

Socialist Republic of Viet Nam

FY2016 Ex-Post Evaluation of Japanese ODA Loan

“Dong Nai and Ba Ria-Vung Tau Water Supply Project (I) (II)”

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

## 0. Summary

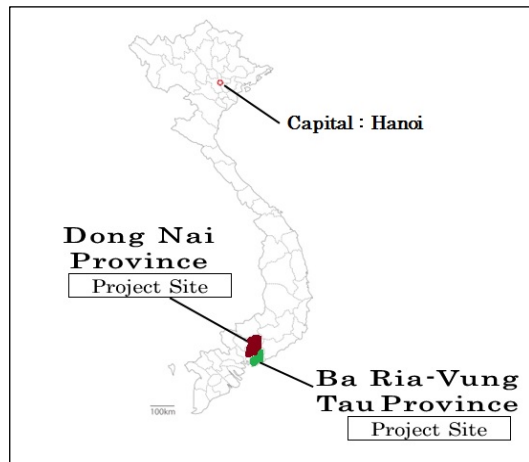
This project was planned to meet water demand for household and industrial use and to improve the living condition of local residents by constructing a water supply system in the province of Dong Nai and Ba Ria-Vung Tau, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment. However, the system was only developed for Dong Nai Province under this project. With regard to relevance, this project has been relevant to the Vietnam’s national development plan and development needs both at the time of appraisal and ex-post evaluation. This project was also relevant to Japan’s ODA policy at the time of appraisal. However, regarding the project components of Ba Ria-Vung Tau Province, it is hard to say that there was no problem in the procedures and approach under implementation of the project, because the necessary procedure to cancel had not actually been carried out. Therefore, it is judged that its relevance is fair. Instead, the other aspects of this ex-post evaluation will be judged based only on Dong Nai Province. As the project cost and project period significantly exceeded the plan, efficiency of the project is low. In terms of effectiveness and impact, most operation and effect indicators came close to achieving the target value. Concerning population served, it is highly thought to achieve the target in the near future. Positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. In addition, it is presumed that this project, by securing stable water supply, is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Therefore effectiveness and impact of the project are high. In terms of sustainability, no major problems have been observed in institutional, technical and financial aspects of the operation and maintenance. Therefore, the sustainability of the project effects is high.

In light of the above, this project is evaluated to be partially satisfactory<sup>1</sup>.

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<sup>1</sup> Nevertheless, the component for Dong Nai Province is evaluated to be satisfactory.

## 1. Project Description



Project Location



Constructed Water Treatment Plant in Dong Nai Province

### 1.1 Background

In Vietnam, the urban population grew rapidly in parallel with the fast-track economic growth in the 1990s. Influx of population to urban centers was remarkable in Southern Vietnam, including Dong Nai Province and Ba Ria-Vung Tau Province. Many industrial parks also started being constructed during this period, as a result of the advancement of foreign companies to Vietnam. It was important to secure industrial water and safe household water, since the water demand for industrial and household use was particularly increasing in the region. Therefore, it was an urgent task to develop water supply facilities in both provinces.

### 1.2 Project Outline

The objective of this project is to meet water demand for household and industrial use and to improve the living condition of local residents in the province of Dong Nai and Ba Ria-Vung Tau by constructing a water supply system, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment.

Loan Approved Amount/ Disbursed Amount	Phase I: 5,771 million yen / 4,859 million yen
	Phase II: 3,308 million yen / 3,188 million yen
Exchange of Notes Date/	Phase I: March 1998 / March 1998

Loan Agreement Signing Date	Phase II: March 2004 / March 2004
Terms and Conditions	<p>Phase I:  Construction: Interest Rate: 1.3% / 0.75%  Repayment Period : 30 years  (Grace Period: 10 years)  Conditions for Procurement: General Untied  Consulting Service: Interest Rate: 0.75%  Repayment Period: 40 years  (Grace Period: 10 years)  Conditions for Procurement: Partially Untied</p> <p>Phase II:  Construction: Interest Rate: 1.3%  Repayment Period : 30 years  (Grace Period: 10 years)  Conditions for Procurement: General Untied  Consulting Service: Interest Rate: 1.3%  Repayment Period: 30 years  (Grace Period: 10 years)  Conditions for Procurement: General Untied</p>
Borrower / Executing Agency(ies)	The Government of the Socialist Republic of Vietnam / People's Committee of Dong Nai (hereafter referred to as "PCDN") People's Committee of Ba Ria-Vung Tau (hereafter referred to as "PCBR-VT")
Project Completion	April 2014
Main Contractor (Over 1 billion yen)	Degremont (France), Salcon Engineering BHD (Malaysia), Kubota Corporation (Japan)
Main Consultant (Over 100 million yen)	Nippon Koei (Japan)/Nippon Suido Consultants (Japan)/Vietnam Consultation Water Supply, Sanitation & Environment (Vietnam) (JV)
Feasibility Studies, etc.	F/S (Own fund by Vietnamese side, 1998)
Related Projects	<p><b>【Japanese Technical Cooperation】</b>  "Master Plan Study on Dong Nai River and Surrounding Basins  Water Resource Development" (1996) (JICA)  <b>【ODA Loan Project】</b>  "Dong Nai Province Water Infrastructure Construction Project"  (2015) (JICA)  <b>【Other Donors' Cooperation】</b>  "Thien Tan Water Supply Project Phase I (2000-2004), Phase II"  (2015), Economic Development Cooperation Fund (EDCF),  The Import-Export Bank of Korea)</p>

## **2. Outline of the Evaluation Study**

### **2.1 External Evaluator**

Kenichi Inazawa, Octavia Japan Co., Ltd.

### **2.2 Duration of Evaluation Study**

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2016 – November 2017

Duration of the Field Study: 11-24 February 2017 and 16 -22 May 2017

### **2.3 Constraints during the Evaluation Study and Points to be Noted**

As explained in 3.1.4 Appropriateness of Project Planning and Approach and 3.2.1 Project Output, it was not possible to confirm the project components and actual condition of Ba Ria-Vung Tau Province. Therefore, the project component of Ba Ria-Vung Tau Province is evaluated only in Relevance. The project component only for Dong Nai Province is focused for the rest of the criteria in this evaluation survey to avoid duplication of judgement, since non-performance of Ba Ria-Vung Tau Province is taken into account in the judgement for Relevance.

## **3. Results of the Evaluation (Overall Rating: C<sup>2</sup>)**

### **3.1 Relevance (Rating: ②<sup>3</sup>)**

The development of water supply facilities in the Dong Nai and Ba Ria-Vung Tau Provinces was part of this project at the time of appraisal. With regard to the development policy and needs of the Ba Ria-Vung Tau Province, confirmation and review of only the project appraisal was done.

#### **3.1.1 Consistency with the Development Plan of Vietnam**

At the time of the project appraisal, the government of Vietnam formulated the *Five Year Socio-Economic Development Plan* (1996-2000). This plan pointed out the need to gradually improve water supply systems in urban centers, especially in unserved areas. In addition, the government formulated the *Comprehensive Poverty Reduction and Growth Strategy (CPRGS)* in 2003, which aimed to ensure that 80% of the urban population and 60% of the rural population

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<sup>2</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>3</sup> ③: High, ②: Fair, ①: Low

have access to clean water with an average daily supply of 50 liters per person by 2005 and that 80% of poor communes are provided with water supply infrastructure by 2005 and 100% by 2010.

At the time of ex-post evaluation, the government of Vietnam aims to achieve 100% water supply coverage rate by 2025, as stipulated in the Prime Minister's Decision of 2009: *Decision Approving Orientations for Development of Water Supply in Vietnam's Urban Centers and Industrial Parks up to 2025, and a Vision Toward 2050*. It also aims to meet the water supply requirements of all industrial parks and economic zones. In addition, the executing agency of this project, PCDN, formulated in January 2014 the *Overall Water Supply Plan for Urban and Industrial Parks in Dong Nai to 2020*, which stipulates the importance of expanding water distribution networks and water supply facilities in urban areas and industrial park in Dong Nai Province.

Based on the above, water facility development has continued to be important in Vietnam as a whole and in Dong Nai Province at the time of ex-post evaluation. Thus, this project is consistent with the national and sectoral plans during appraisal and ex-post evaluation.

### 3.1.2 Consistency with the Development Needs of Vietnam

Before implementation of this project, in Vietnam, many factories were constructed and the urban population grew rapidly in accordance with the fast-track economic growth in the 1990s. It was important to secure industrial water and safe household water especially in Southern Vietnam, where development of industrial parks and influx of population to urban centers were observed. In particular, there was an increasing demand for industrial and household water in Ho Chi Minh City and its surrounding areas. According to JICA internal documents, the whole capacity of water supply in Dong Nai Province was approximately 25,000 m<sup>3</sup>/day in 2003. Meanwhile, the capacity of water supply in Ba Ria-Vung Tau Province then was approximately 50,000 m<sup>3</sup>/day. Since both provinces were facing population increase accompanied by the progress of urbanization, the water demand was estimated at 110,000 m<sup>3</sup>/day in Dong Nai Province and 100,000 m<sup>3</sup>/day in Ba Ria-Vung Tau Province for the future (after 2010). Responding to the increasing drastic demand, implementing the water supply project was necessary for both provinces.

At the time of ex-post evaluation, through this project, a water treatment facility with the supply capacity of 100,000 m<sup>3</sup>/day was developed in Dong Nai Province, which increased the province's supply capacity to about 300,000 m<sup>3</sup>/day. The treated water is mainly distributed to

residents and industrial parks in the province's capital, Bien Hoa, Nhon Thach District and Long Thanh District. On the other hand, the water demand for this province has been increasing every year; it is expected to reach 1,100,000 m<sup>3</sup>/day in 2020, according to PCDN. Behind this, there are reasons such as increases in the population and in companies moving to the industrial parks inside the province. Dong Nai Province is adjacent to Ho Chi Minh City and, with improved traffic accessibility after the completion of the North–South Expressway (Opened in February 2015) and other infrastructure, its location and investment environment are advantageous. There is an ample labor force with more people immigrating to this province. Thus many foreign companies continue to come and invest in this province, making it one of the most industry intensive provinces in Vietnam. As construction of a new international airport is also under discussion, the province is expected to receive more attention in the future (The source is from PCDN.). In these circumstances, a succeeding ODA loan project, the “Dong Nai Province Water Infrastructure Construction Project”, and the “Thien Tan Water Supply Project” (Phase II project) financed by the Economic Development Cooperation Fund (EDCF), The Ex-port-Import Bank of Korea, are ongoing at the time of ex-post evaluation<sup>4</sup>. The province is taking measures so that it can respond to future water demand.

Based on the above, the project is consistent with the developmental needs brought to light by the appraisal and ex-post evaluation.

### 3.1.3 Consistency with Japan's ODA Policy

The *Official Development Assistance (ODA) Charter*, which was approved by the cabinet in 1992, stated that “Attention should be paid to efforts for promoting democratization, the introduction of a market-oriented economy and the situation regarding the protection of basic human rights and freedoms in the developing countries.” Moreover, it mentioned that supporting the infrastructure development, an important basic condition of economic and social development must be focused on. This project offers infrastructure development assistance to Vietnam, which was striving to move to a market economy structure.

In addition, according to the Japan's ODA White Paper in 1999, it clearly stated that it would consider various cooperation that contributes to improvement of the residential (urban) environment through improvement of water and sewerage facilities based on the priorities of Vietnam.

Meanwhile, the *Country Assistance Plan for Vietnam*, was formulated in 2003 before the

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<sup>4</sup> Loan agreement of the both projects was respectively signed in 2015.

commencement of Phase II project, by the Ministry of Foreign Affairs in Japan, stating that assistance to water supply, rural roads, electrification/rural electricity distribution network and agricultural irrigation was among its priorities. Furthermore, JICA prepared the *Strategy for Overseas Economic Cooperation Operations and Country Assistance Policy for Vietnam* in 2003, which highlighted development issues of and assistance policy for Vietnam. These policies identified “Assisting the development of economic and social infrastructure including water supply and sewerage sectors” and “Assisting projects contributing to improve people’s living environments in urban areas”.

Since this project aimed to improve the health condition of the local residents and to promote the industrial development, including foreign investment, through developing infrastructure such as water supply facilities, it can be said that the project was in line with Japan’s assistance policy.

#### 3.1.4 Appropriateness of the Project Plan and Approach

Concerning the water supply development project in Dong Nai Province, there is no significant difference between the outputs planned at the time of appraisal and the status after completion. On the other hand, regarding the water supply development project in Ba Ria-Vung Tau Province, the ODA loan was not used except for a portion of consultancy service. Behind this was the fact that the contract negotiation failed between PCBR-VT and the bidder and the contract was not finalized. Then, PCBR-VT made a decision to draw out from the ODA loan project in March 2004, immediately after the Phase II project began<sup>5</sup>. As water demand in the province was rapidly increasing in 2004, PCBR-VT anticipated that tendering would take a significant amount of time given the requirements specified in the loan agreement; they withdrew from this Project in order to develop the water supply more swiftly. As an alternative, PCBR-VT decided to use its own fund to implement the water supply project. The actual achievements of its project could not be confirmed through this evaluation study<sup>6</sup>

However, PCBR-VT did not submit an official letter informing the Ministry of Planning and Investment (hereafter referred to as “MPI”), the coordinator of ODA loans or JICA Vietnam Office about its request to cancel this component<sup>7</sup>. Therefore, the related parties had the view

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<sup>5</sup> Source: JICA’s internal document and interviews with JICA Vietnam Office

<sup>6</sup> No information was available through JICA’s internal document or interviews with JICA Vietnam Office.

<sup>7</sup> According to interviews with JICA Vietnam Office, the cancellation and change of loan agreement regarding the project component of Ba Ria-Vung Tau Province are usually done based on submission of cancellation notice in writing from the executing agency to MPI, and then from MPI to JICA. Regarding the project components of Ba Ria-Vung Tau Province, MPI and JICA repeatedly advised PCBR-VT to write such an official letter; in fact, MPI even dispatched its staff to follow this up. However, PCBR-VT did not take any action, and loan agreement was not

that cancellation of the component nor amendment of the loan agreement's procedures concerning the project components of Ba Ria-Vung Tau Province was not possible. However, it is not clear if all the options were thoroughly examined. In principle, the terms of the loan agreement is legally binding, and it is not desirable to keep the project scope in an ambiguous state. Considering the legal framework of the loan agreement, there may have been other means to cope with the situation, such as sending the request for cancellation of the component (It is just notice by official documents.) from the JICA side<sup>8</sup>.

Therefore, it is a fact that the necessary procedure has not actually been carried out to make the cancellation official, and the status has continued up to the ex-post evaluation. Based on this point, it is judged that there were some problems on appropriateness of project procedures and approach.

This project has been relevant to the Vietnam's development plan and development needs. In addition, it was also relevant to Japan's ODA policy at the time of appraisal. However, it cannot be judged that all means to resolve the situation were appropriately examined, and in reality no cancellation procedure about the project components of Ba Ria-Vung Tau Province were officially carried out. Based on this point, it is hard to say that there was no problem in the procedures and approach under implementation of the project. Therefore, it is judged that its relevance is fair.



Photo 1: Constructed Water Treatment Plant in Dong Nai Province



Photo 2: Constructed Water Pumping Station in Dong Nai Province

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amended. The reason why PCBR-VT did not send the letter was not confirmed. Meanwhile, it can be said that MPI and JICA made efforts to convince PCBR-VT yet could not control the situation.

<sup>8</sup> More specifically, there may have been an option for the JICA side to offer cancellation of the project scope of Ba Ria-Vung Tau Province, by changing the loan agreement's procedure (e.g., Partial cancellation of loan agreement should have been done.) to the Vietnamese government side.



### 3.2 Efficiency (Rating:①)

#### 3.2.1 Project Outputs

Table 1 shows the planned and actual outputs of this project.

Table 1: Planned and Actual Outputs of this Project

Plans at the Time of Appraisal	Actual at the Time of Ex-Post Evaluation
<p>&lt;Dong Nai Province&gt;</p> <p>(a) Raw water intake: one place</p> <p>(b) Water pumping station: three places</p> <p>(c) Water treatment plant: one place at Nhon Trach (design capacity: 200,000 m<sup>3</sup>/day at appraisal of phase I (March 1998), 100,000 m<sup>3</sup>/day at appraisal of phase II (March 2004))</p> <p>(d) Water transmission pipeline: approx.104km</p>	<p>&lt;Dong Nai Province&gt;</p> <p>(a) Implemented as planned</p> <p>(b) Implemented as planned</p> <p>(c) Implemented as planned for the planned design of phase II (Capacity: 100,000 m<sup>3</sup>/day)</p> <p>(d) Implemented: approx.79km</p>
<p>&lt;Ba Ria-Vung Tau Province&gt;</p> <p>(a) Raw water intake: one place</p> <p>(b) Water transmission pipelines: approx.45km</p> <p>(c) Water treatment plant: one place at Ba Ria (design capacity: 100,000 m<sup>3</sup>/day at appraisal of phase I (March 1998), 50,000 m<sup>3</sup>/day at appraisal of phase II (March 2004))</p>	<p>&lt;Ba Ria-Vung Tau Province&gt;</p> <p>(a)-(c): ODA Loan was not used after 2004.</p> <p>(Reference) Implemented through its own fund after 2004. However details are unknown.</p>
<p>&lt;Consulting Services&gt;</p> <p>(a) Review of F/S, detailed design, preparation and evaluation of tender documents, assistance for tendering, supervision of construction</p> <p>(b) Study of topography, water quality and hydrology</p> <p>(c) Environmental measures including environmental monitoring</p>	<p>&lt;Consulting Services&gt;</p> <p>(a)-(c): Implemented as planned in Dong Nai Province</p> <p>(Reference) Regarding Ba Ria-Vung Tau Province, the consulting services were also partially used. However, details are unknown.</p>

Source: Document provided by JICA (plans at the time of appraisal), answers to the questionnaires (actual at the time of ex-post evaluation).

With regard to Dong Nai Province, the outputs planned at the time of appraisal were implemented mostly as planned. Among these, the actual output related to the design capacity of “(c) Water treatment plant” was less than planned. The reason for this is that in 2000, after the project began, it was estimated that the province’s water demand for water supply would slow down. Then, design capacity of this project was changed (i.e., JICA revised the design capacity from 200,000 m<sup>3</sup>/day to 100,000 m<sup>3</sup>/day as a result of reappraisal.) Behind this were the judgments of the Vietnamese government and the government of Dong Nai Province that demand for water supply would slow down in the province given the Asian Financial crisis in the late 1990s and the country’s economic situation at that time<sup>9</sup>. Based on such a review of

<sup>9</sup> More specifically, it was assumed that the amount of foreign investment and number of enterprises to the province

design capacity, the design capacity was set at 100,000 m<sup>3</sup>/day at the time of appraisal of the Phase II project (2004); the facility was constructed as per the design. With respect to “(d) water distribution pipe”, the actual output (approx. 79km) was shorter than the initial plan. This was due to a change made to the detailed design during appraisal of the Phase II project.

With regard to Ba Ria-Vung Tau Province, the planned component was not implemented after 2004, as explained in 3.1.4 Appropriateness of the Project Plan and Approach.

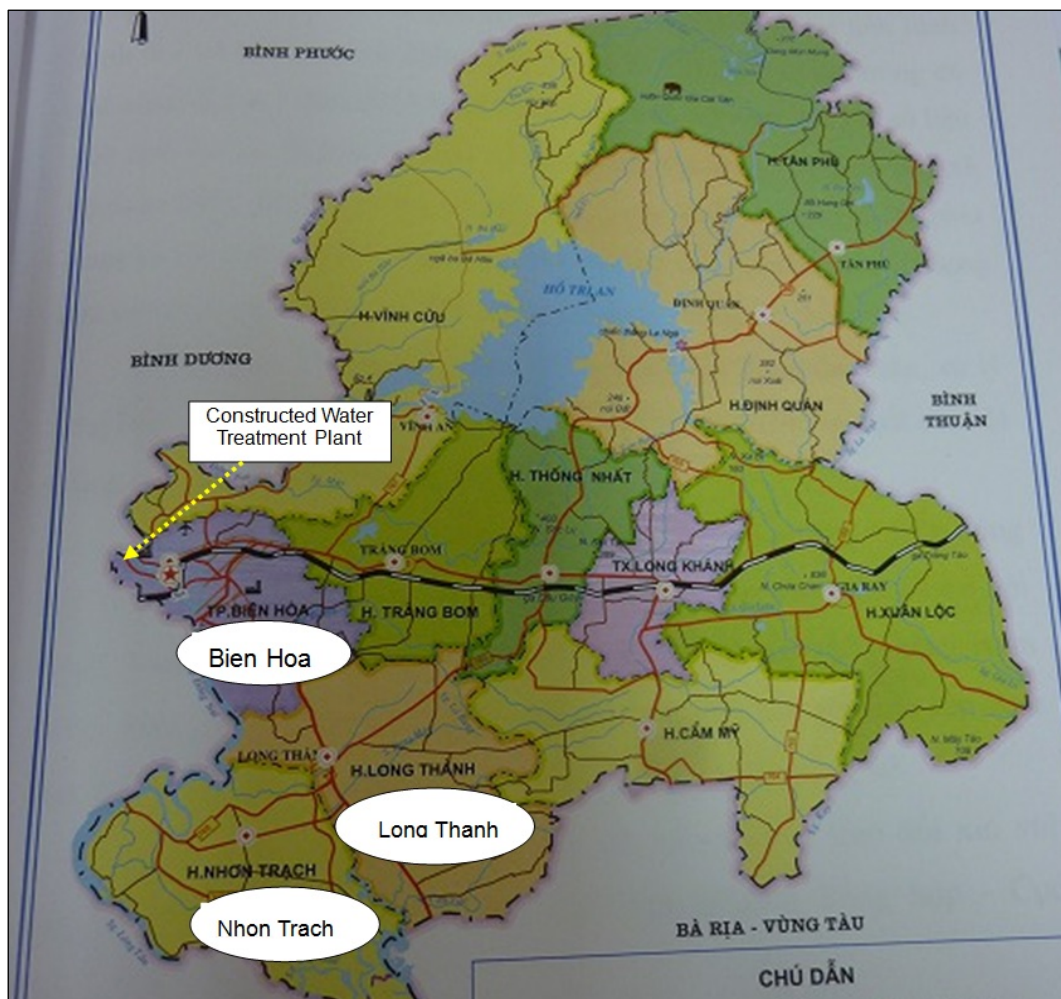


Figure 1: Locations of Project Sites (Dong Nai Province)

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would not increase.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

Table 2 shows planned and actual costs of this project. At the time of the Phase I appraisal (1998), the project cost was planned to be 18,577 million yen for Dong Nai Province and 12,260 million yen for Ba Ria-Vung Tau Province. As mentioned earlier, it was estimated that demand for water supply would slow down in both provinces after the Phase I project began (2000); accordingly, design capacity was adjusted. As a result, the planned project cost was also reduced at the time of the Phase II appraisal (2004). This evaluation study examined the costs planned for the Phase II project after the design change to compare with the actual costs and reviewed the differences. However, as discussed in the 3.2.1 Project Outputs section under Efficiency, the project component concerning Ba Ria-Vung Tau Province was not implemented after 2004. In reality, the detailed design and tendering were conducted, and the consulting service was also provided (approx.209 million yen). Since the paid amount was relatively small, the actual cost of BR-VT was treated as reference, and analysis was done for the project cost of Dong Nai Province.

Concerning Dong Nai Province, the actual project cost was 10,769 million yen, while the amount planned for the Phase II project was 7,412 million yen (approx. 145% of the plan). The main reasons for this are as follows: (1) after Phase II began, the prices of construction materials such as oil and steel increased globally. According to JICA's internal documents and interviews with Dong Nai Water Supply Co., Ltd. (hereafter referred to as "DOWACO"), the organization regarding operation and maintenance for the project, these costs began increasing in 2004, and by 2008, when construction peaked, they had increased by about 30% in four years; (2) compensation for the land acquisition was more than was initially expected. As will be discussed in 3.4.2.2 Land Acquisition and Resettlement under Impacts, while 1,090 households were initially subject to land acquisition, the actual number increased to 1,500 households, and accordingly, the compensation also increased.

Table 2: Planned and Actual Costs of This Project

(Unit: million JPY)

	Plan (Phase I: 1998)		Plan (Phase II: 2004)		Actual	
	Dong Nai	BR-VT	Dong Nai	BR-VT	Dong Nai	BR-VT*** (reference)
Foreign currency	10,484	8,413	3,879	2,296	5,161	128
Local currency	8,093*	3,847*	3,533*	1,356*	5,608** (1,156,495 million VND)	81**
Total	18,577	12,260	7,412	3,652	10,769	209
(Japanese ODA loan)	5,771		3,308		8,047	

Source: JICA provided documents (Plan) and answers to the questionnaire (Actual)

\*Note1: Exchange rate at the time of appraisal (Plan):

(Phase I) 1 USD=JPY120, 1 VND=JPY0.01, as of March 1998

(Phase II) 1 USD=JPY119, 1 VND=JPY 0.00768, as of Oct. 2003

\*\*Note 2: Exchange rate at the time of ex-post evaluation (Actual): 1US dollar=JPY 93.26, 1VND=JPY 0.004849

(Note: Conversion was made by taking the average rate for the period of the construction (October 2007-December 2014) based on rates issued by the International Financial Statistics (IFS), International Monetary Fund (IMF).)

\*\*\*Note 3: The actual amount of BR-VT is expenditure for only a part of consulting service. It is treated as reference, not included in the total project cost, for the rating judgement of efficiency.

### 3.2.2.2 Project Period

The actual project period was compared and reviewed with the initial plan (Phase I). At the time of the Phase I's appraisal, the project period was planned as 6 years and 4 months (76 months) from March 1998 to June 2004. The actual project period for the project components of Dong Nai Province was 16 years and two months (194 months) from March 1998 to April 2014<sup>10</sup> (197% of the plan). The main reasons for the delay are as follows: (1) owing to the increases in market prices of construction materials as discussed above, the Vietnamese side had to review the initial project costs. As a result, the process and coordination between the central government and the executing agency concerning the cost change and others took time; (2) the Vietnamese side was not accustomed to the procurement procedures of JICA for contractors and took a long time to prepare tendering documents and conduct contract negotiations; (3) the number of households subject to land acquisition was more than the initial estimate (as will be elaborated at 3.4.2.2 Land Acquisition and Resettlement under Impacts) and PCDN required time for the negotiation with landowners and acquisition processes. Consequently, construction was delayed. Accordingly, the period of the consulting services was also extended.

For reference, concerning Ba Ria-Vung Tau Province, the project scope was not implemented after 2004, as discussed at 3.2.1.1 Project Costs. Although construction was not implemented by

<sup>10</sup> Completion of this project was defined as the timing at which water supply treatment facilities in Dong Nai Province were completed and began operating. (i.e., April 2014)

this project, the detailed design and tendering were conducted, and the consulting service was also provided<sup>11</sup>.

### 3.2.3 Results of Calculations of Internal Rates of Return (Reference only)

#### Economic Internal Rate of Return (EIRR)

Throughout this evaluation survey, Economic Internal Rate of Return (EIRR) was not recalculated, as the figure was not calculated at the time of project appraisal for both Phase I and II.

#### Financial Internal Rate of Return (FIRR)

FIRR was recalculated using the same conditions as at the time of appraisal: taking revenue from water supply as benefit and the construction cost and operation and maintenance costs of this project as costs, and assuming a project life of 40 years. The result was 6.83%, which is slightly higher than 6.4% calculated at the time of Phase II's appraisal. This is because revenue on water supply<sup>12</sup> including the one from industrial parks in Dong Nai Province was higher than expected at the time of appraisal, in spite of the fact that project period and costs exceeded compared with the initial plan.

Both the project cost and project period significantly exceeded the plan. Therefore, efficiency of the project is low.

## 3.3 Effectiveness<sup>13</sup> (Rating:③)

### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

#### 1) Operation Indicators of the Project

This project constructed water supply facilities with the capacity to supply 100,000 m<sup>3</sup>/day. Table 3 shows operation indicators of this project regarding Dong Nai Province. At the time of ex-post evaluation, the total water supply capacity of the water treatment facilities owned by Dong Nai Province is approximately 300,000 m<sup>3</sup>/day, of which about one-third is supplied by this project. The facilities were completed in April 2014, after which water supply service began.

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<sup>11</sup> Nevertheless, information could not be obtained through interviews with JICA Vietnam Office. Information written in 1) Detailed Design and 2) Bidding and Consulting Services is based on JICA's internal documents; however, the statements are only for reference purposes.

<sup>12</sup> The water tariff rose in line with local economic growth during project implementation, according to DOWACO. However, the rate was not possible to obtain during the period.

<sup>13</sup> Sub-rating for effectiveness is to be put with the consideration of impact.

Table 3: Operation Indicators of the Project

Indicator	Target*	Actual				
	2010 (Four years after the project completion)	From 2010 to 2013	After 2014.4 **	2015	2016	2017 ***
1) Amount (Average) of Water Supply (unit: m <sup>3</sup> /day)	100,000	Not completed yet.	35,450	55,948	80,517	99,000
2) Population Served *** (unit: person)	98,000		68,470	69,396	72,927	77,000
3) Rate of Facility Utilization (unit: %)	100		35.4	55.9	80.5	99.0
4) Non-revenue Water Ratio (unit: %)	16		15	15	15	15

Source: JICA provided documents (Target), Answers to questionnaire (Actual)

\*Note 1: At the time of ex-ante evaluation, the target was set for 2010.

\*\*Note 2: The water supply facilities were completed in April 2014; the figure for this year represents the data for about eight months from April until December. (During the period, data regarding Amount (Average) Water Supply, Rate of Facility Utilization and Non-revenue Water ratio indicate the average value, while data regarding Population Served indicates the cumulative value.)

\*\*\*Note 3: The figures are only shown for areas distributed from the water treatment facilities developed under this project. The figures for 2017 are as of March 2017.

\*\*\*\*Note 4: Target served areas are mainly for Bien Hoa, Long Thanh, and Nhon Trach in Dong Nai Province.

In this ex-post evaluation, indicators of quantitative effects set at the time of appraisal for phase II<sup>14</sup> are compared with the actual figures. Before this project began, the target year for the quantitative indicators (operation and effects indicators) was set at 2010, four years after the completion of the facilities (according to the plan of Phase II's appraisal, the completion was expected to be in 2006). However, in reality, the facilities were completed in 2014. Thus, the target year would be four years after that, which is 2018; but for this evaluation, the comparisons against the targets were made using the actual figures attainable from the most recent year, which was 2017, and these comparisons are reviewed below:

Regarding the operation indicators, after the completion of the water supply facilities, the number of residents who receive the service gradually increased, and 1) amount (average) of daily water supply and 3) rate of facility utilization mostly reached the targets. It is observed that the water supply service expanded after the completion of the water supply facilities and that they are being operated smoothly. Concerning 2) population served, according to DOWACO, the connection to each house usually takes certain time, and therefore the actual population served in March 2017 is relatively lower than the target due to the timing of the evaluation (In other words, four years after the completion have not reached yet, so it is still early to make a

<sup>14</sup> The indicators were not set at the time of appraisal phase I.

comparison.). However, the target figure (98,000 persons) is expected to be achieved by the end of 2018, since the connection works have been increasing, almost as scheduled. In addition, concerning 4) non-revenue water, with the installation of new distribution pipes as part of this project, leakage was reduced and their maintenance status is also good, as will be discussed under Sustainability. Thus, the target (16% or less) has been achieved.

## 2) Effect Indicators of the Project

Table 4 shows effect indicators of this project regarding Dong Nai Province. The indicators have also mostly been achieved. The actual figures were slightly below the targets because the population in Dong Nai Province increased by more than expected<sup>15</sup>. In other words, the designed amount of water supply capacity, 100,000 m<sup>3</sup>/day, needs to be shared by more residents, which makes the 1) water supply service coverage<sup>16</sup> and 2) water supply per capita stagnate.

Table 4: Effect Indicators of the Project

Indicator	Target*	Actual				
	2010 (Four year after the project completion)	From 2010 to 2013	After 2014.4 **	2015	2016	2017***
1) Water Supply Service Coverage **** (unit: %)	96	Not yet completed	69.87	70.81	74.42	78.57
2) Water Supply Per Capita (unit: lit./day)	150		110	120	130	Around 130 *****

Source: JICA provided documents (Target), Answers to questionnaire (Actual)

\*Note 1: At the time of ex-ante evaluation, the target was set for 2010.

\*\*Note 2: The water supply facilities were completed in April 2014; the figure for this year represents the data for about eight months from April until December. (During the period, the data shown in the table indicates the average value.)

\*\*\*Note 3: The figures for 2017 are as of March 2017.

\*\*\*\*Note 4: Target served areas are mainly for Bien Hoa, Long Thanh, and Nhon Trach in Dong Nai Province.

\*\*\*\*\*Note 5: Actual data is based on interviews with DOWACO.

(Reference: Quality of water coming from the water treatment plant developed by this project)

Shown in Table 5 are recent data on the quality of water coming from the water treatment plant developed by this project. The upper row represents actual values, while the lower row

<sup>15</sup> Details will be explained in 3.4 Impacts (quantitative effects) later.

<sup>16</sup> For reference, the population of Dong Nai province is steadily increasing. Approximately 1.84 million (1995), approximately 2.05 million (2000), approximately 2.26 million (2005), approximately 2.58 million (2010), approximately 2.91 million people (2015) (Source: General Statistics Office of Vietnam)

represents the water quality standard set by the government. The water quality is within the country’s standard in terms of all indicators; it can be judged that safe water is being provided.

Table 5: (Upper) Actual Data on Quality of Water Distributed by the Water Treatment Plant / (Lower) Standard Water Quality Set for Vietnam

PH	Turbidity	Hardness	Color	Residual Chlorine
6.7	1.52	30	0	0.5
6.5-8.8	<2.0	<300	<15	0.3-0.5

Source: DOWACO

Note: The upper row is data as of 21 October 2016. The lower row is the water quality standard set for Vietnam. (QCVN01:2009).

### 3.3.2 Qualitative Effects (Improvement of Water Supply Service)

This project has contributed to improve the water supply service for local residents around the project area in Dong Nai Province. DOWACO and PCDN commented in interviews during the field survey: “The population has been increasing rapidly, particularly in the provincial capital, Bien Hoa; and water demand is on an increasing trend. However, serviced area has definitely expanded thanks to this project. The functions of the developed water supply facilities and distribution pipes are satisfactory. There is no problem with the operation of the facilities. In addition, we can respond to the increase in water demand in the future. We think that we will be able to contribute to the future improvements in health and sanitation with the expansion of the served area.”

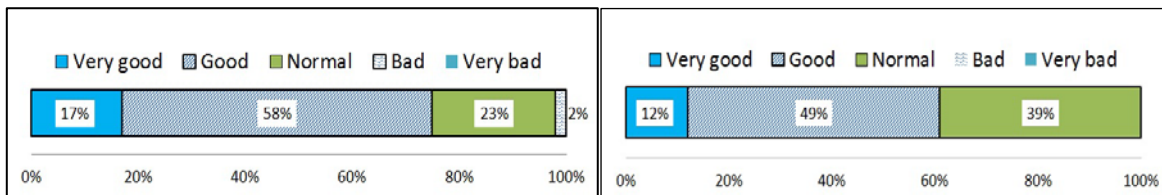
In addition, a beneficiary survey was conducted during the evaluation study, targeting the residents who received water from the water supply facilities developed as part of this project (sample size was 90)<sup>17</sup>. Regarding the questions about water pressure in Question 1 and water quality such as smell, taste and color in Question 2 to 4, the majority answered “good” while some said “normal.” Respondents commented when interviewed: “We used to drink well water. Now, we can drink water without worrying. Water we need for living is securely distributed. When we used well water, water pressure was always a problem. Now, we are satisfied.” Based on such a comment, it can be presumed that the level of satisfaction is high. Those whose answer was “normal” commented: “We do not have any negative impression about the taste, color or smell of the water. The same is true for water pressure.” While these people are not

<sup>17</sup> The properties of the samples are: (1) those who have not moved at least for the past five years (i.e., conditions before and after the project are comparable); (2) those residing in the provincial capital of Bien Hoa or Nhon Thach, the major areas covered by this project; (3) sex ratio: 48% male and 52% female; and (4) average age of 47.94. The survey was based on interviews using a questionnaire. Concerning biases and probability of the interpretations of the results, it can be judged that the results are not statically significant given that this beneficiary survey did not follow a strict systematic sampling.



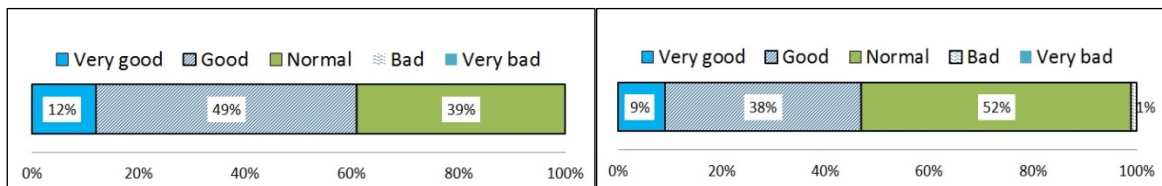
satisfied or dissatisfied, they tend to think that the current status is as per the standard expected of a water supply service. Question 5 is about reduction of physical burden and time involved in carrying water. Almost every one answered “yes”. It can be said that the residents are less burdened compared to the time when they used well water.

Based on these answers and comments, it can be judged that this project has improved the water supply service.



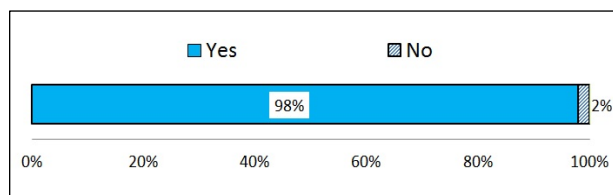
Question 1: What do you think of the current water pressure from DOWACO?  
(90 valid responses, local residents)

Question 2: What do you think of the current odor from supplied water from DOWACO?  
(90 valid responses, local residents)



Question 3: What do you think of the current taste from supplied water from DOWACO?  
(90 valid responses, local residents)

Question 4: What do you think of the current color from supplied water from DOWACO?  
(90 valid responses, local residents)



Question 5: Do you think physical and time burden involved in carrying water has reduced compared with before implementation of this project?  
(90 valid responses, local residents)

### 3.4 Impacts

#### 3.4.1 Intended Impacts

##### 3.4.1.1 Contribution to Promote the Industrial Development of Dong Nai Province

###### 1) Quantitative Effects

Graph 1 shows GDP growth rates in Dong Nai Province and the whole country for the past

few years. Graph 2 shows amount of domestic and foreign investments to Dong Nai Province. Relatively, the GDP and domestic and foreign investment of the province has been growing at higher rates. It can be said that the socio-economy of this province has been developing rapidly. This province is closer to the largest city, Ho Chi Minh City, (one hour by car). The province has many industrial parks, which have developed infrastructure, such as roads, electricity, gas, water supply and sewage. Before this project began, there were 24 industrial parks in this province, which has increased to 31 at the time of ex-post evaluation. The total area is about 10,000 ha; almost all the industrial parks are fully occupied. About 500,000 to 600,000 people worked inside industrial parks as of the end of 2016, and the number has been rapidly increasing in recent years. Behind this is the fact that foreign companies, mainly Japanese, are expanding their businesses<sup>18</sup>.

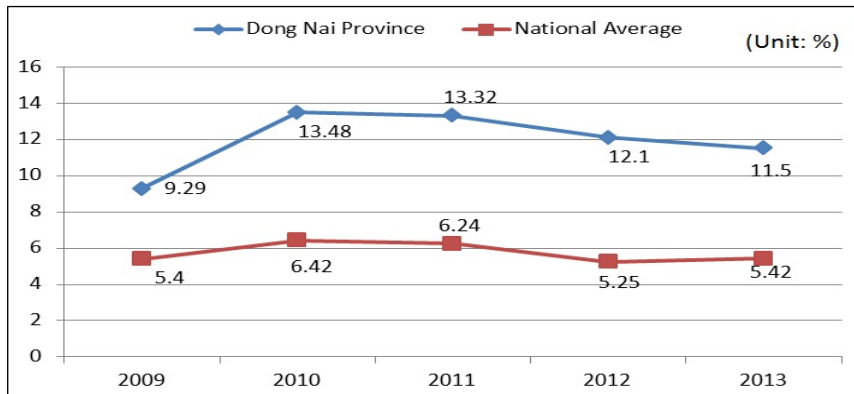
The management departments of the industrial parks<sup>19</sup> (AMATA and LOTECO Industrial Parks) that receive water supply from the water treatment plant in this project commented in interviews during the field survey: “Since some companies use a huge amount of water (e.g., textile companies that do dyeing), we need to store an enormous amount of water in the reservoirs. We have been able to secure a stable water supply from the water treatment plants day and night. For the management departments, development and maintenance of the infrastructure inside the industrial park is important, and we trust the water supply service of DOWACO.”

In light of the above, it is thought that the water supply service made possible through this project is playing an important role for companies operating inside the industrial parks of Dong Nai Province and that it is supporting the social and economic development of this province.

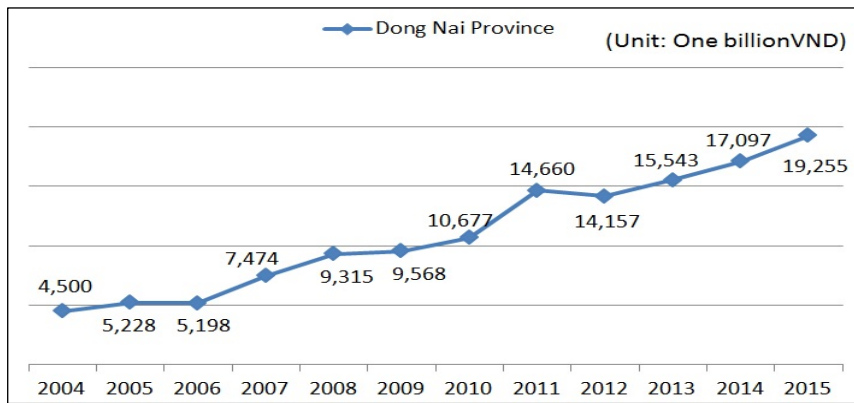
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<sup>18</sup> About 1,000 companies from tens of countries are operating in the province, of which about 200 are Japanese companies, constituting the largest share. Companies operating in the industrial parks of Dong Nai Province are mainly in the textile industry, high-technology businesses, steel industry, electricity and paper industry.

<sup>19</sup> According to DOWACO and industrial parks visited during the field survey, each industrial park has infrastructure, such as roads, electricity, gas, water supply and sewage. Regarding water supply, it is equipped with reservoirs, water pumps and water distribution pipes. Water from water treatment plants is initially stored in reservoirs. Later, water is distributed to each company according to its usage. In other words, companies inside the park do not receive water directly from the water treatment plants of this project.



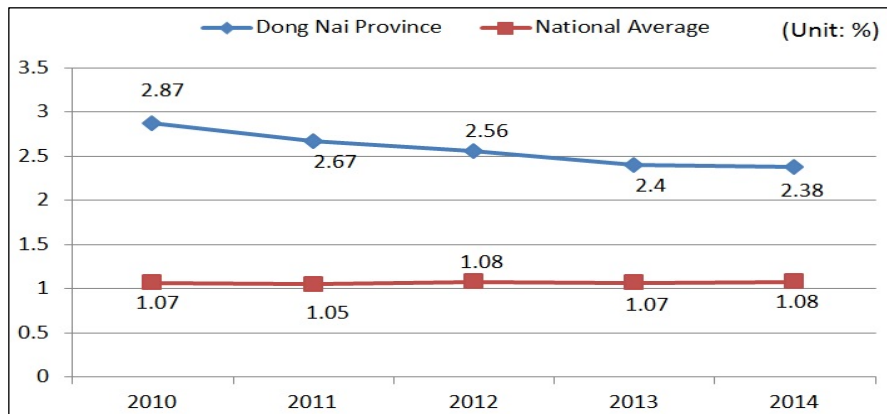
Graph 1: Trends in GDP Growth Rates of Dong Nai Province (upper row) and National GDP Growth Rates (lower row)



Graph 2: Amount of Domestic and Foreign Investments to Dong Nai Province

(Reference) Population Growth in Dong Nai Province

Graph 3 shows the population growth rates of Dong Nai Province and the whole country. The population of the province has been growing at a faster rate than the country. The population has grown by 160% (1,844→2,906 thousand) in the past 20 years. This is because the workers have immigrated from other provinces into the industrial parks (increase in population influx). According to DOWACO, the population is expected to continue to grow, increasing water demand; it can be said that the contribution of this project will be further significant in the future.

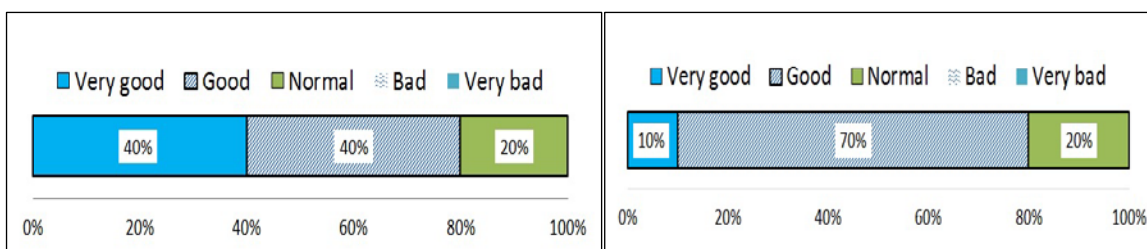


Graph 3: Population Growth Rates of Dong Nai Province (upper row) and the Whole Country (lower row)

## 2) Qualitative Effects

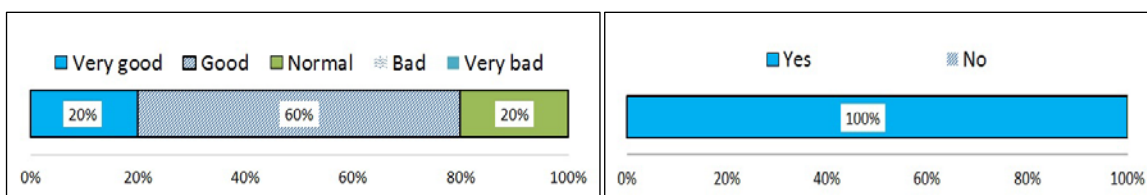
A beneficiary survey was also conducted, targeting the industrial parks that receive water supply service from the facilities developed as part of this project. (sample size was ten)<sup>20</sup> Answers to the questions about water pressure, volume and quality from Question 1 to 3 were mostly positive. The managers of industrial parks commented in interviews: “Concerning water distributed by DOWACO, there have been no problems with water pressure, volume or quality. We have not received any complaints from companies operating inside the industrial parks. Since sufficient volume of water is secured at all times, we can distribute water around the clock.” In addition, as shown in Question 4, some mentioned that water supply made possible through this project had positive impacts on the promotion of industrial development. As shown in Question 5, some think it had increased foreign and domestic investments. Some companies inside the industrial parks use a huge amount of water as discussed earlier. Thus it is presumed that this project, by securing stable water supply, is supporting the enhancement of companies’ productivity, thereby creating a base for more domestic and foreign investments.

<sup>20</sup> The industrial parks that fit the following conditions were targeted: (1) an industrial park has been in operation at least for the past five years (i.e., situations before and after the project are comparable); and (2) it is ten industrial parks either in the provincial capital of Bien Hoa or Nhon Thach, the major areas covered by this project. The survey was based on interviews using a questionnaire. In fact, the industrial parks (the management department) receive water from DOWACO, store it in their reservoirs and distribute it to each company using their own water pumps and distribution pipes. Thus, targeting the industrial parks themselves for the beneficiary survey was judged to be appropriate.



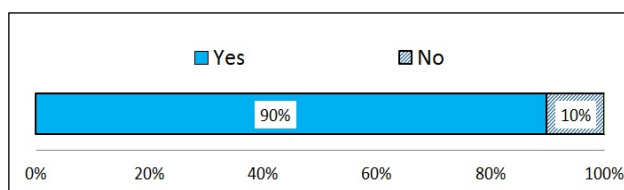
Question 1: What do you think of the current water pressure supplied from DOWACO?  
(10 valid responses, Industrial parks)

Question 2: What do you think of the current volume from supplied water of DOWACO?  
(10 valid responses, Industrial parks)



Question 3: What do you think of the current quality from supplied water of DOWACO?  
(10 valid responses, Industrial parks)

Question 4: Do you think water supply system constructed by this project has influenced on the promotion of the industrial development?  
(10 valid responses, Industrial parks)



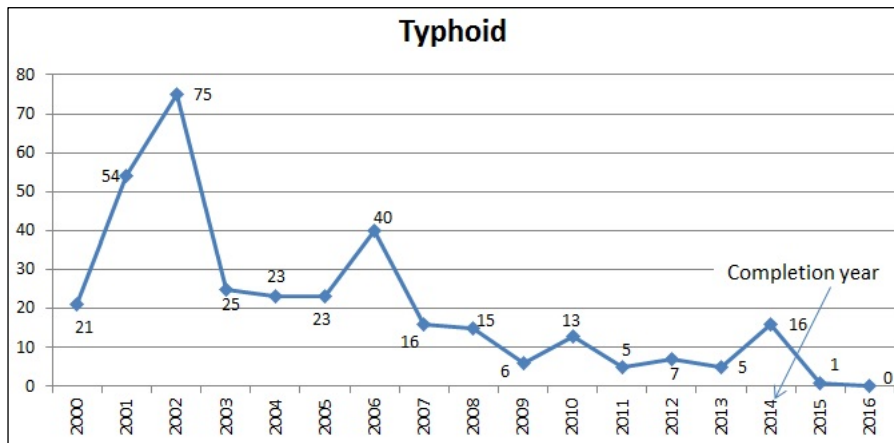
Question 5: Do you think water supply by this project has increased foreign and domestic investment at industrial park in Dong Nai Province?  
(10 valid responses, Industrial parks)

### 3.4.1.2 Contribution to Improve Health and Sanitary Conditions of the Local Residents

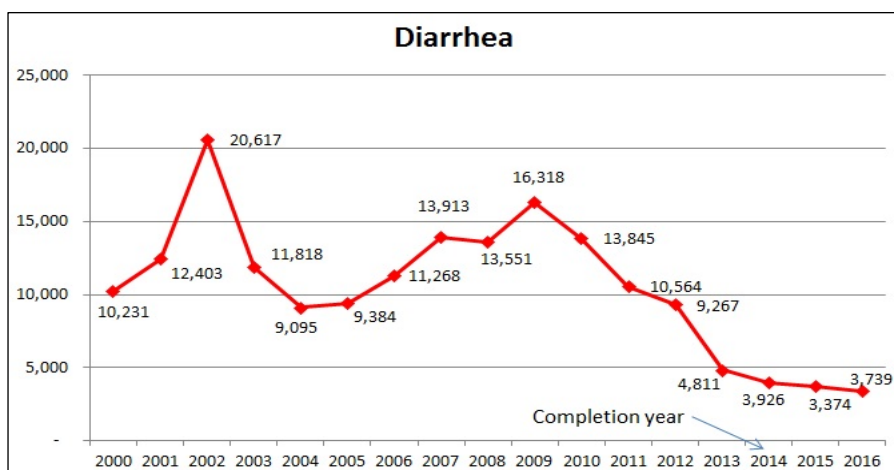
At the time of project appraisal, it was expected that this project would contribute to improve health condition of the local residents. Graph 4 and 5 show the changes in patients with typhoid<sup>21</sup> and diarrhea after the project began until the time of the ex-post evaluation, in Dong Nai Province. Both diseases are transmitted by mouth and most often through water intake. As both graphs show, the cases have generally been on a decreasing trend. The numbers of patients with typhoid and diarrhea have been on a decreasing trend from 2000 until the time of ex-post evaluation (2016). Meanwhile, since such changes are also affected by factors other than this project (such as improvements in living conditions and improvements due to factors other than water supply infrastructure), it is not possible to prove clearly that this project had impacts on

<sup>21</sup> Bacterial infections accompanied by high fever and rash.

health improvements, and therefore the result is not used as the main evidence in the judgment for sub-rating of Impact. However, it can be thought that this project is contributing to decrease the patients with typhoid and diarrhea, to some extent; thereby supporting the decrease of negative factors affecting the health of residents in Dong Nai Province<sup>22</sup>.



Graph 4: Changes in the Number of Typhoid Patients



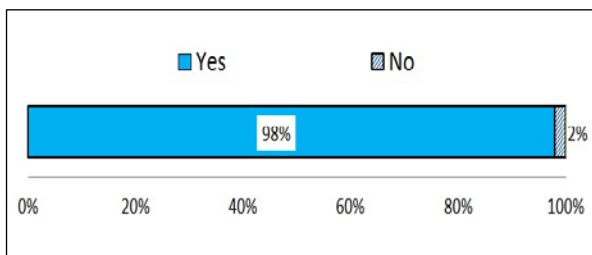
Graph 5: Changes in the Number of Diarrhea Patients

In order to know the improvements in health and sanitation of local residents, a beneficiary survey was also conducted, targeting the residents who received water from the water supply facilities developed as part of this project (sample size was 90)<sup>23</sup>. As shown in Question 1, 98% of the respondents answered “yes” to the question related to the improvements in health and sanitary of local residents. Many people expressed that this was because “Less need to worry

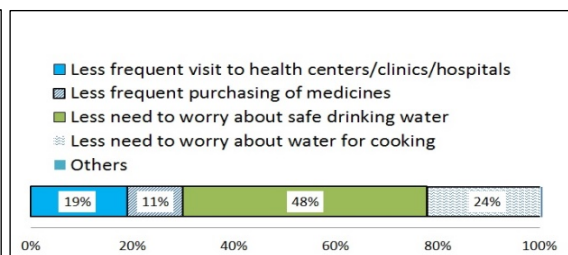
<sup>22</sup> PCDN is planning to ban the use of well water in residential areas of this province by 2020. Their aims are to protect the health of residents and to reduce effects on the environment. For such purposes, DOWACO is playing a role in reducing the use of well water by further increasing the population served by water pipelines.

<sup>23</sup> Same condition from the beneficiary survey at 3.1.2 Qualitative Effect (beneficiary survey) was applied.

about safe drinking water” as shown in Question 2. The respondents also commented in interviews: “We signed up for the water supply service as soon as it began. Compared to the time when we used well water, we can drink water without worrying. While it is difficult to tell whether the project has positive or negative impacts on our health, it is true that we do not suffer from water-borne diseases recently.” Considering such comments, it can be assumed that this project is supporting to the improvements in health and sanitation to some extent.



Question 1: Do you think health and sanitary condition of local residents including you has improved compared with before implementation of this project?  
(90 valid responses, local residents)



Question 2: If you choose “Yes” at Question 1, what kind of changes do you observe in relation to the improved health and sanitary condition?  
(Multiple answers allowed)  
(88 valid responses, local residents)

### 3.4.2 Other Impacts

#### 3.4.2.1 Impacts on the Natural Environment

It was confirmed through questionnaires and interviews with PCDN and DOWACO that there were no significant negative environmental impacts during the project implementation. In addition, no negative impacts on the natural environment (e.g., air pollution, vibration, noise and odor, etc.) occurred after the completion of the project. Based on confirmation of the results of environmental monitoring report conducted by Dong Nai Department of Natural Resources and Environment which is in charge of the environmental monitoring for this project and through sites visits and interviews during the field survey, no particular problems were observed in terms of impacts of the water treatment plants on the natural environment<sup>24</sup>.

#### 3.4.2.2 Land Acquisition and Resettlement

In this project, 636,104 m<sup>2</sup> of land was acquired for the construction of project outputs such as water treatment plants, water pumping stations and water distribution pipes. The number of

<sup>24</sup> In terms of environmental monitoring of this project, the Dong Nai Department of Natural Resources and Environment of PCDN is responsible. The department immediately responds in the case of any negative impacts on the natural environment occurring inside the project sites; however, there have not been any problems since the completion of this project.

households that became subject to land acquisition (land owners) was 1,500 (of which 320 households were affected and needed to resettle). The amount of compensation paid to those who were subject to land acquisition and resettlement was 342 billion VND<sup>25</sup>. The number of households (land owners) that were planned to be subject to land acquisition at the time of appraisal was 1,090, of which about 200 households were expected to be subject to resettlement. On the other hand, the actual numbers of households who became subject to land acquisition and resettlement were 1,500 and 320<sup>26</sup> respectively, approx. 38% and 60% more than the estimates. It is because the Vietnamese central government's land-related laws were revised a number of times and PCDN, a body responsible for land acquisition and resettlement, repeatedly needed to process legal issues and verify land successors, while PCDN had come to an agreement with the affected households about the amounts of compensation. Then, the actual number of households who became subject to resettlement increased from the initial plan. PCDN and DOWACO commented, "Procedures took a longer time than expected, but we repeatedly negotiated with the residents and came to agreements by offering acceptable amounts. All of these processes could not have been predicted at the time of appraisal." Also, local residents commented in interviews during the field study, "We understood the water supply projects of the province. We understood the compensation procedure and land acquisition."<sup>27</sup>

In light of the above, it can be judged that there were no significant negative impacts associated with the land acquisition and resettlement, even though the process and negotiation with the targeted residents required a long time.

Most operation and effect indicators came close to achieving the target at the time of ex-post evaluation. Concerning population served, it is highly thought to achieve the target in the near future. In addition, positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. Furthermore, it is presumed that this project, by securing stable water supply,

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<sup>25</sup> The payment of compensation for the land acquisition and resettlement was handled as per the "Resettlement Plan" set by PCDN.

<sup>26</sup> For the families that needed to resettle (320 households), PCDN has allocated new residential plots in the provincial capital, Bien Hoa, and nearby. The resettled land adds up to 9 ha. PCDN has developed infrastructure such as water supply and sewage services, electricity lines and roads in the resettlement destinations for the resettled residents.

<sup>27</sup> Meanwhile, the report regarding the resettlement was not available from them, and it was not possible to confirm the actual implementation status.



is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Thus, this project has achieved its objectives. Therefore effectiveness and impact of the project are high.



Photo 3: Industrial Park  
(AMATA Industrial Park, Dong Nai Province)



Photo 4: Residential Area  
(Bien Hoa, Dong Nai Province)

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Institutional Aspects of Operation and Maintenance

The executing agency at the time of ex-post evaluation is PCDN. For actual works,, DOWACO under PCDN is the one responsible for operation and maintenance of the water supply facilities developed by this project<sup>28</sup>. DOWACO has about 1,000 staff (as of January 2017), of which 32 are the management and water supply department staff members, 76 are stationed at the Nhon Trach Water Supply Branch, and 33 are at the Long Thanh Water Supply Branch. These members are in charge of the operation and maintenance of this project. The number of DOWACO staff is on more of an increasing trend than before this project began. Particularly, the number has increased by about 400 in the past three to four years. This is because their operation and maintenance works have increased following the completion of this project. At the time of ex-post evaluation, the number of operation and maintenance staff at DOWACO is observed to be sufficient. It was confirmed through field inspections and interviews with DOWACO's management that the necessary number of staff was assigned to different sections.

The operation and maintenance works of DOWACO involve operating water treatment facilities and water pumping stations, developing operation and maintenance plans, cleaning and

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<sup>28</sup> DOWACO is supervised by PCDN. Apart from supervising projects implemented by DOWACO, PCDN monitors water supply systems, such as water quality, water pressure and water supply hours. DOWACO reports its work to PCDN periodically.

inspecting water distribution pipes, collecting water tariffs and others.

In light of the above, it can be judged that there is no problem with the institutional aspects of the operation and maintenance.

### 3.5.2 Technical Aspects of Operation and Maintenance

DOWACO holds training mainly for operation and maintenance staff. Recently they held practical training sessions such as: “On-site training on how to operate the SCADA<sup>29</sup> system for clean water pumping stations” (14 participants), “On-site training on how to operate the Chloritizing Unit” (25 participants) and “On-site training on how to operate the electric valve for the sludge discharging system” (14 participants).

The main specialized areas of the staff are electrical engineers, communication engineers, technical device manufacturing engineers, water supply and drainage engineers. It is organized by experienced staff and it was confirmed through staff interviews during the field study that they are fully aware of the importance of operation and maintenance. In addition, it was confirmed that on-the-job training (OJT) is given to newly recruited staff.

DOWACO owns maintenance manuals for water supply facility operation and carries out maintenance works by referring to such manuals as needed.

In light of above, no particular problems are observed in the technical aspects of the operation and maintenance of DOWACO.

### 3.5.3 Financial Aspects of Operation and Maintenance

Table 6 and 7 show the operation and maintenance budgets (last three years) for the main facilities of this project (water pumping stations and Nhon Trach Water Treatment Plant). The amounts have been increasing for the past three years. Behind this are an increase in revenues from water charges and a good financial situation, shown in Table 8, 9 and 10. The operation and maintenance staff of both facilities commented in interviews, “We think that the operation and maintenance budgets of the past few years have been sufficient. There is no incidence of operation and maintenance being insufficient due to budget shortage.” In addition, DOWACO’s management staff commented, “The revenues from water charges are expected to increase as the population served expands in the future; we will be able to allocate operation and maintenance budgets necessary for the water supply operations.”

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<sup>29</sup> Abbreviation of Supervisory Control And Data Acquisition. SCADA is a kind of industrial control system and performs system monitoring and process control by computer.

Table 6: Operation and Maintenance Budgets for the Pumping Stations  
(Unit: million VND)

	2014	2015	2016
Operation budget	8,780	10,865	10,865
Maintenance budget	40	55	70
Others	35	40	45
Total	8,855	10,960	10,980

Source: DOWACO

Table 7: Operation and Maintenance Budgets of Nhon Trach Water Treatment Plant  
(Unit: million VND)

	2014	2015	2016
Operation budget	31,354	52,998	52,998
Maintenance budget	(Warranty period by contractor)	(Warranty period by contractor)	98
Others	-	-	-
Total	31,354	52,998	53,096

Source: DOWACO

Table 8 shows DOWACO's revenues from water charges. The amount has been increasing for the past few years. The growth rate became particularly high after 2014, the year in which this project was completed. According to DOWACO, the water tariff collection rate against billing is almost 100%<sup>30</sup>. Water supply service is stopped if the service users do not pay the charges (in the event that they are overdue).

Table 8: DOWACO's Total Revenues from Water Charges (upper row) and its Growth Rate (lower row: compared to the previous year)  
(Unit: million VND)

2012	2013	2014	2015	2016
390,051	418,985	532,399	675,080	752,876
N/A	7.4%	27.0%	26.8%	11.5%

Source: DOWACO

Table 9 and 10 contain DOWACO's business results report (income statement) and balance sheets from the last three years. Concerning DOWACO's business results report (income statement), sales from water charges have increased since 2014 following the completion of this project, recording large profits after income tax. In addition, from the balance sheet, it can be seen that the total shareholders' equity has been increasing for the past three years; it can be observed that it is in a stable financial state.

<sup>30</sup> (Reference information) Online payment became available for water service users from January 2017. (Usually DOWACO staff collect from each house; however, online payment became possible as per the preference of the user.)

Table 9: Business Results Report of DOWACO

(Unit: million VND)

Item	2013	2014	2015
Sales and service turnover	453,715	557,871	712,527
Deductible item (from Turnover)	23	14	155
Net sales and services	453,692	557,857	712,372
Prime cost of goods	389,701	424,809	482,823
<b>Gross profits on sales and services</b>	<b>63,991</b>	<b>133,048</b>	<b>229,549</b>
Revenue from financial activities	69,779	173,869	56,861
Financial expenses	32,750	45,700	54,793
(In which, expenses on interest rate)	30,970	42,033	53,101
Cost of sales	51,232	54,629	63,585
Company management cost	25,828	39,515	36,330
<b>Net profit from business</b>	<b>23,960</b>	<b>167,073</b>	<b>131,702</b>
Other incomes	766	894	1,807
Other costs	2,020	1,004	1,665
<b>Total net profits before tax</b>	<b>22,706</b>	<b>166,963</b>	<b>131,844</b>
Current tax on company's income	3,342	35,482	27,365
Cost of delayed company's income tax	-	-	-
<b>Profit after income tax</b>	<b>19,364</b>	<b>131,481</b>	<b>104,479</b>

Source: DOWACO

Table 10: Balance Sheet (B/S) of DOWACO

(Unit: million VND)

Item	2013	2014	2015
Current assets	316,434	290,445	435,242
Fixed assets	2,124,149	2,688,723	2,738,723
<b>Total assets</b>	<b>2,440,583</b>	<b>2,979,168</b>	<b>3,173,965</b>
Total liabilities	1,956,459	1,853,229	1,952,091
Total shareholders' equity	484,124	1,125,939	1,221,874
<b>Total liabilities and shareholder's equity</b>	<b>2,440,583</b>	<b>2,979,168</b>	<b>3,173,965</b>

Source: DOWACO

In light of above, it is thought that there is no particular problem with the financial aspects of DOWACO's operation and maintenance.

### 3.5.4 Current Status of Operation and Maintenance

It was confirmed by interviewing maintenance staff and inspection during the field survey that there are no major problems at the time of ex-post evaluation. The status of the operation and maintenance of the water treatment plant, pumping stations, water distribution pipes and related facilities developed by this project is good. After the project was completed, there has been no breakage or trouble. Maintenance works are categorized into periodic and daily works. It was also confirmed that each facility keeps operation records of the facilities and equipment

and that its staff report to DOWACO headquarters periodically.

DOWACO formulates a maintenance implementation plan every year, based on which operation and maintenance works are carried out.

There were no particular problems with the procurement and storage of spare parts. It was confirmed that a system is in place to make speedy procurement possible.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system of DOWACO. Therefore, the sustainability of the project effects is high.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

This project was planned to meet water demand for household and industrial use and to improve the living condition of local residents, by constructing a water supply system in the province of Dong Nai and Ba Ria-Vung Tau, thereby contributing to improve the health condition of the residents and to promote the industrial development around the area, including foreign investment. However, the system was only developed for Dong Nai Province under this project. With regard to relevance, this project has been relevant to the Vietnam's national development plan and development needs both at the time of appraisal and ex-post evaluation. This project was also relevant to Japan's ODA policy at the time of appraisal. However, regarding the project components of Ba Ria-Vung Tau Province, it is hard to say that there was no problem in the procedures and approach under implementation of the project, because the necessary procedure to cancel had not actually been carried out. Therefore, it is judged that its relevance is fair. Instead, the other aspects of this ex-post evaluation will be judged based only on Dong Nai Province. As the project cost and project period significantly exceeded the plan, efficiency of the project is low. In terms of effectiveness and impact, most operation and effect indicators came close to achieving the target value. Concerning population served, it is highly thought to achieve the target in the near future. Positive answers about water pressure and volume, satisfaction and reductions in labor and the time required for obtaining water were confirmed in the results of the beneficiary survey. In addition, it is presumed that this project, by securing stable water supply, is supporting the enhancement of productivity for manufacturing companies in Dong Nai Province, thereby creating a base for more domestic and foreign investments. Therefore effectiveness and impact of the project are high. In terms of

sustainability, no major problems have been observed in institutional, technical and financial aspects of the operation and maintenance. Therefore, the sustainability of the project effects is high.

In light of the above, this project is evaluated to be partially satisfactory<sup>31</sup>

## **4.2 Recommendations**

### 4.2.1 Recommendations to the Executing Agency

None.

### 4.2.2 Recommendations to JICA

None.

## **4.3 Lessons Learned**

### Appropriate Management of Project Scope (ODA Loan)

Although there was no notification regarding the project cancellation from the BR-VT Province, it is not clear whether other options such as consideration in the JICA side to promote discussion with the Vietnamese government (MPI and the Executing Agency, etc.), in order to agree on the change and clarify the project scope. In case that major changes on the project scope are necessary for similar projects in the future, it is important to agree in writing, in order to clarify the mutual understanding.

### Necessity to Eliminate Project Delays

Regarding the project scope of Dong Nai Province, the project was delayed by factors such as the revision of project costs owing to the price increases of construction materials in the global markets, processes associated with procurement of contractors and land acquisition. It may have been outside factors that were not expected; nevertheless, both the executing and aiding agencies need to mutually confirm progress and hindering factors to prevent project delays, so that they are always prepared for the risk of delays and make efforts to ensure that delays do not affect the realization of the project.

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<sup>31</sup> Nevertheless, the component for Dong Nai Province is evaluated to be satisfactory.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p>&lt;Dong Nai Province&gt;                      (a) Raw water intake: one place                      (b) Water pumping station: three places                      (c) Water treatment plant: one place at Nhon Trach (design capacity: 200,000 m<sup>3</sup>/day at appraisal of phase I (March 1998), 100,000 m<sup>3</sup>/day at appraisal of phase II (March 2004))                      (d) Water transmission pipeline: approx.104km</p>	<p>&lt;Dong Nai Province&gt;                      (a) Implemented as planned                      (b) Implemented as planned                      (c) Implemented as planned for the planned design of phase II (Capacity: 100,000 m<sup>3</sup>/day)                      (d) Implemented: approx.79km</p>
	<p>&lt;Ba Ria-Vung Tau Province&gt;                      (a) Raw water intake: one place                      (b) Water transmission pipelines: approx.45km                      (c) Water treatment plant: one place at Ba Ria (design capacity: 100,000 m<sup>3</sup>/day at Phase I (March 1998), 50,000 m<sup>3</sup>/day at Phase II (March 2004))</p>	<p>&lt;Ba Ria-Vung Tau Province&gt;                      (a)-(c): Not implemented after 2004</p>
	<p>&lt;Consulting Services&gt;                      (a) Review of F/S, detailed design, preparation and evaluation of tender documents, assistance for tendering, supervision of construction                      (b) Study of topography, water quality and hydrology                      (c) Environmental measures including environmental monitoring</p>	<p>&lt;Consulting Services&gt;                      (a)-(c): Implemented as planned in Dong Nai Province                      *Note: Through the evaluation survey, it was not possible to confirm about the consulting services of Ba Ria-Vung Tau Province.</p>
2. Project Period	March 1998 - November 2008 (129 months)	March 1998 – April 2014 (194 months)
3. Project Cost		
Amount Paid in Foreign Currency	3,879 million yen	5,161 million yen
Amount Paid in Local Currency	3,533 million yen (460,026 million VND)	5,608 million yen (1,156,495 million VND)
Total	7,412 million yen <sup>32</sup>	10,769 million yen
ODA Loan Portion	9,079 million yen <sup>33</sup>	8,047 million yen
Exchange Rate	Phase I: 1USD = JPY120 1VND=JPY0.01 (March 1998) Phase II: 1USD=JPY119, 1VND=JPY 0.00768 (October 2003)	1USD = JPY93.26 1VND=JPY0.004849 (Average rate for the period of the construction (October 2007-December 2014) based on rates issued by the IMF's International Financial

<sup>32</sup> This amount was calculated at the time of Phase II appraisal, for the project components of Dong Nai Province.

<sup>33</sup> This amount was the total of the time of Phase I and II, for the project components of Dong Nai Province.

		Statistics (IFS.)
4. Final Disbursement	Phase I: July 2012	
	Phase II: August 2014	