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IMPLEMENTATION COMPLETION AND RESULTS REPORT

IDA 49480-VN, IDA 58170-VN, IBRD 86210-VN

ON

CREDITS FROM THE INTERNATIONAL DEVELOPMENT ASSOCIATION

IN THE AMOUNTS OF SDR 126.14 MILLION AND SDR 35.30 MILLION

(RESPECTIVELY US\$200 MILLION AND US\$ 50.00 MILLION EQUIVALENT)

AND A LOAN FROM THE INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

IN THE AMOUNT OF US\$69.00 MILLION

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR AN

URBAN WATER SUPPLY AND WASTEWATER PROJECT

June 18, 2020

Water Global Practice
East Asia And Pacific Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective December 31, 2019)

Currency Unit = Vietnamese Dong (VND)

VND 23,171.00 = US\$1

US\$1.382830 = SDR 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
ATI	Administration of Technical Infrastructure
BIWASE	Binh Duong Water Supply, Sewerage, and Environmental Company
BOD	Biological Oxygen Demand
CPC	City People’s Committee
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
DED	Detailed Engineering Design
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
FIRR	Financial Internal Rate of Return
GDP	Gross Domestic Product
GoV	Government of Vietnam
ICR	Implementation Completion and Results Report
IEC	Information and Education Campaign
ISR	Implementation Status and Results Report
M&E	Monitoring and Evaluation
MABUTIP	Management Board of Technical Infrastructure Development Projects
MPI	Ministry of Planning and Investments
MTIP	Midterm Investment Plan
MOC	Ministry of Construction
MONRE	Ministry of Natural Resources and Environment
MTR	Midterm Review
NRW	Nonrevenue Water
O&M	Operation and Maintenance
ODA	Official Development Assistance
PAD	Project Appraisal Document
PDO	Project Development Objective
PMU	Project Management Unit
PPC	Provincial People’s Committee

PPMU	Provincial Project Management Unit
PPP	Public-Private Partnership
PSP	Private Sector Participation
RAP	Resettlement Action Plan
SBR	Sequencing Batch Reactor
SSP	Strategic Sanitation Plan
TA	Technical Assistance
URENCO	Urban Environmental Company
UWSWP	Urban Water Supply and Wastewater Project
UXO	Unidentified Ordnance
WWTP	Wastewater Treatment Plant

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P119077	URBAN WATER SUPPLY AND WASTEWATER
Country	Financing Instrument
Vietnam	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Socialist Republic of Vietnam	Management Board of Urban Infrastructure Project, Ministry of Construction

Project Development Objective (PDO)

Original PDO

To increase access to sustainable water services and environmental sanitation in selected urban areas in the Project Provinces



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IDA-49480	200,000,000	195,760,057	176,880,160
IBRD-86210	69,000,000	69,000,000	65,325,748
IDA-58170	50,000,000	30,611,521	24,246,252
Total	319,000,000	295,371,578	266,452,160
Non-World Bank Financing			
Borrower/Recipient	36,200,000	33,100,000	33,100,000
Total	36,200,000	33,100,000	33,100,000
Total Project Cost	355,200,000	328,471,577	299,552,160

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
24-May-2011	07-Oct-2011	12-Jan-2015	30-Dec-2016	31-Dec-2019

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
26-May-2016	149.48	Additional Financing Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Change in Institutional Arrangements Change in Financial Management Change in Procurement Change in Implementation Schedule
26-Dec-2016	157.79	Change in Loan Closing Date(s)
29-Nov-2019	260.73	Change in Components and Cost Cancellation of Financing Reallocation between Disbursement Categories



KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	18-Sep-2011	Satisfactory	Satisfactory	.80
02	16-Mar-2012	Moderately Satisfactory	Moderately Satisfactory	.80
03	17-Jan-2013	Moderately Satisfactory	Moderately Satisfactory	3.20
04	23-Jul-2013	Moderately Satisfactory	Moderately Satisfactory	4.55
05	23-Feb-2014	Moderately Satisfactory	Moderately Satisfactory	12.61
06	05-Oct-2014	Moderately Satisfactory	Moderately Satisfactory	46.60
07	27-Mar-2015	Satisfactory	Satisfactory	98.14
08	14-Sep-2015	Satisfactory	Satisfactory	116.83
09	19-Apr-2016	Satisfactory	Satisfactory	145.59
10	22-Sep-2016	Satisfactory	Satisfactory	157.79
11	26-Dec-2016	Moderately Satisfactory	Satisfactory	157.79
12	31-May-2017	Moderately Satisfactory	Moderately Satisfactory	168.97
13	15-Oct-2017	Moderately Satisfactory	Moderately Satisfactory	180.62
14	03-May-2018	Moderately Satisfactory	Moderately Satisfactory	186.63
15	10-Dec-2018	Moderately Satisfactory	Moderately Satisfactory	192.20
16	28-May-2019	Moderately Satisfactory	Moderately Satisfactory	243.80
17	18-Nov-2019	Moderately Satisfactory	Moderately Satisfactory	260.73



SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Water, Sanitation and Waste Management	100
Sanitation	50
Water Supply	48
Public Administration - Water, Sanitation and Waste Management	2

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	0
Public Private Partnerships	10
Urban and Rural Development	0
Urban Development	74
Urban Infrastructure and Service Delivery	74
Environment and Natural Resource Management	0
Environmental Health and Pollution Management	27
Air quality management	9
Water Pollution	9
Soil Pollution	9

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. In 2010, Vietnam was one of the fastest urbanizing countries in the East Asia and Pacific region and its urban population was expected to grow another 50 percent by 2025.¹ In the 10 years since 2000, population in urban areas increased from 19.5 to 26.8 million people and reached 30 percent of the total population.² In 2009, Ho Chi Minh City and Hanoi together represented around one-third of Vietnam's urban population. At the same time, the combined populations in smaller cities (including those categorized as I, II, III and IV cities³), such as Da Lat, Can Tho, and Uong Bi, represented around 40 percentage of Vietnam's urban population.⁴ A key driver of urban growth in the largest and smaller cities was economic growth in industrial activities, such as construction and manufacturing, which doubled from 1999 to 2009.⁵ Accordingly, many cities became larger and more prosperous.

2. Urban population growth was not necessarily accompanied by the provision of basic services, such as water supply, environmental sanitation, and transport. By 2010, about 70 percent of urban residents overall had access to piped water supply but this was dominated by Ho Chi Minh and Hanoi, which had close to 100 percent.⁶ By contrast, in category I–III cities, less than 60 percent of residents had access to water and, in most cases, the water quality and quantities were inadequate.⁷ Wastewater service was equally limited in category I–II cities. In 2010, only 10 percent of urban wastewater was collected and treated before being discharged into the environment and again, most of this service existed only in Hanoi and Ho Chi Minh City. In smaller cities, septic tanks or combined sewers (pipes collecting both wastewater and stormwater) were common but offered limited environmental protection. In addition, households with septic tanks also incurred high direct (for example, maintenance) and indirect (for example, health risk) costs.

3. By 2010, financial sustainability and operational efficiency of water supply services were typically weak in the smaller cities. Water losses in such systems could be as high as 40 percent. Tariffs could largely cover operational costs but were often insufficient to pay for replacement of major equipment or efforts to reduce water losses, let alone the investments required to meet the needs of a growing number of residents. Efforts to improve asset management, water pressure, and productivity were beyond the reach of many water supply service providers. In terms of sanitation, Decree No. 88/2007/ND-CP introduced principles of cost recovery through fees and tariffs in an effort to improve the management of drainage and sewerage in urban and industrial areas. However, additional decisions at the provincial level were still

¹ "Adjustment of the Master Plan for Urban Development in Vietnam to 2025 and Vision to 2050," Ministry of Construction, Submission No. 101/TTr-BXD; November 28, 2008.

² World Bank data:

<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?end=2018&locations=VN&start=1960&view=chart>.

³ Based on the Decree No. 42/2009/ND-CP, the city category is defined by the population, percentage of urban population, population density, and socioeconomic infrastructure system. In 2009, a class I city had more than 1 million, class II more than 300,000, class III more than 150,000, and class IV more than 50,000.

⁴ World Bank. 2011. *Vietnam Urbanization Review, Technical Assistance*. Washington, DC: World Bank.

⁵ "World Bank. 2011. *Vietnam Urbanization Review, Technical Assistance*. Washington, DC: World Bank.

⁶ Hanoi and Ho Chi Minh City are classified as Special Cities, ranking above all other cities.

⁷ Vietnam Urban Water Supply and Wastewater Project Appraisal Document (P119077).



necessary before this decree could be applied. Only the earlier Decree No. 67/2003/ND-CP, which regulates the environment protection fee, was being implemented.

4. In November 2009, the Government of Vietnam (GoV) issued two decisions, 1929/QD-TTg and 1930/QD-TTg. The first decision aimed to increase access to water by 2020 for 90 percent of residents in class I–IV cities, and by 70 percent in Class V towns. The second decision stipulated that by 2020, there should be an 80 percent increase in drainage coverage in all cities, as well as an increase in wastewater collection and treatment of 60 percent and 40 percent in class I–III cities and class IV–V cities, respectively. These decisions also identified a need to apply commercial principles for water supply utilities and gradual replacement of wastewater subsidies with user charges.

5. The Urban Water Supply and Wastewater Project (UWSWP) was designed to align with these decisions to address water, wastewater, and drainage infrastructure gaps to meet the needs of residents in selected cities with populations ranging from 59,000 to 212,000. At appraisal, the project was consistent with the World Bank's Vietnam Country Partnership Strategy (CPS) 2007–2011.⁸ The main areas of engagement of the CPS (2007–2011) were (a) improving business environment, (b) strengthening social inclusion, (c) better management of natural resources and the environment, and (d) improving governance. These areas supported the GoV's Social Economic Development Plan⁹, which focused on reducing poverty while moving the country toward attaining middle-income status. By improving water and sanitation services, the project outcomes aimed at supporting areas (b) and (c) of the CPS (2007–2011).

Theory of Change (Results Chain)

6. At appraisal, the Project Appraisal Document (PAD) did not describe a theory of change but the activities and long-term outcomes in water supply and sanitation were discussed in the project components and the Results Framework. These were used to develop the theory of change presented in table 1. To improve access to water, the project was to implement systems that would make water available to some residents for the first time and improve service availability for others who only had substandard access. The increased volumes and improved quality of water for beneficiaries would in the long term support their health and well-being and lower their full costs of water access. To improve environmental sanitation, the project aimed to build wastewater and drainage systems and connect households to them. Wastewater system connections were expected to enable participating households to contribute to an improved environment and avoid localized soil and water contamination. In addition, improvements in drainage and flood control were intended to directly benefit residents who were regularly exposed to inundation during rainy periods.

7. The project design recognized that these new capital improvements were needed for the project to be operationally sustainable over time. For water projects, the working ratio financial indicator was established as a standard metric of performance. The working ratio measures the ability of a utility to generate revenue in excess of its costs. To meet this standard, utilities would have to consider actions such as tariff adjustments and revenue collection improvements especially when the subprojects were

⁸ Report No: 38236-VN.

⁹ The Social Economic Development Plan 2011-2020 intended to, among other priorities, focus on urban development and forming an urban system with comprehensive, modern and environment-friendly infrastructure, including some big cities and many small and medium cities and coastal urban areas with strong development.



completed and more customers were connected to the water systems. Financial audits were planned to verify the status of water utilities and, where necessary, additional management and broader policy development support. For sanitation, since tariffs were not collected to directly support this infrastructure, the project aimed to develop two policy support circulars on cost-recovery tariffs and financial management to help address the topics covered in Decree No. 67/2003/ND-CP (regulations on the environment protection fee) and Decree No. 88/2007/ND-CP (management of drainage and sewerage in urban and industrial areas). The project design also intended to enhance operational efficiencies through private sector participation (PSP) in pilot activities. Finally, the project was to support the development of a policy document related to mechanisms for reducing nonrevenue water (NRW) and energy efficiency in water and wastewater utilities.¹⁰

8. The project was also designed to link capital projects with sector wide long-term planning by creating a monitoring and evaluation (M&E) database that would contain water and wastewater capacity and performance information for the entire country. This M&E system was planned to support provincial and national governmental assessment of investment and policy needs and promote accountability and transparency in the sector management. The M&E system was intended to be developed and managed by the Ministry of Construction (MOC) through the Management Board of Technical Infrastructure Development Projects (MABUTIP) with regular updates from utilities on status and performance.

9. To achieve the project outcomes, the following assumptions were made: (a) investments were to be made by the GoV in expanding the water supply treatment plant's capacity and extending the distribution network; (b) construction of wastewater treatment plants (WWTPs) and sewerage network, as well as drainage systems were to be completed; and (c) at the central level, circulars on wastewater tariffs, operation improvements, and investment needs would be developed, as well as a ministerial decision for involvement of PSP in the sector. With the infrastructure in place, the volume of clean water would be increased and sold, and wastewater and stormwater could be collected for treatment and safe disposal. The increase of volume of water treated and the expanded distribution network would allow households to access safe water. Also, wastewater would be collected from other households in different project areas and conveyed to the WWTPs. In parallel, with the approval of the circulars, water utilities would implement tariffs that would allow them to recover the operation and maintenance (O&M) costs and depreciation, while the wastewater companies would also be able to issue tariffs for wastewater collection covering at least the O&M costs. Finally, the ministerial decision on PSP would allow the selected utilities to enter in partnerships with the private sector for new investment, expansion and management of water supply services.

¹⁰ World Bank. 2018. *Vietnam Initial Assessment - Energy Efficiency and Non-Revenue Water*; World Bank. 2019. *Reducing Non-Revenue Water and Improving Energy Efficiency Policy Note*.



Table 1. Theory of Change

Activities	Outputs	Intermediate Outcomes	PDO Outcomes
<ul style="list-style-type: none"> Construction of water treatment plants and storage capacity of water supply schemes, extension of network and household connections 	<ul style="list-style-type: none"> Treatment and storage capacity expanded and in operation Distribution mains and network extended Number of household water supply connections extended (outcome indicator a) 	<ul style="list-style-type: none"> Increase in volume of water sold annually Increase in number of direct beneficiaries of water supply services Increase in the satisfaction rate of beneficiaries (outcome indicator c) 	Increased access to water supply services in the project area
<ul style="list-style-type: none"> Expansion of wastewater treatment capacity, extension of sewer network and household connections to the sewer network, and expansion of drainage system 	<ul style="list-style-type: none"> Wastewater water treatment capacity expanded and in operation Sewer network and drainage capacity in flood prone areas increased Number of household connections extended 	<ul style="list-style-type: none"> Increase in volume of wastewater collected Increase in volume of biological oxygen demand (BOD) removed from collected wastewater Increase in number of direct beneficiaries of wastewater services (outcome indicator b) Increase in areas benefiting from drainage coverage and flood protection Increase in the satisfaction rate of beneficiaries (outcome indicator c) 	Increased access to environmental sanitation in the project area
<ul style="list-style-type: none"> Design and implementation of an M&E system Development of circulars on wastewater tariffs and operational improvement and investment needs Development of ministerial decision for involvement of PSP in the project areas 	<ul style="list-style-type: none"> M&E database established Circulars on wastewater tariffs and operation improvement and investment needs developed and approved Ministerial decision for involvement of PSP in the project areas developed and approved 	<ul style="list-style-type: none"> Performance information on water and wastewater utilities collected on a regular basis Water supply utilities working ratio <0.9 (outcome indicator d) Project areas selected for pilot implementation of PSP 	Water supply and environmental sanitation services provided in a sustainable manner

Project Development Objectives (PDOs)

10. According to the PAD and the Loan and Credit Agreements, the PDO was to increase access to sustainable water services and environmental sanitation in selected urban areas in the project provinces.



Key Expected Outcomes and Outcome Indicators

11. The project had two PDO outcomes: (i) Increased access to sustainable water supply service in the project areas; and (ii) increased access to sustainable environmental sanitation in the project areas. These outcomes were to be measured by the following four outcome indicators:

- (a) Number of new piped household water connections resulting from project interventions
- (b) Number of people in urban areas that have improved sanitation due to the project
- (c) Increase in the satisfaction rate of beneficiaries
- (d) Financial sustainability of water companies.

Components

12. The project included the following two components:

- **Component 1:** Investments and Project Implementation (At appraisal: Cost: US\$232.4 million, of which IDA - US\$ 197.0 million and counterpart financing - US\$35.4 million; At Completion: Cost: US\$345.68 million, of which IDA - US\$ 310.28 million and counterpart financing - US\$35.4 million)
- **Component 2:** Technical Assistance (At Appraisal: Cost: US\$3.8 million, of which IDA - US\$3.0 million and counterpart financing - US\$0.8 million; At Completion: Cost: US\$11.10 million, of which IDA - US\$ 10.0 million and counterpart financing - US\$1.1 million).

13. Component 1 originally covered construction of water supply, wastewater, and drainage infrastructure in 10 cities and 10 provinces (see table 2).

Table 2. Provinces and Cities Selected for Project Implementation

Province	City Name	Water Supply	Sanitation/Drainage
Binh Duong	Di An	—	x ^a
Binh Duong	My Phuoc	x	—
Binh Phuoc	Dong Xoai	x	x
Kien Giang	Phu Quoc	x	—
Lam Dong	Da Lat	x	x
Nghe An	Thai Hoa	—	x
Ninh Binh	Ninh Binh	x	x
Quang Nam	Tam Ky	x	x
Quang Ninh	Uong Bi	x	—
Quang Tri	Dong Ha	—	x
Thanh Hoa	Bim Son	—	x

Note: ^a Added during the additional financing (AF) in May 2016.

14. Activities and costs of Component 1 included the following subcomponents:



- (a) **Subcomponent 1A: Water Supply (Cost: US\$109.5 million, of which IDA - US\$96.1 million and counterpart financing - US\$13.4 million).** This subcomponent supported the design and construction of site-specific water supply infrastructure and included construction of new intakes, increase in water treatment capacity, and increase in transmission and distribution capacity and number of connections. In addition, this subcomponent included consultant activities to support detailed design and bidding documents, construction supervision, and performance of safeguards and fiduciary functions.
 - (b) **Subcomponent 1B: Environmental Sanitation (Cost: US\$122.9 million, of which IDA - US\$100.9 million and counterpart financing - US\$22.0 million).** This subcomponent covered construction of wastewater treatment systems and drainage infrastructure, increase in wastewater collection and number of household connections, and consultancy activities related to the preparation of strategic sanitation plans (SSPs), detailed design and bidding documents, construction supervision, and safeguards and fiduciary functions.
15. Component 2 involved institutional strengthening, efficiency improvement, and decision support:
- (a) **Subcomponent 2A: Institutional Strengthening and Project Monitoring (Cost: US\$2.3 million, of which IDA - US\$1.8 million and counterpart financing - US\$0.5 million).** This subcomponent supported the development of a sector database, capacity building and implementation of the SSPs, establishment of investment priorities for water and sanitation, and project implementation and monitoring.
 - (b) **Subcomponent 2B: Improving the Efficiency of Investments and Operations (Cost: US\$1.5 million, of which IDA - US\$1.2 million and counterpart financing - US\$0.3 million).** This subcomponent supported the development of two circulars on wastewater tariff and operational improvement and investments needs. Furthermore, it included support to the issuance of a ministerial decision on criteria for selecting projects for PSP and development of a PSP toolkit.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

Revised PDOs and Outcome Targets

16. The PDO outcome targets were revised and additions were made to the Results Framework with the AF in 2016. The revised targets were as follows:
- (a) **Number of new piped household water connections resulting from project interventions.** The target was increased from 42,628 to 65,872. The AF did not include additional work on water supply but reflected the focus to continue to expand access to more households.
 - (b) **Number of people in urban areas that have improved sanitation due to the project.** The target increased from 263,051 to 312,051 to account for the added wastewater subproject (Di An wastewater and drainage).
 - (c) **Increase in the satisfaction rate of beneficiaries.** The baseline and target for satisfaction rate were not specified at project appraisal. However, by the time of the AF, information



was available from a baseline survey conducted in August 2014. At that point, both baseline and target satisfaction rates were established (see table 3).

Table 3. Customer Satisfaction Rate at Baseline and Target at Completion

Beneficiaries Satisfaction Ratio	Baseline (%) Dated August 2014	Project Completion (%) Target Date December 2019
Overall (based on an overall average)	72.0	80
Water supply	83.6	90
Wastewater and drainage	60.4	70

Revised PDO Indicators

17. Three new PDO indicators were added: (a) number of direct beneficiaries (baseline defined at zero and target at 450,382 beneficiaries), (b) number of female beneficiaries (baseline and target defined at 51 percent), and (c) increase in satisfaction rate of beneficiaries of wastewater and drainage services in Di An Town (baseline defined at 25.21 percent and target at 80 percent). The first two indicators were planned to be assessed across all subprojects. The third indicator was related only to the added subproject in Di An Town.

Revised Components

18. An additional wastewater and drainage subproject in Di An Town, in a province already covered by the project, was added to Subcomponent 1B with the AF. A new Subcomponent 2C (Water Sector Priority Investment Support) was also added, at a cost of US\$7.3 million, for technical assistance (TA) for the preparation of Mekong Delta water supply investments, specifically, the regional water supply security in the six Mekong Delta provinces¹¹ and the city of Can Tho. The cost of Subcomponent 1A increased from US\$97.60 million to US\$106.60 million. The cost of Subcomponent 1B increased from US\$106.50 million to US\$233.50 million. The cost of Component 2 was increased to US\$11.30 million. Overall, total project costs increased from US\$236.20 million at appraisal to US\$351.20 million at the AF.

Other Changes

Additional Financing - May 2016 (Cost: US\$119 million, of which an IDA credit of US\$50 million and an IBRD loan of US\$69 million)

19. The targets of two intermediate indicators were revised and two intermediate indicators were added:

- (a) Increase in volume of water sold annually: the target was revised to reflect the baseline value at appraisal as 0 while the target at completion remained 21,731,000 m³ on December 31, 2016
- (b) Areas benefiting from increased drainage coverage and flood protection measures changed from 12,564 ha to 12,618 ha with a new completion date of December 31, 2019

¹¹ The six provinces in Mekong Delta are An Giang, Hau Giang, Soc Trang, Bac Lieu, Ca Mau, and Kien Giang.



- (c) Preparation of Mekong Delta water supply investment and (d) volume of BOD¹² mass removed by the WWTP (Di An Town) constructed under the project, were added with a completion date of December 31, 2019.
20. The project closing date was extended from December 30, 2016, to December 31, 2019. Disbursement estimates and the implementation schedule were revised accordingly.
21. New safeguards policies, Physical Cultural Resources (OP/BP 4.11) and Projects on International Waterways (OP/BP 7.50), were triggered.
22. Changes to the institutional arrangements were made, upgrading the Binh Duong Water Supply, Sewerage, and Environmental Company (BIWASE) from city to Province Project Management Unit (PPMU).
23. **Financial management.** The financial management risk was lowered to Moderate from Substantial, and three new Designated Accounts were opened (two for the Binh Duong PMU and one for the MOC country PMU). The Project Operational Manual and the auditing and financial reporting requirements were updated.
24. **Procurement.** References to the applicable procurement guidelines for Goods, Works, and Non-Consulting Services and for Selection and Employment of Consultants under IBRD Loans, IDA Credits Grants by World Bank Borrowers were updated to the 2014 revisions and the bidding procedures set forth in the original Financing Agreement were revised to reflect the new changes and modifications in the national Procurement Law that had become effective since July 2014.
25. A new legal covenant was added: Binh Duong will introduce a 15 percent surcharge on the water supply bill as wastewater tariff to replace the current 10 percent environmental protection fee.
26. **First Level 2 restructuring (October 2016).** The closing date of the original IDA allocation of US\$200 million was extended from December 31, 2016, to December 31, 2017.
27. **Second Level 2 restructuring (November 2019).** A second project restructuring was approved one month before the project ended and changes included (a) a cancellation of the unused credit amount of SDR 17,220,000, (US\$24.42 million equivalent) of which SDR 3,090,000 was from Credit No. 4948-VN and SDR 14,130,000 was from Credit No. 5817-VN and (b) a reallocation of credit proceeds in the project disbursement categories.

Rationale for Changes and Their Implication on the Original Theory of Change

28. The AF amount covered the following:
- A gap in the original project implementation costs of US\$20 million (part of the IDA credit of US\$50 million) related to the appreciation of the U.S. dollar in relation to the SDR.

¹² BOD is an important water quality parameter because it provides an index to assess the effect that discharged wastewater will have on the receiving environment. The higher the BOD value, the greater the amount of organic matter or 'food' available for oxygen-consuming bacteria.



- The construction of wastewater treatment system and drainage in Di An, Binh Duong Province amounting to US\$92 million, of which US\$23 million was from the IDA credit and US\$69 million from the IBRD loan. The intermediate indicator target ‘areas benefiting from increased drainage coverage and flood protection measures’ was adjusted accordingly.
- The new Subcomponent 2C was related to TA to support the MOC in preparing Mekong Delta water supply investment studies toward a new project that could be financed by the World Bank. The studies related to water supply sources in six Mekong Delta provinces and the city of Can Tho. The TA was to help the MOC identify options to improve water supply schemes in the provinces of that region. At AF, the water supply service relied primarily on systems that were highly vulnerable to climate change variability, sea level rise and associated salinity intrusion, and declining groundwater levels. The current water schemes accelerated the subsidence risk in Mekong Delta.

29. The AF-related changes aimed to strengthen project outcomes in several ways, including (a) an increase in the number of beneficiaries of water supply¹³ and environmental sanitation (due to the additional subproject in Di An); (b) improved monitoring of impacts to direct project beneficiaries, and separately, by gender; (c) specification of customer satisfaction targets for water supply and environmental sanitation projects; and (d) performance targets for the Di An wastewater system.

30. Physical Cultural Resources (OP/BP 4.11) was triggered given the significant amount of earth work at the Di An WWTP and Projects on International Waterways (OP/BP 7.50) was triggered because the treated wastewater and the stormwater from Di An would be discharged to a tributary of an international river originating in Cambodia.

31. The new covenant that was added during the AF for Binh Duong Province involved introducing a surcharge on the water supply cost to cover wastewater O&M costs. This surcharge was to replace the 10 percent environmental protection fee, charged to all water supply customers.

32. The financial management risk was reduced because of the good performance and experience with World Bank-financed projects on the part of CMPUs and Provincial Project Management Unit (PPMUs), and because the number of subprojects was expected to decline as more and more of them were completed. The other changes to financial management were in line with the expanded scope of the AF.

33. The changes in procurement reflected updates in both the World Bank and Government regulations.

34. The extended overall project implementation period to December 31, 2019 was to allow time to complete the new project in Di An and the Mekong Delta water supply investments studies.

¹³ Despite the depreciation of SDR against the U.S. dollar, water supply utilities had enough funds not only from the project but also from other sources of financing that combined with the project funds to enable the utilities to increase the number of connections.



35. The project restructuring (November 2016) also extended the implementation period of the original subprojects to December 2017, to achieve the project outcomes defined at appraisal, to allow for completion of the physical infrastructures under the original Subcomponents 1A and 1B.

36. The project restructuring in November 2019 allowed for cancellation of underutilized funds because of delays in Official Development Assistance (ODA) allocation to the provinces caused by the fiscal situation at the time as well as lengthy processing time for approval of additional project activities

37. All of these changes were consistent with the original theory of change.

II. OUTCOME

38. With the closure of most project activities in December 2017, the evaluation of outcomes relative to the Results Framework refers to the achievements for each subproject identified at appraisal¹⁴ up to December 2017, as reported by the MOC in March 2018. The outcome and intermediate indicators from the Di An subproject and the TA on Mekong Delta water supply investments as well as number of beneficiaries and female beneficiaries were provided as of December 2019, when the project closed.

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

Rating: High

39. The PDO, ‘to increase access to sustainable water services and environmental sanitation’, is fully aligned with the GoV’s development priorities. The PDO remained relevant through project implementation by (a) supporting the GoV reach goals stated in the Vietnam 2035 Vision;¹⁵ (b) ensuring availability and sustainable management of water and sanitation for all and making cities and human settlements inclusive, safe, resilient, and sustainable; and (c) demonstrating the manner in which new water supply and sanitation services can be implemented for small to medium cities.

40. Furthermore, the PDO aligns with two of the three objectives¹⁶ of the Country Partnership Framework (CPF) FY18–FY22 (Report No. 111771-VN), approved in May 2017, as well as cross-cutting areas of governance. For example:

- (a) **Enable inclusive growth and private sector participation (Focus Area 1 of the CPF), by addressing infrastructure bottlenecks, improving investment efficiencies, managing and using assets and broadening participation of women and vulnerable groups.** The project contributed to this area by improving planning, management, and delivery of infrastructure; ensuring financial sustainability through approval and implementation of circulars on water and wastewater tariffs; and piloting PSP activities to improve management and operational efficiency. In addition, the project supported the strengthening of Urban Environmental

¹⁴ These are the 14 subprojects approved at appraisal, of which seven are for water supply and seven for wastewater and drainage subprojects.

¹⁵ World Bank and Ministry of Planning and Investments of Vietnam. 2016. *Vietnam 2035 - Towards Prosperity, Creativity, Equity, and Democracy*.

¹⁶ The three areas of focus on the CPS are to (a) enable inclusive growth and private sector participation, (b) invest in people and knowledge, and (c) ensure environmental sustainability and resilience with governance as a cutting-cross engagement area.



Companies (URENCOs), the new government-managed organizations that would operate wastewater treatment facilities.

- (b) **Ensure environmental sustainability and resilience (Focus Area 3 of the CPF) by supporting improvement of environmental management, ensuring sector sustainability and investments in water supply and sanitation.** To this end, the project activities included construction of wastewater systems, improvement of drainage systems, and creation of an enabling environment for involvement of the private sector in management of water supply. It also supported the MOC in assessing regional water supply service options in the Mekong Delta to identify potential investments for resilient and sustainable water supply infrastructure.

B. ACHIEVEMENT OF PDOs (EFFICACY)

41. The project had two PDO outcomes: (a) increased access to sustainable water supply service in the project areas and (b) increased access to sustainable environmental sanitation in the project areas.¹⁷

42. Related to the data used in the efficacy analysis, the Implementation Completion and Results Report (ICR) task team directly contacted the PPMUs to obtain current information from all subprojects to assess progress since 2017. However, because of inconsistencies in the data obtained from the PPMUs, the official MOC project completion data¹⁸ were used to assess outcomes because they were considered to be the most accurate comparison with the PDO indicators.¹⁹ As discussed in the following paragraphs, the data provided by PPMUs were useful for the economic analysis which relied upon related but different performance parameters.

Assessment of Achievement of Each Objective/Outcome

Outcome 1: Increase access to sustainable water supply services in the project areas

43. Progress toward water supply goals was determined through the following PDO indicators: (a) number of new piped household water connections resulting from project interventions; (b) direct project beneficiaries; (c) increase in satisfaction rate of beneficiaries of water supply service; and (d) financial sustainability of water companies.

44. In the PAD, a water supply beneficiary was defined as anyone who has improved access to water because of the project. The project interventions supported two broad categories of improvements: (a) new public water service and (b) enhanced availability and quality of public water service, such as

¹⁷ The sustainability aspect is captured as a separate outcome in the theory of change to clearly show the flow from project-supported activities to outputs to outcomes, based on the project design as described in the PAD.

¹⁸ Project Completion Report from the MOC, August 2019.

¹⁹ During project implementation, an M&E consultant was hired by the MOC to collect information from the PPMUs and compile a progress report that was submitted to the World Bank during the supervision missions. Before the project closing, in August 2019, the M&E consultant submitted the completion report, and these are the data used in this report. The variability in responses from subprojects suggests that performance tracking systems at the project level are not fully operational, at least as far as World Bank indicators are concerned (a detailed discussion is presented in the M&E section).



increased access at different times and rates of flow. Principally, all households that benefited from either of the service improvement categories qualify as beneficiaries.²⁰

45. **At project completion, the number of new water connections exceeded the target, reaching 80,173, compared to the target of 65,872 at AF.** The increase in number of connections resulted in the increase in the number of new beneficiaries who gained access to improved water supply services, amounting to 358,324 people at completion when compared to the original target of 263,488 beneficiaries. Tables 4 and 5 provide achievements each subproject achieved by end of December 2017. The increase in beneficiaries was achieved because of the high demand from households, because of the increase in the treatment capacity of water supply systems, from 2,089,000 m³ per year in 2011 to 27,605,000 m³ per year in 2017. It is worth noting that at completion the target on increase in volume of water sold was surpassed by 127 percent compared with the target at AF (at AF the target was set at 21,731,000 m³ per year). In fact, the infrastructure construction, including distribution networks, progressed rapidly during the project and achieved 98 percent completion by February 2016. Early completion of these works enabled the utilities to shift focus to increasing the household water connections. The overachievement of number of beneficiaries is supported by the volume of water sold at project closure.

Table 4. Results Achieved on Water Supply PDO Outcomes

Project Stage	New Household Water Connections (number)	Direct Project Beneficiaries (number)	Satisfaction Rate of Beneficiaries (%)
Appraisal target	42,628	—	—
AF target	65,872	263,488	90.00
Completion (actual)	80,173	358,324	97.80

Table 5. Results Achieved on Female Beneficiaries and Financial Sustainability

Subproject	Female Beneficiaries (target 51%)	Financial Sustainability Working Ratio (target 0.9)
	Achieved	Achieved
Uong Binh	40.00	0.92
Ninh Binh	50.40	0.85
Tam Ky	52.00	0.82
Dong Xoai	49.40	0.67
My Phuoc	41.00	0.82
Da Lat	49.80	0.78
Phu Quo	50.30	0.73

46. **Customer satisfaction rates** for water supply service were assessed through customer surveys and structured interviews, carried out in all subprojects by random sampling (both at baseline and at completion). The surveys were conducted by the water utilities or the PPMUs and verified by an independent party and the confidence level is at 95 percent (a minimum of 1,000 households were interviewed at baseline and at completion). The baseline survey was conducted in August 2014 to assess general satisfaction in water service. The results indicated that 86.3 percent of surveyed customers were satisfied with their water supply service. The baseline was carried out while the water supply activities

²⁰ The economic and financial analysis avoids this distinction because the value of the project is based on the overall increase in water purchased by beneficiaries.



were being implemented but before their completion. As such, the survey obtained reactions from a random sample of existing customers (that is, those who already had service before the completion of the water supply activities and benefited from improved service quality and reliability when the water supply subprojects were completed), not those who would necessarily directly benefit from the project (that is, those who benefited from having access to improved water system). Two additional surveys (June 2017 and March 2020) were conducted on a random sample of new customers. The June 2017 survey found that 98.9 percent of customers were satisfied and 97.8 percent were satisfied in the March 2020 survey.²¹ Most respondents stated satisfaction with improved water pressure, service continuity, water quality (no chlorine smell and no turbidity), and customer service. Accordingly, the project has clearly exceeded the target satisfaction rate of 90 percent.

47. For water supply subprojects, the sustainability aspect of the PDO was defined by the financial sustainability of water services and it was directly assessed through each utility's financial working ratio—a ratio that is computed by dividing operating costs by revenue collected.²² However, to complete the sustainability assessment, technical and institutional sustainability will also be discussed.

48. The PAD defined financial sustainability as a working ratio of less than 0.9, which meant that tariffs needed to be increased to cover at least the O&M costs. Thus, during project implementation, utilities proposed tariffs high enough to cover O&M, depreciation, and profits, which were approved by the Provincial People's Committee (PPC). According to independent audits, all utilities achieved the working ratio target, except Uong Bi, which was only marginally higher at 0.92. Most subprojects achieved working ratios of less than 0.9 by May 2016 and maintained the working ratio, which demonstrated financial sustainability up to project closure. Furthermore, with the equitization of water supply utilities in Vietnam (see section III.B. Key Factors During Implementation, changes in the institutional arrangements), according to Decree No. 117/2007/ND-CP, tariffs for water supply service provision cover O&M costs as well as depreciation and profits. In addition, all the subprojects reported that new investments in the water supply infrastructure would be funded by loans from commercial banks and costs covered by the tariffs that are currently being implemented. For example, the water supply utility in Binh Duong Province is already expanding the water treatment facilities and these works are being financed by a loan from a local commercial bank.

49. In addition, the Ministry of Planning and Investments (MPI) issued a decision selecting the Binh Duong water supply investment as a pilot for PSP (Subcomponent 2B). As a result, a public-private partnership (PPP) model was proposed for investment in a water supply network through co-financing by BIWASE (public company) using savings from IDA Credit 4948-VN and investment on a new water treatment unit using private funds from a firm in Binh Duong. However, due to the equitization²³ of BIWASE and limited availability of the AF for the water supply component, BIWASE secured commercial funds for extension of the treatment capacity to be paid by the tariffs collected from the water sales.

50. Technical sustainability is based on the adequacy of water supply system technology and availability of water resources. For schemes that increased water production, such as Uong Bi, Tam Ky, Dong Xoai, and Phu Quoc, selected water sources were those with enough capacity and volumes

²¹ The statistical significance of this difference between 2017 and 2020 was not evaluated and is not considered to be significant.

²² The operating expenses exclude depreciation and amortization.

²³ Equitization is a Vietnamese English term that denotes the conversion of a state-owned enterprise in Vietnam into a public company or a corporation.



throughout the year for both household service and environmental flows. In addition, conventional treatment²⁴ that has been used in Vietnam for many years was selected because it has proven to be effective. In other cities, such as Ninh Binh and Da Lat, where increase in water production was not included, a careful assessment was conducted of the available water treatment plants and it was concluded that there was sufficient capacity for expanded distribution.

51. Institutional sustainability has been ensured in the selection of water utilities that were recognized by the PPC and were already operating water supply facilities for many years. In addition, with the equitization of public services in Vietnam, water utilities are operating under an approved management model (which varies by subproject) that has been agreed upon with the PPC and involves reporting directly to either the City People’s Committee (CPC) or PPC, depending on the utility service area. Furthermore, under Subcomponent 2A of the project, training was delivered to all subprojects on topics including (a) asset management, (b) business planning, (c) developing and practicing standardized operational procedures, and (d) training for managerial and operational staff of utilities.

52. To further contribute to the financial sustainability of water supply utilities, a policy note²⁵ was developed on issues related to NRW and energy efficiency. The note incorporated an initial assessment on NRW and energy efficiency carried out in 18 Vietnamese water utilities and was recently submitted to the GoV on June 1, 2020. The findings from this policy note show that (a) although NRW is a recognized issue, utilities have limited options for addressing it and (b) incentives for utilities to identify and resolve water losses are limited in cases where large leaks occur within large developments that are implemented and managed by a third party, for example, a developer. On the energy efficiency side, the policy note shows that (a) improving energy efficiency faces inadequate resources; (b) the current cost norms are outdated and are not conducive to energy efficiency; and (c) while utilities recognize the importance of energy efficiency, such improvement programs are not adequately included in their activities. Overall, the findings provided a set of recommendations on efficiency gains that would help water utilities achieve nationwide targets set by the GoV for reducing NRW to 15 percent by 2025 and reducing total operating costs by 20 percent by 2025, due to energy cost savings.

53. A database for monitoring urban water sector planning and development has been created, with project support, under the MABUTIP/MOC and it is currently managed by the Administration of Technical Infrastructure (ATI), an MOC agency (Subcomponent 2A). The database was designed to provide updated information on water and wastewater facilities and it is expected to provide a solid basis for decision-making at the national, provincial, and city levels. While the M&E database has been completed and is available, the last update for water supply and sanitation was performed in 2015. The lack of incentives for water supply utilities to submit data has posed difficulties for the ATI/MOC to regularly update and monitor the sector performance.

54. **Assessment of Outcome 1 and rating.** Given the overachievement of the outcome indicators—number of household connections; number of direct beneficiaries; customer satisfaction; and the achievement of financial, technical, and institutional sustainability—the achievement of this outcome is rated High.

²⁴ Conventional treatment systems for water supply systems comprise coagulation, flocculation, sedimentation, rapid filtration, and disinfection.

²⁵ World Bank. 2019. *Reducing Non-Revenue Water and Improving Energy Efficiency Policy Note*.



Outcome 2: Increase access to sustainable environmental sanitation in the project areas

55. The PDO indicators for sanitation access and drainage include (a) number of people in urban areas that have improved sanitation, (b) increase in satisfaction rate of beneficiaries of drainage and wastewater service, and (c) increase in satisfaction rate of beneficiaries of wastewater and drainage services in Di An Town. In addition, the following intermediate indicators were defined: (d) areas benefiting from improved drainage coverage and flood protection measures and (e) volume of BOD mass removed by WWTP (Di An Town) constructed under the project.

Box 1. Importance of the SSPs

At appraisal, it was established that the SSPs would be prepared for each sanitation subproject before implementation of the project feasibility studies. This effort was conducted to ensure that the proposed investments were in line with the overall sanitation plans in selected towns. In accordance with the SSPs, project plans included two types of new physical connections to the wastewater treatment facilities: (a) combined systems, which conveyed both sewer-connected households and stormwater runoffs and (b) separate systems that directly connected to wastewater treatment facilities. In areas with existing combined sewers, the project installed interceptors for diverting wastewater to the treatment facility.

The interceptors were designed to work most of the time except when stormwater runoff volumes exceed system capacity, at which point the diluted wastewater would be directly discharged without treatment (as was the case before the project). Both households with increased and new access to wastewater treatment are considered project beneficiaries because all contribute to an improved environment. In this regard, a more fundamental measure of this project component would have been based on the volume of wastewater treated—an indicator not included in the Results Framework, but one that is used in the economic analysis of this component.

56. At AF, the number of people in urban areas who have improved sanitation because of the project was defined as ‘the number of people living in the project areas, where the drainage and wastewater services are provided from the project costs’. The project succeeded in increasing the number of people with improved sanitation to 152,928 beneficiaries but this amounted to just 49 percent of the target number of beneficiaries 312,051 set at AF. Even though all WWTPs under the project were completed and are all in operation as planned, the failure to meet the target set at AF (312,051) occurred mainly because household connections were lower than planned. For instance, in Da Lat, the construction of the WWTP and sewer network was prioritized over establishing household connections. As a result, the volume of wastewater collected and treated remains at about 45 percent of the total installed capacity.²⁶ In Bim Son, a number of targeted households faced connection challenges because the houses are located below the sewer line, and hence were impossible to connect (in this case the wastewater would have to be pumped to the sewer lines), and they ultimately elected to continue using their septic tanks. Also, in most subprojects, although there was no cost for connecting to the sewer, most households would still need to bear the costs to change internal plumbing, move or build manholes, and repair interior floors. In the subprojects where a portion of the system is combined (drainage and sewer), such as Tam Ky, and Dong Xoai, some existing households already discharge their wastewater to the public drains and were reluctant to have a new connection. The Di An subproject notably achieved the largest number of new household connections with 6,268, out of a total of 25,072 direct beneficiaries according to the data provided by Binh Duong PPMU.

²⁶ Future connections beyond the project will allow treated wastewater to be closer to installed capacity under the project.



Table 6. Results Achieved on Wastewater and Drainage Subprojects

Project Stage	Number of People in with Improved Sanitation	Areas Benefiting from Improved Drainage Coverage and Flood Protection (ha)	Satisfaction Rate of Beneficiaries (%)
Appraisal target	263,051	12,564	—
AF target	312,051	12,618	70.00
Completion (actual)	152,928	8,528	72.00

57. Flood protection and improved drainage elements were included in all subprojects, except in Da Lat, and outcomes were measured in terms of the area protected. The flood protection infrastructure included raising river embankments and building drainage canals and pumping stations. Other subprojects created hardened embankments around stormwater detention water bodies that in some cases became new parks, roads, and walkways. These structures reduced the risk of flood-related damage, improved drainage of stormwater, and likely raised property values. During project appraisal, the target level of achievement for the intermediate indicator ‘areas benefiting from increased drainage coverage and flood protection’ was determined to be 12,564 ha for all subprojects (see the breakdown in table 6). This target increased slightly to 12,618 ha at AF with the addition of Di An. At the end of the project, a total of 8,582 ha were protected (68 percent of the target of the 12,618 ha). The lower-than-intended level of achievement is mainly because at AF, with all the SSPs completed, the area for drainage subprojects was lower than expected at appraisal. In particular, Tam Ky and Thai Hoa reduced the targeted flood protection areas by more than 60 percent and Tam Ky and Ninh Binh by more than 30 percent. Dong Xoai was the only subproject that increased the flood protection area by 50 percent. Nevertheless, the drainage infrastructure built under the project in most cities greatly contributed to flood reduction and increased drainage coverage, as showcased in box 2.

Box 2. Experience from Dong Ha Flood Protection and Drainage System

The flood control measures provided significant benefits that extend beyond the original project design and were achieved by a close working relationship between the PMUs, World Bank, and the city. The project in Dong Ha is a good example of what can be achieved. Three large stormwater detention ponds were created to capture a combined 140,000 m³ of storage to address flooding issues across 369 ha of urban land. While the project achieved successes in reducing periodic flooding that could be as high as 1.5 m during the rainy season (September–December), the subprojects also transformed the nearby neighborhoods. Before the project, the sites were unmanaged marshlands that were polluted and visually unappealing. The project set out to improve the water storage function of the area by deepening the lake and shoring up the sides. The perimeters of the lakes were developed with walking paths, roads, and parks. The resulting combined 20 ha area of new public space was supplemented with handrails, landscaping, and lighting around the waterbodies. The final design was originally conceived during project preparation and some refinements were implemented by the local community following the concepts of nature-based solutions. Many of the amenities that converted the land surrounding the project site to public spaces were financed by the city. The combined efforts of the project and the city triggered a rapid increase in land value around the project, an increase thought to be about 500 percent for plots around the lakes and about 10 percent for adjacent ones—these benefits are not captured in the economic analysis. In addition, households around the lakes invested on their balconies and backyards and/or front yards to improve their assets. Now, the public spaces are used for a variety of recreational activities such as walking and jogging, fishing, exercising, and simply meeting friends.

58. **Sustainability of wastewater and drainage subprojects.** Overall sustainability of wastewater and drainage services was not defined at appraisal or AF. For the purpose of this report, the technical, financial, and institutional sustainability will be assessed, based on the available information and on provisions from



the legal agreement. In addition, the project included an M&E system that was established to help the central and local agencies monitor sector development, which in turn supports the sustainability aspects of the investments (see paragraph 53 for discussion on M&E system established).

59. **Technical sustainability is assessed through O&M activities of the treatment plants according to the SSPs, quality of effluent from WWTPs, and volume of BOD removed from Di An WWTP.** Biological pond treatment technology was selected and implemented in most wastewater subprojects because of the simplicity and effectiveness in removing the BOD load from domestic wastewater to comply with discharge standards. Only in Da Lat and Di An was more complex technology implemented, which involved an anaerobic filtration system and activated sludge in sequencing batch reactors (SBRs),²⁷ respectively. As the SBR technology was not previously successfully implemented in Vietnam because of its complex technology, regular activities are conducted to manage processes, such as monitoring the WWTP components, water quality measurements at discharge points, and inflow/outflows volume comparisons. Note that even though the number of household connections for wastewater service is lower than the target, the volume of wastewater collected is high enough to adequately operate the plant. Furthermore, in combined systems, during the dry season all waste and stormwater and any groundwater seepage are collected and treated in the WWTP. In the rainy season, the high volumes of stormwater can exceed the drainage collection system capacity, causing direct environmental discharges of combined but diluted sewage and stormwater.

60. All wastewater subprojects under the project meet Category B discharge water quality standards, as defined by the Ministry of Natural Resources and Environment (MONRE).²⁸ During implementation in Da Lat, MONRE requested that the discharge quality be upgraded to meet Category A, which was a higher standard than planned. The CPC is looking at alternative solutions to upgrade the WWTP to meet the higher standard (this is expected to be done beyond project completion). It is also worth noting that in addition to continuous effluent quality monitors that are electronically linked to MONRE, the WWTPs have also installed biological indicators of effluent quality (that is, specially designed ponds of sensitive fish species) to alert staff of deterioration of water quality. In addition to monitoring for known contaminants identified under Category B and A standards, the use of biological indicators allows for testing of unknown contaminants. Furthermore, fishponds were installed in some WWTPs and effectively demonstrate the efficacy of the treatment to the community because MONRE's numerical standards would be difficult for most to understand. All the WWTPs have applied and obtained permits from MONRE to discharge the WWTP's effluents in the environment.

61. The indicator on the volume of BOD mass removed from the Di An WWTP was measured during project implementation and by project closure (December 2019), the BOD removed was 1,600 kg per day or 159 percent compared to the AF target of 1,020 kg per day.

62. **Financial sustainability will be assessed through approval of instruments for implementation of wastewater tariffs and availability of government subsidies.** Note that financial sustainability of sanitation services was not originally part of the Results Framework, and as such it will be assessed based on the legal agreement provision which states clearly that the total expenses should be covered by total

²⁷ The SBR is a fill-and-draw activated sludge system for wastewater treatment. In this system, wastewater is added to a single 'batch' reactor, treated to remove undesirable components, and then discharged.

²⁸ National Standard QCVN 08:2008/BTNMT and amended by National Standard QCVN 14-MT:2015/BTNMT regulates the quality of the wastewater discharged to environment and the Category B quality standard is the second lowest, in which the maximum allowed BOD is 50mg/l and the total coliform is <5,000/100ml, among other parameters.



revenues, which may include local government financial assistance, if necessary. Implementation of the tariffs is at different stages in the subprojects, with Da Lat being the only subproject that is currently charging wastewater tariffs. Da Lat has been implementing a wastewater tariff since 2013 because of its previous involvement in wastewater system development with other development partners. The remaining six have approved the wastewater tariff but have not implemented it because wastewater treatment facility operators were still in a phasing-in period (commissioning of most of the WWTP was completed in December 2018) and the PPC still needs to revoke the environmental fee charged to all water supply customers. Even though the decision to charge tariffs has not been implemented in all subprojects, this constitutes an important step and a building block toward collection of wastewater tariffs that will cover the wastewater systems O&M costs. A circular on methods for estimating and implementation of wastewater tariff has been prepared by the MPI and issued by the MOC at the national level²⁹ (Subcomponent 2B), and seven out of the eight PPCs have issued a decision to charge the tariff to all customers connected to the wastewater system.

63. A surcharge on water consumption equal to 10 percent of the water tariff is implemented in most subproject areas according to Decree No. 88/2007/ND-CP and Decree No. 04/2007/ND-CP and has been intended to address the environmental impacts of untreated wastewater. While this surcharge can represent cost recovery payments for treatment, fees are not directly collected by the wastewater treatment entity and institutional challenges limit efficient internal fund transfers within the GoV. The collected fee is transferred to the treasurer at the PPC and is not directly allocated to O&M. Financial support for O&M activities for the WWTP and drainage systems is provided by the PPC provinces on a yearly basis, mainly from the environmental fee collected and there is commitment from the PPCs and CPCs in covering the O&M costs through funds allocated at the provincial level. In fact, provinces reported that at the planning stage, an annual budget is allocated for these activities.

64. At appraisal, institutional sustainability was planned for by strengthening the existing URENCOs and assigning them the responsibility for asset ownership and O&M of the wastewater and drainage system. However, given the institutional changes that occurred in 2016, which led to equitization of URENCOs, most PPCs and/or CPCs have assigned an internal entity for asset ownership and that entity to sign service contracts with URENCOs for performing O&M. The exceptions are Di An and Thai Hoa where the water supply and sewerage utility, but not URENCO, has retained responsibility for O&M activities. The MOC has implemented a variety of TA activities under Subcomponent 2A to support capacity building for these entities. In addition, institutional sustainability is also strengthened by the fact that most wastewater companies report directly to, or operate under a contract with, the PPC and must be responsible for O&M activities for the drainage systems.

65. Similar to water supply, baseline and end line customer satisfaction rates for sanitation services for all subprojects³⁰ were conducted. The customer satisfaction was assessed through customer surveys carried out in all sites by random sampling. The surveys were conducted by the wastewater companies or PPMUs and verified by an independent party and the confidence level is 95 percent (a minimum of 1,000 household surveys were conducted). The baseline survey was carried out in August 2014, at the initial stages of project implementation and the findings indicated that 60.40 percent were satisfied with the drainage and wastewater services. Two additional surveys were conducted in June 2017 and March 2020, using a random sample of beneficiaries. In June 2017, the results showed that only 44.50 percent were

²⁹ MOC Circular 13/2018/TT-BXD.

³⁰ Ninh Binh, Dong Ha, Bim Son, Thai Hoa, Tam Ky, Dong Xoai, Da Lat, and Di An.



satisfied with the service, while in March 2020, 72 percent were satisfied—a level that surpasses the target set at 70 percent. The reduction in customer satisfaction to 44.50 percent in June 2017 could have been because the survey was conducted during construction of the sewerage drainage system and customers may not have had a complete sense of the overall benefits. After project completion, survey respondents indicated that they felt that the drainage works reduced their flooding risk and improved the overall environment near their houses. For Di An, the baseline survey was conducted in December 2017 and 25.21 percent of customers were satisfied. A follow-up survey was conducted in December 2019, and the findings indicated that 70.2 percent of the surveyed households were satisfied or very satisfied with drainage and wastewater, surpassing the 50 percent target set at AF.

66. Component 2 focused primarily on institutional strengthening, improving the efficiency of investments and operations. Three intermediate indicators were defined as follows: (a) development of a sector database to support capacity building and implementation of SSPs, (b) issuance of a ministerial decision on criteria for selecting projects for PSP, and (c) development of a PSP toolkit.

67. The sector database, which includes wastewater water performance, was fully developed and sector performance data were collected and updated by the MOC, as discussed in paragraph 53. It is important to note that the eight wastewater subprojects could not have been developed and implemented without first completing the SSPs with support from the MOC. Also, all the PPMUs benefited from training and on-the-job learning in the process of implementing the fairly complex wastewater and drainage infrastructure. These SSPs and new capabilities are supporting the ongoing management as well as future expansions of the project-built wastewater and drainage facilities.

68. While a circular on PSP in operating and managing water supply services had not been issued as planned under the project, a toolkit on PSP was developed and Binh Duong Province was selected for piloting. With the institutional changes that led to the equitization of water supply utilities, Binh Duong was able to leverage on the experience of the PSP and it is currently the only water utility in Vietnam listed in the Vietnamese stock exchange.

69. **Assessment of Outcome 2 and rating.** The achievement of results under this outcome is mixed. There were shortcomings in achievement of the outcome indicator on ‘number of people in urban areas who have improved sanitation’ (49 percent achieved) and on the intermediate indicator on ‘areas benefiting from increased drainage coverage and flood reduction’ (68 percent achieved). However, the outcome indicator on ‘customer satisfaction survey’ was fully achieved (102 percent). The intermediate indicator on issuance of circulars for implementation of wastewater tariffs (Subcomponent 2B) was fully achieved as well. Institutional and financial sustainability also have different levels of attainment. Thus, this outcome achievement is rated Modest.

Justification of Overall Efficacy Rating

70. Based on Outcome 1, increase access to sustainable water supply services in the project areas rated High and Outcome 2, increase access to sustainable environmental sanitation rated Modest, the overall efficacy is rated Substantial.



C. EFFICIENCY

71. Separate analyses have been conducted for project cost-effectiveness and economic and financial analyses of improvements to Subcomponent 1A (water supply), and economic analyses of Subcomponent 1B (wastewater). The methods for analyzing the project performance largely follow those in the PAD.

72. Data on project outcomes were obtained from the MOC project completion report and supplemental data provided to the ICR team. These data provided a baseline assessment of project performance and potential changes in outcomes over time. According to the PAD approach, the benefits of water projects (Subcomponent 1A) are computed by combining the volume of water sold and the tariff paid. Wastewater project benefits (Subcomponent 1B) are analyzed from a public good perspective where health and environmental quality improvements of projects are thought to provide value to the town's entire population. Accordingly, the PAD method computed wastewater benefits by assuming that the per capita value of improved wastewater treatment applies to all town residents. The per capita value is derived from a [World Bank/World Sanitation Program](#)³¹ study, which considered only the health costs and water resource degradation costs to determine a per capita loss of US\$28, or US\$44 per capita in U.S. dollars (2018 base value). The benefits from improved drainage are certainly tangible outcomes for those affected but were not considered estimable in the PAD and therefore excluded here.

73. Results in table 7 present the financial internal rate of return (FIRR) and economic internal rate of return (EIRR) of Subcomponent 1A based on 20 years of operations after construction. The analysis indicates that the FIRR and EIRR for water is 16.2 percent and 17.8 percent, respectively. Following the PAD, the EIRR is determined for a 15-year period or about 9 years of net benefits post-construction because of uncertainties in long-term outcomes. The EIRR for all wastewater projects combined is 22.8 percent. Project-specific results are presented in tables 8 and 9. The results indicate that the EIRR for all but Tam Ky exceeded the original design. In table 9, the EIRRs of all wastewater projects are well above the original analysis except for Di An, but its net benefits are still quite positive.

Table 7. EIRR and FIRR by Component and for the Overall Project

Subcomponent	Years of Benefits, Post-Construction	FIRR (%)	EIRR (%)
1A: Water	20	16.2	17.8
1B: Sanitation	9	n.a.	22.8

Table 8. Water - EIRR and FIRR

Projects	EIRR (%)		FIRR (%)	
	At Appraisal	At Completion	At Appraisal	At Completion
Da Lat	13.9	21.8	11.2	20.3
Dong Xoai	6.3	14.4	2.7	13.2
My Phuoc	15.3	26.3	11.3	24.2
Ninh Binh	11.8	11.8	8.6	10.4
Phu Quoc	9.4	15.8	5.5	14.1
Tam Ky	10.8	6.2	6.6	5.0
Uong Bi	12.4	23.1	8.3	21.1
Total	—	17.8	—	16.2

³¹ World Bank. 2008. *Economic Impacts of Sanitation in Vietnam*. Water and Sanitation Program Research Report.



Table 9. Wastewater - EIRR

Projects	EIRR (%)	
	At Appraisal	Completion
Bim Son	9.6	19.1
Da Lat	12.4	34.6
Di An	19.7	18.8
Dong Ha	9.5	20.4
Dong Xoai	11.1	31.0
Ninh Binh	13.7	24.9
Tam Ky	9.5	18.2
Thai Hoa	13.6	28.6
Total	—	22.8

Cost-effectiveness of Project Implementation

74. A project's cost-effectiveness relates to the cost of construction spending relative to the town population, as discussed during appraisal. The project committed to spending up to a maximum of US\$200 per capita. Table 10 compares the cost-effectiveness during appraisal and the ICR. Overall, the completed projects were more cost-effective than originally designed because the population grew and projects managed the costs well.

Table 10. Cost-effectiveness of Projects

Project Sites	At Appraisal		At ICR	
	Water (US\$ per capita)	Sanitation (US\$ per capita)	Water (US\$ per capita)	Sanitation (US\$ per capita)
Bim Son		201		147
Da Lat	72	88	52	39
Di An				196
Dong Ha		200		140
Dong Xoai	157	174	106	89
My Phuoc	196		75	
Ninh Binh	105	148	78	113
Phu Quoc	132		98	
Tam Ky	125	200	112	147
Thai Hoa		162		104
Uong Bi	127		72	

Administrative and Operational Efficiency

75. The final project cost was US\$267.51 million, 91 percent of the total committed amount (considering the fund cancellation in November 2019). All project components, for both the parent project and the AF, were implemented and finalized as expected. Two activities that were substantially advanced, but not fully completed by the project closing date, were the household wastewater connections and the TA on Mekong Delta water supply investments. These two activities are being pursued with government counterpart funds. Although project implementation faced major delays with large disbursements only starting after three years from the project effectiveness date (November 2011), all major project



infrastructure was constructed and completed. See also financial management and procurement compliance in section IV.B.

Assessment of Efficiency and Rating

76. The efficiency of the project is rated Substantial because the overall EIRR (water supply and wastewater subprojects) is 18.3 percent and the overall FIRR for water supply subprojects is 16.2 percent. In addition, the estimated EIRR for all 15 subprojects is higher at completion than the estimated at appraisal, except for one water supply subproject (Tam Ky). Similarly, the FIRR for all water supply subprojects is higher at completion than estimated at appraisal, with the exception of the Tam Ky subproject.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

77. The overall outcome is assessed as Satisfactory because (a) the relevance of the PDO was rated High, (b) the efficacy was rated Substantial (achievement of outcome 1 rated High and outcome 2 rated Modest), and (c) the efficiency was rated Substantial.³²

E. OTHER OUTCOMES AND IMPACTS

Gender

78. At appraisal, the project did not specify actions or targets to address potential gender gaps in the project area. However, at the AF, the project specified a goal to cover at least 51 percent of female population in the project area (the basis for this percentage though is not known). A customer survey in the project areas indicated that about 21 percent of all households were female headed.³³ At completion, it was estimated that 43.60 percent of beneficiaries from the project activities were women. While the target on percentage of female beneficiaries set at 51 percent was not achieved, it is worth noting that about 26,000 female-headed households directly benefited from the project activities. Furthermore, 90 percent of the women interviewed during the customer survey at completion (March 2020) reported that the improved water supply and sanitation services contributed to better health and 25 percent reported having more time for other activities.

Institutional Strengthening

79. **Preparation of Mekong Delta water supply investment.** The Mekong Delta water supply investment was initially expected to deliver feasibility studies, detailed engineering designs (DEDs), and bidding documents as well as safeguards documents but was ultimately not completed as the GoV required additional time to decide on the best feasible options presented by the consultant. The options

³² According to the ICR Guidelines, Appendix H, the overall outcome should be rated Moderately Satisfactory for a project in which there is modest achievement of one or more of the objectives/outcomes used in the assessment of the overall Efficacy. Although achievement of outcome 2 was rated Modest at project closing, the project successfully laid the foundations for the outcome to be fully achieved in future, having supported the installation of adequate wastewater treatment capacity that could absorb new connections, and with the contributions to technical and financial sustainability of wastewater services, as discussed in the Efficacy section. These considerations and the High rating of outcome 1 would suggest a Satisfactory overall outcome rating.

³³ Based on the customer survey conducted in March 2020.



include investment in (a) regional water supply for all affected provinces/cities and (bi) provincial/city (localized) water supply system. These investment options were submitted to the MOC and are currently being discussed by the MOC and Prime Minister’s Office including consideration for seeking further World Bank financing. Thus, the preparation of feasibility studies, DEDs, and bidding documents as well as safeguards documents is expected to be completed with the GoV funds once a decision on the investment is clear.

Mobilizing Private Sector Financing

Box 3. PSP in Development of Water Supply Services in Vietnam

With the rapid growth of urban centers in Vietnam (by 2025, 50 percent of the total population is expected to live in urban areas), development of efficient water supply infrastructure was crucial. As such, in 2007, the GoV issued Decree No. 117/2007/ND-CP, which allowed water supply companies, previously 100 percent owned by the Government, to become equitized, by having other economic sectors own (purchase shares) water supply and sewerage assets, including properties of management and operation companies. In addition, the decree also stipulates that a ‘full tariff recovery’ principle should be applied. By 2016, more than 100 companies had been equitized, including all utilities under the current project.

While equitization of water utilities was outside the project scope, it allowed for effective and efficient implementation of the project investments as well as technical and financial sustainability of the investments. Under the project, Binh Duong Province was selected to pilot PPP implementation, in which the private sector would finance the construction of a new water supply treatment unit and the public funds from the province would finance the distribution network and connections. Although public funds have not been obtained, Binh Duong Province was able to secure a commercial loan from local banks and is currently increasing the treatment capacity from 90,000 m³ per day to 120,000 m³ per day. It is worth noting that the commercial loan is expected to be fully repaid with tariffs collected from water sales (there will be no contributions from government subsidies or funds).

80. The project support for financial sustainability of the water supply utilities contributed to improved financial conditions and enabled them to seek commercial funds for further investment. The project also supported the development of a PSP toolkit. Building on the experience gained through the project, Binh Duong water supply utility secured commercial financing for a water treatment plant of 30,000 m³ per day.

Poverty Reduction and Shared Prosperity

81. While the project was not designed to specifically target poor or vulnerable populations, several subprojects devoted attention to their needs. The ethnic minorities are one of the most vulnerable population groups in Vietnam. Among this project’s impacts, the extension of water supply in Da Lat primarily benefited areas where large numbers of ethnic minorities live. It is estimated that about 5,000 project beneficiaries are ethnic minorities³⁴ (around 7 percent of the population in Da Lat are ethnic minorities). Similarly, in Binh Phuoc province, about 4,100 ethnic minorities are estimated to have benefited from the project (21.3 percent of the population in Binh Phuoc are ethnic minorities³⁵).

³⁴ Figure provided by the PMU representative during the field visit to water supply subproject in Da Lat.

³⁵ Vietnam Household Living Standards Survey of 2018.



Other Unintended Outcomes and Impacts

Not applicable.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

82. **Soundness of background analysis.** This project drew from the achievements of the Vietnam Water Supply Development Project (P073763), a similar project that was completed in June 2013. At appraisal, most of the selected cities for this new project did not have adequate, if any, water supply and wastewater services. Considering that some of the selected project sites were growing quickly, in part because of their proximity to Hanoi and Ho Chi Minh City, they were relevant targets for helping the GoV meet its strategy for developing smaller cities with population between 58,000 and 212,000 people. Because of the limited level of existing services at appraisal, the project assessed both technical engineering and legal issues around creating new services and service providers in each site.

83. Water supply and environmental sanitation needs were separately assessed. During project design, several service attributes were evaluated including water supply, sanitation and drainage needs, service gaps, financial needs, and operation efficiency. The design team identified the relatively higher needs for environmental sanitation and associated high investment costs. In addition, it was recognized that because sanitation services were not commercial by nature, strong institutional support would be required for sustainable service delivery.

84. **Project design.** The project was designed after assessing the needs of the selected subproject sites. However, considering that the project area was changed from Ho Chi Minh City and Hanoi at Project Concept Note to the 10 cities at approval (all the new 10 cities required preparation of the SSP before implementation of wastewater and drainage activities), the project design could have, at appraisal, budgeted additional implementation time, especially given the need to prepare the SSPs for wastewater and drainage. As such, this caused delays in starting the implementation of wastewater and drainage activities and limited the achievement in number of household wastewater connections.

85. The project design also included relevant lessons learned such as inclusion of household connections in the project activities, selection of subprojects with existing feasibility studies ready to avoid delays in implementation, and decentralized project implementation of arrangements (see PAD paragraph 36).

86. **Information and education campaign (IEC) activities for increase in wastewater connections.** One of the important elements for improving wastewater outcomes would require inclusion of IEC activities, which were not included in the project design. While most subprojects included consultation and communication activities toward increasing the number of household connections for wastewater systems, the project design could have emphasized and included in the PAD activities that needed IECs and potentially improved the outcomes on the environmental sanitation component.

87. **Adequacy of the PDO, PDO indicators, and Results Framework.** The PDO was adequate given the project rationale and design justifications. However, the PDO indicators and Results Framework could



have been better designed and documented by (a) providing clear methods for calculation of direct beneficiaries and (b) defining the development of a sector database to ensure its long-term use and maintenance.

88. **Readiness for implementation.** The change in scope discussed in paragraph 84 led to implementation delays for wastewater projects relative to the original timeline. Wastewater subprojects needed more time before implementation than originally allocated to establish or update masterplans and feasibility studies on environmental sanitation and then prepare detailed designs and bidding documents. These additional steps delayed sanitation project implementation, which in turn led to extension of the closing date and performance levels that were below targets.

89. **Sustainability of environmental sanitation.** At appraisal, the project included activities that supported the development and approval of instruments for charging customers for wastewater service provision. The circular on establishing a wastewater tariff to at least cover O&M costs was developed and issued at the national and provincial levels, which constitutes a critical step in achieving financial sustainability for provision of wastewater and drainage services. Because the implementation of new wastewater tariffs takes time, the financial agreement maintained the provision that the Government would subsidize the costs of wastewater companies to carry out the O&M activities.

90. **Risk assessment at appraisal.** Overall, the project risk at appraisal and implementation was rated High. This rating was justified because the project's success was affected by a variety of factors such as, the unfamiliarity of provinces with World Bank procedures, geographical spread of subprojects, expected delays in land acquisition, and uncertainty in implementing new or revised water and wastewater tariffs. Some risks that perhaps could have been foreseen include the reluctance of households to establish wastewater connections and technical design issues related to ground elevation, as discussed earlier in this document. There was an unforeseen risk related to the GoV limitation on use of the ODA funds, which is discussed in paragraphs 95 and 96.

B. KEY FACTORS DURING IMPLEMENTATION

91. **Performance of the implementing agencies.** At appraisal, it was clear that while most subproject management units understood water development initiatives, they lacked experience in wastewater treatment investments. During the implementation period, the PPMUs and MOC spent significant amounts of time preparing the SSPs, and ultimately, revised feasibility studies and bidding documents. In addition, the designs in some areas, such as certain areas within Bim Son, were flawed because sewer network elevations were higher than the household wastewater outlets, thus creating practical impediments to establishing new connections for certain households. Such issues should have been identified during the feasibility study stage.

92. **Challenges in increasing household wastewater connections.** Even though increasing connections is a challenge for most water supply and wastewater projects and was documented at appraisal as one of the lessons incorporated in the project design (see paragraph 36 of the PAD), the project had difficulties in meeting the target on the household wastewater connections. The PPMUs reported that connections were installed free of charge for households; however, the willingness to connect was still low. One reason for low levels of participation could be inadequate IECs and engagement with the beneficiaries to raise the levels of interest and awareness. Where connections were physically possible, a dedicated communication program could have helped increase numbers of participants. In



other cases, subprojects such as Binh Duong, Dong Ha, and Thai Hoa, appeared to have directly benefited from outside political support and that helped raise their numbers. Ultimately, most wastewater companies struggled to convince households to connect to the sewerage system.

93. **Definitions of outcome indicators during the midterm review (MTR) (January 2015) and AF.** At AF, the new subproject in Di An and a TA activities were included in the project. The PDO remained the same, but some indicators were revised (as discussed on section I.B of this report). Better links should have been established between beneficiaries of water and wastewater projects and the estimation of economic value, which relies on volumes of water consumed and wastewater treated, respectively. Furthermore, the percentage of females living in the service area seems to have been overestimated. Based on the survey conducted in July 2017 and in March 2020, the average percentage of females among all those who benefited by the project was only 48 percent and 44 percent, respectively. If the target of 51 percent female beneficiaries was to be met, specific efforts to enable female participation should have been included in the AF. Alternatively, more realistic gender-focused targets should have been established with a rationale for each subproject.

94. The project was approved in May 2011, the Financing Agreement was signed in July 2011, and the project became effective in October 2011. The MTR was carried in January 2015, almost four years after project approval. This delay was because of the limited funding disbursements faced by the project. During the MTR, when all contracts had been procured, a deficit of US\$20 million was discovered and this led to a project restructuring and AF to cover the gap. Moreover, the new Di An subproject was added. Two years before project completion, the World Bank team identified underutilized project funds because of the fiscal situation in Vietnam and the procedural complexity for the implementing agencies to include approved funds in the Midterm Investment Plan (MTIP). The World Bank team made efforts to flag this issue to the central agencies and find alternatives to use the funds before project completion. However, at project closure, US\$24.42 million was cancelled. Except for monitoring activities from the MOC, all activities under the Subcomponents 2A and 2B were completed on February 28, 2016. The reason for the closure in 2017 was related to changes in internal procedures of the GoV, namely the need for alignment of investment plans in the MTIP.

95. **Counterpart funds availability and fiscal situation.** In early 2016, the GoV restricted the use of ODA funds to reduce public debt because it had reached its borrowing ceiling. As such, only provinces that had not reached their ceilings could request funds. This limit applied to all ODA funds from all international financing institutions. As a result, subprojects with limited funds were not able to pay their contractors on time, which in turn led to a one-year delay in project completion. Nevertheless, at completion, all subprojects were completed and contractors paid.

96. The AF also included funds for an additional wastewater and drainage subproject in Di An and the total loan and credit increased from US\$200 million to US\$319 million. However, with the introduction of MTIP by the GoV and limited knowledge about the procedures for including budgets for existing projects, the PMU could not include the AF funds for the original project activities. Budget limits were aggravated by the GoV's limitations to provinces on accessing ODA funds between late 2015 and late 2017 because of its high debt ceiling. These disbursement constraints affected activities under implementation and directly limited the potential for increasing household connections, especially for wastewater.

97. **Changes in the institutional arrangements.** In 2015, the GoV issued Decree 15/2015 in which all water supply companies were to be equitized and operated like commercial companies. While this change



was positive because water supply utilities would become self-reliant in managing their services, the change altered institutional links between utilities and the MOC. Because the MOC no longer retained authority for allocating funds for water utilities, utilities were no longer compelled or required to maintain their information in the M&E database. At present, the MOC has not allocated funds to maintain the database nor monitor the performance and sector needs toward its overall goals for urban water supply.³⁶ These institutional changes did not however affect wastewater system management. The ATI/MOC has been able to collect and update information on wastewater services provision based on information provided by the subprojects.

98. The MOC, at the request of the GoV, closed the original project activities in December 2017, despite the project closing extension to December 2019. As such, the MOC's monitoring activities on the overall project activities also ended in December 2017. The impact of the GoV's 2017 closure date on monitoring is discussed in the outcome section of this report.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

99. The project followed a structured Results Framework, outlining the manner in which project activities of each component would contribute to achieving the PDO. The PDO was disaggregated succinctly into the four main PDO indicators, which covered water supply, wastewater and drainage services, and the sustainability of water supply services. The intermediate results were divided by project components in which two indicators were established to measure the achievements in Component 1 and three indicators for Component 2. The arrangements for data collation and reporting described in the PAD were elaborated in the Project Operational Manual. Each PMU was responsible for collecting and compiling data on M&E performance of each subproject and the MOC was responsible for consolidating and reporting at the project level.

100. At preparation, the project focused on access to sanitation rather than treatment of wastewater, and as such, the indicators were aligned to focus on access as opposed to volume of wastewater collected and/or treated. In addition, to ensure cost-effectiveness of design, the project required development of the SSPs that would confirm the feasibility studies before investments could be carried out, while also ensuring access to targeted number of people.

101. The intermediate indicators for the TA component could have been more specific in terms of actions. For instance, while the database was developed, regular updating should have been the ultimate goal supported by the project.

M&E Implementation

102. The project followed and implemented the M&E system as defined in the Results Framework. An M&E consultant at the PMU was responsible for assessing the achievement of indicators and the accuracy

³⁶ A national water utility association exists but is mainly composed of large city utilities. The MOC has not engaged it to maintain water and wastewater utility data.



was verifiable by the MOC and task team. For water supply subprojects, the number of connections installed was monitored and verified through indicators such as volumes of water sold, revenues, and costs. For wastewater, monitoring was also based on the number of new connections, while drainage was based on the areas that benefited from improved drainage and reduced flood risk.

103. In some instances, the PDO and intermediate indicators could have been consistently recorded. For instance, the volume of water sold was recorded in thousands while the Results Framework called for recording in millions³⁷ and the area benefiting from increased drainage coverage and flood protection measures in the PAD and AF recorded progress in hectares, but the ISR reported it in square kilometers.

104. An M&E consultant was responsible for regularly updating the Results Framework, but the water utilities and wastewater companies were not directly involved in the process, resulting in a missed opportunity for capacity building. As evidence of this weakness, when information was requested by the task team on results achieved through December 2019 for the purposes of this report, utilities provided inconsistent information. During the project implementation the M&E data was collected and reported annually.

M&E Utilization

105. The results of the M&E process have been compiled and used by the PMUs, PPMUs, and World Bank task team to monitor progress closely and make changes to the project's structure during restructuring/AF, after a thorough assessment at MTR. For instance, at AF, the number of new piped household water connections resulting from project intervention was increased based on the number of connections achieved and the potential for further achievement. In addition, at AF, additional indicators such volume of BOD removed from Di An WWTP, number of direct beneficiaries, and desegregated customer satisfaction (for water supply and for drainage and wastewater) were added for the Di An subproject.

Justification of Overall Rating of Quality of M&E

106. While M&E was used to inform project implementation, few gaps existed in the definition of outcome indicators at appraisal and the update at AF (that is, shortcomings in the review of M&E as part of restructuring at the time of the AF) and reporting inconsistencies during implementation. Therefore, the overall quality of M&E is rated Modest.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

107. At appraisal, the environmental and social safeguards policies that were triggered included Involuntary Resettlement (OP/BP 4.12), Environmental Assessment (OP/BP 4.01), and Safety of Dams (OP/BP 4.37). At AF, two additional safeguards were triggered, Physical Cultural Resources (OP/BP 4.11) and Projects on International Waterways, (OP/BP 7.50).

Environmental Safeguards

³⁷ The unit for volume of water sold defined in the Results Framework was 1,000 m³. In the Implementation Status and Results Report (ISR) sequence 17, from November 9, 2019, the volume was recorded as 34,435 instead of 34,435,000.



108. The project was classified as Environmental Category B-Partial Assessment and according to the requirements of OP/BP 4.01, the Environmental Impact Assessment was conducted before and during the project appraisal and Environmental Management Plans were prepared for each subproject and disclosed on December 6, 2010. The main identified environmental risks that would be key concerns during the operation were (a) safety risks related to unexploded materials before construction; (b) dust, noise, vibration, generation of solid wastes and wastewater, traffic disturbance, community disturbance, occupational health and safety risks for the workers, risks to community health and safety, and erosion risks during construction; and (c) odor, impacts on water quality of the WWTP's receptors, and occupational health and safety risks of the workers.

109. During project implementation, the environmental safeguards were mostly rated Moderately Satisfactory. Overall, there were no major environmental, health, or safety issues and supervision records often indicated that the contractors had implemented the key measures for addressing the negative safety risks and environmental impacts; however, site protection and/or use of personal protective equipment required improvement in some subprojects, particularly those with unidentified ordnances³⁸ (UXO), such as Di An. In addition, the PMU, with support from the World Bank team, closely monitored project implementation to ensure that UXO clearance was completed before the sites were handed over to the contractors. Therefore, UXO-related risks were fully mitigated. Furthermore, given the limited capacity of the first 14 original subproject PPMUs to monitor and supervise implementation of the environmental safeguards, an independent consultant firm was contracted by the MOC and its performance was acceptable. At AF, the Binh Duong PPMU, with World Bank support, monitored the implementation of the environmental safeguards.

110. While the project did not include finance for the construction of dams, OP/BP 4.37 on Safety of Dams was triggered because some of the water supply systems constructed under the project were expected to draw raw water from reservoirs formed by an existing dam. At MTR (January 2015), a review of dam safety was carried out by an independent consulting firm and the findings showed that all dams were found to be operational and safe. Three dams required remedial actions: (a) Duong Dong Dam in Kien Giang Province required treatment of seepage; (b) Phu Ninh dam in Quang Nam Province required gate repair; and (c) Dong Xoai Dam in Bin Phuogn Province required installation of monitoring instrumentation. All the remedial actions were completed during the project.

111. With respect to OP/BP 7.50, Projects on International Waterways, an exception to the riparian notification allowed under paragraph 7(c) of the OP/BP 7.50 was granted by World Bank management. This safeguard was triggered because treated water from the Di An WWTP is discharged to a local canal that flows into the Dong Nai River. The exception was granted because the Dong Nai River runs only in Vietnam. Vietnam is the lowest downstream riparian of the Dong Nai River and the project does not cause harm to other riparian states.

Social Safeguards

112. Social safeguards were rated Moderately Satisfactory through most of implementation. In accordance with OP/BP 4.11, a Chance Find Procedure was prepared and included in the Environmental and Social Management Plan of Binh Duong subproject to address cases where artifacts exposed during

³⁸ Unidentified Ordnances are explosive weapons (bombs, shells, grenades, land mines, naval mines, cluster munition, and other munitions) that did not explode when they were employed and still pose a risk of detonation.



the excavation of considerable amount of earthworks under the AF subproject. OP/BP 4.12 was triggered at appraisal and remained relevant through the end of the project. Public consultations were carried out, and the Resettlement Policy Framework and 15 Resettlement Action Plans (RAPs) were prepared and disclosed in December 2010. At appraisal, it was estimated that 870,583 m² of land would need to be acquired and 556 households would be affected, including 9 which would be relocated, and three household businesses were expected to be affected. At AF, an estimated 69,732 m² of land was ultimately required for the WWTP and pumping stations. This land acquisition and conversion permanently affected 57 households, three firms, and five organizations. During project implementation, efforts were made by each subproject to minimize adverse social impacts and resettlement requirements by using alternative design. This resulted in frequent changes in the number of affected people or scope for land acquisition and frequent revisions and updates in the RAPs.

113. During implementation, a total of 3,081 households were affected by the project, of which 45 households had to be relocated; 455 households lost more than 20 percent of their agricultural land; and 2,581 households were marginally affected due to partial losses in agricultural land or residential land, secondary structures, or for temporary periods during construction. Nevertheless, all compensations to households were completed and at project closure there were no grievances or outstanding issues. Part of the project delays were caused by lengthy processes for land acquisition, weak capacity of social staff of the PPMUs, land management, and differences between resettlement policies of the GoV and the World Bank. For instance, in Di An, the preparation of a cadastral map and identification of landowners took more than one year. Delays were initially problematic because the appraisal of scope of land acquisition required approvals from the Binh Duong People Council, which meets only twice a year. These timing constraints were improved once an ad hoc committee was formed and it could meet more frequently. The PPMUs, such as Di An and Dong Xoai, applied good practices in addressing resettlement-related grievances through negotiation with the affected households.

114. Compensation levels and assistance provided to affected households under the project were established at replacement costs and accounted for living standards and income-earning capacities before the project. Monitoring surveys by an independent resettlement monitoring consultant confirmed that most affected households were able to maintain or improve their pre-project living standards. However, local authorities often applied government policies where gaps were identified in compensation plans, including assistance to households that lost 30 percent of agricultural land, and compensation for structures on agricultural land from 50 percent to 80 percent of its replacement value. The PPMUs and local authorities were requested to solve such issues during implementation. By the end of the project, such issues were addressed in most subprojects, except in Thai Hoa and Ninh Binh subprojects where the status has not been affirmed officially to the World Bank.

115. The World Bank team carried out supervision and monitoring activities throughout project implementation with intensive missions and capacity building for the PPCs and PPMUs during critical periods where acceleration of appraisal process was required to expedite land acquisition. Documentation of land acquisition was, however, not adequately prepared in some subprojects and to mitigate the situation, the World Bank team provided continuous guidance and templates to the PPMUs to record land acquisition and resettlement database, which were submitted before the supervision missions.

116. **Financial Management.** The financial management function was performed by the MOC and the implementing agencies in compliance with the World Bank's policies and procedures, throughout project implementation. All interim (unaudited) financial reports were submitted to the World Bank on time and



in accordance with the Financing Agreement requirements. The interim financial reports were submitted to the World Bank on a quarterly basis, while independently audited financial reports were submitted by the MOC before the end of June every year during project implementation. The final audited report is expected by June 30, 2020. Water supply utilities, which are privately operated, submitted annual audited financial statements that were prepared in accordance with the Vietnamese Accounting Standards and all financial statements received an unmodified (clean) audit opinion.

117. **Procurement.** The project procurement activities were highly decentralized to 14 different implementing agencies at both the national and provincial levels. There were considerable procurement delays at the initial stage of the project because of protracted processes for selection of design and construction supervision consultants. Nonetheless, the PMUs subsequently accelerated procurement activities and successfully awarded all contracts for their respective subprojects. In general, project procurement activities were conducted in compliance with the World Bank's Procurement Guidelines and agreed Procurement Plan. However, contract management in some subprojects remained weak, causing significant implementation delays and quality concerns, which were eventually addressed. Binh Duong Province, despite its large procurement workload (under both the main project and AF) comprising some high-valued and complex works and consulting services contracts, was able to successfully procure and complete all contracts on time and with good quality. There was one substantiated complaint related to a violating bidder (a local company), which was handled by sanctioning the bidder in accordance with national procurement laws and regulations and to the World Bank's satisfaction.

C. BANK PERFORMANCE

Quality at Entry

118. **Relevance of the project at appraisal and World Bank contribution to project design.** The World Bank task team supported the GoV in designing the project based on the needs and request from the country. The team carefully looked at the country legislation, CPF, and country priorities. The World Bank ensured that a team of specialists was mobilized to address all relevant project aspects, including technical aspects of the subprojects that were designed, social and environmental safeguards, and M&E. The World Bank team went further in recognizing that the environmental sanitation component required the strategies to be prepared and feasibility studies to be developed before implementation. TA was provided; however, the PPMUs also needed support from the World Bank to ensure that the advice provided by consultants was adequate.

119. **Incorporation of relevant lessons in the project design.** Even though relevant lessons learned were included in the project design, as discussed in paragraph 85, the team could have included the number of household connection for sanitation as intermediate indicators, in the Results Framework, to better track and assess achievement of the project outcomes.

120. **Adequate time for project preparation.** Although the project preparation was fast-tracked to meet the needs of the population, about 12 months (from Project Concept Note approval to negotiations), changes in selection of the project area occurred and this limited the time for thorough definition of the project targets, particularly for sanitation. In addition, the SSPs were an important factor considered during the project design. Thus, by the MTR, the result indicators had to be revised, particularly for the sanitation component as the baseline data initially used was inaccurate.



Quality of Supervision

121. The World Bank team was composed of an adequate number of team members, including technical, financial, environmental and social safeguards specialists that conducted regular implementation support missions and provided timely technical guidance to the local and the central implementing agencies. Even though the project area was spread across 10 provinces, the task team visited all project sites at least once a year. Recognizing the limited capacity of most PPMUs, the World Bank team supported the client with procurement, fiduciary, and safeguards implementation through trainings and hands-on capacity building to all the PPMUs on issues such as contract management; adequate documentation of land acquisition; preparation and updating of Procurement Plans; and 'innovative' procurement advice for the MOC which helped in successfully procuring the project's largest and complex consultant's contract, among others. In addition, the TTL turnover was reduced to a minimum, in which three Bank staff led the project from preparation to completion over a total of 10 years (from 2010 to 2020). However, given the complexity of the project activities, during the ICR mission, some of the PPMUs expressed views that additional support from the World Bank team on technical matters should have been provided in the early stages of the project.

122. Overall, the World Bank team was diligent in identifying the bottlenecks and providing ongoing support to the implementing agencies, particularly when social and environmental issues came up, such as delays in land acquisition and compensation or project halting because of a number of UXO objects found during mine clearance. There were some missed opportunities, as discussed in the M&E section above, to revise and improve the definition of project beneficiaries and revised the indicator on area benefiting from increased drainage coverage and flood protection.

Justification of Overall Rating of Bank Performance

123. Given the minor shortcomings during the project preparation and early supervision, such as the need for a better definition of project targets and limited technical support during the initial years of project implementation, the overall rating of World Bank performance is deemed Satisfactory. The counterpart praised the Bank team's support and responsiveness and rated Bank performance as highly satisfactory in its project completion report (see annex 5).

D. RISK TO DEVELOPMENT OUTCOME

124. **Financial sustainability of WWTPs.** While all the WWTP projects had a wastewater tariff decision approved by the PPC before project completion, only one was actually implementing the tariffs. Although the issuance of this decision was a major milestone, there remains a risk that actual implementation may take longer because the current environmental fee (paid by water service users) would need to be revoked and new wastewater tariffs would have to be introduced to customers. The implementation of wastewater tariffs to connected customers is meant to provide financial sustainability to the entity responsible for facility O&M—earmarking the money for the O&M of the assets—which in some cases is a state-owned enterprise at the city level or subsidiary of the water supply utility. However, it is expected that subsidies will continue to be provided to all wastewater companies, even when the tariffs are in place, given that those only cover the O&M portion.

125. **Increase in number of connections for wastewater services.** There is a risk that the number of wastewater connections will not increase as expected over the project life given the slow progress made



during project implementation. This is particularly relevant for households that are currently use septic tanks or public drains and are unaffected by environmental nuisance of wastewater discharge. In most subprojects, the household connections were paid for by project funds. With the project closing, cities may not have sufficient funds to install more connections. As such, apart from the communication activities to incentivize households to pay for the connections, the provincial and central governments might need to subsidize wastewater companies to provide increased household connections along with O&M activities.

126. **Institutional arrangements for water supply utilities regulation.** The equitization of the urban water utilities should be accompanied by institutional instruments or arrangements to improve regulations regarding investment planning. For instance, it is not clear how the water utility decides how to extend the service expansion, given that the assets belong to them and they are responsible to secure funds for service expansion. As such, similar to regulation of the water tariff, at the central and provincial levels, the water utilities should be mandated to report on their performance, consult on plans for expansion, and generally be supervised by a government entity, given the nature of service.

127. **Use of the M&E database.** After completion of the sector monitoring system, the database is not being updated on a regular basis, so there is a risk that this important planning and analysis tool will become obsolete and will not be used. This is particularly important for water supply, given the lack of institutional arrangements that mandate utilities to report on their performance. In addition, with the development of wastewater systems in Vietnam, monitoring the performance on urban sanitation will become increasingly important to inform sector policies and decision-making at the national level.

V. LESSONS AND RECOMMENDATIONS

128. A number of issues have been discussed earlier related to areas of strength and weakness from the project. This section highlights the most important of these.

129. **Implementation of wastewater projects should be accompanied by TA and capacity building for inexperienced PPMUs.** At appraisal, it was recognized that the SSPs had to be prepared for implementation of the environment sanitation component. Consultancy packages were included for preparation of the SSPs, and TA and capacity building support was provided to implementing agencies, particularly those with lack of experience. In addition, given the need to prepare the SSPs, time flexibility at appraisal (longer project implementation) should be provided to allow enough time for construction. Under the project, all the PPMUs implemented the city's first wastewater treatment system and although successful steps were taken in developing the SSPs and DED, wastewater systems construction only started three years after the project effectiveness.

130. **Emphasis and priority have to be given on implementation of wastewater connections to households.** Most wastewater subprojects faced significant challenges in meeting targets related to increasing new connections. These challenges could have been better anticipated during appraisal and SSPs' development. In addition, there was a greater focus on technical engineering solutions rather than identifying implementation areas that could have led to higher levels of connections. Better alignment with IEC activities and behavior change communication could have helped avoid the reluctance among some households to connect to the sewer system or the technical difficulties for households to connect (see paragraph 86). Future projects should explicitly include IEC and behavior change communication



activities in the project design and allocate enough time and resources to ensure that beneficiaries understand the project objectives and outcomes and are willing to participate and contribute in meeting the project outcomes.

131. **Need for a robust M&E system.** As noted in the efficacy and M&E sections, the quality of information on direct beneficiaries was inadequate and created challenges for the PMUs to monitor performance and ultimately for the World Bank to assess the project outcomes. This discussion identified that M&E systems in place are inadequate. The lack of disaggregated information on who is connected can create problems in the future for wastewater companies that aim to develop wastewater tariffs based on how many areas are connected and from the household point of view. Therefore, a robust sector M&E system and regular reporting is fundamental in meeting the Vietnam 2035 Vision, supporting national and provincial authorities in decision-making, and bringing governance and transparency in the sector. In addition, the M&E system should also consider including customer surveys on a regular basis, with the aim of engaging the beneficiaries in actions necessary for improving the service provision.

132. **Appropriate regulation instruments must be in place for overall sustainability water and wastewater utility.** The equitization of water supply utilities in Vietnam needs to be accompanied by adequate regulatory instruments for utilities, such as governance and transparency, asset ownership, economic instruments for tariff regulation, and sector performance, among others. The autonomy of utilities carries extra responsibility, such as decision investments of infrastructure and transparency in management of service provision, among other factors, which may affect the service provision and ultimately the customer/beneficiaries. Similarly, while wastewater companies are not autonomous, steps should be taken to slowly introduce regulatory measures that will ensure that these companies are operated in a sustainable manner.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: To increase access to sustainable water services and environmental sanitation in selected urban area

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	0.00	450382.00	450382.00	511252.00
		22-Apr-2011	31-Dec-2019	31-Dec-2019	30-Aug-2019
Female beneficiaries	Percentage	51.00	51.00	51.00	48.30

Comments (achievements against targets):

The total number of beneficiaries had been exceeded, achieving 113.5 percent by the project closing. The figure captures the total new beneficiaries for water supply and wastewater services. The results presented reflect achievements for original water supply and environmental sanitation sub-projects up to December 2017 and achievement for Di An Wastewater sub-project by December 2019. Information on number of beneficiaries by the original project on December 2019 are not available. Data source: Project Completion Report from Ministry of Construction, August 2019.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
New piped household water connections that are resulting from the project intervention	Number	4366.00	42628.00	65872.00	80173.00
		22-Apr-2011	30-Dec-2016	30-Dec-2016	29-Dec-2017

Comments (achievements against targets):

The total number of new household connections has been exceeded, reaching 122 percent. The results presented reflect achievements for original water supply sub-projects by December 2017. Results achieved by December 2019 are not available. Data source: Project Completion Report from MOC, August 2019.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in the volume of water sold annually	Cubic Meter(m3)	0.00	21731000.00	21731000.00	27605000.00
		22-Apr-2011	22-Apr-2011	30-Dec-2016	29-Dec-2017

Comments (achievements against targets):

As per the Additional Financing Project Paper, May 2016, the indicator on "Increase in the volume of water sold annually" was defined as an intermediate results. However, during the project implementation, the indicator was also included as a PDO indicator. The team tried to remove at completion, but it was no longer possible. As such, the results achieved for this indicator are presented both in the PDO indicator as well as in the intermediate indicator.



The volume of water sold was overachieved, reaching 127 percent by the December 2017. The results presented reflect achievements for original water supply sub-projects up to December 2017. Results achieved by December 2019 are not available. Data source: Project Completion Report from Ministry Construction, August 2019.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Financial sustainability of water companies	Text	working ratio <0.9 22-Apr-2011	working ratio < 0.9 30-Dec-2016	working ratio < 0.9 30-Dec-2016	working ratio < 0.9 29-Dec-2017

Comments (achievements against targets):

All water supply sub-projects have achieved the working ratio of <0.9 except Uong Binh subproject, which stood at 0.92. Data source: Project Completion Report from Ministry of Construction, August 2019.

Objective/Outcome: Increase access to environmental sanitation services in selected urban areas

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of people in urban areas that have improved sanitation due to the project	Number	0.00 22-Apr-2011	263051.00 30-Dec-2016	312051.00 31-Dec-2019	152928.00 30-Aug-2019



Comments (achievements against targets):

The total number of beneficiaries of improved sanitation was underachieved, standing at 49 percent. This is mainly due to limited wastewater household connections implemented during the project. The results presented reflect achievements for original environmental sanitation up to December 2017 and achievement for Di An Wastewater sub-project by December 2019. Updated data on results Data source: Project Completion Report from MOC, August 2019.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in the satisfaction rate of beneficiaries	Percentage	72.00 30-Aug-2014	80.00 30-Dec-2016	80.00 31-Dec-2019	83.75 31-Mar-2020
Increase in satisfaction rate of beneficiaries of wastewater and drainage services in Di An Town	Percentage	25.21 09-Dec-2017	80.00 31-Dec-2019	80.00 31-Dec-2019	80.00 31-Dec-2019
increase in satisfaction rate of beneficiaries of water supply service	Percentage	83.60 30-Aug-2014	90.00 30-Dec-2016	90.00 31-Dec-2019	97.80 31-Mar-2020
increase in satisfaction rate of beneficiaries of drainage and wastewater service	Percentage	60.40 30-Aug-2014	70.00 30-Dec-2016	70.00 31-Dec-2019	72.00 31-Mar-2020

Comments (achievements against targets):



The overall satisfaction rate of beneficiaries was slightly overachieved. The latest customer satisfaction rate was accessed on March 2020 for all subprojects, except for Di An wastewater and drainage subproject, which was carried in December 2019. The results reflected the aggregated customer satisfaction rate for water supply and environmental sanitation service provision. Data source: Binh Duong Completion Report, March 2020 and customer satisfaction survey conducted by the PPMU with support from the World Bank task team, on March 2020.

A.2 Intermediate Results Indicators

Component: Component 1: Investments and Project Implementation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in the volume of water sold annually	Number	0.00	21731000.00	21731000.00	27605000.00
		22-Apr-2011	30-Dec-2016	30-Dec-2016	29-Dec-2017

Comments (achievements against targets):

The volume of water sold was overachieved, reaching 127 percent by the December 2017. The results presented reflect achievements by December 2017, updated information is not available. Data source: Project Completion Report from Ministry of Construction, August 2019.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Areas benefiting from	Number	0.00	12564.00	12618.00	8582.00



increased drainage coverage and flood protection measures		22-Apr-2011	30-Dec-2016	31-Dec-2019	30-Aug-2019
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Comments (achievements against targets):
 The target on areas benefiting from drainage and flood protection was underachieved, reaching 68 percent. This is because, after appraisal, the feasibility studies for drainage projects were revised but not updated during the project restructuring in May 2016. Data source: Project Completion Report from Ministry of Construction August 2019.

Component: Component 2: Technical Assistance

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Water Security Priority Investments Developed	Text	no 28-Jul-2016	no 31-Dec-2019	no 31-Dec-2019	no 31-Dec-2019

Comments (achievements against targets):
 By the project closing, the water security priority investments were not finalized. However, options for consideration have been prepared and those include i) regional infrastructure to supply the affected areas or ii) provincial infrastructure to supply each affected area. The Ministry of Construction is currently assessing the options presented and feasibility studies and detailed designs will be conducted once the decision is made. Data source: Interview with the Ministry of Construction, March 2020.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Development of a sector database	Text	none available 22-Apr-2011	The sector database has been developed and is available 30-Jul-2014	The sector database has been developed and is available 20-Jan-2016	The sector database has been developed and is available 20-Jan-2016

Comments (achievements against targets):

The sector database has been developed and is available. However, the last update was carried out on 2015. Data source: Interview with the Ministry of Construction, March 2020.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Ministerial Decision on criteria for selecting projects for PSP	Text	no available 22-Apr-2011	Completed and available 30-Jun-2014	Completed and available 30-Jun-2014	Completed and available 30-Mar-2018

Comments (achievements against targets):

Ministerial decision has been completed and available. Data source: Project Completion Report from Ministry of Construction, August 2019 and interview with the Ministry of Investment and Planning.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Development of a PSP toolkit	Text	no available 22-Apr-2011	Completed and available 30-Jun-2014	Completed and available 30-Jun-2014	Completed and available 30-Jun-2014
<p>Comments (achievements against targets): PSP toolkit has been developed and it is available. Binh Duong Province was selected for piloting the PSP toolkit. Data source: Project Completion Report from Ministry of Construction, August 2019 and interview with the Ministry of Investment and Planning.</p>					

Indicator name	Unit Measure	Baseline	Original Target	Formally Revised target	Actual Achievement at Completion
Volume of BOD mass removed by WWTP (Di An Town) constructed under the project	kg/day	0 28-Jul-2016	1,020 31-Dec-2019	1,020 31-Dec-2019	1,600 31-Dec-2019
<p>Comments (achievements against targets): The indicator on volume of BOD mass removed was added at AF and it is included in its results framework. However, it was not reflected in the ISR during implementation, although it was always monitored. At completion, the Volume of BOD mass removed by the Di An WWTP was overachieved, reaching 1,600 kg/day (159 percent).</p>					



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Increased access to sustainable water supply services in selected urban areas in the Project Provinces	
Outcome Indicators	<p>Subcomponent 1A: Water Supply</p> <ol style="list-style-type: none"> 1. Number of new piped household connections resulting from project interventions 2. Direct Project beneficiaries 3. Female beneficiaries 4. Increase in the satisfaction rate of beneficiaries of water supply services <p>Subcomponent 2B: Improving the efficiency of investment and operations</p> <ol style="list-style-type: none"> 5. Financial sustainability of water companies
Intermediate Results Indicators	<p>Subcomponent 2A: Institutional strengthening and project monitoring</p> <ol style="list-style-type: none"> 1. Increase in volume of water sold annually 2. Development of sector database <p>Subcomponent 2B: Improving the efficiency of investment and operations</p> <ol style="list-style-type: none"> 3. Ministerial Decision on criteria for selecting projects for PSP 4. Development of a PSP toolkit 5. Preparation of Mekong Delta water supply investment
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<ol style="list-style-type: none"> 1. 80,173 new connections have been installed (target was set at 65,827). 2. 358,324 people are new direct beneficiaries of water supply. 3. 48 percent of women are beneficiaries of water supply (target was set at 51 percent). 4. The customer satisfaction rate has reached 97.8 percent (the target was set at 90 percent). 5. All water supply utilities have working ratio lower than 0.9, as set by the project, except Uong Binh which stood at 0.92. 6. 27,605,000 m³ of water has been sold (the target was 21,731,000 m³). 7. The database has been established and is functioning. 8. Ministerial decision on criteria for selecting projects for PSP has been approved and the PSP toolkit developed. 9. Feasibility studies for Mekong Delta water supply investments have not been completed, design options are, however, available.



Objective/Outcome 2: Increased access to sustainable environmental sanitation in selected urban areas in the Project Provinces	
Outcome Indicators	<p>Subcomponent 1B: Environmental sanitation</p> <ol style="list-style-type: none"> 1. Number of people in urban areas that have improve sanitation due to the project 2. Direct project beneficiaries 3. Female beneficiaries 4. Increase in the satisfaction rate of beneficiaries of drainage and wastewater services 5. Increase in satisfaction rate of beneficiaries of wastewater and drainage services in Di An Town
Intermediate Results Indicators	<p>Subcomponent 1B: Environmental sanitation</p> <ol style="list-style-type: none"> 1. Areas benefiting from increased drainage coverage and flood protection measures 2. Volume of BOD mass removed by the WWTP (Di An Town) constructed under the project <p>Subcomponent 2A: Institutional strengthening and project monitoring</p> <ol style="list-style-type: none"> 2. Development of sector database
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	<ol style="list-style-type: none"> 1. About 152,928 people have benefited from improved sanitation due to the project (the target was set at 312,051 people). 2. The customer satisfaction rate has reached 72 percent (the target was set at 70 percent). 3. 8,582 have benefited from increased drainage coverage and flood protection measures (the target was 12,618 ha).



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Sudipto Sarkar	Task Team Leader
Kien Trung Tran	Procurement Specialist
Mai Thi Phuong Tran	Financial Management
Lan Thi Thu Nguyen	Environmental Specialist
Phuong Thi Thanh Tran	Social Specialist
Vinh Quang Nguyen	Team Member
Iain Menzies	Team Member
Linh Thi Thuy Tran	Program Assistant
Supervision/ICR	
Abedalrazq F. Khalil, Vinh Quang Nguyen	Task Team Leader(s)
Kien Trung Tran	Procurement Specialist(s)
Mai Thi Phuong Tran	Financial Management Specialist
Lan Thi Thu Nguyen	Environmental Specialist
Hung Duy Le	Procurement Team
Nga Thuy Thi Nguyen	Procurement Team
Berta Adelaide Da Silva Macheve	Team Member
Hang Diem Nguyen	Team Member
Linh Thi Thuy Tran	Procurement Team
Ha Thi Thu Nguyen	Procurement Team
Rumana Kemer Abubeker	Team Member
Nghi Quy Nguyen	Social Specialist
Hung Sy Pham	Procurement Team

B. STAFF TIME AND COST



Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY10	20.963	106,597.93
FY11	58.781	338,849.35
FY12	4.287	39,213.73
FY13	3.525	33,732.56
FY19	0	1,827.06
FY20	.500	15,231.56
Total	88.06	535,452.19
Supervision/ICR		
FY11	.450	1,419.12
FY12	28.035	108,411.80
FY13	30.780	103,717.96
FY14	46.604	202,660.00
FY15	47.217	190,555.42
FY16	40.345	170,342.22
FY17	33.864	135,574.85
FY18	25.001	223,900.06
FY19	30.264	258,524.39
FY20	29.279	264,682.52
Total	311.84	1,659,788.34



ANNEX 3. TOTAL PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$, millions)	Amount at AF (US\$, millions)	Actual at Project Closing (US\$, millions)	Percentage at Appraisal
Subcomponent 1A: Water Supply	109.50	106.60	108.13	98.75
Subcomponent 1B: Environmental Sanitation	122.90	233.50	237.55	193.29
Subcomponent 2A: Institutional Strengthening and Project Monitoring	2.30	2.30	2.30	100
Subcomponent 2B: Improving the Efficiency of Investments and Operations	1.50	1.50	1.50	100
Subcomponent 2C: Water Sector Priority Investment Plan	0.00	7.30	7.30	N/A
Total	236.20	351.20	356.78	151.05



ANNEX 4. EFFICIENCY ANALYSIS

Overview

1. This annex discusses the data and methods the analyses that have been conducted to assess (a) the economic and financial value of the water access and (b) the economic value of wastewater and drainage improvements. The methods for analyzing project performance largely follow the methodologies applied during the PAD analyses. The best available information on project status was used to determine the project impacts. For example, data collected during this ICR from each subproject. Where these data were not made available or contradictory to other data, the data were obtained from the MABUTIP/MOC project completion report. Final data for this ICR provided both a baseline of actual project performance and an estimate of potential growth rates in real value of the project as well as forecasts for beneficiaries. These data were implemented in a model to separately estimate project benefits. Because the results rely on a variety of information, a sensitivity analysis is conducted to assess the impact of various factors on results.

Project Cost - Estimation Method

2. Project capital and O&M costs for each component are estimated for a 2018 base year in U.S. dollar. The project's capital expenditures are obtained from the MABUTIP/MOC project completion report. Expenditures by year are estimated by pro-rating periodic World Bank disbursements to all projects. It is assumed that 80 percent of expenditures on water occur before 2016 and 80 percent of wastewater expenditures occur after 2016. Because the expenditures in Vietnamese dong, as reported by the MOC, are assumed to be influenced by Vietnamese dong inflation rates, they are converted to a common year of 2018 using historical Vietnamese dong inflation rate deflators. Then, these costs are converted into U.S. dollars (2018 terms) using an end-of-year exchange rate for 2018.

3. Annual O&M costs are not available for the subprojects and estimated by assuming they are equal to 2 percent of capital costs. In cases where operations are significantly below design capacity, a pro-rated share of these costs is applied. Economic costs for water and wastewater are estimated by reducing costs by 10 percent to account for value added taxes. Economic capital and O&M costs in U.S. dollars (2018 terms) for 20 years of operations are presented in table 4.1, for both water and wastewater and drainage.

Table 4.1. Project Costs (including Capital and 20 Years of Operations)

Project Sites	Water (US\$, thousands 2018 Base Value, Not Discounted)		Sanitation and Drainage (US\$, thousands 2018 Base Value, Not Discounted)	
	Total Capital Cost	Total O&M Costs	Total Capital Cost	Total O&M Costs
Bim Son	—	—	8,962	1,135
Da Lat	11,962	5,385	8,962	1,482
Di An	—	—	102,966	9,518
Dong Ha	—	—	12,491	1,381
Dong Xoai	11,866	5,247	9,949	1,394
My Phuoc	12,889	8,907	—	—
Ninh Binh	11,282	5,095	16,306	2,372
Phu Quoc	10,134	4,827		



	Water (US\$, thousands 2018 Base Value, Not Discounted)		Sanitation and Drainage (US\$, thousands 2018 Base Value, Not Discounted)	
Tam Ky	12,853	6,131	16,861	1,963
Thai Hoa	—	—	11,440	994
Uong Bi	8,204	3,952	—	—
Total	79,190	39,543	187,939	20,238

Water Project Value - Estimation Method

4. The value of the project's improvement in water access relates to the numbers of beneficiaries (water users) but is directly computed from the incremental change in the volumes of water sold before and after the project. Using the volumes sold rather than numbers of beneficiaries avoids complications and additional assumptions in estimating the numbers of beneficiaries and is a reasonable perspective on the total project impact.

5. Volumes of water sold and consumed are assumed to grow over time and eventually reach the capacity of the project-constructed system by 2025. Annual rates of growth are determined for each subproject independently based on the demand in 2019 and its total capacity. It is conceivable though that the growth rate could occur faster considering that the towns continue to grow and new property owners (households and businesses) will seek access to available water supplies. A sensitivity analysis explores how the project's net benefits differ under growth rates that last 10 and 15 years until capacity is reached.

6. Improved water access includes both improved supply for those already with access to public water and those with no access at all before the project. In each subproject, various types of improvements occurred including expanded raw water access pipes, water treatment facilities, and water distribution networks. Many households that benefited from the project, according to the customer survey, previously used well water for part or all of their needs. As a result, while the project cannot track the actual improvement in water quality, this was an important attribute of the new supply to beneficiaries, according to the customer survey at the end of the project. Certainly, for households located in areas dominated by septic tanks, the risk of contaminated water and associated health risks are high. Accordingly, the value of public water consumption is likely to be associated with the trade-offs in costs between the two sources and the value of improved water quality. The value per unit of water consumed is assumed to be represented by water tariffs, even though it is an imperfect measure. Estimated values of water per unit for individual households would be ideal because that would capture the net out-of-pocket costs for alternative supply options and the appreciation of quality improvements. Still, it is important to recognize that tariffs are likely to underestimate the willingness to pay for public water.

7. Data on tariffs for multiple years of operations were provided by the PPMUs during this ICR analysis for all but one of the subprojects (Phu Quoc). These tariffs have been converted to a U.S. dollar 2018 base value and used to estimate the value of each project. A tariff for Phu Quoc was assumed to equal the average of other facilities. In addition, it is apparent from the data provided, that real tariff rates are growing over time, along with water volumes consumed. The real growth rate, estimated to be 2.2 percent (see table 4.2), is assumed to represent a real growth in the value of water. In addition, this real growth rate is also applied to the value of wastewater and drainage improvements, as discussed in the following paragraphs. Table 4.2 presents parameters used in estimating the value of water.



Table 4.2. Key Parameters - Water Supply

Key Parameters	Value	Source
Persons per household	4.50	Conversion factor computed from the PAD analysis
Water consumption rate (m ³ per day)	0.13	Government's design standard TCVN33:2006
Annual consumption (m ³ per year)	47.45	Computed Government's design standard TCVN33:2006
Average tariff reported (US\$ 2018 base value per m ³)	0.45	Computed from data reported by subprojects; used for subprojects where data were not supplied
Annual real growth in tariffs (%)	2.22	Computed from subproject site data

8. The number of beneficiary-equivalents can be computed by assuming that a person uses 130 liters per day (see table 4.3), according to the GoV design guidelines. These beneficiary-equivalents are not the same as the beneficiaries accounted for by the PDO indicators, because the PDO tracks beneficiaries related to existing and new connections. In addition, for projects that provided water to businesses, the rate of water use per day would differ. In any case, the value of water projects is based on volumes sold and the value per unit, not the number of beneficiary-equivalents. Both volumes and annual beneficiary-equivalents are shown for 2017, a year that is broadly established to represent a full year in operations for all projects (table 4.3).

Table 4.3. Water Project Impacts

Project Sites	Water (Year = 2017)	
	Estimated Additional Volume of Water Sold* (1,000 m ³)	Estimated Beneficiary Equivalents (number)
Da Lat	2,454	51,710
Dong Xoai	1,750	36,881
My Phuoc	6,502	137,028
Ninh Binh	3,727	78,546
Phu Quoc	4,219	88,915
Tam Ky	3,076	64,826
Uong Bi	4,917	103,625
Total	26,645	561,531

Note: * Estimated from the reported number of beneficiaries.

Sanitation Project Value Estimation Method

9. Monetizable economic benefits are computed and compared against the costs for each wastewater project to assess total net value. Following the PAD, the overall value of avoided welfare loss from the current sanitation conditions is estimated using data from a World Bank/World Sanitation Program report.³⁹ The report found that around 1.3 percent of gross domestic product (GDP) could be lost to water pollution. Applying this aggregated loss at a national level to local conditions amounts to US\$40 on a per capita basis (using purchasing power parity GDP of US\$278 billion and a population of 89.57 million in U.S. dollar 2010 terms). That total estimated loss consisted of health costs (34 percent), water resource degradation (37 percent), environmental degradation (15 percent), loss of tourism revenues (9 percent), and other welfare losses. For this cost-benefit calculation, only the health costs and water resource degradation costs are considered to determine a per capita loss of US\$28, or US\$44 per capita

³⁹ World Bank. 2008. *Economic Impacts of Sanitation in Vietnam*. Water and Sanitation Program Research Report.



in U.S. dollar 2018 terms. This US\$44 (2018 terms) in avoided per capita costs are multiplied with the current population of the town to determine a total annual project value. This annual benefit would be increased at a rate of 2 percent per year (in real terms), taking into account the real growth in income and population. In addition, the analysis accounts for a 15-year period, including construction, or about 9 years of benefits (see benefits in table 4.4). The potential reductions in flood costs and potential property value appreciation are not included in the PAD analysis but are discussed in the sensitivity analysis in the subsequent paragraphs.

Table 4.4. Total Benefits by Component

Project Sites	Water (20 Years of Operations) (US\$, thousands 2018 Base Value, Not Discounted)		Sanitation (9 Years of Operations) (US\$, thousands 2018 Base Value, Not Discounted)	
	Total Benefits	Total Net Benefits	Total Benefits	Total Net Benefits
Bim Son			26,226	16,129
Da Lat	154,976	138,008	49,672	39,227
Di An			171,409	58,925
Dong Ha			38,416	24,544
Dong Xoai	91,097	74,320	47,897	36,554
My Phuoc	162,881	140,837		
Ninh Binh	54,565	37,839	61,787	43,110
Phu Quoc	64,293	49,149		
Tam Ky	40,795	21,751	47,215	28,390
Thai Hoa			49,369	36,936
Uong Bi	83,004	70,896		
Total	651,610	532,800	491,992	283,815

Source: Results reported under the project

10. Even though some evidence is available for monetizing benefits, other project impacts that cannot be analyzed should not be ignored. For example, these projects are likely to improve amenity values of clean and flowing rivers as well as green and water spaces in neighborhoods. In addition, improved river water quality could entail a reduction of offensive odors and floatable debris.

Benefit-Cost Analysis Results

11. The value of the overall project is presented in table 4.5 in terms of internal rates of return. As indicated earlier, the water projects performed quite well relative to their cost. The highest rates of return were achieved in My Phuoc and Uong Bi, while the lower returns occurred in Dong Xoai and Tam Ky. The financial analysis of water supply projects presented in table 4.5 also indicates that the project generates a high rate of return on capital invested. Among sanitation projects, all projects generated substantial net benefits and high EIRRs.

Table 4.5. Total Net Benefits

Project Sites	FIRR (%)	EIRR (%)	
	Water	Water	Sanitation
Bim Son			19.1
Da Lat	20.3	21.8	34.6
Di An	—	—	18.8



Project Sites	FIRR (%)	EIRR (%)	EIRR (%)
	Water	Water	Sanitation
Dong Ha	—	—	20.4
Dong Xoai	13.2	14.4	31.0
My Phuoc	24.2	26.3	—
Ninh Binh	10.4	11.8	24.9
Phu Quoc	14.1	15.8	
Tam Ky	5.0	6.2	18.2
Thai Hoa	—	—	28.6
Uong Bi	21.1	23.1	—
Total	16.2	17.8	22.8

Sensitivity Analysis - Alternative Estimation of Sanitation Project Benefits

12. A drawback of the PAD method for estimating wastewater benefits is that its public good perspective is not fully linked to direct project impacts. An alternative and more conservative approach is taken here to estimate the benefits of wastewater treatment based on the volumes of wastewater treated. The volumes of wastewater treated because of the project are thought to be readily measurable and thus provide a robust measure of impact because before the project no treatment existed. The treated volume is then used to estimate an equivalent number of households that could be considered as beneficiaries of the improvements.

13. Beneficiary-equivalents are determined by dividing the total volume treated by the daily household waste generated per day (see table 4.6), after assuming that 80 percent of water consumed becomes wastewater. The estimated number of beneficiaries is necessary because the value of improved sanitation is available from the World Bank/World Sanitation Program study from 2012. In addition, the estimated number of beneficiary households for drainage improvements is computed by multiplying the hectares of coverage by the density of households in the city. Data on volumes treated and hectares of drainage were provided to this ICR team by the PMUs for this analysis (see table 4.4). To check internal consistency in reported values, these volume data were compared to their separately reported numbers of beneficiaries by computing estimated beneficiary-equivalents. Similar to water supply projects, it is assumed that wastewater volumes will grow over time to achieve the design capacity by 2025. The growth in WWTP users would occur from increases in new developments that are required to connect and local efforts that would maintain a commitment to project performance.

Table 4.6. Estimated Project Beneficiaries from Sanitation and Drainage Improvements

Project Sites	Sanitation (Year = 2019)		Drainage (Year = 2019)	
	Estimated Volume of Wastewater Processed (1 000 m ³)	Estimated Beneficiary-equivalents (number)	Area Protected (Hectares)	Estimated Beneficiary-households Equivalents (number)
Bim Son	1,300	34,247	1,232	2,315
Da Lat	1,240	32,653	0	0
Di An	1,080	28,451	54	602
Dong Ha	1,387	36,538	1,365	3,422
Dong Xoai	826	21,758	1,660	1,793
My Phuoc	—	—	—	—



Project Sites	Sanitation (Year = 2019)		Drainage (Year = 2019)	
	Estimated Volume of Wastewater Processed (1 000 m ³)	Estimated Beneficiary-equivalents (number)	Area Protected (Hectares)	Estimated Beneficiary-households Equivalents (number)
Ninh Binh	1,188	31,300	1,826	9,548
Phu Quoc				
Tam Ky	1,168	30,769	2,559	4,925
Thai Hoa	402	10,577	801	770
Uong Bi	—	—	—	—
Total	8,590	226,293	9,497	23,375

Source: Estimation based on the project results

14. The value of improved wastewater is derived from results of an analysis by the World Bank/World Sanitation Program (2012)⁴⁰ on the value of wastewater improvements across Vietnam and elsewhere in Southeast Asia. The per capita benefit (see table 4.7), in U.S. dollar (2018 terms), is estimated by the difference in value to urban residents of an upgrade from septic tanks to a wastewater treatment facility. This value is approximately US\$56.64 per capita and is on the low end of a range of potential values (the derivation of this value and data are discussed in the next paragraph and in **Error! Reference source not found.**). Consistent with the value of water, a real growth rate equal to 2.2 percent (see table 4.2) is assumed to also reflect the increase in real benefits in improved water quality over time. The development of this alternative wastewater service value of US\$56.64 per beneficiary is discussed in more detail in table 4.8.

Table 4.7. Key Parameters - Wastewater Service

Key Parameters	Value	Source
Wastewater discharge (relative to water)	80%	Government's design standard TCVN33:2006
Annual wastewater (m ³ /year)	37.96	Computed from Government's design standard TCVN33:2006
Proportion of households saving water treatment costs from improved sanitation	38.60%	World Sanitation Program/ISI; Computed from proportion of households with currently risky water sources (households Survey)
Per beneficiary value of wastewater improvement (in US\$ 2018 terms)	56.64	Calculated from data in World Sanitation Program/ISI

Table 4.8. Factors Contributing to Value of Wastewater Service

Health Benefits			
Category	Urban (Annual VND, thousands per household, 2008 year)		
	Shift from OD to Basic (Septic)	Shift from OD to Sewerage	Difference in Value of Shift
Health care	159	208	49
Productivity	54	70	16
Mortality	2,235	2,928	693

⁴⁰ World Bank/World Sanitation Program. 2012. Economic Assessment of Sanitation Interventions in Vietnam.



Health Benefits			
Project impact on benefits of shift to sewerage			758
Water benefits			
Category	Annual VND, thousands per households (2008 year)	Percentage cost savings in Water Treatment	Urban (Annual VND thousands per households, 2008 year)
Savings from water treatment (table 30)	2,658	39%	1,026
Waste system maintenance cost savings (table 47)			766
Project impact of treatment/maintenance benefits			1,792
Grand total with adjustments			
Annual VND, thousands per household, 2008 year			2,550
Annual VND thousands per household, 2018 year			5,908
Annual US\$ per household, 2018 year			254.87
Annual US\$ per capita, 2018 year)			56.64

Note: OD represents Open Defecation, that is, households with no toilet.

15. Regarding the discussion in table 4.8, the annual US\$ per capita differs from the PAD method value because it is developed from individual elements of value to households instead of a more top-down approach that scales an aggregated GDP-level impact down to local levels. In addition, this alternative value applies only to estimated numbers of beneficiaries. The value accounts for users' improved health, reduced mortality risk, improved productivity, and reduced costs for water treatment at home. Other values associated with facility access time, which would dramatically increase the value of sanitation, are not included in this ICR value because of the uncertainty of its relevance for project beneficiaries. The table references for data from the World Bank/World Sanitation Program (2012) report are included in each line of table 4.8, **Error! Reference source not found.** where relevant. At the bottom of the table, adjustments are made to determine the value per capita in U.S. dollar (2018 terms) from Vietnamese dong per household.

Flood Protection Value Estimation Method

16. Also, as part of the sensitivity analysis, because the total cost for Subcomponent 1B involved drainage system improvements, efforts are undertaken to estimate the benefits. These benefits were recognized but not estimated in the PAD. The AF economic analysis did consider flood reduction risk benefits. Following the AF analysis data and methods, a notional value of improvements in drainage is estimated for this sensitivity analysis (see table 4.9)**Error! Reference source not found.** The economic valuation parameters of flood damage that are used in Di An were obtained originally from a study by IIED.⁴¹ Because the relevance of these damage costs for all other project sites is unclear, it is assumed that 25 percent of the newly protected project areas would benefit.

17. Total benefits are derived from the reported hectares of improved drainage from the project (see table 4.6). Then, the number of household beneficiaries is estimated by combining the size of protected areas with city-specific population density estimates and an assumed number of persons per household.

⁴¹ This report was not available at the time of this analysis. So, the discussion in the AF report provided background on the data.



Forecasts of the numbers of protected households are assumed to grow over time at 1 percent per year based on a reasonable assessment of potentially increasing density and value of land.

18. According to the AF analysis for Di An, another benefit of the flood protection intervention is the appreciation of land value. The AF states in paragraph 13 of the annex, that “A preliminary assessment showed that the average price of land in the project area is approximately US\$255 per m². After project implementation, land prices within 0 m to 20 m distance from the roadside will increase to US\$414.2 per m² and land price for areas within 21 m to 100 m distance from the roadside will increase to US\$318.6 per m². It was reported that the extent of land within 0 m to 20 m distance from the roadside in the project area is 96,000 m², while area within 21 m to 100 m from the roadside was estimated to be 384,000 m².”

19. Using these values, the total increase in property value can be computed as the difference in property values for each distance band from the protected area. The total value equals US\$39.6 million. Because this value equals the future sum of a stream of benefits, the annualized value is more appropriate for use in the benefit-cost analysis. This value, assuming a 25-year period and 5 percent borrowing rate (which is the same interest rate as in the AF), equals US\$2.8 million, or US\$3.06 million in U.S. dollar (2018 terms). This large increase in value is equivalent to a US\$6.40 per m² annual increase over the entire 100 m distance from the roadside where impacts of the project are expected.

Table 4.9. Key Parameters - Drainage

Key Parameters	Value	Source
Annual direct flood costs (per household)	US\$29.7	AF values, adjusted to US\$ (2018 terms)
Annual indirect flood costs (per household)	US\$68.4	AF values, adjusted to US\$ (2018 terms)
Annual total flood costs (per household)	US\$98.2	AF values, adjusted to US\$ (2018 terms)
Annual property value increase in Di An (US\$, millions)	US\$3.06	AF analysis, recomputed for Di An, adjusted to US\$ (2018 terms)
Density growth in flood-prone area	1%	https://www.macrotrends.net

Sensitivity Analysis Results

20. A series of sensitivity analyses were conducted to compare the PAD-based method of sanitation benefits and the alternative discussed earlier. The first comparison (see **Error! Reference source not found.**) is between the PAD method and the alternative method. The results for all projects combined indicate that the alternative method is more conservative in that the EIRR is lower, even after including monetizable benefits for drainage. The additional results involve changing one parameter at a time in the alternative analysis. This result indicates that over a longer period of time, net benefits continue to grow. Considering that the sanitation and drainage projects do not have sophisticated machinery, it is reasonable to expect that a 25 year project horizon is justified. Other factors explored below include a slower rate of reaching full capacity, such as 15 years instead of 5. Total benefits also decline if the value per project impact does not grow in real terms over time. Alternatively, if the values for sanitation are say 25 percent higher per beneficiary, total benefits and the EIRR would increase. Excluding the land value appreciation from benefits in Di An lowers its EIRR but not appreciably. Benefits of drainage and the associated reduction in flood risk only add a small amount to the overall value of Subcomponent 1B except in Di An, which would generate increases in property value. It should be noted that only in Di An has the flood risk reduction value been estimated. All other sites could certainly experience higher benefits, but the impacts were not estimated there.



Table 4.10. Sensitivity Analysis

Years of Benefits	Analysis Characteristics	EIRR	EIRR
		Sanitation (%)	Sanitation and Drainage (%)
9	PAD-based Method	22.8	
20	Alternative Method - Baseline parameters (discussed earlier)	17.1	18.9
25		17.8	19.4
	Sensitivity Analysis of Alternative Method		
20	15 years until full capacity (baseline = 5)	13.2	15.2
25		14.4	16.1
20	No land value appreciation in Di An (baseline = US\$ 3 million)	n.c.	17.5
25		n.c.	18.1
20	0% real growth in value (baseline = 2.2%)	14.7	16.5
25		15.4	17.1
20	25% increase in value of wastewater	20.5	22.1
25		21.0	22.5

Note: n.c. = no change from baseline.

Alternative Cost - Effectiveness Method and Results

21. The PAD-based method assesses cost-effectiveness by dividing capital costs by the town population. This metric is an important reference point for capital planning in Vietnam in that projects should not exceed US\$200 per capita. An alternative method determines cost-effectiveness of water and wastewater projects from the annualized cost per units of services provided, which are the volumes of water sold and volumes of wastewater treated, depending on the project. In other words, the cost-effectiveness of these projects is determined by dividing their annualized costs by their annualized volumes of water consumed or wastewater treated.

22. Annualizing costs and quantities uses the same principals of discounting involved in cost-benefit analysis. The annualized cost in each project type is determined by discounting all future capital and O&M costs to the present and then determining an equivalent annual payment stream using the same 6 percent discount rate. The annualized consumption of water is computed in the same way as costs, that is, by annualizing the present value of quantities with the same discount rate. This approach maintains consistency with the time-based measure of costs and reflects the basic notion that water consumed now is preferred to waiting for it. Annualizing costs and quantities in this way is also consistent with cost-benefit principles.⁴² For reference purposes, the cost-effectiveness of water supply is also computed as a percentage of the water tariff. Highly cost-effective projects would have a low cost per quantity provided and a low percentage of the tariff.

23. Annualizing future volumes of wastewater treated begins with first estimating the volumes generated from the predicted number of beneficiary-equivalents by using a standard volume generated per capita. Then, the annualized treated volumes are computed similar to water and costs. The cost-effectiveness of wastewater is also compared with the water tariff because tariffs are not widely implemented for wastewater. Using the water tariff as a reference facilitates comparisons of cost-

⁴² This approach is also consistent with a benefits analysis, in which future values are discounted. The only difference with this cost-effectiveness metric is that the value per unit of water volumes is not combined with water volumes.



effectiveness between project types. Because the costs for wastewater include drainage improvements, some projects (for example, Di An and Dong Xoai) with high drainage-related costs will likely have worse cost-effectiveness measures.

24. Results of the cost-effectiveness assessment are presented in **Error! Reference source not found..** The results for water indicate that all but Tam Ky are cost-effective relative to the water cost. For example, the Da Lat project delivered water for an average cost of US\$0.18 per m³, which was just 35 percent of the reported tariff cost of US\$0.54 per m³. By contrast, Tam Ky has a cost-effectiveness of US\$0.39 per m³, and this is more than the entire reported tariff. This finding suggests that the new project cost will create upward pressure on the existing tariff. These results should be considered more indicative than accurate.

25. Wastewater cost-effectiveness results in **Error! Reference source not found.** indicate that overall the cost per volume of service provided is higher than water. This result may not be surprising because most projects included drainage and flood control efforts that do not increase wastewater treatment volumes. Also, some sanitation and drainage projects have high costs because they represent altogether new services whereas water projects build onto the existing infrastructure and systems. It can be readily seen than relative to the water tariffs, the cost of delivering sanitation services are much higher. In all cases except Thai Hoa, which applies an average tariff rate, the cost-effectiveness of sanitation is above the tariff costs. In Di An, Dong Xoai, and Ninh Binh, the cost-effectiveness of sanitation is more than three times the water cost.

Table 4.11. Cost-effectiveness of Water, Wastewater Projects

Project Sites	Water		Sanitation	
	Annualized Cost-effectiveness (US\$ per m ³)	Cost-effectiveness as a % of Water Tariff in 2018 (%)	Annualized Cost-effectiveness (US\$ per m ³)	Cost-Effectiveness as a % of Water Tariff in 2018 (%)
Bim Son	—	—	0.59	131
Da Lat	0.18	35	0.67	128
Di An	—	—	2.66	594
Dong Ha	—	—	0.47	106
Dong Xoai	0.24	54	1.43	324
My Phuoc	0.15	32	—	—
Ninh Binh	0.31	71	1.62	369
Phu Quoc	0.27	57	—	—
Tam Ky	0.39	107	0.93	255
Thai Hoa	—	—	0.35	78
Uong Bi	0.16	36	—	—
Total	0.22	49	1.11	247



ANNEX 5. BORROWER, CO-FINANCIER, AND OTHER PARTNER/STAKEHOLDER COMMENTS

A. Project Background

1. The GoV received an IDA credit in the amount of SDR 126.14 million (US\$200 million equivalent) toward the UWSWP. The Financing Agreement (4948-VN) signed on July 13, 2011, between the GoV and the World Bank became effective on October 7, 2011, with the original plan to be completed by December 2016. The closing date was later approved and extended to December 31, 2019.

2. In August 2015, the GoV requested an AF for the UWSWP. The World Bank Board approved the AF that includes an IDA credit in the amount of SDR 35.3 million (US\$50.0 million equivalent) and an IBRD loan in the amount of US\$69.0 million for the UWSWP (P119077) (Cr-4948-VN). The proposed AF financed costs associated with (a) a project cost overrun in the amount of US\$20 million because of the appreciation of the U.S. dollar against the special drawing right (SDR); (b) a scaling-up of activities under the environment sanitation component by adding a US\$92 million wastewater and drainage subproject for Binh Duong, a province under the current UWSWP; and (c) an expansion of the US\$7 million TA component to the MOC for the preparation of the Mekong Delta water supply investment to be financed by the World Bank. While the closing date was extended to December 31, 2019, the activities linked to the original 14 subprojects were brought to closure on December 29, 2017.

B. Project Development Objectives

3. The objectives of the project were 'to increase access to sustainable water services and environmental sanitation in selected urban areas in project provinces. The success in meeting the objective would be measured through expansion of sanitation coverage, expansion of water coverage and use, and improved financial sustainability of the service providers. The environmental sanitation activities under the project included improved drainage services'. Key project components included capital expenditures and TA.

C. Assessment of Project Outcomes

4. The results related to PDOs at the subproject/component level are detailed in the following paragraphs.

Subcomponent 1A (Water Supply)

- Number of new piped household water connections resulting from project interventions: all seven water supply subprojects achieved the
- Increase in the volume of water sold annually: Five out of seven subprojects achieved targets. Ninh Binh water subproject completed 75 percent and Da Lat water subproject completed 37 percent of the targets, respectively.
- Financial sustainability of water companies: all but Uong Binh water subproject are lower than 0.9.



Subcomponent 1B (Environmental Sanitation)

- Number of people in urban areas that have improved sanitation because of the project: all subprojects have not been achieved.
- Areas benefiting from increased drainage coverage and flood protection measures: two out of seven subprojects are achieved, including Ninh Binh wastewater and Dong Xoai wastewater ; five out of seven other subprojects are not achieved.

Component 2: Technical Assistance

- The results indicator for the Subcomponents 2A and 2B executed by the MOC and MPI have been completed and meet the end targets as stipulated and are rated Satisfactory.
- Subcomponent 2C under the AF was completed on December 31, 2019.

Impact on Health and Sanitation

5. The general impact of the whole project was positive and provided an important step to improving water supply and sanitation facilities for project cities. The construction of water supply infrastructure secured water supplies through well-designed water supply systems. The project helped people in the project areas improve their living conditions by having safe water resources. Also, public communication for changing sanitary activities, improving public health, and increasing capacities of community and local organizations aimed to maximize profits and secure stability of the project. In some subproject project completion reports, the statistics on water-related disease infection at the project district towns in recent years were provided.

D. Bank Performance

Identification and Preparation

6. The World Bank performance is rated Highly Satisfactory. The World Bank coordinated effectively with the central and local authorities and subprojects to discuss the contents of the project including preparation, appraisal, and negotiation of the signing contract and implementation agreement.

Supervision

7. Performance is rated Highly Satisfactory. In fact, with regard to providing guidance to the PMU and consultants, the word 'excellent' would best describe performance. The supervision team made every possible effort to assist the project in all possible ways. Foreign and Vietnamese team members were very accessible for all parties and they sincerely tried to keep the project moving forwards at all times. Experiences in other projects were forwarded to others and many joint evaluation meetings arranged by the supervision team made it possible for the PMUs to learn from each other. It is difficult to underestimate the effect of the supervision teams on the project and on the PPC that had to oversee the project at the local level.



E. Borrowers Performance

Performance of MOC

8. To support the participating provinces, the MOC, in collaboration with the World Bank, regularly conducted provincial visits to review project progress, discussed measures to promptly resolve difficulties, and wrote to urge the participating PPC to support and facilitate subproject progress. Examples of activities included the following:

- **Act as focal point among the Government, World Bank, and the participating PPCs.** The MOC played a critical role in providing implementation assistance and reporting to the World Bank on progress made and taking timely remedial actions on any proposed revision of objectives, scope of work, and durations of components and/or project
- The MOC played an active role in submitting requests to the World Bank/GoV for providing AF support against depreciation of the U.S. dollar and extending the closing date of the original credit (Cr.4948-VN) to December 29, 2017, to complete all the activities and achieve its intended development objectives.
- Coordinate with the task team to conduct regular meetings (audio conferences), during the critical period of the project with the PMUs that were considered to be at a risk of delay. These meetings were aimed at speeding up the progress and conducting site visits, as needed, to review the progress and take timely remedial actions.
- Recruit independent consultants and organize conferences and technology consultations to speed up the preparation of updated feasibility study reports, provide guidance to provinces on the selection of treatment technology appropriate to the condition of each province and satisfactory to the requirements and regulations of Vietnam and donor partners.
- Coordinate with the task team to organize training courses and exchange experiences on procurement and disbursement and contract management for the PMUs.
- Coordinate with the World Bank to meet directly with the PPC or send the letter requesting for support and allocate adequate and timely counterpart funds for the project.
- Facilitate and assist in making materials and data and any facility, as may be required, to satisfactorily complete the agreed actions.

9. Performance of MOC is rated Satisfactory.

Performance of Provincial Authorities

10. The implementation performance is rated Moderately Satisfactory because of the delays in approvals of design changes, variations, and especially ODA plans' allocation. Moreover, counterpart funds still caused significant implementation delays in the project with regard to disbursement and physical works progress.



Performance of PPMUs

11. Overall, project implementation activities by the PPMUs are rated Moderately Satisfactory. The institutional arrangements under the project reflected the decentralized environment of the sector where the provinces were responsible for implementation of investment. Not all provinces were familiar with the World Bank procedures related to financial management, procurement, and social and environmental safeguards. The geographic spread of the subprojects in 10 provinces makes it difficult for close supervision of the projects by the MOC, while the capacity of the PMUs at the provincial level was limited by staff capability. The PPMU staff were not appointed in sufficient number, with combined positions, limited competence, particularly in terms of foreign language capability especially wastewater subprojects where the People's Committee of the City/Towns was assigned as the employer. Exceptions included Kien Giang and Binh Duong, which had adequate experience in managing ODA projects. Other PMUs at the start seemed to be weak in technical, procurement and contract management, and monitoring and reporting. However, these functions were strengthened and improved gradually during implementation at the subprojects in the last years but still left an adverse impact on the project progress, especially the wastewater subprojects.

F. Lessons learned

Project Preparation

- The feasibility studies should be well prepared and carefully appraised at the preparation stage to avoid the updated feasibility studies and design change/variations during implementation.
- The proposed investments should be included in the MTIP, as stipulated by the existing Law on Public Investment,

Project Implementation

- Improve the PPMUs' capacity in financial management, procurement, contract management, and supervision
- Internal audit function is included but needs further improvements at the implementation agencies
- Strong commitments from the local government authorities in providing counterpart funds, ODA plan allocation on time
- Improve cooperation between the implementation agencies with the local authorities such as Department of Construction, Department of Finance, and Provincial Treasury in approval procedures, disbursement, and getting permits related to the project activities
- Qualified contractors/consultants should be selected to carry out the construction activities to ensure the quality of the works and progress, as required



- Strengthen the IEC activities in water, drainage, and environmental sanitation before and after project completion. The IEC activities in drainage and wastewater treatment in the urban areas do not seem to have a close connection between the local authorities and public utilities, while these two organizations have to work closely together to achieve the highest effectiveness of IEC activities.

12. The public utilities need to continue implementing the IEC activities according to the comprehensive IEC plan developed by the project so that the local residents know the significance of wastewater treatment and payment for drainage service fee to operate and maintain the system in the future, especially after the PPC's decision on collecting drainage service fee and regulations related to drainage connection.



ANNEX 6. SUPPORTING DOCUMENTS

1. Project Appraisal Document P119077 (Report No. 59385-VN) and Legal Agreement.
2. Aide Memoires of the World Bank Missions and Management Letters (2011–2019)
3. Implementation Status and Results Reports (17 ISRs during 2011–2019).
4. Additional Financing Paper - 2016 P156678 (Report No. PAD1724).
5. Restructuring Paper - 2016 (Report No. RES26519).
6. Restructuring Paper - 2019 (Report No. RES38572).
7. Vietnam Country Partnership Framework FY18–FY22 (Report No. 111771-VN).
8. Vietnam 2035 Toward Prosperity, Creativity, Equity, and Democracy - 2016.
9. Vietnam: Toward A Safe, Clean, And Resilient Water System - 2019.
10. “Vietnam Initial Assessment – Energy Efficiency and Non-Revenue Water”- 2018.
11. “Reducing Non-Revenue Water and Improving Energy Efficiency Policy Note”- 2019.
12. “Development Of Policy Guidelines And Conditions For Water Sector Investment” - MOC and Vces Consultancy and Investment Company Limited, 2016.
13. Review of the Feasibility studies, Summary Report and Annexes - CDM International, Inc, 2011.
14. Project Completion Report - Ministry of Construction, Government of Vietnam, August 2019.