rural economy through rural infrastructure development, was well aligned with Viet Nam's development policies.

3.1.2 Relevance with the Development Needs of Viet Nam

The needs and urgency for Japanese yen loans were very strong at the time of the appraisal since the development of basic rural infrastructure and environmental protection were pressing problems. Table 3 shows the conditions of each sector at the time of the appraisal in 1998 as well as the ex-post evaluation.

Table 3: Conditions of each sector at the time of the appraisal and ex-post evaluation

Sector	Conditions in 1998	Conditions at the ex-post evaluation
Road	The pavement rates for the provincial roads and rural roads were 23.4% and 3.7%, respectively, while the corresponding figure for the national roads was 78%.	The pavement rates were 83.5% for the natural roads and 53.6% for provincial roads (as of 2004)[9]
Electrification	The rate of electrified households in rural areas was only 27.9%[10].	The rate of electrified households in rural areas was 94.6% as of 2009.[11]
Water supply	Only 130 (23%) out of 569 rural cities, town and villages had water supply stations. Around 60% of the residents in these cities, towns and villages received water from the stations.	The percentage of rural residents who were connected to the piped water system was 5.5% in 2000 and 10.6% in 2008[12].
Irrigation	About 40% of Viet Nam's farm land had irrigation systems. However, the systems were built before 1945, during the French colonial times, and 245 facilities were in need of rehabilitation by 2010.	There were 8,000 medium- to large-scale irrigation systems in 2006. Out of 9.7 million ha, 8.34 million ha (86%) are irrigated (as of 2007)[13].
Afforestation	Viet Nam has lost five million ha, or 35% of the total forest land, since the 1930s.	The forest land was 28.8%[14] in 1998. It recovered to 44.6%[15] in 2009.

Although 12 years have passed since the appraisal to the ex-post evaluation, the needs for rural development are still very strong in the five sectors as shown in Table 3.

3.1.3 Relevance with Japan's ODA Policy

At the time of the appraisal, Japan's ODA policy for Viet Nam included the promotion of agriculture and rural development as one of the priority areas. In providing yen loans to Viet Nam, Japan emphasized infrastructure development in such areas as transport and

[9] Viet Nam Road Administration (2004)
[10] "Population and Housing Census Viet Nam 1999" (http://www.gso.gov.vn/default_en.aspx?tabid=476&idmid=4&ItemID=1841)
[11] "The 2009 Viet Nam Population and Housing Census"(http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=10799)
[12] "Result of the Survey on Household Living Standards 2008" (http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=9647)
[13] Data by United Nations Environmental Programme (http://www.rrcap.unep.org/pub/soe/vietnam/issues/pressure/forest_pressure.htm)
[14] Data by United Nations Environmental Programme (http://www.rrcap.unep.org/pub/soe/vietnam/issues/pressure/forest_pressure.htm)
[15] "Statistical Yearbook of Viet Nam 2009"

electricity and gave priority to rural development for minimizing the regional gap. Japan has been assisting Viet Nam in agricultural and rural development through its ODA. Thus it is fair to say that the project is highly consistent with Japan's ODA policy.

This project has been highly relevant to Viet Nam's development plans, development needs, as well as Japan's ODA policy; therefore its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

In implementing the project, a direct line of command between the Ministry of Planning and Investment (MPI) and the Department of Planning and Investment (DPI) of each province was established. In the MPI, the Central Project Management Unit (CPMU) was set up which communicated directly with the Provincial Project Management Units (PPMUs) established at the DPIs[16]. According to the interviews with MPI and DPIs, decision and communication were made promptly and smoothly between the MPI, the supervising and coordinating body of the central government, and the DPIs, which held the main responsibility for implementing subprojects, as a result of this direct line. This structure was first introduced in the preceding projects, Rural Infrastructure Development and Living Standard Improvement Project (I) and (II), with the aim of managing the numerous subprojects throughout Viet Nam efficiently. The project also employed this structure because the effectiveness of this institutional setup was confirmed during the said projects. However, some weaknesses concerning insufficient management capacity of both the MPI and the provinces were identified during the implementation of the preceding projects. This project tried to minimize such weaknesses by improving the staffing at the MPI, strengthening communication with the provinces, and streamlining necessary paperwork.

The project implemented a number of subprojects in the five sectors, namely, the road, electrification, water supply, irrigation and afforestation sectors, throughout Viet Nam. The MPI had the final decision-making power in selecting the subprojects. Here is the procedure of the subproject selection: First, the MPI asked the provinces to submit a request of subprojects together with the feasibility studies (F/S) filled out in the format the MPI provided; Second, the DPI in each province submitted the F/S and a priority list of the subprojects to the MPI after taking into account the sector-wise five-year development plans and having discussions with the provincial people's committee and other relevant organizations; and Third, the MPI examined the documents submitted by the provinces and made a final selection of the subprojects. In prioritizing subprojects in the province, the

[16] For the MPI's other projects, communication and decisions are made through a complicated line such as the MPI's department in charge to the MPI's high level, then to the Provincial People's Committee, and finally to the province's DPI.

province used the selection criteria set by the MPI for each sector (facility size, investment amount, beneficiary size, etc.) and took into consideration social aspects such as poverty rates of the districts or communes. For the selection of subprojects, the provinces submitted to the MPI the lists of candidate subprojects together with the results of the feasibility studies (F/S). The MPI then finalized the selection based on the lists provided.

Table 4 shows the comparison between the plans and actual performance of the outputs.

Table 4: Comparison of planned and actual outputs

Sector	Original plan (at appraisal)	Revised plan	Actual performance (at ex-post evaluation)
Road	43 subprojects: 390 km of provincial and rural roads, 113 km of urban roads, 162 m of bridges (26 provinces)	94 subprojects (17 new and 77 improved): 988 km of provincial and rural roads, 41 km of urban roads, 1,805 m of bridges (55 provinces)	94 subprojects (17 new and 77 improved): 932 km of provincial and rural roads, 35 km of urban roads, 1,805 m of bridges (55 provinces)
Electrification	79 non-electrified villages: 1,766 km of electric lines, 510 transformers (39 provinces)	109 non-electrified villages: 2,638km of electric lines, 39,672 kVA (38 provinces)	109 non-electrified villages: 2,535 km of electric lines, 39,602 kVA (38 provinces)
Water supply	20 water supply stations: a total capacity of 83,000 m^3 (20 provinces)	27 water supply stations: a total capacity of 69,200 m^3 (26 provinces)	27 water supply stations: a total capacity of 85,900 m^3 (26 provinces)
Irrigation	Rehabilitation of 15 irrigation systems in the central region which was badly hit by drought in 1998. (Total 67,169 ha of irrigated areas) (11 provinces)	Rehabilitation of 16 irrigation systems (Total 29,158 ha of irrigated areas/ 36,631 ha of benefited crop areas) (16 provinces)	Rehabilitation of 16 irrigation systems (Total 38,576 ha of irrigated areas/ 52,626 ha of benefited crop areas) (16 provinces)
Afforestation	14 sites in the Northwest region, Northern and Southern coastal regions, and Northeastern Mekong Delta region for the creation and improvement of production forest aiming at environmental conservation and social forestry promotion (36,950 ha) (14 provinces)	20,779 ha of afforestation, 18,957 ha of natural forest protection, 4,438 ha of forest for assisted natural regeneration (total of 44,174 ha) in the five provinces in the Central region. Forestry infrastructure and rural infrastructure construction including nurseries, fire break lines, access roads, rural roads, a bridge and small irrigation systems. Training and extension on forest management and livelihood development (5 provinces)	20,253 ha of afforestation, 18,045 ha of natural forest protection, 3,843 ha of forest for assisted natural regeneration (total of 42,141 ha) in the five provinces in the Central region. Forestry infrastructure and rural infrastructure construction including nurseries, fire break lines, access roads, rural roads, a bridge and small irrigation systems. Training and extension on forest management and livelihood development (5 provinces)

Source: Appraisal documents, Project Completion Report by the MPI, Questionnaire to the MPI

Revisions of the plans[17] were made in all the five sectors due to substantial changes in the project scopes. The details of the changes of the plans and the actual outputs in each

[17] The revisions of the plans were made after the time of the loan agreement signing. The provinces conducted F/S and then the MPI selected the subprojects. The revised plans were based on the MPI's final selection of the subprojects.

sector are explained below.

(1) Road Sector

Outputs were substantially increased as a result of the surplus of budgets stemming from the foreign exchange gain during the implementation period. The number of subprojects was increased from 43 in the original plan to the actually implemented 94. Construction and improvement of provincial and district roads as well as access roads to commune centers were preferred to urban roads, taking particular note of the importance of rural development. To compare the revised plan and the actual performance, all the subprojects were implemented as planned and most of the outputs were produced as expected. Table 5 indicates the details of the outputs of the 94 subprojects.

Table 5: Details of the outputs in the road sector

Area	48 flat areas, 42 mountain areas (4 unknown)
Mode	30 new, 60 improved (4 unknown)
Category	49 provincial roads, 40 district roads, 1 Commune road, 3 urban roads (1 bridge only construction)
Class[18]	Class I: 0, Class II: 2, Class III: 4, Class IV: 29, Class V: 29, Class VI:16, Rural A:3, Rural B: 3 (8 unknown)

Source: Documents provided by JICA

(2) Electrification Sector

Outputs increased considerably because the preliminary cost estimation at the time of the appraisal was not so accurate that more subprojects turned out to be financially feasible with the originally secured budget. The original plan was to implement subprojects in 79 non-electrified villages. However, 109 villages were actually electrified by the project. The comparison of the actual outputs with the revised plan indicates that, while the total electric line length and total capacity decreased slightly, other outputs were produced as expected in the revised plan.

It was realized that, while the poverty rates and required costs for the subproject were taken into consideration in selecting subprojects, clear selection criteria were not necessarily set in each province.

(3) Water Supply Sector

The original plan at the time of the appraisal was to construct water supply stations in

[18] Roads in Viet Nam are categorized into six groups: from Class I to Class VI. Rural roads have two categories: Rural A and Rural B. Criteria for classification are as follows: Class II: >6,000 PCU/day, Class III: >3,000 PCU/day, Class IV: >500 PCU/day, Class V: >200 PCU/day, Class VI: <200 PCU/day, Rural A: a road connecting a commune and village (Road width of 3.5 m), Rural B: a Commune road (Road width of 3.0 m). PCU stands for Passenger Car Unit.

relatively large towns. However, the plan was revised to the construction of smaller-scale stations of capacity between 1,000 m^3 and 2,000 m^3 because of the change of policies which prioritized development of smaller towns. Thus the total number of subprojects increased from 20 to 27; so did the total capacity from 83,000 m^3 to 85,900 m^3.

(4) Irrigation Sector

To meet the latest needs, the project rehabilitated 16 irrigation facilities, as opposed to 15 facilities as originally planned. Although the total irrigated areas were 38,576 ha, slightly less than the original plan, it was more than 29,158 ha targeted in the revised plan. The benefited crop areas were also considerably more than the revised plan.

(5) Afforestation Sector

The original plan was substantially revised due to the changes in conditions caused by a natural disaster, changes in projects sites and target forest categories, and the introduction of new project components. The afforestation areas decreased from 36,950 ha planned originally to 20,568 ha of the actual performance. However, the total areas including natural forest protection areas and assisted natural regeneration areas amount to 43,664 ha, which is 20% more than the original afforestation plan. On the other hand, the revised plan targeted the total area of 44,151 ha, which was slightly more than the actual performance.
The revised plan introduced new components such as forestry and rural infrastructure development, training and extension on forest protection and fire control, which aimed at enhancing sustainability of forest management. As for these components, all the expected outputs were produced as planned in the revised plan.

As explained above, substantial changes in the outputs were made in all the sectors and the changes were reflected in the revised plans. In the road and electrification sectors, the outputs were increased substantially in the revised plans while the remaining three sectors did not change the scale of the outputs from the original plan. In all the sectors, the expected outputs were produced as targeted in the revised plans. The total road length, electric line length and capacity, and afforestation areas saw slight decreases from the revised plans. These decreases were mainly for meeting the latest needs and socio-economic and natural conditions in which each subproject was situated. Thus these changes were proved to be appropriate.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost was 2,076,447 million Vietnamese dong (VND), which was 147% of the original plan of 1,411,900 million VND. However, due to the depreciation of VND

against the Japanese yen[19], the total cost in yen was 15,781 million, which was 112% of the original plan of 14,119 million yen. In comparison with the revised plan, the actual cost was within the planned budget, or 98% of the cost in the revised plan.

Table 6: Planned and actual cost of each sector[20]

(Unit: million yen)

Sector	Original plan (at appraisal)			Revised plan			Actual performance			Difference between original plan and actual	Difference between revised plan and actual
	Counterpart fund	Loan portion	Total	Counterpart fund	Loan portion	Total	Counterpart fund	Loan portion	Total		
Road	530	2,718	3,248	2,874	3,767	6,641	1,738	4,635	6,373	196%	96%
Electrification	530	2,718	3,248	937	1,523	2,460	548	1,462	2,010	62%	82%
Water supply	423	2,175	2,598	789	2,109	2,898	789	2,109	2,898	112%	100%
Irrigation	318	1,631	1,949	525	1,368	1,835	498	1,329	1,827	94%	100%
Afforestation	318	1,631	1,949	271	1,442	1,713	576	1,474	2,050	105%	120%
Consulting services	0	1,127	1,127	96	527	623	96	527	623	55%	100%
Total	2,119	12,000	14,119	5,492	10,736	16,170	4,245	11,536	15,781	112%	98%

Source: Documents provided by JICA, Questionnaire to the MPI

The costs for the electrification, irrigation, afforestation sectors and consultation services were within the original plans, while the costs for the water supply and road sectors were 112% and 196% of the original plans, respectively. The cost increase in the latter sectors was mainly due to the increased number of subprojects. Although the cost of the afforestation sector was 120% of the revised plan, the other sectors kept their costs within the budgets in the revised plan[21].

Although the project cost was slightly higher than planned, it should be regarded appropriate considering the fact that the total outputs were increased and the actual cost was mostly as planned in the revised plan.

3.2.2.2 Project Period

While the planned project period was 70 months, the project actually took 118 months,

[19] The exchange rate was 0.01 yen to one VND at the time of the appraisal. However, a notable depreciation of VND against yen happened during the project period and the average exchange rate during that time was 0.0076 yen to one VND.

[20] The exchange rate used for calculating the costs for the original plan was 0.01 yen to one VND (as of October 1998). The average exchange rate between the period of March 1999 and December 2008, i.e., 0.0076 yen to one VND, was used for the calculation of the revised plan and actual cost. While the total loan amount was 11,547 million yen, the amount in the table is shown as 11,536, which is exclusive of the commissions.

[21] Rising inflation rates have become a major problem in Viet Nam particularly since 2007. "World Economic Outlook (October 2010)" by the International Monetary Fund (IMF) indicates the inflation rates of Viet Nam as follows: With the inflation rate in 2000 as a standard of 100, the rate was 101 in 2001, 105 in 2002, 108 in 2003, 119 in 2004, 129 in 2005, 138 in 2006, 156 in 2007, 187 in 2008. It can be observed that the rates have soared particularly since 2007. In the project, however, most of the subprojects were completed before 2007 and the influence of the hike in inflation rates remained nominal.

or 169% of the planned duration.

Here are the main reasons for the extended period of time: (1) partial changes in designs frequently occurred because there was a time lag for 1.5 to two years between the F/S conducted at the province and the start of the actual implementation period (particularly the road and electrification sectors); (2) the number of subprojects was increased mainly due to the foreign exchange gain (particularly the road and electrification sectors); (3) delay in land acquisition happened (particularly the road and water supply sectors); (4) delay in construction happened due to severe weather such as flood and heavy rain (particularly road and water supply sectors); and (5) substantial reconsideration of the target areas and target forest categories was necessary owing to the flood damage which hit the central region (the afforestation sector).

Although the project period was significantly longer than planned, the project cost was mostly as planned considering the increase of the output. Therefore, efficiency of the project is fair.

3.3 Effectiveness (Rating: ③)[22]

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators[23]

(1) Road Sector

According to the data of 31 subprojects for which information on traffic volume was available, the annual average daily traffic counted as Passenger Car Unit (PCU) increased from 193 to 531 on average, which was a 180% increase. Among the 31 subprojects, 12 roads had an increase of less than three times, 10 roads between thee times and less than five times, two roads between five times and less than ten times, and seven roads more than ten times. Many roads increased traffic volume by three times. Some increased their traffic volume as much as 20 times.

(2) Electrification Sector

The project provided electricity to 109 non-electrified villages. The average rate of electrified households was very high, reaching 96.8%[24]. A small number of the facilities, i.e., 4.2% (four out of 99 facilities which answered the questionnaire) were facing the lack of capacity. They were not fully meeting the growth of demand in the area.

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[22] The rating of the project's effectiveness takes into account the evaluation of the project's impact.

[23] Operation and effect indicators were not set at the appraisal since the project was approved before JICA introduced such indicators for the Japanese ODA loan projects. They were not set at the completion of the project either. The project is a nationwide multi-sector project which covers 246 subprojects in four sectors and five provinces for afforestation. While part of the data was obtained through existing documents and a questionnaire survey, it was difficult to gather data which served as operation and effect indicators for each subproject within the study framework. Thus the study relied on the data on subprojects collected by the "Asset Survey for Small Scale Pro-Poor Infrastructure in Viet Nam."

[24] Based on statistics on 82 subprojects for which data was available.

(3) Water Supply Sector

The total capacity of the 27 water supply stations was 85,900 m^3 and the average capacity per facility was 6,136 m^3. The total of the average water supply per day of the 27 facilities was 46,910 m^3, or 3,351 m^3 per facility. It indicates that the facilities used only 54.6% of their capacity whereas the planned facility utilization rate[25] at the time of the planning was 65.3%.

Three facilities had the low utilization rates of less than 20%. The main reason for the low utilization rate was that the population growth was unexpectedly lower than projected at the time of facility designing in smaller towns.

On the other hand, four facilities supplied an amount of water beyond their designed capacity. The total population served was 137,322, based on the data of 25 facilities where the information was available. The average rate of population served was 68.7%, based on the data of 17 facilities. The average rate of unaccounted-for water was 22.2%, with two facilities exceeding 50%. These facilities faced financial difficulties which had lead to high rates of unaccounted-for water. The difficulties included inability to repair broken water piles and to purchase new water meters for replacing degraded ones.

(4) Irrigation Sector

The total irrigated areas after the rehabilitation of 16 irrigation systems were 38,576 ha, which exceeded 29,158 ha targeted in the revised plan. The average irrigated area per facility was 1,837 ha. The average actual irrigated area rate was 98%, with only three out of 16 facilities not reaching 100%. The great majority of the irrigation systems achieved efficient irrigation systems as planned. The total benefited crop areas were 52,626 ha, which was far more than the planned 36,631 ha[26]. The total number of beneficiary farm households was 450,950 and the average number of benefited households per facility was 22,548.

(5) Afforestation Sector

The afforested areas in the five provinces in the central region were 20,547 ha. The total intervention areas including natural forest protection and assisted natural regeneration were 43,664 ha. It was predicted that the survival rate of the planted trees would be 10 to 20% if only the local tree varieties were planted. Thus the project chose to mix fast-growing acacia trees with local species. As a result, the survival rate was as high as 87%. Apart from afforestation and forest protection, forestry and rural infrastructure was

[25] The facility utilization rate is calculated by dividing the average water supply amount (m^3) by the capacity of the facility (m^3/day).

[26] The benefited crop areas include farm land which became arable due to mitigation of salt or flood damage after the project.

developed by the project[27]. The cumulative number of local residents who took part in the training and extension services on forest protection and livelihood development was 11,656. The total number of households in the nearby communities[28] was 44,530. Therefore, 26.2% of the households were deemed to have participated in the training, assuming that each household sent one member to the training.

In terms of job creation for local residents, about 2.7 million man/day of planting work was offered throughout the project period and the average 5.4 million VND (approximately 40,000 yen) of income per household was generated.

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

As data needed for quantitative analysis were not available, analysis for the internal rate of return was not possible.

3.3.2 Qualitative Effects

As shown in Table 2 in 2.3, the beneficiary survey was conducted in three provinces in order to measure qualitative effects of the project. The survey collected information from a total of 490 facility users and nearby community residents. The following is the sector-wise qualitative effect confirmed by the survey.

[27] 10 nurseries, 443 km of fire break lines, 240 km of access roads, 23 watch towers, and 17 guard stations were built as part of forestry infrastructure development. As for rural infrastructure, 42 km of rural roads, one bridge and small irrigation systems (10 check dams and 10km of irrigation canals) were developed.

[28] The total number of the households in the Communes in which the target forests are located. The data is based on the 2003 statistics in the five target provinces.

(1) Road Sector[29]

94.7% of the road users shortened their travel time to markets, commercial facilities, schools, hospitals and government offices. They shortened their travel time by 39.8 minutes on average both in the dry and rainy seasons.

The main purposes of travel on road were as shown in Fig. 1. 88.2% of the road users answered that they used the road more frequently than before.

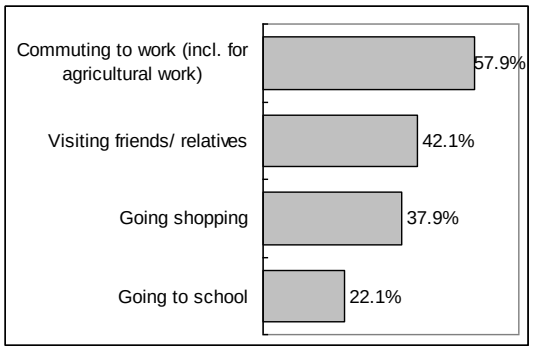

Fig. 1: Main purpose of travel by road users (multiple answers)

(2) Electrification Sector[30]

50.0% of the respondents said that the frequency of power outage was once or twice a week in the dry season, while 39.2% answered every other day. When power outage happened, it usually lasted for 13.1 hours on average. In the rainy season, on the other hand, the average power failure duration was 4.1 hours. 72.7% of the respondents said that the frequency of power outage in the rainy season was less than once a week. As for power voltage, 69.3% answered it was "very stable" or "stable," confirming that the supply was stable to a certain degree.

The problem was that the conditions of electric power supply had a substantial gap between the dry and rainy seasons. Frequent and long power outage in the dry season posed a problem. A small number of the respondents also pointed out that power failures sometimes occurred without prior announcement and insufficient power voltage was causing inconveniences. The unannounced power failures occurred because the O&M organizations failed to conform to the rule to give communes notice of the power outage schedule. The low power voltage problem was a result of the insufficient capacity of the transformers installed. In light of these drawbacks pointed by the beneficiaries, both the designs and operation of some facilities seem to have some challenges, although the extent of the challenges seems rather limited.

[29] The beneficiary survey in the road sector was conducted in three subprojects in Dien Bien Province and one subproject in Tien Giang Province. The total number of the survey respondents was 95. The four roads surveyed are: three provincial roads (3 at a flat location and one at a mountain location) and one district road (at a mountain location). Their classes are as follows: one Class IV, two Class VI, and one Rural B.

[30] The beneficiary survey in the electrification sector was conducted in three subprojects at three Communes in Tien Giang Province. The total number of the survey respondents was 102.

(3) Water Supply Sector[31]

62.0% of the users of the water supply stations answered that they were supplied with a sufficient amount of water throughout the year. 31.6% answered that they were able to obtain a certain amount of water. 67.1% of the respondents answered yes to the question "Do you obtain higher quality of water than before?" All the 32.9% of the respondents who answered "no" to the question were the users of the Tuan Giao water supply station in Dien Bien Province. They strongly complained about high mineral contents, strong chlorine smell and an impermissible level of turbidity. The water source of the Tuan Giao water supply station was a nearby lake and thus the maintenance of water quality posed a challenge. According to the interviews with the facility managers, the complaints of the users were partly attributable to the facility's weak water quality management.

Apart from the three facilities where the beneficiary survey and field visit were conducted, some facilities posed challenges in water quality management. Some facilities did not undertake legally required procedures of water management; others were concerned about deterioration of water quality which might be caused by an imminent population growth in the area[32].

(4) Irrigation Sector[33]

While the average crop area per farm household before the project was 0.58 ha, the figure increased to 0.74 ha, which was a 30% increase. Rice was the primary crop in the surveyed areas and the annual average rice yield increased from 4.36 tons to 7.02 tons, which was an increase by 61%. In terms of yield per ha, the increase was from 3.84 tons to 4.81 tons, or a 25% increase, in the dry season, and from 4.05 tons to 5 tons, or a 23% increase, in the rainy season (Box 4). 74% of the respondents said that the rehabilitation of the irrigation system had led to the production of substantially higher quality crop. The remaining respondents answered that the quality was improved to some degree. For example, the farmers observed changes such as more and heavier rice on the rice plant or vegetables grown better than before. 70.2% of the farmers felt they were able to obtain a sufficient amount of water. Those who did not feel that way pointed out problems including unannounced power outage at the pump station, dumping of waste in the irrigation canals by the local residents, and delays in necessary repair work at the irrigation system.

It was confirmed that the project increased the arable crop areas significantly. The agricultural yield, as well as yield per ha, had also been increased. The quality of the crop

[31] The beneficiary survey in the water supply sector was conducted at the Tuan Giao water supply station in Dien Bien Province and at the Phu Bai water supply station in Thua Thien Hue Province. The total number of the survey respondents, who were the users of the water supply systems, was 49.

[32] JICA (2011) "Asset Survey for Small Scale Pro-Poor Infrastructure in Viet Nam"

[33] The beneficiary survey in the irrigation sector was conducted in two subprojects, namely Phong Chuong and Cua Lac irrigation systems, in Thua Thien Hue Province. The total number of the survey respondents, who were the farmers who used the facilities, was 104.

had also seen improvement.

(5) Afforestation Sector[34]

66.7% of the survey respondents attended the training and extension services on forest management and livelihood development offered by the project. 99.0% of the respondents answered that they were satisfied with the afforestation work "very much" or "to some extent." All the respondents answered that they were satisfied with the tree species planted by the project "very much" or "to some extent." Furthermore, the satisfaction rate of the respondents in the forestry and rural infrastructure development exceeded 90%.

In light of the above quantitative and qualitative effects, the project has largely achieved its objectives, the promotion of rural livelihoods (mainly the road, electrification and water sectors), local industries (mainly the road, electrification, and irrigation sectors), and the natural environment (the afforestation sector). Therefore the project's effectiveness is high.

3.4 Impact

3.4.1 Intended Impact

(1) Road Sector

76.3% of the road users answered that the expenses for motorcycle and bicycle maintenance were less than before due to the improvement of the road. 53.9% answered that they were able to save fuel cost because the travel time became shorter. Almost all the respondents felt that their living conditions had improved "very much" or "to some degree" due to the upgraded roads. The main reasons for their improved living conditions include better access to major places, more business and employment opportunities, as shown in Figure 2.

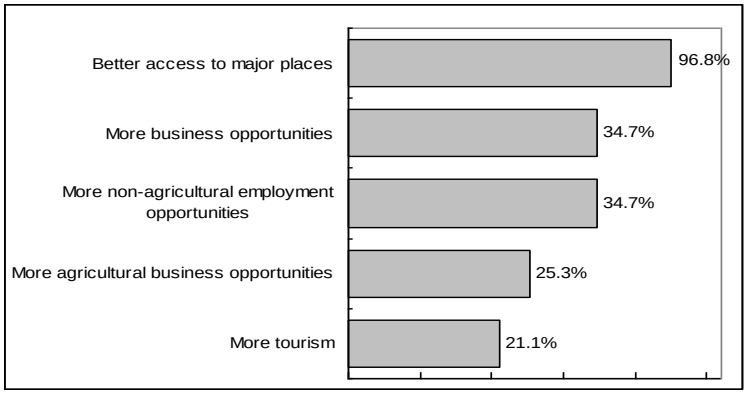

Figure 2: Reasons for better living conditions by use of road (multiple answers)

[34] The beneficiary survey in the afforestation sector was conducted in three districts in Thua Thien Hue Province. The total number of the survey respondents, who were the community members near the target forest, was 93. The respondents included 29 people from ethnic minority groups: eight Pha Hy, 13 Ka Tu, and eight Pa Ko.

Impact of the project in the road sector was observable because the project helped the road users save the cost of transportation and promote business and employment opportunities, which in turn led to livelihood development of the road users.

Because of the increase of the traffic volume, the frequencies of traffic accidents have changed on many roads. 54.1% of the subprojects saw an increase of two to three traffic accidents per year. However, most of the accidents were not serious because bicycles and motorcycles were the main modes of transportation. On the other hand, since 80% of the subprojects were improvement, rather than new construction of roads, the road conditions became better than before. Thus, 27.0% of the subprojects experienced a decrease of traffic accidents. 18.9% of the subprojects saw no difference in the number of traffic accidents[35].

Box 1: Road improvement in Quang Tri Province

The central road in Dakrong District in Quang Tri Province connects to Provincial Road 558. It was newly constructed by the project. Before the project, the four neighboring communes had a narrow road passable only by pedestrians. People used a boat for carrying goods. After the opening of the central road, easy access among the four commune was realized and the traffic volume increased from 150 PCU/day (annual average) in 2001 when the road was partially completed, to 300 PCU/day in 2004. Bridges and culverts were also constructed and transportation by motorcycle became much easier. After the completion of the road, a school for the minority people was constructed since more than 80% of the local residents are ethnic minorities. Business and government offices were also constructed and construction activities are still actively ongoing alongside of the road now.

A motorcycle on a bridge on the central road in Dakrong District

(2) Electrification Sector

The survey to the households and businesses in the electrified village revealed that they used a variety of electric appliances such as TV and cell phones as shown in Figure 3**:** 98% of the respondents answered that their living conditions improved because of the use of these electric appliances. Specifically, they pointed that they were now able to obtain information on health, raise agricultural and commercial income, communicate easily by cell phone, save agricultural labor, improve the study environment for their children, and so forth.

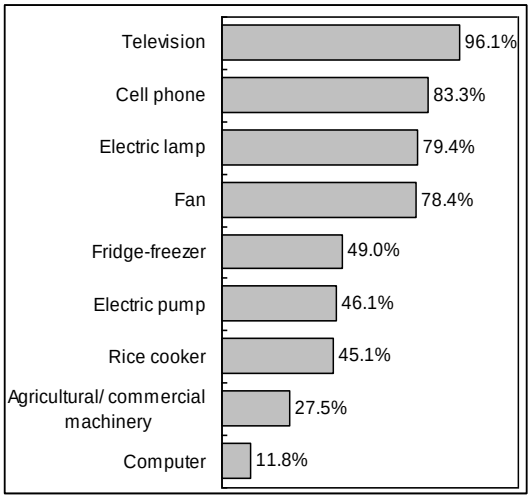

Figure 3: Electric appliances used in the electrified village (multiple answers)

[35] Based on statistics on 37 subprojects for which data on traffic accident were available.

96.1% answered that their household work became easier and they were able to save 54.6 minutes per day on average. Furthermore, 69.3% confirmed that they raised their income. The main reasons for raised income were as follows: more work on other things after the household work became less, raised agricultural productivity due to more information on agriculture and animal husbandry, less fuel cost after replacing gasoline pumps with electric pumps, raised productivity by use of an electric sewing machine, and so forth. It was confirmed that people's life became convenient and agricultural and business productivity was improved as a result of electrification.

Box 2: Generation of an alternative income source for a farm household in Quang Nam Province

Mr. P in Than Bihn District in Quang Nam Province used to be a full-time rice farmer. When his village was electrified, he purchased four machines and started a rice milling business on a part-time basis. He started the business because he wanted to stay home as long as possible to take care of his sick mother who had been bedridden for 15 years. He gave part of his rice field to his three children and he shortened his time in the field. Although his monthly income from rice decreased from 1.5 million VND to one million VND, he now earns 0.5 million VND from the rice milling business. He feels his life became better because he is able to maintain his income level even though his labor became much less. He is very much satisfied with his new lifestyle since he can take care of his family better than before.

Mr. P operating
a rice milling machine

(3) Water Supply Sector

96.2% of the users of the supply water system answered that their household work became easier than before. They were able to save 69.7 minutes per day on average because they no longer had to carry water from a well or river.

While 55.1% of the users of the Phu Bai water supply station in Thua Thien Hue Province recognized fewer incidents of water-borne diseases, only 4.3% of the users of the Tuan Giao water supply station in Dien Bien Province felt the same. Many users of the latter facility did not use water for drinking or cooking purposes because they were not satisfied with the chlorine and mineral content and turbidity of the water.

75.5% of the users of the Phu Bai water supply station were satisfied with the water supply service, whereas the corresponding figure for the users of the Tuan Giao water supply station was only 42.6%.

Box 3: Supply water in Duc Pho Town in Quang Ngai Province

People used to fetch water from a well and river for drinking and household purposes in Duc Pho Town in Quang Ngai Province. The well and rive water had high salinity and iron content and many people had digestive and skin problems. The problems were solved after water started to be supplied to the households. It required less time to obtain water and people's life became easier. Mrs. D runs a small rice porridge shop at her house. Her customers have told her that the porridge tastes better after tap water was used. Mrs. D has two children aged one and two, and gets a lot of clothes to wash every day. Shirts became red-tinged when she used well water for washing. Now she is happy that she gets her laundry white after switching to tap water.

Mrs. D operating her rice porridge shop

(4) Irrigation Sector

Before the project, the farmers in the project areas used a bucket to carry water manually from lowland to their farmland. All the farmers who participated in the survey answered that their agricultural workload for irrigation decreased significantly, requiring 133 minutes less per day on average. All the 104 respondents pointed to their raised income due to the rehabilitation of the irrigation system, and the average increase of income among the respondents was 27%. They purchased more fertilizer (36.5%), agricultural machinery (24.0%), pesticide (18.3%) by the extra income they obtained (multiple answers).

As other benefits they received from the project, they listed positive changes including mitigation of salt and flood damage, alleviation of drought damage in the dry season, easier access within and among villages by use of the dykes constructed, and relief of severe dryness in the residential area in the dry season. It was clear that the project in the irrigation sector gave a positive impact not only on agriculture but also on rural life in general.

Box 4: Rehabilitation of the irrigation system in Thua Thien Hue Province

Phong Chuong, located in the coastal area in Thua Thien Hue Province, had long suffered salt damage from seawater, frequent floods in the rainy season, and drought in the dry season, which severely affected rice and vegetable production. The project rehabilitated a dam, water gates, irrigation and drainage canals, and dykes. The Cua Lac & Phong Chuong irrigation system was completed in 2004. 90% of the local farm households benefited from the project as they now enjoyed reduced salt, flood and drought damage. The crop land per farm household increased by 30%, from 0.58 ha to 0.74 ha, and annual yield of rice increased by 60%, from 4.4 to 7.0 tons. The yield per ha was also raised by 25%, from 3.8 tons to 4.8 tons.

The rehabilitated irrigation

(5) Afforestation Sector

74.2% of the local residents near the afforestation sites answered that the project contributed to improvement of their living environment "very much" or "to some extent." The main reasons were the positive changes such as protection from wind or sand and

improvement of living conditions by rural infrastructure development as shown in Figure 4. All the respondents answered that the local natural environment had improved "very much" or "to some degree." Figure 5 indicates some of the main reasons for the improvement of the natural environment: natural disaster prevention including land erosion, forest fire, and flood, and amelioration of the environment including cleaner air, better landscape, and improved biodiversity. It was confirmed that many local residents recognized the positive impact by the project both on their living environment and the local natural environment.

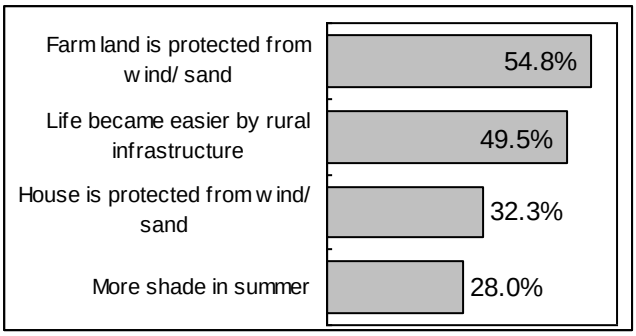

Fig. 4: Main reasons for the improvement of the living environment (multiple answers)

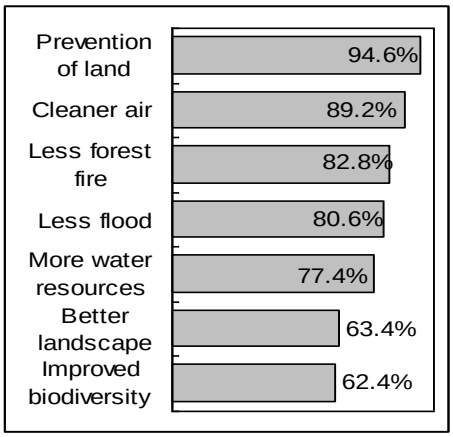

Fig. 5: Main reasons for the improvement of the natural environment (multiple answers)

Box 5: Additional activities implemented alongside of afforestation work

The project implemented forestry infrastructure development in order to realize effective and sustainable forest management. It also conducted rural infrastructure construction and training/ extension for local residents for the purpose of livelihood development and awareness-raising. Equipment for forest fire prevention and suppression was provided and rural roads for improving access to major village facilities were constructed as part of these efforts.

Fire fighting equipment purchased by the project

A rural road leading to a kindergarten in the village

3.4.2 Other Impacts

(1) Impacts on the Natural Environment

Apart from minor impacts happened in some subprojects, no major negative impact on the natural environment was confirmed[36]. In the afforestation sector, positive impacts such

[36] Negative impacts observed in some subprojects include noise and dust problems during the construction period of the facilities. In the road sector, noise and air pollution problems from the traffic are happening in some areas.

as increased water resources, prevention of land erosion, and biodiversity improvement (e.g., frequent sighting of monkeys, deer, and wild boars) were confirmed.

(2) Land Acquisition and Resettlement

Although land acquisition and resettlement took place mainly in the road and water supply sectors, little negative effect on society was observable since the incidents were on a small scale, usually affecting only 10 to 20 households. They were settled by the legal procedures in accordance with the Vietnamese regulations. The interviews with local residents confirmed that sufficient consensus among local residents was built and appropriate compensation money was paid to the affected people.

(3) Unintended Positive/ Negative Impacts

Table 7 lists major unintended positive and negative impacts in each sector, which were confirmed through the beneficiary survey and field visit. Although negative impacts including the increase of traffic accidents, social problems and pollution were confirmed in the road sector, these problems were limited to certain areas. The other sectors did not experience major negative impacts. Instead, various positive impacts were confirmed.

Table 7: Unintended positive and negative impacts by sector

Sector	Unintended positive and negative impact
Road	<Traffic accidents> 54.1% of the roads have more traffic accidents, while 27% have fewer accidents. <Better livelihood of ethnic minorities> The construction of roads in the mutinous areas helped the ethnic minority groups to have better access to schools and other facilities. Increased commercial and transportation activities also benefited local minority groups in raising living conditions. <Raised land price> Land price along the roads became higher. <Pollution> Construction vehicles and trucks caused noise, air and dust problems. <Social problem> Young people congregated on the roadsides. More incidents of thefts, smuggling, drugs, and prostitution happened.
Electrification	<Diversification of industries in rural areas> Farmers who used to rely fully on rice farming diversified their job, such as rice milling and carpentry after their village was electrified. Alternative income sources were generated and their livelihoods became stable.
Water supply	<Benefit to poor households> The monthly water charge for a household in a small town is so low, about 10,000 VND (about 40 yen), that even poor households can afford it.
Irrigation	<Prevention of natural disaster> The irrigation system led to not only raised agricultural productivity but also prevention of natural disasters such as drought, salt and flood damage. <Multipurpose use> The dykes constructed as part of the irrigation system were serving as rural roads which connected nearby communes. They were functioning as multipurpose facilities.
Afforestation	<Vigilance of local residents against forest loss> Local residents became more vigilant for illegal logging and forest fire owing to their raised awareness towards environmental and forest protection.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

During project implementation, the CPMU led by the MPI coordinated overall activities and PPMUs led by the DPI at provinces were responsible for implementing

subprojects. After the completion of the project, organizations such as government offices and private firms listed in Table 8 became responsible for operation and maintenance (O&M) of the facilities constructed.

Table 8: Organizations responsible for O&M in the five sectors

Sector	O & M organizations
Road	Private corporations or state-owned organizations under the Provincial Department of Transport, Provincial Department of Agriculture and Rural Development (DARD), District People's Committee, City People's Committee, and Town People's Committee
Electrification	(Before February 2009) Electricity Offices supervised by the Electricity of Viet Nam (EVN) where the EVN took charge of power distribution. The Department of Electricity of Provincial People's Committee where the local government took charge of power distribution. (After February 2009) EVN
Water supply	Water supply companies or privatized corporations supervised by the Provincial Department of Construction
Irrigation	In case of medium- to large-scale irrigation systems (such as dams, head works, pumping stations, main canals), DARDs, District People's Committees, Commune People's Committees, and irrigation management companies In case of small-scale irrigation systems (such as minor canals), farmers' organizations
Afforestation	For forest and forestry infrastructure, the Protection Forest Management Boards (PFMBs) in the provinces, forestry companies, and Commune People's Committees. For rural infrastructure, Commune People's Committees.

According to the interviews with organizations responsible for O&M, the water supply and afforestation sectors faced difficulties in conducting monitoring due to lack of field staff. Other sectors did not present any major issues in terms of organizational structures and O&M is functioning well.

3.5.2 Technical Aspects of Operation and Maintenance[37]

(1) Road Sector

Most of the O&M organizations formulate annual maintenance plans for conducting appropriate road maintenance. Their technical level is high in general. While statistical data gathering activities including traffic volume survey are held regularly for provincial roads, the data on district roads are scarce, which inhibits accurate traffic volume projections or formulation of detailed future plans. Private corporations responsible for O&M tend to have adequate equipment and machinery. However, local governments responsible for O&M often have few equipment and machinery items, which hinders efficient O&M activity.

(2) Electrification Sector

The Electricity of Viet Nam (EVN) has rich experience in managing the electric distribution systems in Viet Nam and its technical level is high. It has established O&M plans, implementation procedures and an information management system. Electricity

[37] The evaluation of technical aspects of operation and maintenance was made based on information gathered through document analysis, field visits and questionnaire surveys.

cooperatives at the district level, which are the contractors of the EVN for O&M, also have sufficient skilled staff and maintain high technical levels.

(3) Water Supply Sector

Mainly due to lack of technical staff and budget for O&M, the staff members of O&M organizations do not receive enough technical training. In particular, they are in great need of strengthening technical skills for water quality control.

(4) Irrigation Sector

Local governments responsible for O&M and irrigation management companies have rich experience and high technical capacity. However, more training for raising efficiency of irrigation may be needed as indicated by the fact that two facilities are having the problem of inefficient irrigation caused by leakages from earth lining[38].

The farmers' organizations are not required to have a high level skill since they are only in charge of daily maintenance of small-scale canals. Strengthening communication among farmers is needed for more effective daily operation such as cleaning of the canals.

(5) Afforestation Sector

The O&M of the protection forest is mainly undertaken by the Protection Forest Management Boards (PFMBs) under the Department of Agriculture and Rural Development (DARD). Their technical level and experience in protection forest management are sufficient. However, they have little experience of facilitating local community members in mobilizing them for forest management. Skills necessary for extension services such as awareness-raising and group formation need to be strengthened.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Road Sector

The road O&M budget of the provincial government is insufficient and many roads are not sufficiently maintained. Urban roads with heavy traffic volume[39] and mountain roads are susceptible to quick degradation from floods and land slides and require large expenses for O&M. The current amount of the O&M budget allocated by the provincial government is not sufficient to cover costs for necessary repairs. For example, No. 862 Provincial Road in Tien Giang Province is allocated only 25% of the budget required for full O&M, according to the interview with the O&M organization. Substantial raise in budget allocation from the provincial government is needed for better O&M in the road sector.

[38] Earth lining is a method of construction which binds the surface of a canal with earth of low permeability.
[39] The number of urban roads constructed/ rehabilitated by the project was three and the total road length was 34 km.

(2) Electrification Sector

No major issue is observed. However, a commune[40] responsible for O&M said in the interview that only 70% of the necessary budget was allocated. Because of the budget constraint, the commune was unable to hire a sufficient number of technicians[41] for effective O&M.

(3) Water Supply Sector

According the interviews with the O&M organizations, many water supply stations in relatively small towns face financial difficulties mainly due to low water charges[42]. Relatively new water supply stations tend to face this situation because the amount of water supplied at such stations is still small. Because of the financial constraints, many stations cannot invest in necessary facilities and equipment. For example, they cannot install laboratories for speedy water testing or cannot purchase equipment for minimizing the amount of unaccounted-for water. The provincial government has the decision making power over the water tariff. The financial situation of water supply stations needs to be examined and the tariff should be reviewed by the provincial government so that each facility can have a strong financial base to generate profits.

(4) Irrigation Sector

Collection of user fees was abolished in 2008[43] and expenses for O&M are now covered by the subsidies from the central government. According to the O&M organizations, the subsidies are mostly sufficient to pay for necessary expenses. Before 2007, the organizations spent a substantial amount of time and effort in collecting user fees and delay in payments by the users occurred frequently. Now such problems do not occur, and they are able to secure stable income, which in turn enabled them to formulate medium- to long-term plans and to enhance financial and institutional sustainability. When the organizations need additional money for repairing facilities damaged by natural disasters, they can obtain an extra budget from the provincial government.

(5) Afforestation Sector

Daily forest patrol is necessary since illegal logging and forest fire occur frequently in the protection forest. The current number of personnel for guarding the forest is far from sufficient and more contracts with local community members need to be made for forest patrol. The budget for making contracts needs to be secured by using funds for national

[40] Chau Thanh Commune in Tien Giang Province
[41] Two more mid-career staff members and five more field technicians were needed in this Commune.
[42] Profits generated in the provincial capital and other cities are used to cover the deficit of the water stations in small towns.
[43] Decision made by Decree115/2008/CP.

afforestation programs and other relevant programs.

3.5.4 Current Status of Operation and Maintenance[44]

(1) Road Sector

Road inspection is carried out on a regular basis but its frequency is not enough to detect problems at an early stage. Sometimes damage to the road remains unnoticed until it becomes serious enough to raise the risks of traffic accidents. In particular, roads in the mountain areas tend to develop many potholes and erosion on shoulders, causing traffic accidents. At the time of the evaluation study, four roads in the mountain regions had been temporarily closed due to landslide[45]. Furthermore, overloaded vehicles often cause damage to the road surface. It is necessary to take measures against the problem of overload.

(2) Electrification Sector

In four subprojects, or 4.2% of all the subprojects, the capacity exceeds the area's demand because of population growth. In addition, a few other subprojects are likely to encounter the problem of insufficient capacity in the future. Such problems are most likely to have been caused by lack of detailed planning based on population projection. For some subprojects where a budget for O&M is insufficient, lack of field staff for O&M is a major problem.

(3) Water Supply Sector

The problems in the water supply sector are twofold: (1) problems caused mainly by lack of or insufficient city planning and population projection in time of planning; and (2) problems related to inadequate water quality management and insufficient measures against unaccounted-for water caused by financial limitations. The examples of the former are the four facilities which are not meeting the demand[46] and more facilities which are unlikely to meet the future demand as confirmed in the case of the Duc Pho water supply station in Quang Ngai Province. On the contrary, three water supply stations have the utilization rates of less than 20%[47].

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[44] The evaluation of current status of operation and maintenance was made based on information gathered through document analysis, field visits and questionnaire surveys. As for quantitative information, the data collected by "Asset Survey for Small Scale Pro-Poor Infrastructure in Vietnam" was used.

[45] Four roads in the mountainous areas: Quang Phong-Dong Xua road in Bac Kan Province; Ban Nga-Xuan Truong Commune Road in Cao Bang Province; Van Ho-Xuan Nha road in Son La Province; and Khau Lang-Cao Duong road in Tuyen Quang Province.

[46] The Tri Ton water supply station in An Giang Province, the Tuan Giao water supply station in Dien Bien Province, the Moc Chau water supply station in Son La Province, and the Vung An water supply station in Ha Tinh Province.

[47] The Yen Lac water supply station in Vinh Phuc Province, the Vu Quang water supply station in Ha Tinh Province, and the Hai Lang water supply station in Quang Tri Province.

The latter problems include a facility where legally required chlorination is not conducted[48] and facilities such as the Tuan Giao water supply station in Dien Bien Province where the residents are strongly dissatisfied with the quality of water supplied by the station[49].

Even if water quality is controlled presently, some facilities are likely to encounter the problem of degraded water quality caused by increasing groundwater contamination as population grows in the future. Other facilities are unable to replace damaged equipment (such as water meters) or repair broken parts because of lack of budget. Such facilities are unable to take necessary measures against the unaccounted-for water problem[50].

(4) Irrigation Sector

Settlement and erosion of dykes are not uncommon[51]. In two subprojects, the irrigation rates are around 90% due to the leakage from earth lining[52]. The leakage problem can be solved by upgrading the technical skills of the O&M staff.

The O&M structures of the irrigation sectors are categorized into two: (1) local authorities or irrigation management companies responsible for medium- to large-scale irrigation systems, and (2) farmers' organizations responsible for small-scale irrigation systems (Table 8). In the former case, it is important to strengthen communication between the O&M organizations and farmers groups. For the latter case, information sharing among the farmers and farmers' participation in O&M needs to be encouraged.

(5) Afforestation Sector

In general, afforested sites have seen healthy growth of planted trees and forests were regenerated on barren land. No large-scale forest loss has occurred since the completion of the project up to the time of the evaluation study. The protection forests planted or protected by the project are appropriately managed without being affected by illegal logging or forest fire. The forest protection has become effective especially since 2008 when local residents started patrolling forest as contractors.

Thinning at the sites where fast-growing acacia trees are dominating and inhibiting the growth of local species is urgently needed. Degraded forestry infrastructure such as

[48] The Sao Do water supply station in Hai Duong Province.

[49] Since the Tuan Giao and Duc Pho water supply stations have capacity of less than 3,000m^3/day, the law does not require them to have a water testing laboratory on the site as long as a local health office in the vicinity can undertake water testing services for them. These two facilities use the service by the local health offices. However, the time needed for the facilities to obtain the testing result is about one week for Duc Pho and two weeks for Tuan Giao, which suggests that they are not able to know the result in a timely manner.

[50] Such as the Tuan Giao water supply station in Dien Bien Province. The rate of unaccounted-for water at the Tuan Giao water supply station was 60% due to reasons including water meter problems.

[51] There are many cases where the problems were already solved at the time of the evaluation study after the efforts by the organizations responsible for O&M.

[52] The Ea Yeng reservoir in Dak Lak Province and the Song Rac irrigation system in Ha Tinh Province.

forestry roads and fire break lines also needs to be rehabilitated. The O&M organizations should secure a financial source for these activities.

Some problems have been observed in the road, water supply and afforestation sectors in terms of financial sustainability. The road and water supply sectors also have problems in the current status of O&M. Therefore, sustainability of the project is fair.

Box 6 Analysis of sustainability of the afforestation sector

Since it was Vietnam's first time to undertake an afforestation project with a Japanese yen loan, an additional in-depth study focusing on sustainability of the afforestation sector was conducted along with the ex-post evaluation study. The following is a summary of the analysis.

(1) Benefit-sharing mechanism – Purpose of its introduction

The project introduced a benefit-sharing mechanism which aimed at sharing economic benefits derived from the protection forest between the forest owners (PFMBs, local governments, etc.) and local residents. The mechanism was supposed to be fully operational after the termination of the project. Local residents were allowed to extract, free of charge, non-timber forest products such as firewood from the protection forest. Profits generated after thinning, which was to be conducted around eight years after the planting of the trees, were supposed to be shared by the forest owners and residents. In particular, profits from the thinning of fast-growing acacia trees were to be given only to residents. The purpose of the benefit-sharing mechanism was to raise the effectiveness of forest protection by introducing economic incentives to local residents.

Forest in the process of regeneration

(2) Actual operation of the benefit-sharing mechanism – Use of non-timber forest resources

The protection forests supported by the project are usually located at difficult-to-access sites such as very steep mountain areas or remote places very far from settlements. In most cases, households near the protection forests are surrounded by a production forest, which they own, and they collect a sufficient amount of timber and non-timber forest products from it. Therefore, few local residents rely on the protection forest for resource extraction purposes. The beneficiary survey has revealed that 75% of Kinh people, the majority ethnic group in Vietnam, and 38% of ethnic minorities do not use forest resources (firewood, nuts, fruits, honey, fodder, vine, etc.) from the protection forest at all. While ethnic minority groups living near the mountain peak have a tendency to use the protection forest, however infrequent it may be, for the Kinh group use of the protection forest is inconvenient and unappealing. Therefore, the forest resource sharing scheme can hardly serve as an economic incentive for residents since their reliance

(3) Actual operation of the benefit-sharing mechanism – Balance of payment of thinning

Due to the forests' remote locations and low market value of acacia, thinning of the forests that the project supported turned out to generate no profit. In 2008, the final year of the project, trial thinning of 50ha of acacia located at a relatively easy-to-reach area was conducted, which ended up with a negative balance of payment. Most of the protection forests which require thinning are located at more difficult-to-access places and high expenses of transportation, labor and forestry road repair costs are anticipated. The benefit-sharing mechanism was formulated on the premise that thinning would generate profits. However, the premise turned out to be untrue. Thinning, instead, incurs costs and the concerned organizations need to secure additional financing to conduct thinning.

Forest where trial thinning was conducted in 2008

(4) Occurrence of forest loss

Since project completion, no major forest loss has occurred. Thus, the forests generated or protected by the project can be said to have been managed and maintained effectively to a certain extent. During the project period, however, 256ha, or 0.6% of the total forest supported by the project, was lost due to reasons including death of trees caused by drought and severe natural conditions (100ha), forest fire (80ha), conversion to production forests by change of land zoning or conflicts with other development initiatives (60ha), and conversion to farm land or commercial forest land by encroachment (15ha). "Conflicts with other development initiatives" specifically mean that hydroelectric power plants were constructed in Phu Yen and Thua Thien Hue Provinces, and electric lines were laid down in Phue Yen Province. A number of trees were cut down during the constructions. Risks of forest loss listed here have been present for many years. It is, therefore, important for the concerned organizations to take

Illegally logged timbers confiscated by the PFMB

(5) Measures to raise forest sustainability

As stated in (4), strengthening measures to mitigate risks of forest loss is the key to sustainability. It is realized, as shown in (2) and (3), that the effects of the benefit-sharing mechanism for giving economic incentives to local communities are very much limited. It will be necessary to promote contracts with local residents for forest patrol with sufficient budgets which make such contracts possible. Participatory forest management mainly aiming at prevention of illegal logging and forest fire will be achieved by contracting out part of the forest management duties to local communities. In putting forward this measure, improvement of extension and facilitation skills of PFMB staff is necessary. In order to minimize death of trees, concerned organizations such as the Ministry of Agriculture and Rural Development (MARD), the Departments of Agriculture and Rural Development (DARDs) and PFMBs should strengthen their capacity particularly in the areas of soil analysis, tree selection, geographic information management, and mapping. For avoiding problems stemming from the change of land zoning and conflicts with other development initiatives, better communication and coordination with relevant government organizations will be effective. For preventing encroachment, raising residents' awareness is important, just as the measure for the prevention of illegal logging. In addition, training on generation of alternative income sources should be offered to the residents so as to avoid excessive reliance on forest and land resources in mountain areas. The concerned organizations are advised to undertake these measures and acquire necessary budgets.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

A total of 246 subprojects throughout Viet Nam were implemented in the five sectors, namely, the road, electrification, water supply, irrigation and afforestation sectors, under the project (The subprojects in the afforestation sector were undertaken in 53 Communes in five provinces). Relevance of the project which promoted local development is very high. Effectiveness is also high because the project prompted local industry development, improved rural living conditions, and ameliorated the local natural environment. Efficiency is fair mainly because the project period was longer than planned. Sustainability of the project has challenges including constraints in the road, water supply and afforestation sectors and partially insufficient operation and maintenance status of the water supply sector.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Planning Based on Long-term Perspectives

Some subprojects, particularly those in the water supply sector, were planned without long-term visions based on hard data such as the area's population projection. When formulating detailed plans, the provincial governments need to examine if the subprojects are designed to provide appropriate services over a long period of time. The MPI is also advised to examine this aspect by, for example, asking the provincial governments to fill out the information on the conformity to the area's long-term development plans in the standardized format used for the F/S.

(2) Strengthening the Monitoring System

The project covered multiple sectors and numerous target sites. While operational performances of each subproject can be measured, the examination of the project's effects as a whole is difficult. Despite having this constraint, the MPI needs to strengthen its monitoring system in order to access the operation and effect performances to a certain degree. It is recommended that the MPI review sector-wise problems and challenges experienced in the past projects and give necessary advice to the provincial governments based on the findings. The indicators which the O&M organizations routinely use for O&M can be used for monitoring purposes and the introduction of new indicators should be considered as long as it does not cause too much burden on the O&M organizations. In that way, the accuracy of the monitoring will be improved and it will be possible for the MPI to confirm if the project is producing expected effects continuously. For those sectors in which many challenges were identified, conducting sampling surveys to gather in-depth information on the project's effectiveness is recommended.

The recommended operation and effect indicators for each sector for regular monitoring are as follows:

Road sector: annual average daily traffic (AADT)
Electrification sector: Sales volume (MWh), electrification rate of household (%), distribution loss (%)
Water supply sector: population served, amount of water supply (m^3/day), rate of facility utilization (%), unaccounted-for water rate (%), number of incidences which did not meet water quality standards
Irrigation sector: area benefited by the project (ha), cultivated area by crops (ha), yield of rice per unit area (ton/year), number of benefited farmers
Afforestation sector: afforestation area (ha), survival rate (%), quantity of complementary planting, number of training participants

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Support for Human Resource Development and Institutional Strengthening

In the "recommendations" section, a major problem concerning the lack of long-term perspectives in planning is identified. It is also confirmed that insufficient capacity development hampers smooth O&M. When facilities are handed over to the O&M organization, training on skills development for the staff of the O&M organization should be offered so that sustainability of effective operation of the facility is ensured. This activity can be undertaken as part of the project during the implementation stage.

For solving these problems, JICA should give technical support to the recipient country not only in the areas of construction management and engineering but also in the fields of policy and institutional strengthening. The consulting services to be provided during project implementation should include services for supporting capacity building and institutional improvement activities.

(2) Efficient Project Management System and Delegation of Authorities to the Provinces

Quick decision-making was realized by establishing a direct and simplified line of command: from the CPMU at the MPI to the PPMU at the DPI in the province. In addition, the project employed a bottom-up approach of planning and delegated authorities to the provinces which were close to the project sites and better positioned to listen to what the beneficiaries had to say. These arrangements made it possible for the project to design subprojects which could best serve the needs of the beneficiaries. The provincial governments revised the plans flexibly in accordance with the changing needs and situations on the ground. As a result, outputs which met the expectation of the beneficiaries were produced and planned effects were achieved.

Smooth implementation of the project based on this decentralized management system seems to have been possible because the provincial governments in Viet Nam had sufficient capacity and experiences in managing multi-sector projects such as this project, as they have experienced in the preceding projects, "Rural Infrastructure Development and Living Standard Improvement Projects" (I) and (II).

(3) Setting Operation and Effect Indicators and Calculation of IRR

The project did not set operation and effect indicators which would enable the quantitative measuring of the project effects. Thus it was not possible to collect quantitative data on the project effects after the completion of the project. It is necessary to set the operation and effect indicators and conduct quantitative monitoring in order to confirm the outcome of the project at the completion and to appropriately conduct O&M after the project. It is recommended that sector-wise operation and effect indicators be set at the planning of the project.

Moreover, IRR was not calculated at the planning. The electrification and water supply sectors, in particular, are advised to calculate IRR so that the information can be used in setting appropriate user fees, which in turn leads to better cost recovery.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	(1) 43 subprojects: 390 km of provincial and rural roads, 113 km of urban roads, 162 m of bridges (2) 79 non-electrified villages: 1,766 km of electric lines, 510 transformers (3) 20 water supply stations: a total capacity of 83,000 m^3 (4) Rehabilitation of 15 irrigation systems: a total 67,169 ha of irrigated areas (5) 14 sites for the creation and improvement of production forest: a total of 36,950 ha (6) Consulting services	(1) 94 subprojects: 932 km of provincial and rural roads, 35 km of urban roads, 1,805 m of bridges (2) 109 non-electrified villages: 2,535 km of electric lines, 39,602 kVA (3) 27 water supply stations: a total capacity of 85,900 m^3 (4) Rehabilitation of 16 irrigation systems: a total 38,576 ha of irrigated areas and 52,626 ha of benefited crop areas (5) 20,568 ha of afforestation, 18,658 ha of natural forest protection, 4,438 ha of forest for assisted natural regeneration: a total of 43,664 ha Forestry infrastructure and rural infrastructure construction, training and extension on forest management and livelihood development (6) As planned
2. Project Period	March 1999 – December 2004 (70 months)	March 1999 – December 2008 (118 months)
3. Project Cost Amount Paid in Foreign Currency Amount Paid in Local Currency Total Japanese ODA Portion Exchange Rate	 2,787 million yen 11,332 million yen (1,133,200 million VND) 14,119 million yen 12,000 million yen 1 VND = 0.01 yen (As of October 1998)	 — 15,781 million yen (2,076,447 million VND) 15,781 million yen 11,547 million yen 1 VND = 0.0076 yen (Average between March 1999 and December 2008)

Viet Nam

Ex-Post Evaluation of Japanese Technical Cooperation Project

Project for Modernization and Internationalization of Customs Administration

External Evaluator: Kumiko Shuto, IC Net Limited

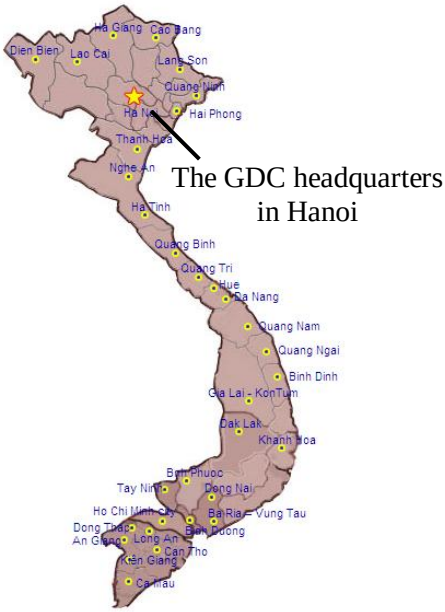
0. Summary

While the project's relevance and the achievement level of the Project Purpose are high, there are challenges in terms of the achievement of the Overall Goal and the sustainability of the project's effects. The General Department of Viet Nam Customs (GDC) has not developed human resources in a systematic manner after the project. It hindered the achievement of the Overall Goal, and thus limited the effects of the project. The project's efficiency is hindered because the preparation for the operation and management of the chemical analysis machines provided by Japan was not adequately done. Frequent breakdowns of the machines have occurred and, as a result, the production of the expected outputs was undermined. Presently, the GDC plans to strengthen staffing and financing for staff training. If the plan is carried out smoothly and the recommendations made in this evaluation report are put into practice, the sustainability of the project will be enhanced.

While the project produced certain effects, it is evaluated to be partially satisfactory.

1. Project Description

The project locations are 33 local customs offices and other GDC facilities all over Viet Nam.



Project Location

The GDC headquarters in Hanoi

Operation of a chemical analysis machine

1.1 Background

In Viet Nam, the volume of trade had been increasing rapidly in recent years. However, customs administration was not in line with the international standards and such inefficient and ineffective customs procedures might affect trade facilitation and hamper the improvement of the investment environment. Before the start of the project, Viet Nam intended to become a member state of the World Trade Organization (WTO) (It later became a member in January 2007) and recognized that meeting the international standards developed and maintained by the WTO was a pressing issue. It was necessary that the General Department of Viet Nam Customs (GDC) would enhance its capacity of customs procedures especially in the fields of customs valuation, post clearance audit and HS classification[1] for modernizing customs administration in accordance with international standards.

JICA offered three-year in-country training courses for customs modernization in 2001 and provided information on the international standards to the GDC staff. However, the training courses did not necessarily help the GDC to organize staff training courses on its own. Under these circumstances, the Government of Viet Nam requested a technical cooperation project with Japan for enhancing the capacity of the GDC staff in the aforementioned three fields.

1.2 Project Outline

Overall Goal		Appropriate staff training on customs valuation, post clearance audit and HS classification (including chemical analysis) is periodically provided to the frontline officers who work at selected regional customs offices.
Project Purpose		Master trainers[2] are raised to provide practical training on customs valuation, post clearance audit and HS classification (including chemical analysis) based on the international standards and act as instructors in the staff training courses.
Outputs	Output 1	The activity plan for developing the master trainers, who can teach customs officers in local staff training courses, is prepared.
	Output 2	Training materials and teaching guidelines are prepared in order to introduce the international standards to the regional customs offices.
	Output 3	At selected regional customs offices, periodic on-the-spot training is conducted by the master trainers.

[1] Customs valuation refers to the calculation of the values of import goods based on the customs tariff. Post clearance audit is an audit examination performed at the importers' premises subsequently to the clearance of the goods. HS is a short abbreviation for "Harmonized Commodity Description and Coding System" and refers to an internationally standardized system of names and numbers for classifying traded products upon which the customs tariff is based. In classifying goods in accordance with HS, chemical analysis may be required in some cases to determine the materials of the goods.

[2] The project applied the name "master trainers" to those who were trained to teach one of the three fields in the staff training. The title "master trainer" was informal and used only when referring to the trainers trained by the project. After the project, the GDC simply addresses them as "trainers" because the GDC officers who are accredited to teach other professional fields are officially called "trainers."

	Output 4	The sustainable training plan, which would be implemented after completing the Project, is prepared.
Inputs		Japanese Side: 1. Experts: 2 for Long-Term, 56 for Short-Term (cumulative numbers) 2. 38 Trainees received 3. Local Cost: 10.79 million yen 4. Equipment: 142 million yen[3] (1.25 million US dollars) Vietnamese Side: 1. 44 Counterparts 2. Land and Facilities: Project Office, Utilities 3. Local Cost: 30 million yen[4] (3 billion VND)
Total Cost		280 million yen
Period of Cooperation		August 1, 2004 – July 31, 2007
Implementing Agency		The General Department of Viet Nam Customs, the Ministry of Finance
Cooperation Agency in Japan		The Customs and Tariff Bureau, the Ministry of Finance
Related Project		JICA In-country Training Course "Customs Training in Viet Nam" (2001 – 2003) World Bank "The Viet Nam Customs Modernization Project" (2006 – 2010) JICA Technical Cooperation Project "The Project on Strengthening the Training System for Improving Capacity of Frontline Officers of Viet Nam Customs" (2009 – 2012)

1.3 Outline of the Terminal Evaluation

The following is the outline of the terminal evaluation conducted in April 2007.

1.3.1 Achievement of Overall Goal

It was expected that, if the GDC established a system to produce successor master trainers continuously and conducted improved staff training based on the training plans, it would be possible to train 80% of the frontline customs officers engaged in customs valuation, post clearance audit and HS classification.

1.3.2 Achievement of Project Purpose

The terminal evaluation confirmed that the Working Group members, who were the candidate master trainers, had acquired necessary knowledge and skills through lecturing at the on-the-spot training courses based on the action plans. They also produced training materials, guidelines and sustainable training plans. These activities had led to the

[3] 113.79 yen against the US dollar, which was the average exchange rate during the period between August 1, 2004 and July 31, 2007, was used.
[4] 0.01 yen against the Vietnamese dong (VND), which was the average exchange rate during the period between August 1, 2004 and July 31, 2007, was used.

achievement of the Project Purpose.

1.3.3 Recommendations

The following five recommendations were proposed by the terminal evaluation. The following table shows the measures taken by the time of the ex-post evaluation study.

Recommendations made by the terminal evaluation	Measures taken
Strengthen the capacity of the Customs Training Center[5], which will be a key player of planning, conducting and monitoring training courses in the near future, with a concrete plan fully endorsed by the leadership of the GDC.	The plan has not been formulated.
Assign master trainers to spend an appropriate length of time on training activities in the Customs Training Center.	The Personnel and Organization Department circulated an official letter requesting the master trainers to teach at least 60 hours per year.
Assign a sufficient number of full-time staff members as training organizers, who can establish a better cycle of training management, including carrying out monitoring and assessment, and updating of training materials and teaching guidelines in line with the international standards.	The number of full-time staff members has not increased and the GDC is still understaffed.
Develop and conduct appropriate plans for training of successors of master trainers by reflecting the draft plans, which were already submitted by Working Groups of the Project.	The plans for raising the successor trainers, which was developed during the Project, have not been implemented.
Allocate necessary funds for conducting training courses and activities, such as travel fee of trainers, and for maintenance of chemical analysis machines provided by the Project.	Necessary funds are not allocated. In particular, the budget for the operation and maintenance of chemical analysis machines is significantly lacking: only one seventh of the required amount of the budget is allocated.

2. Outline of the Evaluation Study

2.1 External Evaluator

Kumiko Shuto, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: December 2010 – October 2011

Duration of the Field Study: March 6, 2011 – March 26, 2011; June 25, 2011 – July 3, 2011

[5] It is presently called "the Viet Nam Customs School."

2.3 Constraints during the Evaluation Study

The project covered Viet Nam as a whole, including the GDC headquarters in Hanoi, 33 local customs offices throughout Viet Nam, and the Centres for Analysis and Classification located in Hanoi, Ho Chi Minh and Da Nang. It was not possible to visit all these places due to time limitations. Thus, the GDC headquarters, the Centre for Analysis and Classification located in Hanoi, the Viet Nam Customs School and a local customs office in the Thang Long Industrial Zone in the outskirts of Hanoi were selected for field visits. Document analysis, questionnaire surveys and interviews were conducted to collect data on locations where the field visit was not conducted. A questionnaire survey was conducted to the beneficiaries of the project, i.e., the frontline customs officers who took part in the staff training[6]. In additions, a logistics company which carried out customs clearance procedures for trading companies in Hanoi was interviewed for the purpose of gathering information from a final beneficiary.

3. Results of the Evaluation (Overall Rating: C[7])

3.1 Relevance (Rating: ③[8])

3.1.1 Relevance with the Development Plan of Viet Nam

The Government of Viet Nam was pushing forward reforms on customs administration as part of the means to promote competitive modern industries in its Five-Year Socio-Economic Development Plan for 2001 to 2005 and also the Plan for 2006 to 2010. The Government also formulated the Master Plan for Customs Reform and Modernization (-2010) and was pursuing human resource development in the field of customs modernization.

Viet Nam became a member of the WTO in January 2007, which was during the project period. For the Ministry of Finance and the GDC, realization of customs administration which met the international standards became a more important issue than ever. The project, which aimed at modernizing customs administration by way of building capacity of customs officers, was well aligned with the development policies of Viet Nam.

3.1.2 Relevance with the Development Needs of Viet Nam

Modernization and internationalization of customs administration was a pressing issue for Viet Nam, which intended to become a member of the WTO, since the country was facing an increasing amount of trade and foreign investments. JICA offered in-country training courses for customs officers in Viet Nam for the purpose of enhancing capacity of

[6] 25 training participants, who were local customs officers, answered the questionnaires by e-mail.
[7] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[8] ③: High, ②: Fair, ①: Low

customs administration for three years from 2001. 33 courses were conducted and about 2,000 customs officers took part in the training. The training contributed to providing knowledge on the international standards and prompted the officers to identify problems that the GDC was facing. However, it did not necessarily help the GDC to conduct appropriate staff training on its own and it was felt that more cooperation in this area was needed.

Strengthening of the three fields of customs procedures, namely customs valuation, post clearance audit and HS classification (including chemical analysis), was particularly important for conducting appropriate customs clearances based on the international standards and for preventing false customs declarations.

The trade volume of Viet Nam doubled from 58.4 billion US dollars in 2004 to 111.3 billion US dollars in 2007[9] and the needs for customs modernization remained very strong throughout the project period. The needs for strengthening the capacity of the staff in the above three fields were particularly strong at the start of the project, Viet Nam's entry in the WTO in January 2007, and project completion. Thus the project addressed well the development needs of Viet Nam.

3.1.3 Relevance with Japan's ODA Policy

When the project began, Japan's ODA policy toward Viet Nam emphasized the support for the country's transition to a market-oriented and open economy. In particular, human resources and institutional development for the promotion of a market economy was considered a priority. The project aimed at developing human resources in modernization of customs administration and it was consistent with Japan's ODA policy.

This project has been highly relevant to Viet Nam's development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Effectiveness and Impact (Rating: ②)[10]

3.2.1 Effectiveness

3.2.1.1 Project Output

(1) Output 1

Output 1 was "the activity plan for developing the master trainers, who can teach customs officers in local staff training courses, is prepared." The indicator for measuring the achievement of Output 1 was that "the GDC prepares activity plans of local staff

[9] Statistical data posted on the website of the General Statistics Office of Viet Nam.

[10] The rating on the project's effectiveness and impact is based on the evaluation results of both "3.2.1. Effectiveness" and "3.2.2. Impact." For this project, the rating for the effectiveness was 3 (high) while the rating for the impact was 2 (fair). The overall rating for both the effectiveness and impact was judged as 2 (fair).

training courses and revises it based on the results of on-the-spot training."

During the project period, the Working Group members of the three fields, i.e., customs valuation, post clearance audit, and HS classification (including chemical analysis), formulated action plans for training master trainers in cooperation with the Japanese experts. After reviewing their performance in the on-the-spot training, the plans were revised and finalized. The action plans covered all the necessary information including the number of trainers required, the selection procedure of the trainers, and the teaching guidelines. Therefore, it is fair to say that Output 1 has been achieved in a satisfactory fashion.

(2) Output 2

Output 2 was "training materials and teaching guidelines are prepared in order to introduce the international standards to the regional customs offices," and the indicator for measuring the achievement of Output 2 was that "training materials and teaching guidelines for all subjects are prepared in Vietnamese."

The training materials and teaching guidelines for all the three fields were prepared in Vietnamese by the Working Groups which met regularly during the project. 400 copies of the teaching materials of each field were printed and distributed to 33 local customs offices (2 – 3 copies to each office) and handed to the 32 Working Group members.

79% of the respondents in the beneficiary survey answered that the training materials were "very easy to use" or "easy to use." 98% felt that the curriculum was appropriate. Furthermore, 90% of the respondents answered that they became more confident in executing their duties after attending the training. Therefore, it is safe to say that Output 2 has been achieved.

(3) Output 3

Output 3 was "at selected regional customs offices periodic on-the-spot training is conducted by the master trainers," and the indicator for measuring the achievement of Output 3 was that "the average satisfaction rate of the training participants of the on-the-spot training concerning the training contents is improved."

Six on-the-spot training courses were held for each of the three fields during the project period. The questionnaire survey to the training participants was conducted and the contents of the training were revised on a regular basis. The satisfaction rate of the participants became higher with each training course. Thus, Output 3 is considered to have been achieved.

(4) Output 4

Output 4 was "the sustainable training plan, which would be implemented after completing the Project, is prepared," and the indicator for measuring the achievement of Output 4 was that "the training plan for successors, which is drafted in the Project, is proposed to the GDC."

A sustainable training plan for each of the three fields was drafted by the Working Groups after repeated discussions among their members. The plan included practical information such as the selection criteria of the candidate trainers, curricula, and evaluation methods. The plan was designed as a useful guideline for training successors of the master trainers and submitted to the Project Management Unit (PMU) and to the GDC. Thus Output 4 has been achieved.

3.2.1.2 Achievement of Project Purpose

The Project Purpose was that "master trainers are raised to provide practical training on customs valuation, post clearance audit and HS classification (including chemical analysis) based on the international standards and act as instructors in the staff training courses," and the following four indicators were set to measure the achievement of the Project Purpose. The following is an assessment of the achievement of the Project Purpose based on the four indicators.

(1) Indicator 1

"The average test score of the Working Group members improves to 80% by the end of the Project" was set as Indicator 1. The average test score was more than 90% in all the three fields. The beneficiary survey revealed that 96% of the participants of the on-the-spot training judged the levels of knowledge of the trainers were adequate and 85% evaluated the teaching skills of the trainers were sufficient. Therefore, it can be evaluated that the members of the Working Groups acquired necessary knowledge as master trainers.

(2) Indicator 2

Indicator 2 was "contents concerning on-the-spot training are updated regularly and corrected in accordance with international standards." The Working Group members reviewed and revised the training materials and teaching guidelines each time they had finished teaching at the on-the-spot training. Thus Indicator 2 was achieved.

(3) Indicator 3

"The number of the participants who received the local staff training reaches to 1,000

by the end of the Project[11]" was set as Indicator 3. 1,100 frontline customs officers attended the training. 98% of the training participants answered in the beneficiary survey that they were able to obtain expected knowledge in the training. Thus Indicator 3 has been achieved.

(4) Indicator 4

Indicator 4 was that "official documents of the GDC gives the Working Group members the status of the instructors of on-the-spot training." A ceremony for the 32 Working Group members was held at the GDC in July 2007 and certificates of the master trainer were given to them. These 32 members were given the official status of the trainer of one of the three fields by the Personnel and Organization Department of the GDC. Thus Indicator 4 has been achieved.

All the four target indicators were achieved satisfactorily as explained above.

All the planned activities were conducted and four outputs were achieved as planned as shown in 3.2.1.1. The successful achievement of the four outputs brought about the realization of the Project Purpose.

In the Project Design Matrix (PDM), a summary of the project, the important assumptions to be met to realize the Project Purpose were not set. In fact, no major conditions that hindered the achievement of the Project Purpose were observed. In addition, there was no major change in the external environment surrounding the project.

The GDC had been conducting training in customs valuation and HS classification (including chemical analysis) before the start of the project. However, at the time, there were no trainers or teaching materials which met the international standards developed by the WTO. In other words, the training officered before the project was not contributing to the modernization of customs administration.

Under such circumstances, 32 master trainers who specialized in the three fields were trained and the on-the-spot training which provided knowledge on the international standards was offered by the project. The training materials and teaching guidelines were also developed for the first time. Therefore, it is reasonable to conclude that the Project Purpose, which aimed at raising the master trainers and offering staff training, was achieved as planned.

This project has largely achieved its objectives; therefore its effectiveness is high.

[11] The total number of the GDC staff members was around 7,200 in 2004.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

The Overall Goal which should be achieved three to five years after the project termination was that "appropriate staff training on customs valuation, post clearance audit and HS classification (including chemical analysis) is periodically provided to the frontline officers who work at selected regional customs offices." The following three indicators were set to measure the achievement of the Overall Goal.

(1) Indicator 1

Indicator 1 was "80% of the front line officers in fields of customs valuation, post clearance audit, and HS classification (including chemical analysis), received appropriate local staff training course at least once."

There was no reliable statistical data at the GDC on the percentage of the frontline customs officers who attended the staff training. Therefore, an assumption of the rough figures was made through the interviews with the stakeholders and discussions at the GDC. The total number of the GDC officials is 8,400. Among them, 2,000 to 2,500 are estimated to be engaged in customs administration in the three fields. During the project period, 1,100 officials already took training. After that, the GDC estimates that additional 800 to 1,000 officials have taken the training. It indicates that 80 to 90 % of the officers engaged in the customs administration in the three fields have attended the training course at least once.

During the project period, however, the training course lasted five days, whereas it lasts only two days now. The main reason for shortening the training period was the busy schedules of the trainers and participants. The lectures tended to be basic or superficial due to time limitations for each module. The training implementers felt that they were unable to include a sufficient amount of case studies. It is also confirmed that the satisfaction rates of the training participants are now lower than before. According to the beneficiary survey, 51% of the participants in the training held during the project period said that the training met their expectations well. The corresponding figure of the participants of the training held after the project was only 18%.

According to the interviews with the master trainers and training participants, the majority of them felt attending one training course in six years since 2004 when the project started was not enough.

It can be said that, although the numerical target of Indicator 1 is achieved, the quality of the training conducted presently has room for improvement. In addition, it should be noted that attending only one training course in six years does not fully satisfy the participants' training needs.

(2) Indicator 2

Indicator 2 was that "the local staff training is conducted based on the sustainable training plan drafted in the project. The customs officers in selected regional customs offices are raised properly and work as local staff training instructors."

The sustainable training plan was formulated by the project and submitted to the GDC. However, no action based on the plan has been taken since then. After the project, no new trainers, i.e., the successors of the master trainers, were raised based on the plan. The trainers who teach in the staff training at present are those who were trained during project implementation. There are no trainers in the three fields who were raised after the project. The successor raising manuals, which, according to the plan, were supposed to be produced after the project, were not drafted and it was not even clear which department was responsible for drafting the manuals.

According to the Personnel and Organization Department, two full-time trainers in HS classification, four in customs valuation and three in post clearance audit are lacking as of 2011. Including part-time trainers, the GDC needs 20 more trainers[12]. Presently, two officers in post clearance audit and another two in HS classification (including chemical analysis) are being trained through on-the-job training so as to become accredited trainers. However, these four officers are not trained based on the sustainable training plan formulated by the project. The departments they belong to are conducting the training at their discretion (refer to 3.4 Sustainability 3.4.3 Technical Aspects of the Implementing Agency). Therefore, the achievement level based on Indicator 2 is low.

(3) Indicator 3

Indicator 3 was that "training materials, teaching guidelines and training curricula were revised by the Vietnamese side periodically, or every other year, through the lessons learned by the local staff training."

"The Project on Strengthening the Training System for Improving Capacity of Frontline Officers of Viet Nam Customs,[13]" the JICA technical cooperation project that is currently conducted at the GDC, includes activities of reviewing and revising the training materials for customs valuation and HS classification. On the other hand, much organizational action

[12] At the time of the ex-post evaluation study, one full-time trainer in the field of post clearance audit and 26 part-time ones (including those who taught less than 60 hours in a year) were engaged in training as instructors.

[13] The project period is from September 2009 to September 2012. The Project Purpose is "Supporting system to improve capacity of frontline customs officers in strengthened in order to provide stakeholders with better customs administration services." The project aims at producing three outputs: (1) "The training system for frontline customs officers is strengthened"; (2)"The system for collecting and sharing information which is necessary for proper customs administration is enhanced"; and (3) "The system for providing and sharing information which is useful for stakeholders is enhanced." This project is related to the project being evaluated because the teaching materials for the two fields, customs valuation and HS classification (including chemical analysis), are revised and developed to meet the demand of the intermediate-level learners.

is not taken for the field of post clearance audit because it is outside the scope of this project.

A few trainers in the field of post clearance audit, who were raised as the master trainers during the project period, have been updating the training materials. Because these trainers have been teaching on a regular basis, it is necessary for them to update the materials. They are revising the materials essentially on a voluntary basis, although the revised materials are reviewed and approved by the manager of the department to which the trainers belong to. The materials are updated more often than every other year, mainly when the concerned legislations in Viet Nam are revised. However, the revised materials are not necessary shared with other trainers and there is no established system to disseminate them. Therefore, not all the trainers are using the latest version of the training materials.

As for the training curricula, revisions are made by individual trainers when they feel it is necessary to do so. The teaching guidelines are neither updated nor revised. Moreover, they are hardly used by the trainers. Unlike the training materials, these curricula and guidelines are not meant to be distributed to the training participants. Therefore, it is not important to review them each time the trainer gives a lecture in the training course. There is no clear system on the handling and management of the curricula and guidelines.

In terms of the achievement of Indicator 3, while the revisions of the documents for the two fields, customs valuation and HS classification, are effectively conducted within the framework of the currently ongoing project, the field of post clearance audit presents many challenges.

In the PDM, the following are the important assumptions to be realized to achieve the Overall Goal: (1) "Budget for the local staff training allocated by the GDC continues to increase (or not decrease, at least), even after the project termination"; (2) "Legislation reforms on customs valuation, post clearance audit, and HS classification (including chemical analysis) progress smoothly as planned"; and (3) "Regional customs officers who have received on-the-spot training are raised as candidate lecturers based on the sustainable training plan drafted in the project." Among these assumptions, (1) is realized to some extent, (2) to a large extent, and (3) is hardly realized. As analyzed in the section of Indicator 2 for the Overall Goal, (3) should be regarded as one of the most important activities that the GDC should undertake in order to achieve the Overall Goal. The GDC's insufficient effort to realize (3) is a problem. As for (1), the overall budget has not been decreased. The number of the trainers was 32 during the project, which later decreased significantly to one full-time[14] and six part-time trainers who teach more than 60 hours

[14] Apart from this full-time staff member, a former member of the Project Management Unit (PMU) was engaged in full-time teaching at the Viet Nam Customs School for several years.

annually. However, there are ten part-time trainers who teach less than 60 hours annually and additional ten trainers, who were not trained by the project but officially acknowledged by the GDC as eligible trainers. These numbers are still insufficient but at least the GDC has a minimum number of trainers. As for (2), Viet Nam has been revising regulations, particularly those concerning the three fields, based on the international standards maintained by the WTO. Thus it can be said that this assumption is realized to a large extent.

While the achievement level of Indicator 2 is low, the targets of the remaining two indicators are achieved to a certain extent. However, the situation which the Overall Goal aims to realize, "the appropriate staff training is periodically provided", cannot be said to have been created. The most critical issue is, as typified by the unsatisfactory achievement level of Indicator 2, that the GDC has not established a systematic structure to strengthen human resources. The project should have sufficiently shared information among the concerned departments, identified the rights and responsibilities of the concerned departments, and transferred duties on training successor trainers and organizing staff training courses to the responsible departments. In reality, however, transferring the responsibilities to the concerned departments was not sufficiently made and the departments responsible for various tasks became unclear. Presently, the GDC is unable to continue necessary activities in a systematic manner.

Although the Overall Goal was somewhat achieved for its target indicators 1 and 3, the achievement of the indicator 2 was lower than the plan primarily because of the discontinuation of the sustainable training plan for raising successor trainers. Institutional arrangements for sustainable human resource development are yet to be materialized at the GDC. Therefore, the Overall Goal was only partially achieved.

3.2.2.2 Other Impacts

The ties between the GDC and the customs department of neighboring Laos have long been strong. Several master trainers trained by the project have been dispatched to Laos every year as experts in the modernization of customs administration since during the project[15]. In 2011, 20 customs officials from Laos plan to visit Viet Nam to attend training, in which the master trainers raised by the project will be lecturing. It can be said that the effect of the project is spreading to the Laos Customs as well.

"The Viet Nam Customs Modernization Project," implemented with the World Bank loan of 66 million US dollars, was conducted from January 1, 2006 to December 31, 2010[16].

[15] The GDC bears the expenses for the dispatch of the experts to Laos.
[16] It was a 77,060,246 dollar project, with a 65,901,400 dollar loan from the World Bank and a 11,158,846 dollar counterpart funding from the Vietnamese side

The scope of this project is limited mainly to the formulation of strategic papers on capacity building of staff for customs modernization. Its impact in terms of actual capacity development of the GDC staff is limited. The project did not overlap with the World Bank project. A synergistic effect between the two projects was that the GDC reaffirmed the importance of strengthening the organizational structure and arrangements for the staff training.

The project's effectiveness is high because the Project Purpose was achieved to a high degree. However, since the achievement of the Overall Goal is partial, the impact of the project cannot be regarded as high. Therefore, the project's overall effectiveness and impact are fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

The following table summarizes the inputs provided both by the Japanese and Vietnamese sides.

Inputs	Plan	Actual performance
(1) Experts	- One long-term expert - 55 short-term experts	- 2 long-term experts (cumulative) - 56 short-term experts (cumulative)
(2)Trainees received	5 – 10; Fields of training: Training management	38; Fields of training: Training management
(3) Equipment	Chemical analysis machines, office equipment, and other necessary equipment	Chemical analysis machines, office equipment, and other necessary equipment
Total Project Cost	250 million yen	280 million yen
Total Local Cost	Miscellaneous cost for project operation	30 million yen[17] (3 billion VND)

3.3.1.1 Elements of Inputs

Inputs from Japan were provided as planned. Inputs from Viet Nam were also provided as planned in terms of the local cost and the assignment of the counterpart personnel. However, the candidate master trainers of the GDC, to whom technology was to be transferred, were sometimes too busy to teach as trainers. They also faced a financial problem and sometimes had to give up traveling to a local customs office to conduct training or had to bear part of the travel cost on their own (such as travel between Hanoi and Ho Chi Minh by air). These constraints led to lowering efficiency of the project. The insufficient travel budget has been a continuing problem at the GDC and stands as a barrier in dispatching trainers to local customs offices.

[17] 0.01 yen against the Vietnamese dong (VND), which was the average exchange rate of between August 1, 2004, and July 31, 2007, was used.

400 copies of the training materials were printed for each of the three fields. After being distributed to 32 master trainers and 33 local customs offices, the remainder copies are kept at the GDC headquarters. The materials, however, need to be frequently revised as regulations change. Therefore, it seems more economical to keep soft copies (electronic files) and print them on demand. Soft copies could also avoid the risks of using outdated materials. It was one of the factors that hindered efficiency of the project.

On the other hand, three factors contributing to efficiency of the project were confirmed through interviews with the Vietnamese and Japanese stakeholders. They are, firstly, that the long-term and short-term Japanese experts possessed excellent professional knowledge, presentation skills, and skills of developing education materials. Secondly, strong bonds between the counterpart personnel and the Japanese experts were established as the same short-term Japanese experts were repeatedly dispatched. The smooth implementation of training was made possible because of the bonds between them. Thirdly, strongly motivated high-caliber customs officers were assigned as the counterpart personnel.

The equipment and machinery provided by Japan included expensive chemical analysis machines such as X-ray fluorescent spectrometers which were worth 20 – 40 million yen apiece (Three spectrometers were provided in total). Thus, the total cost for the procurement of the machines was high, reaching 105 million yen. The chemical analysis machines were installed at the Centre for Analysis and Classification in Hanoi, Da Nang, and Ho Chi Minh, where the needs for such machines were very high. However, frequent breakdowns and troubles have occurred to the machines since then. Thus sufficient outputs have not been generated from the provision of these inputs.

On the other hand, the provision of the X-ray fluorescent spectrometers enabled the GDC to carry out chemical analysis on its own without relying on external organizations such as research institutes and private companies. The GDC also substantially shortened required time for chemical analysis[18] and raised the quality of the analysis by not outsourcing the procedure. Therefore, it is fair to say that the provision of these machines itself has been appropriate.

However, insufficient budget allocation for the maintenance of the machines is an issue. The Centre for Analysis and Classification in Hanoi is allocated 0.45 million yen for the maintenance of the machines while the actually required amount for maintenance is at least 3.2 million yen[19]. The Centre also has challenges in terms of ensuring appropriate operation and maintenance (O&M) because the laboratories where the machines are

[18] It took about one month for the GDC to receive the analysis report from the external organization before the machines were installed at the GDC. It now takes only five days on average.

[19] The total budget the Centre for Analysis and Classification has for the O&M of the equipment and machinery is 1.3 million yen. This amount is used to cover all the O&M expenses at the North, Central and South branch offices.

installed sometimes face excessive humidity and high temperature, as well as power outage. Thus the GDC may not have been ready to receive these machines as it failed to operate them smoothly to produce expected outputs. The GDC should have established a more favorable environment for the O&M of the machines in terms of technical and managerial skills as well as appropriate facilities.

3.3.1.2 Project Cost

The project cost was slightly higher than planned (112% of the plan), i.e., 280 million yen as opposed to 250 million yen planned originally. It is mainly due to the increase of the chemical analysis machines provided. In the plan, the machines were to be installed only at the Centers for Analysis and Classification in Hanoi and Ho Chi Minh. However, in light of the importance of the East-West Economic Corridor linking Viet Nam, Laos, Thailand and Myanmar, the project decided to install some machines at the Centre in Da Nang as well. As a result, the total project cost exceeded the plan by 30 million yen. It was necessary to provide machines to all the three Centers because the needs were pressing. However, the unfavorable facts including insufficient budgets for the O&M of the machines and inappropriate maintenance situations of the machines suggest that more careful preparation for receiving the machines were needed prior to the procurement.

3.3.1.3 Period of Cooperation

The cooperation period was 36 months, which was as planned.

Although the period of cooperation was within the plan, the institutional system for operating the equipment and machinery provided by the project was inadequate. Therefore, the efficiency of the project is fair.

3.4 Sustainability (Rating: ②)

3.4.1 Related Policy towards the Project

Sustainability in terms of policy is maintained well.

Viet Nam's Five-Year Socio-Economic Development Plan for 2006 to 2010 as well as the Master Plan for Customs Reform and Modernization (-2010) identifies customs reforms as one of the most important areas for the GDC to push forward. Furthermore, Viet Nam acceded to the WTO in January 2007. Since then, the improvement of customs administration in line with the international standards has been a high priority area for the GDC. Both the Ministry of Finance and the GCD maintain that further modernization of customs administration is one of the most important areas to address.

Among the three fields, customs valuation and HS classification (including chemical analysis) tended to have been given priority because of their urgency. However, the GDC

has designated the year 2011 as the "year of strengthening post clearance audit" and tries to focus on enhancing staff capacity in this field, together with the other two fields.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

The institutional and operational aspects of the GDC pose some problems.

The Personnel and Organization Department of the GDC has overall responsibility for formulating plans on staff training. The Department is also responsible for conducting on-the-spot training for mid-career officials at local customs offices. On the other hand, the Viet Nam Customs School is responsible for implementing part of the plans formulated by the Personnel and Organization Department. In particular, the School's main responsibility lies on carrying out training for the new recruits.

In other words, different departments take different responsibilities of staff training depending on the training participants and modes of the training. As for the training in the three fields for mid-career officials, the needs of which are expected to keep growing, the Personnel and Organization Department takes responsibility for both planning and implementation. The Department, however, had limited involvement in the project[20] and was unaware of current situations of the training materials, teaching guidelines, curricula, and sustainable training plans that the project developed. Thus it was difficult to ensure continuity of the project activities. The limited involvement of the Personnel and Organization Department was inevitable to some extent because, at the time, the project aimed primarily at strengthening the Customs Training Center (presently called the Viet Nam Customs School). After the project, the organizational situations have changed and the Personnel and Organization Department, together with the School, has taken substantial responsibility for the training in the three fields.

When the project terminated, the GDC promised the continuation of on-the-spot training and training of trainers. However, transferring responsibilities and duties from the PMU to the responsible departments in the GDC was not done in a thorough fashion, and led to unclear divisions of responsibilities within the GDC. It became difficult to train successor trainers and continue various activities undertaken during the project. As will be explained later in the following section, "3.4.3. Technical Aspects of the Implementing Agency", the GDC has not developed an effective institutional arrangement for raising the successor trainers. This fact is leading to lower sustainability in terms of the institutional aspect of the implementing agency.

During the project, 32 master trainers[21] were trained. However, due to reasons such as

[20] Only one assistance director of the Personnel and Organization Department belonged to the Project Management Unit (PMU).
[21] One of the 32 master trainers passed away after the project.

transfer to a different department and demanding workload, only seven of the 32 trainers have been teaching more than 60 hours a year. The seven trainers include one full-time trainer assigned at the School, who specializes in post clearance audit, and six part-time trainers in the three fields. Although the GDC issued an official letter in 2008 informing that the 32 master trainers should teach at least 60 hours a year, the departments that the master trainers belong to tend to prioritize other work over teaching. Thus the letter has not been particularly effective.

3.4.3 Technical Aspects of the Implementing Agency

While the technical level of some of the counterpart personnel has been maintained at a certain level, the technical capacity of other staff needs strengthening.

Among the 32 master trainers trained by the project, only around half of them continue teaching presently. Regular training or follow-up meetings have not been held for the master trainers after the project. While the knowledge of the trainers in charge of revising the training materials was updated regularly, the study could not confirm the level of knowledge of other trainers due to time constraints. The exception is the trainers who are taking part in the ongoing "Project on Strengthening the Training System for Improving Capacity of Frontline Officers of Viet Nam Customs." Their knowledge in the fields of customs valuation and post clearance audit is updated regularly.

At the time of the evaluation study, which is four years after the project termination, no successor trainers have been trained and the continuation of the project activities seems minimal.

Presently, two officers in post clearance audit and another two in HS classification (including chemical analysis) are being trained through on-the-job training and they are expected to become the first accredited trainers after the project in 2011 or 2012. Their technical levels are still insufficient at present. Moreover, these four officers are not trained based on the sustainable training plan formulated by the project. The senior staff members in their departments are conducting the on-the-job training based on their individual experiences.

While the training materials are updated in accordance with the revisions of the relevant regulations, the updated materials for post clearance audit, which are not included in the ongoing project, are not distributed properly to the stakeholders because the staff members who update the materials save them on their computers without sharing the information systematically. As a result, skills and knowledge concerning the training materials are not shared with people concerned.

Another issue is that not enough staff members can operate complicated chemical analysis machines. According to the interview with the logistics company in the beneficiary

survey, the chemical analysis by the GDC turned out to be inaccurate several times. Accurate chemical analysis may have been hindered by lack of technical skills of the GDC staff. It is necessary to improve the GDC's chemical analysis skills and increase the number of staff members who can operate the machines properly. The GDC should train all the staff in charge of chemical analysis to operate and maintain machines and equipment in an appropriate manner.

3.4.4 Financial Aspects of the Implementing Agency

Although the financial status of the GDC for staff training is not satisfactory at present, it is expected to improve in the near future when the School moves to the outskirts of Hanoi for expansion.

Presently, the GDC allocates 150 million VND (approximately 0.6 million yen) for training trainers, 300 million VND (approximately 1.2 million yen) for on-the-spot training, and 200 million VND (approximately 0.8 million yen) for various training operations (including travel expenses). These amounts are not enough to conduct the required training fully.

The GDC tries to transform the School into "a top-level customs training center in southeast Asia" and plans to move the School from Hanoi to Hung Yen Province[22], where it can have more space, in three years. For this plan, 250 – 300 billion VND (approximately one billion yen) will be allocated as a construction cost. Land was already acquired and the construction is to begin soon. Additional funds for various training operations are expected to be allocated in the near future. The number of staff members assigned to the School is expected to be doubled from the current number of 40. Although the amount of the School's future budget is still undecided, the current shortage of funds for staff training may be solved in about three years.

Meanwhile, the Personnel and Organization Department plans to assign new officials: two for HS classification, four for customs valuation and three for post clearance audit, to work as full-time trainers at the School by the end of 2011. They are expected to lecture primarily in on-the-spot training for mid-career customs officers. Additional funds for staff training are scheduled to be allocated, although the specific amount of the funds is undecided yet.

The machines such as chemical analysis machines provided by the project incur routine O&M costs. However, the O&M funds secured for the Centres for Analysis and Classification in three cities are limited to only one seventh of the required amount. Therefore, prompt repair and maintenance are difficult. Moreover, funds to conduct skills development training for the staff in charge of machine operation are significantly lacking

[22] Hung Yen Province is located about 20km away from the current location of the Viet Nam Customs School.

and more financing is needed to raise the technical capacity of the machine operators.

3.4.5 Continuity of Effectiveness / Impact

Sustainability of the project's effectiveness is fair at present and improvement is needed in various fields.

The recommendations made by the terminal evaluation, "strengthening the capacity of the Customs Training Center (presently called the Viet Nam Customs School)," "the assignment of the master trainers to be engaged in teaching," "the assignment of training organizers for updating training materials," "the development and implementation of plans for train successors of master trainers," and "the allocation of necessary funds for training and other related activities as well as for maintenance of the chemical analysis machines," have not been adequately put into practice thus far. In particular, the sustainable training plan, which was formulated by the project and submitted to the GDC, was not taken up by the GDC at all. The project also expected the School to formulate the successor raising manuals based on the sustainable training plans after the project. However, this was not carried out either. In order to establish institutional arrangements for sustainable human resource development, taking measures to raise successor trainers seems most important among these recommendations.

The number of the trainers in the three fields is clearly too small and substantial improvement is needed in the future. A stronger partnership between the School which is responsible for the training for the new recruits and the Personnel and Organization Department responsible for conducting training for mid-career officers should be built to increase the number of the trainers and to conduct training more frequently.

The training needs for the mid-career officers are expected to increase in the future. Appropriate training materials and curricula for the mid-career officers are not developed yet and the frequency of the training is not enough at present. The training materials and the distribution systems of the updated materials need to be developed. As for the existing materials also, the storage space and people responsible for storage and distribution of the hard copies of the training materials are unclear. The hard copies are, in fact, already obsolete, and it is necessary to establish the distribution systems of the soft copies.

The O&M of chemical analysis machines poses many challenges in terms of management, technical skills and financing. The current conditions of the machines are not satisfactory. The Centre for Analysis and Classification in Hanoi had an X-ray fluorescent spectrometer (worth 432,000 US dollars) broken until 2010[23]. A surface tension meter (worth 23,500 US dollars) is also out of order. The X-ray fluorescent spectrometer in Da Nang could not analyze liquid substances due to lack of some equipment and became out of

[23] It was repaired in 2010 with the financial assistance from JICA.

use after an accident. A digital viscosity meter system (worth 12,285 US dollars) at the Centre in Ho Chi Minh is also out of order and a repair is being requested. It is usually difficult to get the spare parts and the technicians for the repair of these machines. It takes as long as six months to get the machines fixed. Hardly any investment for capacity development of the GDC staff in charge of the machines is made due to lack of budgets. As mentioned earlier, the O&M budgets for the machines are significantly lacking.

The reasons for the frequent breakdown of the machines include poor physical conditions of the laboratories. Some machines are installed in a room where humidity exceeds 90% and mice and cockroaches infest the laboratories due to insufficient cleanliness or tidiness of the rooms. Although the GDC has power generators in the buildings, they are not designed to send electricity to the laboratories in case of power outage. These physical conditions need to be improved substantially.

Some problems have been observed in the structural, technical, and financial aspects of the implementing agency. Therefore, the sustainability of the project's effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

While the project's relevance and the achievement level of the Project Purpose are high, there are challenges in terms of the achievement of the Overall Goal and sustainability of the project's effects. The GDC has not developed human resources in a systematic manner after the project. It hindered the achievement of the Overall Goal, and limited the effects of the project. The project's efficiency is hindered because the preparation for the operation and management of the chemical analysis machines provided by Japan was not adequately done. Frequent breakdowns of the machines have occurred and, as a result, the production of the expected outputs was undermined. Presently, the GDC plans to strengthen staffing and financing for staff training. If the plan is carried out smoothly and the recommendations below are put into practice, the sustainability of the project will be enhanced.

While the project produced certain effects, it is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

The following recommendations -- three to be implemented immediately and another three to be followed in the medium- to long-terms -- are made to the GDC. It is advised that action based on these recommendations be taken so that the effects of the project will be created in a sustainable manner.

<To be implemented immediately>

(1) Taking institutional and systematic action to increase the number of trainers

Both the Viet Nam Customs School and the Personnel and Organization Department take responsibilities for undertaking staff training. Therefore, better communication and a stronger partnership between the two departments are required for raising trainers. Institutional and systematic action to increase the number of trainers is necessary. The departments responsible for training trainers of each of the three fields should be decided and the departments should implement the sustainable training plans formulated by the project after making revising the plans to meet the present situation.

(2) Securing sufficient funds for trainers' travel and introducing a system to increase teaching hours of part-time trainers

Sufficient travel funds for trainers who travel to local customs offices to teach in the on-the-spot training should be secured. The funds should cover the costs for air travel, if needed, and lodging expenses taking into consideration recent price hike so that the trainers do not have to spend their own money. As part-time trainers often have no choice but to prioritize other work required by their departments, securing 60 hours of teaching time per year is difficult for them. The GDC should consider and introduce a system of facilitating increases in their teaching hours.

(3) Establishing an efficient updating and distribution system of training materials

The departments responsible for updating the training materials need to be identified and a speedy distribution system of the revised materials must be established. Because the production and distribution of hard copies raise the risks of use of outdated materials, the system of revision, distribution and appropriate management of soft copies should be established. In doing so, the utilization of the existing information systems such as the Intranet may be efficient and effective.

<To be implemented in the medium- to long-terms>

(1) Increasing the number of training participants by securing an adequate number of full-time trainers and training coordinators

A plan to increase the number of full-time trainers in the three fields and training coordinators should be formulated as the School expands its activities by moving to Hung Yen Province. The training coordinators are expected to improve the training not only for the new recruits but also for the mid-career officers in collaboration with the Personnel and Organization Department. Institutional efforts need to be made to increase the number of training participants, particularly the number of mid-career officers who attend the

on-the-spot training courses.

(2) Developing training materials for intermediate- and advanced-level learners

Training materials for intermediate- and advanced-level learners should be developed after understanding the needs of the mid-career customs officers. The "Project on Strengthening the Training System for Improving Capacity of Frontline Officers of Viet Nam Customs" includes the activity of developing the intermediate-level training materials for the two fields. Further development of the advanced- as well as intermediate-level materials, particularly in the field of post clearance audit, is advisable.

(3) Securing funds and strengthening technical and management capacity for O&M of the chemical analysis machines

Speedy repair and regular maintenance of the chemical analysis machines should be made possible by securing sufficient O&M funds. The O&M system for the equipment and machinery should also be improved by taking into account hygiene, safety and power supply situations. Meanwhile, the technical capacity of the machine operators should be enhanced by offering appropriate training to them.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

The lessons learned from the project are as follows:

(1) Appropriate updating and distribution systems of training materials

The training materials on customs administrations need to be revised frequently as the regulations change. Quicker and easier ways to revise hardcopies of the training materials need to be developed. For reducing costs and also for mitigating risks of people referring to outdated information, the use of soft copies (electronic files) is more efficient and effective as it can be promptly disseminated to the people concerned. An appropriate management system of soft copies needs to be established by identifying the responsible departments and clarifying the distribution methods.

(2) Ensuring a smooth transition from the PMU to the departments responsible for continuation of activities

The departments responsible for certain tasks may change or the division of responsibilities may alter within the organization after the project. This project terminated

without clearly identifying the primarily responsible departments for implementing the sustainable training plan. The project should have identified the rights and responsibilities of the Personnel and Organization Department and the School, which play a pivotal role in human resource development, and reflected their roles fully in the project design. It is important for the project and the implementing agency to be aware of the changing institutional environment and delegate or transfer responsibilities promptly to the concerned departments in accordance with the latest situations. The PMU should ensure continuation of the project activities by the time of the project termination by sufficiently transferring responsibilities to the relevant departments and by establishing an institutional framework for the continuous realization of the project's effects.

(3) Sufficient preparatory study to judge the financial and physical conditions of the O&M of machines

In providing equipment and machinery, it is necessary to confirm the needs and effects of the machines. In addition, it should be made clear that insufficient funds for the O&M of the machines and inadequate laboratory conditions should be rectified beforehand. A sufficient preparatory study to judge the appropriateness of the financial and physical conditions is essential before the provision of the equipment and machinery.