



Completion Report

Project Number: 28315
Loan Number: 1880
October 2011

Viet Nam: Third Provincial Towns Water Supply and Sanitation Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Viet Nam Dong (D)

		At Appraisal	At Project Completion
		15 November 2001	20 July 2011
D1.00	=	\$0.000066	\$ 0.000048
\$1.00	=	D15,078.00	D20,797.00

ABBREVIATIONS

ADB	–	Asian Development Bank
CESI	–	community environmental sanitation improvement
EIRR	–	economic internal rate of return
EOCC	–	economic opportunity cost of capital
FIRR	–	financial internal rate of return
km	–	kilometer
M&E	–	monitoring and evaluation
m ³	–	cubic meter
NPV	–	net present value
NRW	–	nonrevenue water
O&M	–	operation and maintenance
PCU	–	project coordination unit
PHAP	–	public health awareness program
PIA	–	project implementation assistance
POA	–	project orientation assistance
PPC	–	provincial people's committee
PPMU	–	provincial project management unit
PSC	–	provincial steering committee
PVWU	–	Provincial Viet Nam Women's Union
SDR	–	special drawing right
SMART	–	specific, measurable, acceptable, relevant and time-bound
WACC	–	weighted average cost of capital
WSC	–	water supply companies

NOTE

In this report, "\$" refers to US dollars, unless otherwise stated.

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BASIC DATA

A. Loan Identification

1.	Country	Viet Nam
2.	Loan number	1880
3.	Project title	Third Provincial Towns Water Supply and Sanitation Project
4.	Borrower	The Socialist Republic of Viet Nam
5.	Executing agencies	Tay Ninh Provincial People's Committee Binh Duong Provincial People's Committee Kien Giang Provincial People's Committee Ninh Thuan Provincial People's Committee Phu Yen Provincial People's Committee
6.	Amount of loan	SDR46,945,000
7.	Project completion report number	1269

B. Loan Data

1.	Appraisal	
	– Date started	18 June 2001
	– Date completed	4 July 2001
2.	Loan negotiations	
	– Date started	12 November 2001
	– Date completed	13 November 2001
3.	Date of Board approval	13 December 2001
4.	Date of loan agreement	2 April 2002
5.	Date of loan effectiveness	
	– In loan agreement	1 July 2002
	– Actual	17 September 2002
	– Number of extensions	0
6.	Closing date	
	– In loan agreement	30 June 2008
	– Actual	20 July 2011
	– Number of extensions	1 (until 30 June 2010)
7.	Terms of loan	
	– Interest rate	1% per year during grace period and 1.5% thereafter
	– Maturity (number of years)	32
	– Grace period (number of years)	8
8.	Terms of relending (if any)	
	– Interest rate	6% per year
	– Maturity (number of years)	22
	– Grace period (number of years)	6
	– Second-step borrowers	Tay Ninh Provincial People's Committee Binh Duong Provincial People's Committee Kien Giang Provincial People's Committee Ninh Thuan Provincial People's Committee

Phu Yen Provincial People's Committee

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
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3 February 2003	20 July 2011	102 months
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Effective Date	Original Closing Date	Time Interval
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17 September 2002	30 June 2008	70 months
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b. Amount	SDR46,945,000	\$60,000,000
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Category or Subloan	Original Allocation	Last Revised Allocation	Amount Canceled	Amount Disbursed	Undisbursed Balance
Civil works	9,167,000	17,939,935	(4,694,353)	17,939,935	0.00
Equipment	7,940,000	5,118,557	3,984,272	5,014,834	0.00
Materials (Part A)	270,000	2,290,992	(1,487,875)	2,281,131	0.00
Materials (Part B)	10,283,000	9,202,578	3,189,382	9,202,578	0.00
Materials (Part C)	2,111,000	1,230,526	1,166,342	1,230,526	0.00
Consulting services	5,251,000	5,092,160	1,294,281	5,092,160	0.00
Administration expenses	1,285,000	1,461,636	146,840	1,463,376	0.00
Interest charge	822,000	821,836	187,891	821,836	0.00
Unallocated	9,816,000				
Total SDR	46,945,000	43,158,220	3,786,780	43,158,220	0.00

10. Local costs (financed)

- Amount (\$'000)	22,510
- Percent of local costs	101.12
- Percent of total cost	21.48

C. Project Data

1. Project cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign exchange cost	50.35	53.88
Local Currency Cost	47.60	50.92
Total	97.95	104.80

2. Financing plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation costs		
Borrower financed	27.0	23.20
ADB financed	60.0	69.14
Other external financing	11.0	12.46
Total	98.0	104.80
Interest costs during construction		
Borrower financed	5.91	6.63
ADB financed	1.05	0.82
Other external financing		
Total	6.96	7.45

ADB = Asian Development Bank.

3. Cost breakdown by project component (\$'000)

Component	Appraisal Estimate	Actual
A. Community environmental sanitation improvement	1.75	1.87
B. Water supply	56.50	60.45
C. Drainage and sanitation	6.67	7.14
D. Implementation assistance and capacity building	9.16	9.80
E. Contingencies	16.91	18.09
F. Interest during construction	6.96	7.45
Total	97.95	104.80

4. Project schedule

Item	Appraisal Estimate	Actual
Date of contract with consultants		
Project orientation assistance	Apr 2002	23 Dec 2002
Project implementation assistance	Jul 2002	31 Jul 2003
Community environmental sanitation improvement ^a		
PHAP design and delivery	Jul 2002–Dec 2007	Oct 2003–June 2010
CESI implementation	Oct 2002–Dec 2007	Oct 2003–June 2010
Water supply		
Nonrevenue water reduction	Jul 2002–Dec 2006	Jan 2004–Dec 2007
Detailed design	Oct 2002–Sep 2003	Apr 2004–June 2005
Construction works		
Date of first contract award	Jan 2004	28 Oct 2004
Handing over of last work contract	Dec 2007	31 Mar 2010
Drainage and sanitation		
Detailed design	Jan 2003–Sep 2003	Apr 2004–Jun 2005
Construction works		
Date of first contract award	Apr 2005	16 Mar 2007
Handing over of last work contract	Mar 2006	31 Sep 2008

CESI = community environmental sanitation improvement, PHAP = public health awareness program.

^a Implementation of both PHAP and CESI is being continued, albeit without ADB funding.

5. Project performance report ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 17 September 2002 to 31 December 2002	Satisfactory	Satisfactory
From 1 January 2003 to 31 December 2003	Satisfactory	Satisfactory
From 1 January 2004 to 31 December 2004	Satisfactory	Satisfactory
From 1 January 2005 to 31 December 2005	Satisfactory	Satisfactory
From 1 January 2006 to 31 December 2006	Satisfactory	Satisfactory
From 1 January 2007 to 31 December 2007	Satisfactory	Satisfactory
From 1 January 2008 to 31 December 2008	Satisfactory	Satisfactory
From 1 January 2009 to 31 December 2009	Satisfactory	Satisfactory
From 1 January 2010 to 31 December 2010	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Loan inception	11–19 March 2002	2	18	a,c
Special project administration	17–19 June 2002	1	3	a
Loan review 1	14–26 May 2003	2	26	a,b
Loan review 2	3–13 November 2003	1	11	a
Loan review 3	23 February–4 March 2004	1	11	a
Loan review 4	9–19 August 2004	1	11	a
Loan review 5	21–22 October 2004	1	2	a
Loan review 6	23–26 November 2004	1	4	a
Loan review 7	4–8 April 2005	1	5	a
Loan review 8	22–27 August 2005	1	6	a
Loan review 9	24 May–2 June 2006	2	20	a, b
Loan review 10	2–5 August 2006	3	3	a,b,e
Loan review 11	4–11 December 2006	3	24	a,b,c
Midterm review	19–29 March 2007	3	33	a,b,d
Loan review 12	1–10 October 2007	1	10	a
Loan review 13	17–20 June 2008	1	4	a
Loan review 14	2–10 October 2008	3	27	a,b,c
Loan review 15	18–22 June 2009	2	10	a,b
Loan review 16	1–7 December 2009	3	21	a,b,c
Loan review 17	12–20 April 2010	3	27	a,b,c
Project completion review	7–18 March 2011	2	24	a,b

Note: a = mission leader; b = project implementation officer; c = project analyst; d = poverty reduction specialist; e = sector director.

I. PROJECT DESCRIPTION

1. The projected impact of the Third Provincial Towns Water Supply and Sanitation Project was to enhance human development and reduce poverty. This was to be achieved through sustainable improvement of the water supply and sanitation conditions in the following towns: (i) Chi Thanh, La Hai and Tuy Hoa in Phu Yen Province; (ii) Phan Rang in Ninh Thuan Province; (iii) Rach Gia in Kien Giang Province; (iv) Tay Ninh in Tay Ninh Province; and (v) Thu Dau Mot in Binh Duong Province. These improved conditions would lead to (i) improved health conditions; (ii) higher rate of school attendance; and (iii) increased time for productivity, particularly for women, who are normally responsible for water provision for the family.¹
2. Water supply facilities in the project towns were in poor condition, had intermittent supply, and only served approximately 30% of their populations. The project would assist the water supply companies (WSCs) in addressing these issues by providing investment capital and technical assistance to improve financial management, specifically through reducing nonrevenue water and improving the water tariff structure.
3. The project towns' population relies completely on septic tanks and pit latrines. The septic tanks were often of substandard quality and not provided with appropriate effluent discharge, thus posing great health risks. The project would provide microcredit for septic tank construction and boost community awareness as to the linkage between sanitation and health.
4. Aggravating the health risk was the poor condition of drainage systems for the towns, leading to floods, which most often mixed with wastewater. The project would provide assistance not only to upgrade and properly maintain the drainage system, but also to initiate community-based small scale drainage improvements.
5. The project's expected outcomes were
 - (i) improved water supply and sanitation in the project towns,
 - (ii) participation of local communities in local sanitation improvement,
 - (iii) improved financial sustainability of the WSCs, and
 - (iv) introduction of local regulations on sanitation and environmental improvement.
6. These outputs were to be achieved by
 - (i) expanding water production and distribution systems,
 - (ii) reducing nonrevenue water (NRW),
 - (iii) rehabilitating and constructing drains,
 - (iv) increasing public awareness about hygiene and sanitation,
 - (v) establishing microcredit schemes, and
 - (vi) improving staff capacity of water WSCs.
7. The project framework is presented in Appendix 1.
8. The total project cost was estimated at \$98 million. Asian Development Bank (ADB) provided \$60 million equivalent from its Special Funds resources, while Agence Française de Développement provided \$11 million in parallel cofinancing. The provincial governments provided \$23.5 million, while the beneficiaries provided the remaining \$3.5 million. Following

¹ ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project*. Manila.

approval of the project, Norwegian Agency for Development Cooperation agreed to finance the project orientation assistance with a \$1.1 million grant.

9. The project was approved on 13 December 2001 and declared effective on 17 September 2002. The loan was originally scheduled to be closed on 30 June 2008.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

10. At the time of appraisal, ADB's operational strategy for Viet Nam's urban water supply and sanitation sector was to support the government in enhancing the investment climate in provincial towns by improving and expanding water supply and sanitation services. Policy changes and institutional reforms were supported to improve sustainability with the ultimate goal to make the WSCs financially viable and with adequate cost recovery. The government intended to refocus the role of the Ministry of Construction on policy formulation, planning, regulation, and technology transfer while making the provincial people's committees (PPCs) the responsible implementation agencies. It was recognized that the WSCs had but limited autonomy. Moreover, water tariffs set by the PPCs are at an insufficient level. That not only prevents WSCs from recovering the full cost of service, but also from providing service at adequate levels.

11. ADB's water and sanitation sector assessment strategy and road map show that the water supply and sanitation coverage ratios have improved significantly since 1995. However, significant gaps remain in the quality and reliability of service. Areas requiring the attention of WSCs are (i) financial sustainability, (ii) efficiency and accountability of decentralized sector institutions, and (iii) utility assets and performance data. The policy and legal basis for the sector is relatively strong, because the government has issued two key decisions that detailed a clear vision and set targets and implementation measures. The water supply decree² addresses the main recommendation³ from ADB's Independent Evaluation Department by transforming water from a social to a commercial commodity and requiring water supply tariffs to be set for full cost recovery. The orientation plan for urban water supply⁴ and the decision on NRW⁵ set ambitious targets for the water sector, particularly for reducing NRW to 25% by 2015 and 18% by 2020.

12. In the context of the aforementioned sector issues and policies, the project remains relevant and the design addresses the key issues. Although the main outputs targeted physical expansion of the water supply and sanitation services, strict conditions were set for tariff increases. Also, capacity building support was provided to the WSCs to improve their operations and reduce NRW.

13. One of the project outcomes was introducing local regulations on sanitation and environmental protection by the PPCs. The project design did not identify a related activity and supporting activities to achieve this outcome, however, and only included the requirement to introduce local regulations on sanitation as a covenant. All but one PPC were able to introduce

² Government of Viet Nam. 2007. *Decree 117/2007/ND-CP on Clean Water Production, Supply and Consumption*. Ha Noi.

³ ADB. 2009. *Sector Assistance Program Evaluation on Urban Services and Water Supply and Sanitation Sector in Viet Nam*. Manila.

⁴ Government of Viet Nam. 2009. Decision approving orientations for developing water supply in Viet Nam's urban centers and industrial parks up to 2025, and a vision towards 2050 (Decision 1929/2009/QD-TTg). Ha Noi.

⁵ Government of Viet Nam. 2010. Decision 2147/2010/QD-TTg on Approval of National Unaccounted-for Water and NRW Program to 2025. Ha Noi.

local sanitation and environment protection regulations, which were later superseded by a government decree on urban and industrial park water drainage, which includes wastewater discharge standards and principles for sewerage charges.⁶

14. The project design included an extensive list of impact, outcome, and output indicators to be used for monitoring and evaluation (M&E). Although the M&E program was supposed to be developed by the consultants and implemented by the WSCs, the list of proposed M&E indicators was too extensive and resources were too limited to implement such an extensive M&E program. M&E has only been done to the extent of monitoring the physical outputs.

15. At the project's March 2007 midterm review, substantial unused loan amounts were identified. These resulted from exchange rate fluctuations between special drawing rights (SDRs) and the dollar and unused contingencies. The project was extended for 2 years and a major change in scope was approved to allow for constructing a treatment plant and additional distribution systems. The additional distribution capacity accelerated the revenue increases of the WSCs and improved the efficiency of the project.

B. Project Outputs

16. The project's activities were grouped into four parts:

- (i) **Part A: Community Environmental Sanitation Improvement (CESI).** This comprised (a) a public health awareness program (PHAP), (b) improvement of local small-scale sanitation, (c) a sanitation credit scheme, and (d) constructing sullage pipes.
- (ii) **Part B: Water Supply.** This comprised upgrade and/or expansion of (a) water intakes, (b) raw water transmission, (c) water treatment plants, and (d) distribution networks in the project towns to meet the projected demand of 212,000 cubic meters (m³) per day in the service area by 2010.
- (iii) **Part C: Drainage and Sanitation.** This comprised rehabilitating and cleaning about 22 kilometers (km) of existing drains, constructing 69 km of secondary and tertiary drains, and assembling about 20,000 septic tanks in households and service areas.
- (iv) **Part D: Implementation Assistance and Capacity Building.** This comprised (a) project orientation assistance, (b) project implementation assistance, and (c) capacity building for the WSCs.

17. **Part A: Community Environmental Sanitation Improvement.** This component is financially a small part of the project, but it has potential to impact the lives of poor families in the five project provinces. By raising awareness about the links between water, sanitation, and health and by facilitating increased access to clean water and sanitation, it aims to bring about health improvements that will lead to reduced vulnerability, more productive lives, and, ultimately, poverty reduction. A focus on community participation in sanitation improvements lends the component an element of empowerment.

18. The PHAP and CESI are implemented by the Provincial Viet Nam Women's Union (PVWU) in each project area.

19. While aiming to enhance community awareness on sanitation, the PHAP sought to motivate households to connect to piped water supply and convert to pour-flush toilets with septic tanks. The awareness activities focused on the economic and health benefits of piped

⁶ Government of Viet Nam. 2007. *Decree 88/2007/ND-CP on Urban and Industrial Park Water Drainage*. Ha Noi.

water supply, basic hygiene practices, safe excreta disposal, and proper disposal of both solid waste and wastewater to improve the environment and reduce personal health risks. It also informed the communities as to the availability of financial support through CESI. Some of the materials, manuals, and training methods in use were developed under ADB's First Provincial Towns Water Supply and Sanitation Project,⁷ while others came from the Department of Health and from the PVWUs themselves.

20. **CESI aimed to provide small-scale environmental sanitation improvement.** The exact scope of the CESI in each town depended on community demand and priorities. Items financed under this component included toilets with septic tanks and wash basins for schools, public areas, or communal residential areas; rubbish bins and handcarts; collection depots; collection and disposal systems; and the cleaning of public waste dumping areas, such as drains, canals, and other waterways. A sanitation credit scheme for households to construct latrines and/or septic tanks was developed and was managed by each PVWU. Details of latrine and/or septic tank construction and use of the sanitation revolving fund as of 6 March 2011 are shown in Table 1. The collection rates are reported to be high, at around 98%.

Table 1: Progress of Sanitation Credit Scheme as of December 2010

Province	Number of latrines and/or septic tanks		Disbursed (D'million)	Credit conditions		
	Target	Achieved		Maximum loan amount (D'million)	Interest rate (%)	Repayment period (months)
Phu Yen	2,086	2,843	2,696	3.0	0.3–0.5	24
Ninh Thuan	4,858	6,321	12,642	2.0	0.03	24
Kien Giang	2,588	2,389	6,295	2.5–4.0	0.40–0.65	24
Tay Ninh	1,924	2,491	3,898	3.0	0.40	18
Binh Duong	4,800	4,858	7,488	3.0	0.3–0.5	24
Total	16,260	18,902				

Sources: PPMU and PVWU reports.

21. Improvement of local small-scale sanitation and sillage pipe construction, the two other components of the CESI, were the responsibility of the provincial project management units (PPMUs).

22. The target for Part A, as formulated in the report and recommendation of the President (footnote 1), refers to an increase of septic tank coverage from less than 41% to 60%, or the construction of 20,000 septic tanks, in the project areas. Following approval of the loan, these numbers were refined for each subproject, resulting in a downward adjustment in the total number of septic tanks to about 16,000. Data from December 2010 show achievement just 5% below the original target. Considering that the program is continuing, it can be concluded that the original target for the CESI program has been achieved.

23. The output targets for the PHAP are (i) increased awareness of linkage between safe water, sanitation, and health; (ii) expanded coverage of sanitation facilities; and (iii) established microcredit system. The projected outcome is increased coverage of sanitation systems and

⁷ ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to the Socialist Republic of Viet Nam for the Provincial Towns Water Supply and Sanitation Project*. Manila.

improved community environment. No quantitative baseline data and target were provided in the report and recommendation of the President.

24. All PVWUs report improved environmental sanitation, reduced incidences of open defecation, as well as willingness to connect to the piped water supply system and pay solid waste collection fees. In addition, local government agencies are more aware of the need for environmental sanitation interventions, as reflected in their social-economic policies. Although no quantitative data is available, anecdotal information supports the overall impression that beneficiaries' health conditions have improved through reduced incidences of diarrheal diseases, skin and eye diseases, and malaria.

25. The project design documents formulated no exit strategy for the CESI program after closing of the ADB project. All provinces reported that the program is being continued in the project areas and extended to new areas to comply with the demand for sanitation credit. In some provinces, the loan amounts and repayment periods were adjusted for inflation. Interest rates were also increased to cover administrative expenses. The interest rate is well below that of the Viet Nam Bank for Social Policy, which is the government agency in charge of similar microcredit schemes.

26. The PHAP has also been continued through its incorporation into the regular activities of the PVWUs.

27. The CESI has been implemented differently in the various project provinces. Not only do financing conditions differ in terms of loan amount, tenor, and interest rate, but construction arrangements and technical design of latrines and septic tanks also vary. Although the lack of strict implementation guidelines allowed for a flexible approach to cater to local circumstances, sharing of knowledge and experiences between the PVWUs could have benefited the project.

28. The local small-scale sanitation and sullage pipe subcomponent is not being implemented as originally intended. The PPMUs have rolled small-scale sanitation improvements into national competitive bidding contracts under Part C (drainage and sanitation). The PPMUs are procuring items such as mobile toilets, vacuum trucks, washbasins, and so on, but the element of community participation appears to have gotten lost.

29. **Part B: Water Supply.** The project upgraded and expanded raw water intakes, water treatment plants, pumping stations, reservoirs, and distribution systems in the project towns. In addition, an NRW reduction program was carried out in each project town, identifying the main sources of technical and commercial losses and provided equipment and training for leak detection. The construction of the water supply and rehabilitation works is completed and the systems are in operation, providing improved piped water supply in the service areas of the project towns. Table 2 presents an overview of the physical parameters, while more details are in Appendix 2.

Table 2: Physical Outputs of Water Supply Works as of December 2010

	Binh Duong	Kien Giang	Ninh Thuan	Tay Ninh	Phu Yen			Total
Item	Thu Dau Mot	Rach Gia	Phan Rang	Tay Ninh	Tuy Hoa	Chi Thanh	La Hai	
Plant design capacity ^a (m ³ /day)	90,000	34,000	52,000	19,000	28,000	3,000	3,000	229,000
Production (m ³ /day)	74,214	33,832	26,871	10,603	16,124	1,423	1,152	164,218
Production ratio	82.5%	99.5%	51.7%	55.8%	57.6%	47.4%	38.4%	71.7%
Service area population (persons)	550,000	225,700	453,722	93,940	122,300	27,000	16,300	1,488,962
No. of connections	22,438	33,310	46,612	12,237	15,939	2,564	2,098	135,198
Population served (persons)	412,000	130,240	272,148	58,425	55,633	11,694	9,004	949,144
Coverage ratio	74.9%	57.7%	60.0%	62.2%	45.5%	43.3%	55.2%	63.7%
Per capita consumption (Liters per capita/day)	70	164	56	130	159	69	79	142
Nonrevenue water Ratio	9.3%	28.1%	25.1%	25.8%	21.3%	27.6%	32.4%	18.3%
Liters/connection/day	306	286	145	223	215	153	178	222

m³ = cubic meters, No. = number. ^a Plant refers in every case to potable water treatment plant.

Sources: PPMU and PVWU reports.

30. The projected outcome targets as originally formulated are to increase the water supply coverage ratio to 78% of the service area population by supplying water to 894,700 beneficiaries at a minimum consumption rate of 117 liters per capita per day. The output targets further state that the upgraded system should be able to meet a minimum demand of 212,000 m³ per day, while NRW ratios should be reduced from 30% to 25%.

31. From Table 2, it can be seen that the design capacity and number of beneficiaries exceed the targets. The average coverage ratio achieved is lower than the target because of population growth in the project towns that was higher than projected. This is most notable in Kien Giang, where the actual production equals the design capacity, indicating an urgent need for further expansion of the water supply capacity.

32. With the exception of Ninh Tuan and Phu Yen, the per capita consumption exceeds the minimum requirement. In all project towns, the NRW levels were reduced substantially. With the exception of Tuy Hoa, project towns complied with the targeted ratios. Nevertheless, when reviewing the NRW levels in liters lost per connection per day one sees that the best-performing systems as measured by the ratios are not necessarily the lowest in absolute terms.

33. **Part C: Drainage and Sanitation.** The purpose of this output was to improve the drainage and environmental sanitation of the project towns. Drains have become heavily silted and blocked by solid waste, leading to uncontrolled overflows that expose residents to health risks when mixed with sewage. This part was implemented by the PPMUs through national competitive bidding contracts. The works consisted of (i) rehabilitation and construction of secondary and tertiary drains; as well as (ii) sanitation improvement, including the supply of equipment and tools for operation and maintenance (O&M).

34. The output target as formulated in the report and recommendation of the President refers to rehabilitating and cleaning 22 km of existing drains plus constructing 69 km of secondary and tertiary drains. No specific target for each town was provided. Following loan approval, the total was adjusted downward after these numbers were refined for each subproject (see Table 3).

Table 3: Progress of Drainage Improvement Works as of 30 June 2010

Province	Kilometers of drains constructed	
	Proposed	Built
Phu Yen	5.00	8.33
Ninh Thuan	7.00	3.01
Kien Giang	4.90	4.07
Tay Ninh	14.00	10.16
Binh Duong	3.95	4.70
Total	34.85	30.27

Source: PPMU.

35. It is obvious that the output achieved falls short of the intended targets. It is impossible to assess the consequence of this shortfall, however, since no outcome-related targets were presented in the report and recommendation of the President. No indication was presented on whether this output had to be achieved in order to reduce the flooding incidences to a specified frequency or that the adjusted output targets are sufficient to achieve this. Therefore, it cannot be concluded whether the intended outcome has been achieved. The project design also did not take into account the consequences of the continuing urbanization of the project towns. This should be regarded as a flaw in the project design.

36. **Part D: Capacity Building and Trainings.** Two consulting services packages were provided: (i) project orientation assistance (POA) to project management and capacity building for the project coordination unit (PCU) and PPMUs; and (ii) project implementation assistance (PIA) for updating the feasibility studies, detailed design, construction supervision, and institutional support for parts A, B and C, as well as capacity building for WSCs. Norwegian Agency for Development Cooperation provided sufficient training and lessons on water tariff planning and implementation, as well as public health awareness programs.

37. The POA consultants commenced their services on 12 January 2003 by providing institutional and managerial assistance to the PCU and PPMUs prior to the start of detailed design by the PIA consultant. The services included establishing functional procedures for the PPMUs; setting up project accounts; and delivering intensive training to the PCU and PPMUs in project management, procurement, project accounting, administration, reporting, monitoring, and evaluation. Project administration procedures, manuals, and software were also provided.

38. The PIA consultants commenced their services on 1 September 2003. The contract was extended to 15 April 2010 to provide assistance for the additional contracts and works undertaken. The services included engineering studies; investigations; designs for water supply, sanitation, and drainage systems; preparation of draft contracts and bid documents; construction supervision; and commissioning of the water supply, sanitation, and drainage schemes. The consultants also reviewed reports for bid evaluation and provided assistance for M&E activities, environmental management and monitoring, community development, awareness activities, and sanitation credit schemes.

39. The intended outputs of this assistance were not only to assist with project implementation, but also to improve skills in project management and financial planning and sustain the sanitation credit schemes. All these outputs have been achieved.

C. Project Costs

40. Total project cost was estimated at \$97.95 million equivalent at the time of appraisal, with foreign exchange cost of \$50.35 million and local currency cost of \$47.60 million equivalent. For the ADB-financed part of the project, the cost estimate at appraisal was \$60 million equivalent, which comprised \$41.4 million of foreign exchange and \$18.6 million equivalent of local currency cost, representing 61.2% of the total project cost. Financing was also to be provided by Agence Française de Développement of \$11 million, the provincial governments of \$23.5 million, and the beneficiaries of \$3.5 million.

41. Although the Norwegian Agency for Development Cooperation financing was agreed in 2002, following ADB Board approval, this did not lead to reduced ADB financing, as the overall ADB financing at that time was already lower by \$1.6 million due to SDR rate fluctuation.

42. In early 2007, an estimated \$26.5 million of surplus loan funds was identified. This resulted from (i) a \$12.2 million exchange rate change in the SDR vis-à-vis the US dollar since the time of approval, (ii) an unallocated loan amount of \$12 million due to unused contingencies, and (iii) a \$2.2 million contract financed by Phu Yen PPMU's own budget due to the urgency of the works. In June 2008, ADB approved utilizing about \$16.7 million for extending the distribution system, including booster pumps. Only Binh Duong PPMU requested additional production capacity to supply the rapidly expanding residential and industrial development. Feasibility studies for the expansion were prepared by the PIA consultants.

43. As of 30 June 2010, all 32 original and 6 additional works contracts were completed. At the project's closing date of 20 July 2011, loan proceeds available equaled \$72.25 million. The value of the cumulative contracts awarded was \$64.97 million, which is 90% of the ADB loan. An overview of the appraised and actual project costs is in Appendix 3.

D. Disbursements

44. Disbursements were held up by approximately 1 year after delay in loan effectiveness. Disbursements were slow in the early years since the focus was on project design and procurement. After 3 years, disbursements picked up and reached the 50% mark by the 4th year. Appendix 4 shows the contract amount and disbursement curves. The actual disbursements followed the annual projections.

45. Imprest accounts were opened for the PCU and five PPMUs, which contributed to successful project implementation. However, loan closing was delayed by about 9 months due to issues regarding reconciliation of accounts and liquidation of the advances.

46. On 20 July 2011, when the loan account was closed, disbursements amounted to \$66.23 million, or 91.67% of the ADB loan, which included interest during construction of about \$1.268 million. The unutilized loan amount of \$6.02 million was cancelled.

E. Project Schedule

47. Loan effectiveness was delayed by 9 months following loan approval because it depended on the effectiveness of the Agence Française de Développement loan and execution of the subsidiary loan agreements between the government and PPCs. Although advance recruitment of consultants was approved by ADB, this was not used by the executing agencies. The PIA consultants only mobilized in September 2003, almost 2 years after loan approval, thus resulting in delay in preparing the feasibility studies, detailed designs, and tender documents, and, consequently, in tendering the works. Further delays were caused by the internal approval procedures of executing agencies for various documents, such as variation requests of previously approved designs, resulting in an overall delay of about 18 months by August 2004.

48. The construction of the works was delayed due to poor performance of contractors and the PPMUs. First, the geotechnical and site survey works financed by the PPMUs were found to be of poor quality, leading to design adjustments. Second, the PPMUs orally requested design modifications during construction, which national consultants allowed. Third, consequent variation orders were frequently not prepared until near or after completion of a contract, resulting in additional administrative burden and disbursement delays. Finally, contractors were unable or unwilling to prepare adequate work schedules and methods of approach. These issues were systematically addressed by the international consultant and ADB, leading in most cases to considerable improvements and acceleration of construction.

49. In June 2008, ADB approved extending the project closing date to June 2010 to implement additional physical works financed by unutilized loan funds. ADB management's approval to finance additional works through a major change in scope was obtained following the PPCs' approval of feasibility studies. Hard deadlines set for approval of bidding documents, bid evaluation reports, and contracts were adhered to, and additional works were completed on time.

F. Implementation Arrangements

50. Implementation arrangements were as envisaged at appraisal. The State Bank of Vietnam represented the government. A PCU was established to select and supervise consultants, prepare a consolidated project progress report, negotiate the contract for an auditing firm, and assist in overall project implementation, particularly with regard to ADB and Agence Française de Développement procedures.

51. The PPC was the executing agency in each province. Each PPC set up a provincial steering committee which had overall responsibilities for project implementation. The steering committee was supported by the PPMUs. Each PPMU was managed by the director of the WSC. The PVWUs were responsible for implementing and managing the PHAP and the sanitation credit scheme in the project towns. There were no changes in implementation arrangements during the project period, and those arrangements were sufficient for delivering the project's outputs and achieving its outcome.

G. Conditions and Covenants

52. Delayed effectiveness was due to delayed compliance with each of the following criteria: (i) The Agence Française de Développement loan agreement should be effective, which required the ADB loan agreement to be effective; and (ii) subsidiary loan agreements should be duly executed, which was delayed due to government approval procedures.

53. Of the 28 main loan covenants, 27 were complied with, albeit with some delays due to the general delay of project implementation (Appendix 5). Two covenants for the WSCs to prepare a credit policy to allow low-income households to pay connection fees in installments over 18 months and for the tariff adjustments to be based on recommendations from the consultant were superseded by the water supply decree,⁸ requiring the WSC to pre-finance house connections, charge cost through the depreciation component of the water tariffs, and set tariffs on full cost recovery level.

54. Schedule 6, para. 24 of the loan agreement provided the requirements to achieve financial sustainability of the WSCs, which are currently being met with the exception of the following: Ninh Thuan, whose tariff level is not enough to cover O&M, depreciation, and debt service; Tay Ninh, whose average current ratio was below 1.0; and Binh Duong whose cash flow balance is less than 30 days worth of annual cash O&M and debt service and whose current ratio is marginally lower than 1.0.

Table 4: Selected Financial Indicators (Historical Averages 2008 to 2010)

Financial sustainability of WSCs (LA sched. 6 para 24)		Phu Yen	Ninh Thuan	Binh Duong	Tay Ninh	Kien Giang
a	Tariff levels to cover O&M costs and depreciation or debt service and cover bonus/welfare contribution;	Complied with (1.32)	Not complied with (0.86)	Complied with (1.13)	Complied with (1.70)	Complied with (1.16)
b	Increase O&M expenditure to at least match increase in water production and domestic inflation;	Complied with (1.07)	Complied with (1.33)	Complied with (1.46)	Complied with (1.16)	Complied with (1.23)
c	Maintain positive cash flow and balance at year end no less than 30 days worth annual cash O&M expenditure plus debt service.	Complied with (60 days)	Complied with (60 days)	Not complied with (16 days)	Complied with (131 day)	Complied with (128 days)
d	Maintain current ratio at no less than 1.0 at end of each year	Complied with (3.31)	Complied with (7.30)	Not complied with (0.96)	Not complied with (0.70)	Complied with (2.23)
e	Maintain accounts receivable less than 45 days of sales equivalent	Complied with (19 days)	Complied with (9 days)	Complied with (45 days)	Complied with (32 days)	Complied with (43 days)
f	Self-finance increasing proportion of annual capital expenditure requirements	Complied with (15%)	Complied with (5%)	Complied with (43%)	Complied with (99%)	Complied with (42%)

LA = loan agreement, O&M = operation and maintenance, WSC = water supply company.

Source: Financial consultant's estimates based on WSCs' financial statements for 2008 to 2010.

H. Consultant Recruitment and Procurement

55. The consultant recruitment and procurement procedures followed ADB's Guidelines on the Use of Consultants and Procurement Guidelines (as amended from time to time). Delay in consulting recruitment caused delay in works contracting. Works contracting was further delayed due to prolonged and fragmented approval processes. Useful construction design modifications were being made during construction, but the variation orders were frequently not prepared until near or after completion of the contract.

⁸ Government of Viet Nam. 2007. *Decree 117/2007/ND-CP on Clean Water Production, Supply and Consumption*. Ha Noi.

56. For the additional works, ADB conditioned that approvals to design and tendering should follow a strict time frame, with noncompliance leading to cancellation of the works. This time frame was adhered to.

I. Performance of Consultants, Contractors, and Suppliers

57. The POA consultants performed well and were able to deliver the projected outputs, although did so with a delay. The PIA consultants, comprised of an international firm and three national firms, originally allowed the design works to be carried out by the national consultants at their local offices. Without quality assurance by the international firm, this resulted in a lack of coordination and variations in design. In addition, national consultants sometimes accepted oral requests for design modifications even after the international firm had reviewed and approved designs. The coordination between international and national firms improved during project implementation. Clear procedures were established and followed. Because of this improvement, the performance of the consultants is rated satisfactory.

58. A total of 40 work contracts were awarded. Nine were awarded through international competitive bidding. The remaining contracts were awarded through national competitive bidding. The contractors had difficulties understanding and following the conditions of contract. Design variation requests were often accepted without proper documentation. Some contractors were unable to prepare an adequate work schedule and method of approach, indicating that these contractors did not have a good understanding of how to carry out the work. The contractors also did not give the needed benchmark for evaluation and appraisal of their work. The performance varied by contractor but was generally satisfactory. The contractor in Binh Duong performed extremely well, delivering works at acceptable quality and well within budget and time frame. However, the contractor in Kien Giang, Phu Yen and Tay Ninh delayed works considerably, reportedly due to cash flow problems.

J. Performance of the Borrower and the Executing Agency

59. The project was implemented under the supervision of a PCU established by the Management Board of Urban Technical Infrastructure Development Projects of the Ministry of Construction. The executing agencies were the PPMUs, managed by the director of the WSC. The PCU's performance was highly satisfactory. The guidance provided to the PPMUs and assistance provided to ADB were highly adequate, efficient, and timely. The PCU set up a satellite office in Ho Chi Minh City, close to the project area. PPMU performance varied by province and over time. They initially struggled with ADB procedures and requirements and with internationally acceptable procurement practices. Performances improved over time, however, resulting in efficient and effective implementation of the additional works.

60. The project design foresaw the provision of two consulting services packages, for POA and PIA services. The POA consultants were to provide institutional and managerial assistance to the PCU and PPMUs prior to the start of detailed design by the PIA consultant. This arrangement was less effective than foreseen because staff trained under the POA were not involved in implementation, and the training provided under the POA required PIA consultants to later carry out further training due to lack of budget in their PIA contract.

K. Performance of the Asian Development Bank

61. ADB's performance was satisfactory. It conducted regular project review missions, consultations, and briefings with the PCU and PPMUs. ADB provided prompt approvals for the

contracts it financed, as well as necessary funds disbursements under the direct payment scheme. ADB carried out special administrative missions, and an ADB staff consultant on resettlement was mobilized to assist the PPMU in Tay Ninh Province with a compensation dispute settlement. ADB assisted in the successful implementation of the additional works, thereby increasing the effectiveness, efficiency, and sustainability of the projected outcome.

III. EVALUATION OF PERFORMANCE

A. Relevance

62. The project is rated *highly relevant*. It remains consistent with the government's development strategy and ADB's lending strategy for Viet Nam. The project design has proven adequate to deliver outputs and contribute to foreseen outcome, which is increased access to water supply and sanitation for the inhabitants of the project towns. The project scope was expanded following the midterm review, which contributed to the project's relevance.

B. Effectiveness in Achieving Outcome

63. The project is rated *effective*. The projected outcomes were achieved. The number of beneficiaries of the water supply and sanitation interventions have exceeded and equaled the nominal targets. Through the PVWUs, communities have benefitted from hygiene education and physical improvements in local sanitation. As of 2010, the WSCs have increased the water tariffs above the estimated average incremental financial cost and reduced inefficiency, particularly NRW levels, to such extent that they are self-sustaining. The fourth outcome, which is the introduction of local regulations on sanitation and environment protection, was achieved through the issuance of Government Decree 88/2007(footnote 6).

C. Efficiency in Achieving Outcome and Outputs

64. The project is rated *efficient* in achieving outcome and outputs, as substantiated by the financial and economic reevaluation (Appendix 6). Of the five subprojects, three are financially viable, with financial internal rates of return (FIRRs) ranging from 5.34% to 6.95%, all of which are above their respective weighted average cost of capital (WACC) (Table 5). However, two of the subprojects, Ninh Thuan and Tay Ninh, have recalculated FIRRs lower than their computed WACC. These provinces are expected to expand their services to include more customers and generate more revenues.

65. The project was completed 2 years after the original completion date in order to fully utilize the loan amount, including contingencies and amounts arising due to favorable foreign exchange rate change. The additional works mainly focused on expanding the distribution network, increasing the number of customers, and contributing to the efficiency of the project.

Table 5: Comparative Financial Internal Rates of Return Results by Subproject

Water supply companies	At appraisal ^a			At midterm review			At completion ^b		
	WACC	FIRR (%)	FNPV (D'million)	WACC	FIRR (%)	FNPV (D'million)	WACC	FIRR (%)	FNPV (D'million)
Binh Duong	3.0	3.4	14,775	3.21	5.31	53,504	4.16	6.95	149,350
Kien Giang	2.7	3.0	6,330	3.11	4.04	18,668	3.28	5.34	44,440
Ninh Thuan	1.7	3.0	40,494	4.34	4.59	5,735	4.69	2.02	(50,944)
Phu Yen	1.8	3.3	47,613	3.49	3.55	930	4.26	6.02	27,871
Tay Ninh	2.2	2.6	4,386	3.09	4.06	13,121	2.91	1.81	(12,726)

FIRR = financial internal rate of return, FNPV = financial net present value, WACC = weighted average cost of capital.

^a ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project.*

^b Project completion review mission consultant's estimates.

Source: Asian Development Bank.

D. Preliminary Assessment of Sustainability

66. The WSCs all have the technical capacity to manage and maintain the works financed by the loan. Financial sustainability is likely, but it depends on the capacity of the WSCs to generate sufficient revenues and manage all their expenses (O&M, depreciation, and financial costs) and in addition generate internal revenues to further expand the system. Tay Ninh WSC needs to improve its financial situation by increasing its cash flow and reduce its O&M expenses.

E. Impact

67. Through sustainable improvement of access to water supply and sanitation facilities, the project is expected to impact positively on health conditions of the population in project areas, which is in line with the project objective. Improved access to water supply has increased time for productivity, especially for women, and school attendance rates by children, especially girls. The project successfully eliminated potential negative environmental and resettlement impacts.

68. WSC staff have benefitted from exposure to international best practices and hands-on training from the consultants, as demonstrated by improved performance during implementation. PVWUs realize the importance of raising hygiene and sanitation awareness, and they have incorporated the project financed activities into their regular program. The project has provided them resources and capacity to expand these to communities beyond the project areas.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

69. The project is rated *successful*. It is *highly relevant*, *effective*, and *efficient* in achieving outcome and outputs, despite some implementation delay and the absence of a detailed M&E program, as proposed in the project design. Considering the WSCs' increased autonomy and the decision of the PVWUs to continue the PHAP, the project is *likely sustainable*.

70. The project framework was acceptable, although it could have been improved by stating appropriate and consistent baseline data. The links between outputs and outcomes should have been clearer. The proposed M&E indicators were not all relevant for monitoring project progress.

71. This project was the third consecutive water supply and sanitation project focused on provincial towns and implemented under increasing delegation of project management from the national government to provincial water companies. This has contributed to the project success and should be continued. The project confirmed there remains a high need for investments in urban water supply and sanitation in Viet Nam, as indicated by ADB's water and sanitation sector assessment strategy and roadmap and ensuing water sector investment program.⁹

B. Lessons

72. **Appropriate monitoring indicators are required.** A project framework or design monitoring framework should list SMART¹⁰ indicators that, as much as possible, are part of the specified agencies' established monitoring program, such as number of connections, water produced etc. Introducing new indicators should be accompanied by a strong support program because if agencies do not see the benefit of monitoring certain indicators, they will be unwilling to pay for collecting the data, such as the health indicators in this case. Indicators should be specific as to what output, outcome, and impact is being measured, when this will be done, and by whom. The lack of sufficient resources and guidance has affected the quality of the PHAP's monitoring, and the absence of specific drainage indicators prevented assessing that outcome.

73. **Water supply and sanitation coverage indicators need to be simplified.** Monitoring coverage ratios requires the monitoring of two independent parameters: physical outputs and population growth. Sometimes this is complicated by a change in delineating the service area of the utilities. Nominal targets are therefore easier to monitor than ratios and are equally functional for assessing achievements.

74. **NRW reduction indicators need to be versified.** Expressing the NRW levels in liters lost per connection per day, demonstrates a large variation in results. The best performing systems in terms of NRW ratios¹¹ are not necessarily the lowest in absolute terms. To get a fundamental idea on actual performance, NRW results should at least be reported in ratios and absolute terms.

75. **Sanitation credit scheme requires an exit strategy.** The project foresaw the establishment of a sanitation credit scheme, financed by the project through a grant from the central government. However, it did not address what should happen with the grant money and potential revenues once the project was completed. This lack of clarity has made PVWUs reluctant to continue the program by revolving the first batch of repaid credits and expanding it to other communities outside the original project area. In all provinces, the PPC issued specific orders that PVWUs are in charge of the funds. The program may be continued after loan closing and initiatives may be extended outside the original project area.

76. **PVWU experience sharing is beneficial to effective implementation.** Although guidelines were provided for the sanitation revolving fund, each PVWU had the flexibility to implement it differently. Sharing of experiences, especially at the beginning stages, could have contributed to a more streamlined and effective implementation of the CESI program.

⁹ ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to the Socialist Republic of Viet Nam: Water Sector Investment Program*. Manila.

¹⁰ The acronym stands for "specific, measurable, acceptable, relevant and time-bound."

¹¹ NRW reduction targets are defined as the ratio of unbilled production versus total input capacity in m³/day.

77. **Project outcome and outputs need resource allocation.** The identification and procurement of small-scale sanitation improvements was not carried out through community participation as intended, but directly by PPMUs. The strong investment focus and the PPMUs' lack of knowledge about community-based approaches should have been identified as risks and mitigated by the project design through resource allocation.

78. Likewise, the introduction and enforcement of local regulations on sanitation and environment protection was not supported by the project nor included as a covenant. Although the introduction was still achievable, enforcement would need support from the project.

C. Recommendations

1. Project Related

79. **Future monitoring.** The sustainability of the water districts, especially Tay Ninh and Ninh Tuan provinces, remains an issue that needs continued monitoring by the Ministry of Construction.

80. **Further action or follow-up.** The WSCs need to further expand their distribution systems so the full capacity of their treatment systems could be used as soon as possible. Also, water tariffs will need to be adjusted regularly to ensure full cost recovery in compliance with the water supply decree.¹² The NRW levels will also have to be reduced further.

81. **Additional assistance.** Depending on the capability of the WSCs to maintain sustainable operations, the Ministry of Construction may decide to provide capacity building and financial support through ADB's assistance to the water sector (footnote 9).

82. **Covenants.** The number of covenants should be limited to addressing only the key requirements. Project outputs and outcome, which can only be achieved with proper support, should not be included as covenants. Appropriate activities and resources to implement these activities should be identified and included in the project design.

2. General

83. **Design and monitoring indicators.** The design and monitoring framework should be realistic and logical. It should include a set of SMART indicators (footnote 10). These should be specific to the output they monitor as well as acceptable and relevant for the agency that carries out the monitoring. Otherwise, the agency will have no incentive to do this monitoring.

84. **Project duration.** Project scheduling in Viet Nam should be realistic and accept that projects will need start-up times of about 3–4 years, after which disbursement levels will increase. Total project duration is 7–8 years.

¹² Government of Viet Nam. 2007. Decree 117/2007/ND-CP. Ha Noi.

PROJECT FRAMEWORK

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks	PCR Evaluation of Accomplishments
Sector Goal Enhance human development and reduce poverty through sustainable improvement of the water supply and sanitation conditions in the project towns	Improved health conditions; higher rate of school attendance by children; increased productive time, particularly of women, in the project towns	Central and local government statistics and reports; studies or reports of bilateral and multilateral agencies and nongovernment organizations	Overall economic growth; effective implementation of the sector policies by the government	No data is available for the specific project towns. National and provincial data are too general to assess project specific impacts. Nevertheless, based on provincial Viet Nam women's verbal reports, the project has contributed to these targets.
Project Objectives Improve water supply and sanitation in project towns	By 2010, water supply coverage in project towns to be increased from current 30% to 78%; septic tank coverage from 41% to 61%; per capita water consumption from 107 to 117 liters per capita per day; and beneficiaries of piped water supply from 253,000 to 894,700	Project progress reports, loan review missions, and M&E indicators	Adequate budget will be provided for preventive maintenance of the constructed water supply and sanitation facilities. Viet Nam Women's Union will effectively manage the sanitation credit schemes.	Number of beneficiaries with average 142 liters per capita water supplied per day increased to 950,000. Water supply coverage increased to 64%, which is below the target due to higher than expected population growth rate. Likewise, despite achieving the nominal sanitation coverage target, the coverage increased to an estimated 50%.
Support participation of communities in local sanitation improvement and self-help Improve financial sustainability of the WSCs in project provinces	Extend the coverage of sanitation systems; improve the community environment Collect adequate tariffs to cover costs of operation and maintenance plus debt service or depreciation, whichever is higher	Project progress reports, loan review missions, and post evaluations Financial statements of WSCs, project progress reports, loan review missions, and post evaluations	The credit schemes will recover sufficient funds and charges to be sustainable over the long term. PPCs will be able to increase the water tariffs over the project period as proposed, and WSCs will be able to collect the tariffs.	Based on PPMU's and provincial Viet Nam women's verbal reports, the project has achieved these targets. For all but one WSC, this has been achieved.
Introducing local regulations on sanitation and environment protection	Local regulations on septic tank construction, wastewater discharge and treatment, water source protection, and ground water licensing	Project progress reports, loan review missions, and post evaluation	PPCs will be able to introduce and enforce the proposed local regulations.	This was superseded by government decree 88/2007/ND-CP.

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks	PCR Evaluation of Accomplishments
Outputs				
Water supply	<p>Upgrade and/or expand water intakes, raw water transmission mains, water treatment plants, and distribution networks in the project towns to meet projected daily demand for water of 212,000 cubic meter/day in the service areas in 2010</p> <p>Program in each project town to reduce unaccounted for water from current 32%–54% to 25%–30% by 2010</p>	Project progress reports, loan review missions, and post-evaluation	<p>PPCs will appoint qualified staff to the PPMUs.</p> <p>Land acquisition and resettlement plans will be implemented.</p> <p>PPCs will speed up approval procedures.</p> <p>Timely recruitment of competent consultants</p>	<p>Completed works:</p> <ul style="list-style-type: none"> • 5 water intakes • 6 water treatment plants with total capacity 167,000 m3/day, bringing total capacity to 229,000 m3/day • 1,050 kilometer of transmission and distribution mains <p>Nonrevenue water levels are reduced to average 18.3%.</p>
Sanitation and drainage	Rehabilitate and/or clean 32 kilometers of existing drains, construct 67 kilometers of new secondary and tertiary drains in the towns, and build 20,000 septic tanks	Project progress reports, loan review missions, and post-evaluation	<p>Availability and timely release of counterpart funds</p> <p>Effective coordination between PPMUs, WSCs, provincial steering committees, Viet Nam Women's Union, and consultants</p>	<p>30 kilometers of new drains built.</p> <p>18,902 septic tanks constructed. Program is continued following loan closing.</p>
Community environmental sanitation improvement	Increase public awareness of the linkage between safe water, sanitation, and health; expand the coverage of sanitation facilities; and establish microcredit systems in the local communities	Project progress reports, loan review missions, and post-evaluation	Full support from PPCs, PPMUs, and consultants to Viet Nam Women's Union for establishing and operating sanitation credit schemes.	<p>Microcredit systems are duly established in the form of revolving funds. These funds are fully incorporated in the provincial Viet Nam women's program and are continued following loan closing.</p> <p>Based on provincial Viet Nam women's verbal reports, the project has contributed to improved health of the population.</p>
Capacity building and training	Improved skills in project management, improved	Project progress reports, loan review missions, and		WSCs skills improved considerably over the duration

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks	PCR Evaluation of Accomplishments
	financial planning and management by WSCs; sustainable sanitation credit schemes	post-evaluation		of the project, resulting in effective and efficient implementation of the project.
Activities			Inputs	Cost (\$'000)
Project coordination unit selects project orientation assistance consultants, and selects detailed design consultants			Civil works	\$21,077
			Equipment	\$11,039
			Materials	\$30,093
Project Orientation Assistance			Consulting services (excluding equipment)	\$6,986
<ul style="list-style-type: none"> PPMUs set up project management information system and accounts PPMUs finalize M&E systems PPMUs receive training on implementation procedures, project accounting, management information system, and M&E 			Incremental administration	\$1,655
			Land acquisition and resettlement	\$3,230
			Total base cost	\$74,080
Community Environmental Sanitation Improvement			Interest charges during construction	\$6,965
<ul style="list-style-type: none"> Provincial Viet Nam Women's Unions prepare the public health awareness programs and carry out the programs in pilot wards Town people's committees identify small sanitation improvement projects, seek PPMUs' approval, and carry out the projects Provincial Viet Nam Women's Unions establish credit schemes for sanitation improvement and administer the schemes 			Price contingencies	\$9,500
			Physical contingencies	\$7,408
			Total project cost	\$97,953
Water Supply				
PPMUs are responsible for				
<ul style="list-style-type: none"> surveys, engineering design, prequalification, preparing bidding plans, tendering, bid evaluation, contract awards, construction supervision, commissioning inspection, and reporting; designing and carrying out unaccounted for water reduction programs; carrying out training 				
Drainage and sanitation				
PPMUs are responsible for:				
<ul style="list-style-type: none"> surveys, engineering design, prequalification, preparation of bidding plans, tendering, bid evaluation, contract awards, construction supervision, commissioning inspection, and reporting; setting up septic tanks management systems; identifying and improving public sanitation facilities; and carrying out training. 				

M&E = monitoring and evaluation, PPC = provincial people's committee, PPMU = provincial project management unit, WSC = water supply company.

TABLE A2: WATER SUPPLY—DETAILS ON PHYSICAL OUTPUTS

Item	Unit	Binh Duong	Kien Giang	Ninh Thuan	Tay Ninh		Phu Yen		Total
		Thu Dau Mot	Rach Gia	Phan Rang	Tay Ninh	Tuy Hoa	Chi Thanh	La Hai	
Water treatment design capacity	m ³ /day	90,000	34,000	52,000	19,000	28,000	3,000	3,000	229,000
Actual production	m ³ /day	74,214	33,832	26,871	10,603	16,124	1,423	1,152	164,218
Billed volume	m ³ /day	67,347	24,386	20,153	7,952	13,192	1,067	841	134,939
Paid volume	m ³ /day	67,347	24,313	20,138	7,873	12,693	1,030	778	134,172
Population	persons	550,000	225,700	453,722	93,940	122,300	27,000	16,300	1,488,962
Growth rate	%	13.18	1.20	1.10	10.92	12.29		11.67	
Average number of persons per household	persons	6.0	4.6	6.0	5.0	5.4	6.0	5.1	
Customers:									
Residential	no.	21,319	28,313	45,358	11,685	10,360	1,949	1,783	
Institutional	no.	142	1,000	628	160	2,391	359	168	
Industrial	no.	739	333	348	298	2,550	179	105	
Commercial	no.	238	3,664	278	94	638	77	42	
Total		22,438	33,310	46,612	12,237	15,939	2,564	2,098	135,198
Customers usage:									
Residential	m ³ /mo	879,691	650,605	462,325	231,012	269,823	24,675	21,735	
Institutional	m ³ /mo	26,322		55,255	3,163	60,190	4,546	2,046	
Industrial	m ³ /mo	478,181	14,984	70,849	5,891	64,202	2,273	1,279	
Commercial	m ³ /mo	664,275	76,167	24,566	1,858	16,051	974	511	
Total		2,048,469	741,756	612,995	241,924	410,266	32,468	25,571	
Production ratio		82.5%	99.5%	51.7%	55.8%	57.6%	47.4%	38.4%	71.7%
Population served		412,000	130,240	272,148	58,425	55,633	11,694	9,004	949,144
Coverage ratio for service area population		74.9%	57.7%	60.0%	62.2%	45.5%	43.3%	55.2%	63.7%
Consumption		70	164	56	130	159	69	79	142
Billing efficiency		100.0%	99.7%	99.9%	99.0%	96.2%	96.5%	92.6%	99.4%
Nonrevenue water		9.3%	28.1%	25.1%	25.8%	21.3%	27.6%	32.4%	18.3%
		306.03	285.75	144.46	223.11	215.29	153.27	177.99	222.24

m³ = cubic meter, mo = month, no. = number.

Sources: PPMU and PVWU reports.

APPRAISED AND ACTUAL PROJECT COSTS

Table A3.1: Appraised Project Costs
(\$'000)

Item	Appraisal Amounts		Total Cost
	Foreign Exchange ^a	Local Currency ^d	
A. Community Environmental Sanitation Improvement			
1. Public health awareness program	131	369	500
2. Local small-scale sanitation	3	189	192
3. Sanitation credit scheme	98	887	985
4. Sullage pipes	7	62	69
Subtotal (A)	239	1,507	1,746
B. Water Supply			
1. Headworks	3,274	1,699	4,973
2. Water treatment plant	3,474	3,742	7,216
3. Transmission and distribution network	15,363	12,162	27,525
4. Service connections and meters	3,021	1,275	4,296
5. Mechanical and electrical equipment	7,144	1,568	8,712
6. Construction and/or O&M equipment	763	144	877
7. Land acquisition and compensation	3,274	2,900	2,900
Subtotal (B)	33,039	23,460	56,499
C. Drainage and Sanitation			
1. Drainage	1,497	2,779	4,276
2. Sanitation improvements	487	729	1,216
3. Construction and/or O&M equipment	741	111	852
4. Land acquisition and compensation	0	330	330
Subtotal (C)	2,725	3,949	6,674
D. Implementation Assistance and Capacity Building			
1. Design and construction supervision	2,387	2,336	4,723
2. Project orientation assistance	616	431	1,047
3. Capacity building for PPMUs and WSCs	299	317	616
4. Engineering investigations and survey	151	307	458
5. PCU costs	84	533	617
6. PPMU costs	341	1,058	1,399
7. Computer hardware and software	153	47	200
8. Training programs	8	93	101
Subtotal (D)	4,039	5,122	9,161
Total base cost (A–D)	40,042	34,038	74,080
E. Contingencies			
1. Physical contingencies ^b	4,004	3,404	7,408
2. Price contingencies ^c	5,261	4,239	9,500
Subtotal (E)	9,265	7,643	16,908
F. Interest during Construction	1,051	5,914	6,965
Total	50,358	47,595	97,953

O&M = operation and maintenance, PCU = project coordination unit, PPMU = provincial project management unit, WSC = water supply company.

^a Includes both direct and indirect foreign exchange costs.

^b 10% for all categories.

^c 2.4% per year for foreign exchange and local currency costs.

^d Includes duties and taxes estimated at \$5.6 million.

Source: ADB estimates.

Table A3.2: Actual Project Costs
(\$'000)

Item	Actual Amounts		
	Foreign Exchange ^a	Local Currency ^d	Total Cost
A. Community Environmental Sanitation Improvement			
1. Public health awareness program	140	395	545
2. Local small-scale sanitation	3	202	206
3. Sanitation credit scheme	105	949	1,054
4. Sullage pipes	8	66	74
Subtotal (A)	256	1,612	1,868
B. Water Supply			
1. Headworks	3,503	1,818	5,321
2. Water treatment plant	3,717	4,004	7,720
3. Transmission and distribution network	16,437	13,012	29,449
4. Service connections and meters	3,232	1,364	4,596
5. Mechanical and electrical equipment	7,643	1,678	9,321
6. Construction and/or O&M equipment	816	122	938
7. Land acquisition and compensation	.	3,103	3,103
Subtotal (B)	35,348	25,100	56,499
C. Drainage and Sanitation			
1. Drainage	1,602	2,973	4,575
2. Sanitation improvements	521	780	1,301
3. Construction and/or O&M equipment	793	119	912
4. Land acquisition and compensation	.	353	353
Subtotal (C)	2,915	4,225	7,141
D. Implementation Assistance and Capacity Building			
1. Design and construction supervision	2,554	2,499	5,053
2. Project orientation assistance	659	461	1,120
3. Capacity building for PPMUs and WSCs	320	339	659
4. Engineering investigations and survey	162	328	490
5. PCU costs	90	570	660
6. PPMU costs	365	1,132	1,497
7. Computer hardware and software	164	50	214
8. Training programs	9	100	108
Subtotal (D)	4,321	5,480	9,801
Total base cost (A–D)	42,840	36,417	75,309
E. Contingencies			
1. Physical contingencies ^b	4,284	3,642	7,926
2. Price contingencies ^c	5,629	4,535	10,164
Subtotal (E)	9,913	8,177	18,090
F. Interest during Construction	1,124	6,327	7,452
Total	53,878	50,922	104,800

O&M = operation and maintenance, PCU = project coordination unit, PPMU = provincial project management unit, WSC = water supply company.

^a Includes both direct and indirect foreign exchange costs.

^b 10% for all categories.

^c 2.4% per year for foreign exchange and local currency costs.

^d Includes duties and taxes estimated at \$5.6 million.

Source: ADB estimates.

CONTRACT AWARDS AND DISBURSEMENT DATA**Table A4: Cumulative Contract Awards and Disbursements as of 31 May 2011**
(\$ million)

Milestone date or year	Contract awards and/or commitments		Disbursements	
	Projected	Actual	Projected	Actual
Approved on 13 December 2001				
Signed on 2 April 2002				
Effective from 17 September 2002				
2003	5.00	7.32	0.95	1.21
2004	6.50	9.28	1.30	2.53
2005	16.10	10.07	6.80	6.24
2006	43.10	36.46	12.30	11.77
2007	50.60	43.77	22.30	24.43
2008	52.60	45.25	40.30	37.68
2009	68.80	61.90	50.80	54.93
2010	70.80	64.95	58.80	66.58
2011		64.97		66.23
As of 30 September 2011	70.80	64.97	58.80	3. 66. 23

Source: Asian Development Bank. Operational Data Store based on the most recent download from the mainframe-based loans and grants information systems.

COMPLIANCE WITH LOAN COVENANTS

No	Covenants and Specific Assurances	Ref.	Deadline	Responsible	Status of Compliance
Project Management Structure					
01	Executing Agencies (EA): Provincial People's Committees (PPC) in Phu Yen, Ninh Thuan, Binh Duong, Tay Ninh and Kien Giang provinces, as EA to be responsible for implementation.	LA Sch 6, para 1	Loan effective-ness	MOC to info PPC	Complied with
02	Provincial Steering Committee (PSC) in each province (except Ninh Thuan - PPC with functions of PSC) to act on behalf of PPC and be overall responsible for Project implementation in the respective province.	LA Sch 6 para 2	31 March 2002	PPC	Complied with
03	Provincial Project Management Units (PPMU) to be set up by EA to be responsible for day-to-day implementation of the Project in the respective province (on behalf of WSC) and report to PSC (PPC in Ninh Thuan).	LA Sch 6 para 3	31 March 2002	PPC	Complied with
04	PPMU staff: Director of WSC, expertise in project management, water supply engineering, sanitary engineering, environmental management, accounting, community education and development. GOV, PSCs and ADB to agree on specific tasks for PSC.	LA Sch 6 para 4	31 March 2002	MOC/ MB/ PPC	Complied with
05	Central Steering Committee (CSC) to be set up to ensure that Project is implemented in accordance with agreed standards. Project Coordination Unit (PCU) to be set up in HCMC to assist CSC, appointed by CSC. PCU Staff: full time professionals with project experience and proficiency in English language. GOV, PCU and ADB to agree on specific tasks for PCU.	LA Sch 6 para 5	31 July 2001	MOC/ PCU	Complied with
06	Upon request from PPMUs, provide assistance in Project implementation, part. on ADB & AFD procedures.	LA Sch 6 para 6	Ongoing	PCU	Complied with
Implementation, Financing of Part A					
07	Public Health Awareness Program (PHAP). Provincial Vietnam Women's Unions (PVWU) to a) implement PHAP, b) sanitation credit scheme, and c) report quarterly and annually.	LA Sch 6 para 7		PVWU	Complied with
08	PHAP materials, manuals and training methods developed under TA No. 2376-VIE, 17.08.95 to be utilized.	LA Sch 6 para 8		PCU/ PPMU/ PVWU	Complied with
09	Community Environmental Sanitation Improvement program (CESI). Funds to be provided by PPMU to a) Project Towns/ District PC to cover 60 % of public sanitation facilities. T/DPC to provide the rest. b) PVWUs through a sanitation credit scheme to meet 50 - 80 % of costs for improving private sanitation facilities.	LA Sch 6 para 9 SA		PPMU T/DPC PVWU	Complied with

No	Covenants and Specific Assurances	Ref.	Deadline	Responsible	Status of Compliance
10	Terms and conditions of a) and b) as agreed between PVWU, PPMU and T/DPC (Schedule 6.9), of which the credit terms of CESI shall be accepted by ADB.	LA Sch 6 para 10		PVWU/ PPMU	Complied with
Resettlement					
11	WSCs to submit Land Acquisition and Resettlement (LAR) Plans to ADB for review and approval.	LA Sch 6 para 11 SA 02	Prior to issue of tender doc.	PPC/ WSC/ PPMU	Complied with
Resettlement completion reports were submitted to ADB for review as a condition for award of civil works contract as per loan agreement.					
12	Complete LAR. WSCs to complete implementation of LARs and obtain legal rights to entry of private property for construction and ongoing maintenance of facilities.	LA Sch 6 para 12 SA 03	Prior to award of contract	WSC/ PPMU	Complied with
The completion reports confirm that the Resettlement Plans were disclosed to the affected people, and land were acquired and that all affected people were fully and appropriately compensated for all their losses in accordance with the approved Resettlement Plan					
13	Funding of LAR. PPCs to ensure sufficient funds for LARs.	LA Sch 6 para 13 SA 04		PPC	Complied with
14	Monitoring of LAR. PPCs to ensure independent M&E of implementation of LAR Plans. PPC to take actions to mitigate identified difficulties.	LA Sch 6 para 14 SA 05	During implem.1 year after completion	PPC/ PPMU	Complied with
15	Quarterly LAR reports. WSCs to provide LAR quarterly PR to PCU for inclusion in PR to ADB.	LA Sch 6 para 15 SA 06		WSC/ PCU	Complied with
The completion reports were verified by the Provincial Women's Union who acted as third party monitoring group for the Project.					
Sanitation Legislation, Regulation					
16	Introduction of regulation. PPCs to introduce regulation on sanitation according to requirements.	LA Sch 6 para 16 SA 07	Before end of 2004	PPC/ MON-RE	Complied with
17	Enforce compliance. GOV to cause PPCs to enforce compliance with sanitation regulation.	LA Sch 6 para 17	Before end of 2006	MON-RE	Complied with
M&E: Operation and Maintenance					
18	Sanitation and drainage systems. PPCs and WSCs to ensure proper management and effective operation of the systems.	LA Sch 6 para 18 SA 09	At commissioning	WSC/ UPWC	Complied with
19	Unaccounted for Water (UFW). WSCs to ensure implementation of UFW program, establish leakage detection teams, install bulk meters, monitor and report UFW on a monthly basis.	LA Sch 6 para 19 SA 10	Ongoing	WSC	Complied with

No	Covenants and Specific Assurances	Ref.	Deadline	Responsible	Status of Compliance
20	M&E benchmarks. PPMUs to submit to PCU detailed plan for establishing M&E benchmarks.	LA Sch 6 para 20 SA 14	6 m's after fielding PIA	PPMU	Complied with
21	M&E Reports. PPMUs to submit annual M&E reports to PCU.		Within 6 m's of end FY		All of M & E Plans have been accepted by ADB. Annual M & E Report have been submitted to ADB.
Financial Matters					
22	Accounts . Separate accounts for construction from water supply operations.	LA Sch 6 para 21	1 y of field PIA		Complied with
23	Payments for connections in installments. WSCs to prepare a credit policy to allow low-income households to pay connection fees in installments over 18 months.	LA Sch 6 para 22 SA 11	Within 6 m's of loan effect.	WSC	All WSCs confirmed separation of the accounts. This covenant is superseded by Decree 117, requiring WSC to pre-finance house connections and charge cost through depreciation charges (part of water tariff) Complied with
24	Water tariffs. PPCs to introduce water tariff structure, and increase tariffs as agreed with ADB (MOU/PA).	LA Sch 6 para 23 SA 08	31 Dec 2002	WSC/ PPC	All the PPCs increased tariffs in the 2008 and 2009 (one time for two years) as agreed with ADB
25	Adjust tariffs based on recommendations from PIA Consultant as discussed between PPCs, WSCs and ADB.				This covenant is superseded by Decree 117, requiring WSC to set tariffs on full cost recovery level
26	Financial sustainability of WSCs. PPCs and WSCs to ensure financial sustainability of WSCs as required.	LA Sch 6 para 24	Report by fin. statement	WSC/ PPC	Being complied with
	a) Tariff levels to cover O&M costs and depreciation or debt service and cover bonus/welfare contribution;				Being complied with
	b) Increase O&M expenditure to at least match increase in water production and domestic inflation;				Being complied with

No	Covenants and Specific Assurances	Ref.	Deadline	Responsible	Status of Compliance
	c) Maintain positive cash flow and balance at year end no less than 30 days worth annual cash O&M expenditure plus debt service; d) Maintain current ratio at no less than 1.0 at end of each year; e) Maintain accounts receivable less than 45 days of sales equivalent; f) Self-finance increasing proportion of annual capital expenditure requirements.				Being complied with Being complied with Partly being complied with Being complied with
Operation and Maintenance					
27	WSCs shall be responsible for O&M of water supply systems and drainage and public sanitation facilities (or UPWC) as specified in LA. Individual households to be responsible for O&M of private sanitation facilities Provincial VWUs to be responsible for operation and administration of sanitation credit schemes.	LA Sch 6 para 25	At commissioning At commissioning	WSC/ UPWC House-holds PVWU	Complied with Complied with Complied with
Implementation reporting requirements					
28	Progress Reports. PPMU submit to PCU, PCU submit to CSC and ADB quarterly progress reports (PR) on carrying out the of Project, expenditure of the proceeds of the Loan, and operation and management of Project facilities (LA Article IV 4.07a/b). Annual projections of contracts award and disbursements with quarterly breakdowns for each contract (Appendix 5 to QPR to be updated quarterly for each PPMU)	LA Sch 6 para 26	PPMU 15 days of end Q PCU 1 m of end Q 1 m of end Q	PPMU/ PCU	Complied with Complied with
Project Accounts					
29	i) PPMUs to set up Project accounts in accordance with GOV regulations, and prepare information for audit according to requirements of GOV and ADB. Audited Accounts and Financial Statements. ii) WSC submit financial statement to auditor (refer MoU/PA). iii) PCU submit to ADB certified copies of audited Project accounts and financial statements and the report of the auditors in English - as soon as available, but not less than 9 months after end of fiscal year (LA Article IV, Section 4.06b)	LA Sch 6 para 27 SA 12 PA 2.09 (a)	Within 1 year of PIA Cons. iii) start from FY 2003	WSC/ PPMU	Complied with Complied with
Project Completion Report (PCR)					
30	After physical completion of the Project, but not later than 3 months, prepare a final report (LA Article IV, Section 4.07c)	PA 2.08 (c)	3 m's after project compl.	PPMU PCU CSC	Complied with

FINANCIAL AND ECONOMIC REEVALUATION

A. General

1. Prior to approval of the Third Provincial Towns Water Supply and Sanitation Project by Asian Development Bank (ADB) in 2002, the viability of the proposed subprojects was determined by conducting both financial and economic analyses of the subprojects for the five water supply companies (WSCs): Binh Duong, Kien Giang, Ninh Thuan, Phu Yen, and Tay Ninh. A reevaluation was done in 2006 during the project's midterm review to include the utilization of loan fund savings from unused contingency allocations. For the project completion review, the internal rate of return for each of the subprojects was recalculated using actual data on costs, revenues, and other benefits. The methodology applied for the reevaluation was based on the following ADB guidelines: *Financial Management and Analysis of Projects* (2005); *Guidelines for the Economic Analysis of Projects* (1997); *Framework for the Economic and Financial Appraisal of Urban Development Sector Projects* (1994); and *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB* (2002).

2. Based on financial reports gathered during the project completion review mission The total investment cost, water tariff level, operating cost, total revenue, and financing plan were updated.

B. Major Assumptions

3. The methodology and assumptions used for the economic and financial evaluation of the subprojects generally followed those used in the subprojects' feasibility studies. Costs and benefits were measured at border price equivalent values using domestic prices, and were expressed at 2010 constant prices in Vietnamese Dong. The project life of each component was assumed to be 30 years with no salvage value assumed thereafter. The economic opportunity cost of capital (EOCC) was assumed to be 12% while the weighted average cost of capital (WACC) was calculated for each subproject. The WACC varies between subprojects because of the differences in the proportions of debt and equity contributions.

4. The quantifiable economic benefits from improved water supply included nonincremental water consumption, valued at the current average price of water; and incremental water consumption, valued at the average demand price of water per cubic meter.

5. From the total actual investment costs, the financial costs adjusted to constant 2010 prices were derived. Furthermore, economic costs were estimated from the detailed financial estimates of total investments. Taxes and duties were deducted from the financial costs then segregated into tradable and nontradable components. The cost figures were then converted to economic prices by applying the appropriate conversion factors: a shadow exchange rate of 1.11, shadow wage rate for unskilled labor of 0.65, and a factor of 1.0 for nontradable components.

6. Total investment costs for the five WSCs ranged from D111,585 million for Tay Ninh to D505,128 million for Binh Duong. Fund sources came from ADB, Agence Française de Développement, and the provincial governments. Costs for the water supply subprojects are summarized in the Table A6.1:

Table A6.1: Summary of Water Supply Investment Costs
(D'000)

Item	Binh Duong	Kien Giang	Ninh Thuan	Phu Yen	Tay Ninh
Funds Application					
Land acquisition and compensation	15,693	4,080	1,176	1,422	6,188
Headworks	44,854	12,938	856	10,306	5,940
Water treatment plant	280,709	102,139	146,456	47,363	46,761
Transmission and distribution network	163,872	23,720	56,550	120,698	35,062
Service connections and meters				4,255	6,187
Construction and/or monitoring and evaluation equipment		1,864	2,980	4,808	11,447
Total	505,128	144,741	208,018	188,852	111,585
Funds Sources					
Asian Development Bank	331,287	82,277	165,446	125,802	68,655
Agence Française de Développement	90,296	21,518	18,943	36,838	12,837
Provincial governments	83,545	40,946	23,629	26,212	30,093
Total (D'000)	505,128	144,741	208,018	188,852	111,585
Total (\$'000)	29,943	11,325	12,657	11,534	5,879
Financial cost ^a	493,711	196,645	200,986	167,587	111,553
Economic cost ^b	301,657	115,589	125,398	98,187	61,925

^a Adjusted to 2010 constant prices.

^b Financial cost was converted to economic cost by applying the appropriate conversion factors.

Source: water supply companies.

7. Water tariffs for all five WSCs have been adjusted since implementation of the subprojects. This is in compliance with the loan covenants regarding cost recovery of investments, operations, maintenance and depreciation. The comparative water tariffs for years 2000, 2006 and 2010 are presented below:

Table A6.2: Comparative Water Tariffs: 2000, 2006, 2010
(D/cubic meter)

Province and customer category	At appraisal 2002 ^a	At midterm review 2006 ^b	At completion 2010 ^c
Ninh Thuan			2010
Domestic			
Block 1	2,500	2,800	3,900
Block 2	3,000	4,200	
Block 3	4,000	5,000	
Block 4	5,000	7,000	
Industrial	5,200	6,400	8,200
Commercial	7,600	10,000	11,600
Institutional	4,000	5,000	7,000

Table A6.2 Comparative Water Tariffs: 2000, 2006, 2010 (Cont.)
(D/cubic meter)

Province and customer category	At appraisal 2002 ^a	At midterm review 2006 ^b	At completion 2010 ^c
Phu Yen			July 2009
Domestic			
Block 1	1,250	2,000	4,000
Block 2	2,000	2,500	5,000
Industrial	3,500	3,500	7,000
Commercial	5,000	5,000	8,000
Institutional	2,500	2,500	6,000
Binh Duong			September 2009
Domestic	2,300	3,000	
Block 1			4,000
Block 2			5,000
Block 3			6,500
Block 4			8,000
Industrial	4,000	4,400	6,500
Commercial	4,500	5,100	8,000
Institutional	2,700	3,300	6,500
Tay Ninh			April 2009
Domestic	2,300	2,700	
Block 1			
Block 2			3,900
Block 3			4,900
Block 4			6,100
Industrial	3,500	4,500	8,900
Commercial	4,500	5,000	7,900
Institutional	2,800	3,400	8,900
Kien Giang			2009
Domestic	2,330	3,550	4,850
Industrial	2,530	4,550	6,500
Commercial	3,330	5,550	7,500
Institutional	2,330	3,550	4,850

^a ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project*. Manila (Loan 1880-VIE, approved on 22 November).

^b ADB. 2006. Midterm review mission report (L1880-VIE). Manila.

^c Water supply companies.

Sources: As noted above.

C. Economic Analysis

8. The economic viability of the subprojects was assessed by computing the economic internal rate of return (EIRR) and comparing the results with the EOCC. Subprojects with EIRR higher than EOCC were deemed economically viable. The net present value (NPV) of benefits and costs over the assumed horizon of 30 years was also calculated using EOCC as the discount rate. For NPV, the viability of the subprojects was based on whether their respective discounted economic benefits exceeded the economic costs. The economic analysis was performed using the incremental costs (capital, operating, and maintenance) and benefits arising from the investments.

9. The economic costs of capital works are computed from the actual disbursements for the project during the implementation period with the following adjustments: (i) taxes, duties, and subsidies are excluded; (ii) tradable input is valued at the domestic price numeraire using the shadow exchange rate factor of 1.11; (iii) unskilled labor is set at a shadow price that is 0.65 of the market price to reflect the country's level of unskilled labor underemployment; and (iv) land is valued at the market price, which is considered to best reflect its opportunity cost. It is further assumed that the economic life of the project will be 30 years from 2003 to 2032, after which all project assets are assigned a zero salvage value.

10. Apart from the community obtaining water at a lower cost under the project, which by itself will induce more water consumption, the project is also likely to result in greater quantities of water being used per capita (incremental water). The benefit of the additional water available is equivalent to the willingness to pay for an improved water supply as reflected in the water tariffs and connection charges.

11. The recalculated EIRRs in the five project towns ranged from 11.3% to 18.8%. That compares with the 13.7% to 19.9% estimated during appraisal and 17.3% to 22.6% during the midterm review. The reason the recalculated EIRRs are slightly lower than those estimated at appraisal is mainly due to the higher investment costs. The recalculated EIRRs are compared with those estimated at appraisal and midterm review in Table A6.3

Table A6.3: Comparative Economic Internal Rates of Return, by Subproject

Water supply company	At appraisal ^a		At midterm review ^b		At completion ^c	
	EIRR (%)	ENPV (D'million)	EIRR (%)	ENPV (D'million)	EIRR (%)	ENPV (D'million)
Binh Duong	19.0	153,451	22.6	-	12.71	15,542
Kien Giang	19.9	147,462	18.7	-	18.82	50,573
Ninh Thuan	15.5	36,549	19.5	-	16.16	32,551
Phu Yen	14.2	2,753	17.3	-	13.48	8,139
Tay Ninh	13.7	12,224	19.9	-	11.31	(2,603)

EIRR = economic internal rate of return, ENPV = economic net present value.

^a ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project*. Manila (Loan 1880-VIE, approved on 22 November).

^b ADB, 2006. Midterm review mission report (L1880-VIE). Manila.

^c Project completion review mission consultant's estimates.

Sources: As noted above.

D. Financial Analysis

12. The financial analysis establishes the financial viability of the individual subproject investment and involves calculating the financial internal rate of return (FIRR) and NPV and then comparing the FIRR result with the estimated WACC for the operating entity. A given subproject's NPV is considered to indicate financial viability if that value is positive.

13. Actual investment costs were incorporated into the analyses based on actual project disbursements made from 2003 to 2007. The actual operating and maintenance expenses from 2008 to 2010 were provided by each of the WSCs. Operation and maintenance costs include expenses for personnel, electricity, chemicals, administration and other operating expenses. Since

the financial statements reflect the entire operation of the WSC, however, a proportion was assumed to estimate the incremental costs attributable to the project.

14. Similarly, the revenues were based on incremental increase brought about by the project. Two revenue streams were projected for the computation of FIRR and NPV. The revenue from improved water supply included nonincremental water consumption, valued at the current average price of water, and incremental water consumption, valued at the average demand price of water per cubic meter.

15. The resulting FIRRs and NPVs are summarized in Table A6.4. Of the five subprojects, three were found to be financially viable, with FIRRs ranging from 5.34% to 6.95% and all of which are above their respective WACCs. However, two of the subprojects, Ninh Thuan and Tay Ninh, have recalculated FIRRs lower than their computed WACCs.

Table A6.4: Comparative Financial Internal Rates of Return, by Subproject

Water supply company	At appraisal ^a			At midterm review ^b			At completion ^c		
	WACC (%)	FIRR (%)	NPV (D'million)	WACC (%)	FIRR (%)	FNPV (D'million)	WACC (%)	FIRR (%)	NPV (D'million)
Binh Duong	3.0	3.4	14,775	3.21	5.31	53,504	4.16	6.95	149,350
Kien Giang	2.7	3.0	6,330	3.11	4.04	18,668	3.28	5.34	44,440
Ninh Thuan	1.7	3.0	40,494	4.34	4.59	5,735	4.69	2.02	(50,944)
Phu Yen	1.8	3.3	47,613	3.49	3.55	930	4.26	6.02	27,871
Tay Ninh	2.2	2.6	4,386	3.09	4.06	13,121	2.91	1.81	(12,726)

FNPV = financial net present value, FIRR = financial internal rate of return, WACC = weighted average cost of capital.

^a ADB, 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project*. Manila (Loan 1880-VIE, approved on 22 November).

^b ADB, 2006. Midterm review mission report (L1880-VIE). Manila.

^c Project completion review mission consultant's estimates.

Sources: As noted above.

E. Sustainability Analysis

16. Service coverage of the five subproject towns varies at 46% population coverage in Tuy Hoa (Phu Yen WSC), 58% in Rach Giah (Kien Giang WSC), 60% in Phan Rang (Ninh Thuan WSC), 62% in Tay Ninh (Tay Ninh WSC), and 75% in Thu Dau Mot (Binh Duong WSC).

17. Nonrevenue water (NRW) levels have likewise declined significantly since completion of the project. Overall NRW was reduced from the earlier 32%–54% to 9%–28%. The WSCs' current NRW levels are as follow: Binh Duong at 9.3%, Kien Giang at 28.1%, Ninh Thuan at 25.1%, Phu Yen at 21.3%, and Tay Ninh at 25.8%.

18. Personnel numbers vary between 5 and 24 employees per 1,000 connections. Binh Duong appears to be the most cost-efficient at 5 staff per 1,000 connections, followed by Phu Yen and Tay Ninh at 6 and 7 staff per 1,000 connections. On the other hand, Kien Giang and Ninh Thuan have high staff complements of 17 and 24 employees per 1,000 connections, respectively. Compared with the before-project situation (at appraisal), only Kien Giang WSC has increased its number of staff per 1,000 connections—from 10 to 17.

Table A6.5: Comparative Data on WSC Staffing Levels (2010)

Water supply company	At appraisal			At completion		
	Number of personnel	Number of connections	Staff/1,000 connections	Number of personnel	Number of connections	Staff/1,000 connections
Binh Duong	100	5,180	19	302	54,977	5
Kien Giang	175	16,700	10	368	21,823	17
Ninh Thuan	146	6,070	24	146	6,070	24
Phu Yen	43	5,790	7	185	30,577	6
Tay Ninh	89	5,180	17	113	16,137	7

Source: water supply companies.

19. Financial analysis was undertaken for each WSC on a stand-alone basis. The WSCs prepare annual financial statements composed of a balance sheet, income statement, and cash flow statement. All the WSCs account for depreciation. The assessment of past financial performance was based on the financial statements provided by the five WSCs for 2008 to 2010. These years represent the period immediately after completion of the subprojects.

20. The key financial indicators used in the analysis are the current ratio, which provides a measure of the adequacy of working capital and short-term liquidity; the revenues to total assets ratio, which shows an entity's ability to maximize the use of its resources to generate revenue; the operating ratio, which relates to the entity's efficiency in using its workforce, materials, transport, and other factors of production; the debt service coverage ratio, which measures the extent that the entity's debt service is covered by its internally generated cash over a defined period; and the self-financing ratio, which reflects the contribution to expansion or investment.

21. The Phu Yen WSC had more than enough resources to pay its short-term debts, with an average current ratio of 3.31. Operating costs averaged 0.70 of operating revenues for the past 3 years, meaning that operating expenses consumed 70% of operating revenues. The revenue generated by the company as a proportion of its assets was low at 0.14 but enough to cover debt payments, as its average debt service coverage was 4.65 in 2008 to 2010.

22. The Kien Giang WSC likewise showed a favorable current ratio at an average of 2.23. This means receivables were twice as great as its current payables. The revenues generated relative to its assets were high at 0.24, while its average operating ratio was 0.82. Average debt service coverage ratio is a high 10.45, which shows good coverage of the company's debt service requirements. The self-financing ratio was likewise high at 4.02.

23. The Ninh Thuan WSC showed a very weak performance, specifically for 2010 when it reported negative net income and negative cash flow. The big net loss in 2010 was due to a large increase in the cost of goods sold in that year, which grew by 28% from 2009 to 2010. Despite its having a high current ratio, there was a sudden increase in liabilities due to an increase in its investments funded from borrowings. The average operating ratio was above 1.0 which means that expenses were higher than revenues. To improve its financial operations, there is a need to further increase its water tariff or to control its expenses.

24. The Binh Duong WSC has an average current ratio of 0.96 from 2008 to 2010. A ratio substantially above 1.0 is generally deemed necessary but with steady inflows of funds from monthly billings, a current ratio marginally below 1.0 may still be acceptable. The debt service coverage ratio, however, was high at 4.5 and the self-financing ratio stood at 0.43.

25. The Tay Ninh WSC's current ratio declined significantly from 0.93 in 2009 to 0.22 in 2010, which means that short-term liabilities are not fully covered by assets that are in the short term readily converted (or convertible) into cash to cover those obligations. The operating ratio was very low at 0.57. The debt service coverage was a very low 0.32, which points to very low coverage of its debt service from its internal cash sources.

26. The financial ratios based upon historical averages during the 3 years from 2008 to 2010 are summarized in Table A6.6:

Table A6.6: Historical Average Financial Ratios, 2008–2010

Ratio	Phu Yen	Kien Giang	Binh Duong	Ninh Thuan	Tay Ninh
Current ratio	3.31	2.23	0.96	7.30	0.70
Revenue to total assets	0.14	0.24	0.16	0.16	0.18
Operating ratio	0.70	0.82	0.68	1.04	0.57
Debt service coverage	4.65	10.45	4.50	1.73	0.32
Self-financing ratio	0.15	4.02	0.43	0.05	0.99

Source: Consultant's estimate based on WSC's financial statements.

27. Details of the financial and economic evaluation for the five WSCs are presented in Tables A6.7 to A6.16.

Table A6.7: Financial Evaluation, Binh Duong Water Supply Company

Year	Water sold		Financial revenues (D'million)			Financial costs (D'million)			Net financial benefits (D'million)
	No. of connections	Volume (‘000 m ³)	Nonincre- mental	Incremental	Total	Investment	Incremental O&M	Total	
2003						31,749		31,749	(31,749)
2004									
2005						20,937		20,937	(20,937)
2006						52,714		52,714	(52,714)
2007	5,180					191,226		191,226	(191,226)
2008	12,448	7,962		39,810	39,810	91,009	2,633	93,642	(53,832)
2009	19,038	15,182		75,912	75,912	156,063	23,944	180,007	(104,095)
2010	22,438	24,582	16,798	94,534	111,332	76,534	59,083	135,617	(24,286)
2011	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2012	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2013	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2014	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2015	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2016	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2017	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2018	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2019	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2020	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2021	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2022	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2023	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2024	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2025	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2026	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2027	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2028	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2029	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2030	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2031	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
2032	22,438	24,582	16,798	94,534	111,332		59,083	59,083	52,248
NPV	275,167	288,113	184,816	1,128,376	1,313,192	493,711	670,131	1,163,841	149,350
D per m ³ sold					4,558	1,714	2,326	4,040	518
Weighted average cost of capital (WACC)									4.16%
Average incremental financial cost (AIFC)									4,040
Financial internal rate of return (FIRR)									6.95%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies.

Table A6.8: Economic Evaluation, Binh Duong Water Supply Company

Year	Volume of water sold (‘000 m ³)			Economic benefits (D'million)			Economic costs (D'million)			Net economic benefits (D'million)
	Nonincre- mental	Incremental	Total	Nonincre- mental	Incremental	Total	Investment	O&M	Total	
2003							27,701		27,701	(27,701)
2004										
2005							18,564		18,564	(18,564)
2006							47,145		47,145	(47,145)
2007							172,091		172,091	(172,091)
2008		7,962	7,962		39,810	39,810	82,230	2,351	84,582	(44,771)
2009		15,182	15,182		75,912	75,912	145,052	21,378	166,431	(90,519)
2010	5,675	18,907	24,582	36,569	94,534	131,103	71,371	52,753	124,124	6,979
2011	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2012	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2013	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2014	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2015	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2016	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2017	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2018	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2019	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2020	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2021	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2022	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2023	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2024	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2025	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2026	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2027	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2028	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2029	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2030	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2031	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
2032	5,675	18,907	24,582	36,569	94,534	131,103		52,753	52,753	78,350
NPV@12%	19,813	76,913	96,727	127,678	384,566	512,244	301,657	195,044	496,702	15,542
D per m ³ sold						5,296	3,119	2,016	5,135	161
Economic opportunity cost of capital (EOCC)										12.00%
Average incremental economic cost (AIEC)										5,135
Economic internal rate of return (EIRR)										12.71%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.9: Financial Evaluation, Kien Giang Water Supply Company

Year	Water sold		Financial revenues (D'million)			Financial costs (D'million)			Net financial benefits (D'million)
	No. of connections	Volume (³ 000 m)	Nonincre- mental	Incremental	Total	Investment	Incremental O&M	Total	
2003						7,729		7,729	(7,729)
2004						2,282		2,282	(2,282)
2005						19,417		19,417	(19,417)
2006						26,816		26,816	(26,816)
2007	16,700	4,450	11,215		11,215	52,462		52,462	(41,247)
2008	20,925	4,450	11,215		11,215	54,034	5,232	59,266	(48,051)
2009	28,047	7,495	11,215	14,764	25,979	42,272	7,546	49,818	(23,839)
2010	33,310	8,901	11,215	21,585	32,800	29,697	16,173	45,870	(13,070)
2011	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2012	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2013	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2014	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2015	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2016	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2017	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2018	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2019	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2020	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2021	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2022	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2023	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2024	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2025	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2026	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2027	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2028	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2029	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2030	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2031	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
2032	33,310	8,901	11,215	21,585	32,800		16,173	16,173	16,627
NPV	478,346	126,870	170,662	286,863	457,526	196,645	216,441	413,086	44,440
D per m ³ sold					3,606	1,550	1,706	3,256	350
Weighted average cost of capital (WACC)									3.28%
Average incremental financial cost (AIFC)									3,256
Financial internal rate of return (FIRR)									5.34%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.10: Economic Evaluation, Kien Giang Water Supply Company

Year	Volume of water sold (⁰⁰⁰ m ³)			Economic benefits (D'million)			Economic costs (D'million)			Net economic benefits (D'million)
	Nonincre- mental	Incremental	Total	Nonincre- mental	Incremental	Total	Investment	O&M	Total	
2003							6,743		6,743	(6,743)
2004							1,995		1,995	(1,995)
2005							17,216		17,216	(17,216)
2006							23,983		23,983	(23,983)
2007	4,450		4,450	27,891		27,891	47,213		47,213	(19,322)
2008	4,450		4,450	27,891		27,891	48,822	4,672	53,493	(25,602)
2009	4,450	3,044	7,495	27,891	14,764	42,655	39,290	6,738	46,027	(3,372)
2010	4,450	4,450	8,901	27,891	21,585	49,476	27,694	14,440	42,133	7,342
2011	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2012	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2013	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2014	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2015	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2016	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2017	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2018	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2019	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2020	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2021	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2022	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2023	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2024	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2025	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2026	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2027	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2028	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2029	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2030	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2031	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
2032	4,450	4,450	8,901	27,891	21,585	49,476		14,440	14,440	35,036
NPV@12%	22,332	16,915	39,247	139,952	82,040	221,992	115,589	55,830	171,419	50,573
D per m ³ sold						5,656	2,945	1,423	4,368	1,289
Economic opportunity cost of capital (EOCC)										12.00%
Average incremental economic cost (AIEC)										4,368
Economic internal rate of return (EIRR)										18.82%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.11: Financial Evaluation, Ninh Thuan Water Supply Company

Year	Water sold		Financial revenues (D'million)			Financial costs (D'million)			Net financial benefits (D'million)
	No. of connections	Volume ('000 m ³)	Nonincrem- ental	Incremental	Total	Investment	Incremental O&M	Total	
2003									
2004									
2005									
2006						24,042		24,042	(24,042)
2007	11,080	2,811	3,232		3,232	122,607		122,607	(119,375)
2008	24,082	3,800	3,232	3,860	7,092	60,921	2,535	63,456	(56,363)
2009	35,401	5,587	3,232	10,827	14,059	38,366	5,773	44,138	(30,079)
2010	43,574	6,876	3,232	15,857	19,089	13,558	7,132	20,690	(1,601)
2011	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2012	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2013	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2014	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2015	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2016	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2017	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2018	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2019	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2020	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2021	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2022	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2023	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2024	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2025	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2026	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2027	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2028	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2029	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2030	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2031	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
2032	46,612	7,356	3,232	17,727	20,959		7,132	7,132	13,827
NPV	520,248	82,945	39,929	188,072	228,001	200,986	77,960	278,945	(50,944)
D per m ³ sold					2,749	2,423	940	3,363	(614)
Weighted average cost of capital (WACC)									4.69%
Average incremental financial cost (AIFC)									3,363
Financial internal rate of return (FIRR)									2.02%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.12: Economic Evaluation, Ninh Thuan Water Supply Company

Year	Volume of water sold (’000 m ³)			Economic benefits (D'million)			Economic costs (D'million)			Net economic benefits (D'million)
	Nonincre- mental	Incremental	Total	Nonincre- mental	Incremental	Total	Investment	O&M	Total	
2003										
2004										
2005										
2006							21,502		21,502	(21,502)
2007	2,811		2,811	23,052		23,052	110,338		110,338	(87,286)
2008	2,811	990	3,800	23,052	3,860	26,912	55,045	2,263	57,308	(30,396)
2009	2,811	2,776	5,587	23,052	10,827	33,879	35,659	5,154	40,813	(6,934)
2010	2,811	4,066	6,876	23,052	15,857	38,909	12,643	6,368	19,011	19,898
2011	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2012	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2013	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2014	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2015	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2016	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2017	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2018	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2019	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2020	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2021	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2022	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2023	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2024	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2025	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2026	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2027	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2028	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2029	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2030	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2031	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
2032	2,811	4,545	7,356	23,052	17,727	40,779		6,368	6,368	34,411
NPV@12%	14,103	17,433	31,536	115,670	67,990	183,660	125,398	25,711	151,108	32,551
D per m ³ sold						5,824	3,976	815	4,792	1,032
Economic opportunity cost of capital (EOCC)										12.00%
Average incremental economic cost (AIEC)										4,792
Economic internal rate of return (EIRR)										16.16%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.13: Financial Evaluation, Phu Yen Water Supply Company

Year	Water sold		Financial revenues (D'million)			Financial costs (D'million)			Net financial benefits (D'million)
	No. of connections	Volume (³ 000 m)	Nonincre- mental	Incremental	Total	Investment	Incremental O&M	Total	
2003						1,213		1,213	(1,213)
2004						239		239	(239)
2005									
2006						132		132	(132)
2007	5,790	2,701	10,288		10,288	57,197		57,197	(46,909)
2008	9,843	2,701	10,288		10,288	56,543	5,013	61,556	(51,268)
2009	17,769	4,754	10,288	10,264	20,552	76,423	6,035	82,458	(61,906)
2010	20,601	5,512	10,288	14,053	24,341	25,962	8,414	34,376	(10,036)
2011	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2012	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2013	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2014	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2015	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2016	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2017	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2018	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2019	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2020	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2021	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2022	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2023	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2024	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2025	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2026	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2027	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2028	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2029	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2030	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2031	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
2032	20,601	5,512	10,288	14,053	24,341		8,414	8,414	15,926
NPV	248,326	67,424	135,255	159,571	294,826	167,587	99,368	266,955	27,871
D per m ³ sold					4,373	2,486	1,474	3,959	413
Weighted average cost of capital (WACC)									4.26%
Average incremental financial cost (AIFC)									3,959
Financial internal rate of return (FIRR)									6.02%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.14: Economic Evaluation, Phu Yen Water Supply Company

Year	Volume of water sold ('000 m ³)			Economic benefits (D'million)			Economic costs (D'million)			Net economic benefits (D'million)
	Nonincre- mental	Incremental	Total	Nonincre- mental	Incremental	Total	Investment	O&M	Total	
2003							1,058		1,058	(1,058)
2004							209		209	(209)
2005										
2006							118		118	(118)
2007	2,701		2,701	16,652		16,652	51,473		51,473	(34,822)
2008	2,701		2,701	16,652		16,652	51,089	4,476	55,565	(38,913)
2009	2,701	2,053	4,754	16,652	10,264	26,916	71,031	5,388	76,420	(49,504)
2010	2,701	2,811	5,512	16,652	14,053	30,704	24,211	7,513	31,723	(1,019)
2011	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2012	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2013	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2014	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2015	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2016	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2017	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2018	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2019	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2020	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2021	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2022	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2023	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2024	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2025	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2026	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2027	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2028	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2029	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2030	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2031	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
2032	2,701	2,811	5,512	16,652	14,053	30,704		7,513	7,513	23,191
NPV@12%	13,553	10,741	24,294	83,555	53,706	137,262	98,187	30,936	129,122	8,139
D per m ³ sold						5,650	4,042	1,273	5,315	335
Economic opportunity cost of capital (EOCC)										12.00%
Average incremental economic cost (AIEC)										5,315
Economic internal rate of return (EIRR)										13.48%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.15: Financial Evaluation, Tay Ninh Water Supply Company

Year	Water sold		Financial revenues (D'million)			Financial costs (D'million)			Net financial benefits (D'million)
	No. of connections	Volume ('000 m ³)	Nonincre- mental	Incremental	Total	Investment	Incremental O&M	Total	
2003						5,551		5,551	(5,551)
2004						497		497	(497)
2005						6,997		6,997	(6,997)
2006						5,180		5,180	(5,180)
2007	5,180	1,229	1,463		1,463	17,608		17,608	(16,145)
2008	6,597	1,565	1,463	1,310	2,774	44,174	309	44,483	(41,709)
2009	8,788	2,084	1,463	3,337	4,801	21,015	832	21,847	(17,047)
2010	12,237	2,902	1,463	6,528	7,991	31,453	1,201	32,654	(24,662)
2011	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2012	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2013	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2014	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2015	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2016	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2017	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2018	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2019	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2020	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2021	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2022	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2023	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2024	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2025	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2026	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2027	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2028	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2029	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2030	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2031	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
2032	12,237	2,902	1,463	6,528	7,991		1,201	1,201	6,791
NPV	183,449	43,512	23,574	92,504	116,078	111,553	17,251	128,804	(12,726)
D per m ³ sold					2,668	2,564	396	2,960	(292)
Weighted average cost of capital (WACC)									2.91%
Average incremental financial cost (AIFC)									2,960
Financial internal rate of return (FIRR)									1.81%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies

Table A6.16: Economic Evaluation, Tay Ninh Water Supply Company

Year	Volume of water sold (⁰⁰⁰ m ³)			Economic benefits (D'million)			Economic costs (D'million)			Net economic benefits (D'million)
	Nonincre- mental	Incremental	Total	Nonincre- mental	Incremental	Total	Investment	O&M	Total	
2003							4,843		4,843	(4,843)
2004							434		434	(434)
2005							6,204		6,204	(6,204)
2006							4,633		4,633	(4,633)
2007	1,229		1,229	7,688		7,688	15,846		15,846	(8,158)
2008	1,229	336	1,565	7,688	1,310	8,998	39,913	276	40,189	(31,191)
2009	1,229	856	2,084	7,688	3,337	11,025	19,533	743	20,276	(9,251)
2010	1,229	1,674	2,902	7,688	6,528	14,216	29,331	1,072	30,403	(16,188)
2011	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2012	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2013	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2014	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2015	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2016	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2017	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2018	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2019	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2020	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2021	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2022	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2023	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2024	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2025	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2026	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2027	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2028	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2029	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2030	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2031	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
2032	1,229	1,674	2,902	7,688	6,528	14,216		1,072	1,072	13,144
NPV@12%	6,165	6,401	12,567	38,575	24,965	63,540	61,925	4,219	66,144	(2,603)
D per m ³ sold						5,056	4,928	336	5,264	(207)
Economic opportunity cost of capital (EOCC)										12.00%
Average incremental economic cost (AIEC)										5,264
Economic internal rate of return (EIRR)										11.31%

m³ = cubic meter, NPV = net present value, O&M = operation and maintenance.

Source: water supply companies