Performance Evaluation Report

Reference Number: PPE:VIE 2008-77
Project Number: 27405
Loan Number: 1514-VIE(SF)
December 2008

Viet Nam: Second Provincial Towns Water Supply and Sanitation Project

Operations Evaluation Department

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – dong (D)

		At Appraisal (31 October 1996)	At Project Completion (30 June 2005)	At Operations Evaluation (9 May 2008)
D1.00	=	$0.0000909	$0.000630358	$0.00008135
$1.00	=	D11,000	D15,864	D16,299

ABBREVIATIONS

ADB	–	Asian Development Bank
BME	–	benefit monitoring and evaluation
BTOR	–	back-to-office report
CPMU	–	central project management unit
EA	–	executing agency
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
ICB	–	international competitive bidding
LCB	–	local competitive bidding
MDG	–	Millennium Development Goal
MOC	–	Ministry of Construction
MPI	–	Ministry of Planning and Investment
NRW	–	nonrevenue water
O&M	–	operation and maintenance
ODA	–	official development assistance
OED	–	Operations Evaluation Department
OEM	–	operations evaluation mission
PCR	–	project completion report
PEEP	–	Public Environmental Education Program
PPC	–	provincial people's committee
PPIO	–	provincial project implementation office
PPTA	–	project preparatory technical assistance
PSC	–	project steering committee
SDR	–	Special Drawing Rights
TA	–	technical assistance
UNV	–	United Nations volunteer
UPEC	–	Urban Public Environment Company
VRM	–	Viet Nam Resident Mission
VWU	–	Viet Nam Women's Union
WSC	–	water supply company
WTP	–	water treatment plant

WEIGHTS AND MEASURES

km	–	kilometer
l	–	liter
lpcd	–	liter per capita per day
m^3/day	–	cubic meter per day
m	–	meter
mg/l	–	milligram per liter
mm	–	millimeter

NOTE

In this report, "$" refers to US dollars.

KEYWORDS

vietnamese urban development evaluation, viet nam water supply project evaluation, viet nam provincial towns water supply and sanitation, vietnamese public health, millennium development goals, adb, evaluation, asian development bank, public hygiene, public environmental education program

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The guidelines formally adopted by the Operations Evaluation Department (OED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. Director, OED1 recused himself from the review and approval of this report due to his previous involvement in the country operation of Viet Nam. To the knowledge of the management of OED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

APPENDIXES

Attachment: Management Response

BASIC DATA
Loan 1514-VIE(SF): Second Provincial Towns Water Supply and Sanitation Project in Viet Nam

Program Preparation

TA No.	TA Name	Type	Amount ($)	Approval Date
2146	Second Provincial Towns Water Supply and Sanitation Project	PPTA	500,000	17 August 1995

KEY PROJECT DATA (in $ million)	**As per ADB Loan Documents**	**Actual**
Total Project Cost	92.00	71.97
Foreign Exchange Cost	47.13	50.82
Local Currency Cost	44.87	21.15
ADB Loan Amount/Utilization	69.00	59.27
ADB Loan Amount/Cancellation		6.48

KEY DATES	**Expected**	**Actual**
Fact-Finding		3–18 April 1996
Appraisal		18–31 August 1996
Board Approval		27 February 1997
Loan Agreement		11 June 1997
Loan Effectiveness	09 September 1997	17 November 1997
Loan Closing	30 June 2002	29 March 2006
Number of Extensions		2

Developing Member Country	Socialist Republic of Viet Nam
Executing Agency	Ministry of Construction

MISSION DATA	**No. of Missions**	**No. of Person-Days**
Type of Mission		
Fact-Finding	1	48
Appraisal	2	98
Inception	1	26
Project Administration		
Review	19	304
Special Project Administration	4	11
Project Completion Review	1	30
Operations Evaluation	1	43

PROJECT PERFORMANCE REPORT RATINGS

Implementation Period	**Development Objective**	**Implementation Progress**
17 November 1997–31 December 1998	S	S
1 January 1999–31 December 1999	S	S
1 January 2000–31 December 2000	S	S
1 January 2001–30 June 2001	HS	S
1 July 2001–31 December 2001	HS	S
1 January 2002–31 March 2002	HS	S
1 April 2002–30 June 2002	HS	S
1 July 2002–30 September 2002	HS	PS
1 October 2002–31 December 2002	S	S
1 January 2003–31 December 2003	S	S
1 January 2004–31 December 2004	S	PS
1 January 2005–31 December 2005	S	PS
1 January 2006–31 July 2006	S	PS

ADB = Asian Development Bank, HS = highly satisfactory, PPTA = project preparatory technical assistance, PS = partly satisfactory, S = satisfactory, TA = technical assistance.

EXECUTIVE SUMMARY

In August 1995, the Asian Development Bank (ADB) approved project preparatory technical assistance to the Government of Viet Nam for the formulation of the Second Provincial Towns Water Supply and Sanitation Project. A loan amounting to $69 million was approved in February 1997. The expected objectives were to address infrastructure and environmental deficiencies constraining provision of safe water and sanitation to communities in seven provincial capital towns: Tuyen Quang, Ninh Binh, Vinh, Dong Hoi, Dong Ha, Qui Nhon, and Ben Tre. The Project supported the Government's efforts to provide safe water to satisfy a basic human need and improve public health. Other affiliated objectives were to (i) enhance public awareness of hygiene and sanitation, (ii) improve the urban environment in the project towns by investing in drainage and sanitation systems, and (iii) restructure and strengthen existing institutions through a blend of capacity building and policy reform.

The Ministry of Construction (MOC) was the executing agency for the Project, and the Management Board for Water Supply and Sanitation Development acted as the central project management unit (CPMU). The implementing agency for each project town was the water supply company (WSC). A provincial project implementation office (PPIO) was established by the respective provincial people's committee (PPC) to assist the WSC in implementation at the provincial level, and to coordinate with the CPMU.

At appraisal, the Project was scheduled to be implemented over 5 years from January 1997 to December 2001. Consultant services providing primary project management support commenced in February 1998, with the Project divided into two packages (one including three northern towns, and the other four central-southern towns). The physical completion of the Project stretched over 3.5 years, and the loan account was closed on 29 March 2006. Delays occurred at all stages, including detailed design, procurement bidding and evaluation, contractor selection (especially for international competitive bidding [ICB] contracts), and construction. The bulk of detailed design was completed in 1998, but some major bidding document preparations were delayed until late 2000. The delay can be attributed to the following: (i) the CPMU was inexperienced with ADB procurement procedures and lacked the technical capacity to review the work of international consultants; (ii) major packages required cumbersome approvals from multiple ministries; (iii) local competitive biddings had to be reviewed and revised by PPIOs, which initially had very little capacity and experience; (iv) project towns were geographically scattered and did not always receive the support they needed from project management support consultants, who had to adjust to the different conditions in each town; and (v) there were problems with bidding, including extremely high and non-responsive bids, and some instances of multiple re-bidding (in one ICB case, re-bidding took place three times).

In terms of physical outputs, part A—the Public Environmental Education Program—had a beneficial impact, with wide-ranging participation that included communities, PPCs, the Viet Nam Women's Union, local preventive health care units, and two United Nations volunteers building awareness on public hygiene. Under part B—water supply systems development—running water will be continuously available, while prior to the Project, water was typically available for just 2–4 hours on alternate days. The rate of nonrevenue water in the seven project towns was in the range of 21%–30%, down from 33%–57% in 1996. Part C—environmental sanitation improvements—constructed approximately 65 kilometers of new drainage and rehabilitated an equivalent length of the primary, secondary, and tertiary drainage system; improved sanitation systems; and introduced 14,170 toilets with septic tanks (compared with an anticipated 11,540 units at project inception). Through part D—implementation assistance and institutional strengthening—the staff of both the CPMU and the PPIOs gained experience and understanding with ADB procurement and bid evaluation regulations and guidelines.

The Project is rated “successful.” The Project is rated “highly relevant,” given the Government’s priorities both at appraisal and at the time of evaluation. It was consistent with ADB’s country strategy of improving infrastructure and the standard of public services, which contributed to a general improvement in the environment and standard of living. The Project was “highly effective,” as the envisioned outcomes were achieved. The targets and indicators show that the objectives were generally met, particularly in part B (which was the focus of the Project); the seven towns now have water continuously available, with 80% of the core contiguous area of the towns generally covered. The Project was “less efficient,” as the contracting process delayed it, indicating that the process was inefficient. Economic benefits identified during project appraisal were realized, and the Project was economically viable. The average economic internal rate of return (EIRR) for the seven project towns is estimated at 13.98%, compared with 16.79% at project completion. The EIRR for individual project towns ranged from 12.19% to 17.95%, which are above the standard threshold of 12% for public infrastructure projects. They are also comparable to the appraisal estimates for the EIRR, which ranged from 11.4% to 20.9%. After the initial start-up delay, the Project picked-up momentum. The project scheduling during the processing was too optimistic. The Project is rated “likely sustainable.” The financial reevaluation of the water supply component generated an average financial internal rate of return (FIRR) of 5.59% for the seven project towns, which is above the weighted average cost of capital. Technically and institutionally, the Project has good prospects to be sustainable, but in terms of financial sustainability, most of the seven towns will be facing a challenging task to cover costs for adequate maintenance when facilities begin to wear, and for capital for expansion and renovation. Despite the decentralization, provincial governments are still reluctant to charge the full-cost recovery based tariff. Currently, the WSCs recover cost by doing other businesses or by using subsidies from PPCs. Another concern is water quality; soil in Viet Nam contains high amounts of iron, and towns that chose groundwater extraction require clear guidelines from MOC regarding treatment procedures.

The Project’s experience points to a number of lessons with regards to WSC operation, including:

(i) When engaging other agencies, ADB needs to conduct a rigorous needs assessment at the beginning and constant review during the implementation to meet high standards of the local body (Vietnam Women’s Union). The project engaged two United Nations Volunteers (UNVs) in the public awareness campaigns component. However, Vietnam Women’s Union already had an established record and sufficient capacity on the issue. OED could not confirm the effectiveness of UNV contribution which was paid by ADB loan proceeds. (para 45 [i])

(ii) MOC needs to draw up a long-term strategy on (a) which agency will be responsible for the development and maintenance of drainage, (b) whether the sewerage operation needs to be integrated with water supply, or kept separate, and (c) how to sustain the technical and financial burden of the sewerage, either from local taxes or a specific tariff. (para 45 [ii])

(iii) There is a need to maintain various project impact data, including health and socioeconomic data, to continuously monitor improvements in the public health and livelihood that social infrastructure projects will yield. (para 45 [iii])

(iv) Both the central government and responsible WSCs should take concrete actions to improve water quality and address consumers’ complaints. For removal of iron, manganese and other hazardous minerals, which are prevalent in some

parts of the country, water supply companies need both step-by-step technical advice and financial support. The water should be treated at source, rather than at the household level, as it will be less expensive. (para 45 [iv])

(v) Where there are bacteria-related cases occurring, WSCs should push for (a) an extensive monitoring system on well water quality; (b) daily microbiological testing at random sites; and; (c) most importantly, public release of results to inform the general public that their concerns have been addressed. (para 45 [v])

(vi) Currently, all the expenses associated with septic tank installation and maintenance are fully borne by households, and where there is no sewer system development plan in sight, the provincial government will have to strategize how to achieve greater sanitation coverage to improve local hygiene conditions, including providing financial incentives. (para 45 [vi])

The evaluation has raised several issues that require follow-up actions by the Government. Some major follow-up actions discussed during the Operations Evaluation Department mission are presented in the following table.

Suggested Follow-up Actions

Issues	Recommended Authority	Time Line	Monitoring
1. Tuyen Quang's water quality problems (i.e., iron and manganese content, turbidity and *E. coli* concerns) should be addressed through concrete action to identify their causes, and water quality testing results should be made public to inform the general public that the concerns have been addressed.	**Tuyen Quang WSC and Government**	2009	MOC
2. National sanitation (sewerage and drainage) targets should be established and translated into concrete investment plans.	**MOC**	2009	MOC
3. The Government should draw up a long-term strategy regarding (i) which agency will be responsible for the development and maintenance of drainage; (ii) whether the sewerage operation needs to be integrated with water supply or kept separate; and (iii) how to sustain the technical and financial burden of sewerage; from local taxes or a specific tariff.	**MOC, MPI and Prime Minister's Office**	2009–2010	MOC
4. Government approval procedures need to be streamlined, especially on externally funded infrastructure projects.	**MOC, MPI, Prime Minister's Office and State Bank of Viet Nam**	2009–2010	ADB VRM and other aid agency local offices

ADB = Asian Development Bank, MOC = Ministry of Construction, MPI = Ministry of Planning and Investment, VRM = Viet Nam Resident Mission, WSC = water supply company.

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SOCIALIST REPUBLIC OF VIET NAM
SECOND PROVINCIAL TOWNS WATER SUPPLY AND SANITATION PROJECT
(as implemented)
Project Town
Non-Project Town for Socioeconomic Survey
National Capital
Provincial Capital
City/Town
National Road
Other Road
Railway
River
Provincial Boundary
International Boundary
Boundaries are not necessarily authoritative.
PEOPLE'S REPUBLIC OF CHINA
LAO PEOPLE'S DEMOCRATIC REPUBLIC
CAMBODIA
Gulf of Tonkin
Gulf of Thailand
Phu Quoc Island
103°00'E
108°00'E
20°00'N
12°00'N
0 50 100 200
Kilometers
PROVINCES
1. Lai Chau
2. Dien Bien
3. Son La
4. Lao Cai
5. Phu Tho
6. Tuyen Quang
7. Ha Giang
8. Yen Bai
9. Cao Bang
10. Bac Kan
11. Thai Nguyen
12. Vinh Phuc
13. Ha Noi
14. Bac Ninh
15. Hung Yen
16. Lang Son
17. Quang Ninh
18. Bac Giang
19. Hai Duong
20. Hai Phong
21. Thai Binh
22. Hoa Binh
23. Ha Nam
24. Ninh Binh
25. Nam Dinh
26. Thanh Hoa
27. Nghe An
28. Ha Tinh
29. Quang Binh
30. Quang Tri
31. Thua Thien Hue
32. Da Nang
33. Quang Nam
34. Quang Ngai
35. Kon Tum
36. Gia Lai
37. Binh Dinh
38. Phu Yen
39. Dak Lak
40. Dak Nong
41. Khanh Hoa
42. Lam Dong
43. Ninh Thuan
44. Binh Phuoc
45. Tay Ninh
46. Binh Duong
47. Dong Nai
48. Binh Thuan
49. Ba Ria - Vung Tau
50. Ho Chi Minh
51. Long An
52. Tien Giang
53. Dong Thap
54. An Giang
55. Kien Giang
56. Hau Giang
57. Can Tho
58. Vinh Long
59. Ben Tre
60. Tra Vinh
61. Soc Trang
62. Bac Lieu
63. Ca Mau
Lai Chau
Dien Bien Phu
Lao Cai
Ha Giang
Cao Bang
Bac Kan
Trang Dinh
Tuyen Quang
Yen Bai
Son Duong
Thai Nguyen
Lang Son
Mong Cai
Son La
Phu Tho
Vinh Yen
Viet Tri
Bac Giang
Cam Pha
HA NOI
Ha Long
Hoa Binh
Hai Duong
Hai Phong
Hung Yen
Phu Ly
Thai Binh
Ninh Binh
Thanh Hoa
Thai Hoa
Dien Chau
Vinh
Ha Tinh
Dong Hoi
Ba Don
Dong Ha
Hue
Da Nang
Hoi An
Tam Ky
Quang Ngai
Kon Tum
Bong Son
Pleiku
Quy Nhon
Buon Ma Thuot
Tuy Hoa
Dak Song
Ninh Hoa
Gia Nghia
Da Lat
Nha Trang
Cam Ranh
Dong Xoai
An Loc
Di Linh
Phan Rang-Thap Cham
Tay Ninh
Thu Dau Mot
Bien Hoa
Lien Huong
Phan Thiet
Chau Doc
Cao Lanh
Tan An
Ho Chi Minh City
Dat Do
Vung Tau
Ha Tien
Long Xuyen
Vinh Long
My Tho
Can Tho
Ben Tre
Rach Gia
Tra Vinh
Vi Thanh
Soc Trang
Ca Mau
Bac Lieu

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I. INTRODUCTION

A. Evaluation Purpose and Process

1. The Operations Evaluation Department (OED) of the Asian Development Bank (ADB) included the Second Provincial Towns Water Supply and Sanitation Project in Viet Nam[1] in its annual work program for 2008 (the proposed design and monitoring framework is in Appendix 1). The main reasons for selecting the Project for evaluation were: (i) OED plans to conduct a sector assessment program evaluation for the urban sector in Viet Nam; and (ii) at the time of project completion report (PCR) review (25 September 2006), OED concurred with the rating of a successful project given by the project completion report (PCR).[2] The evaluation is based on project documents, a range of country studies, and the findings of the operations evaluation mission (OEM), which visited Viet Nam from 4 to 22 May 2008.[3] The OEM consulted the national and two provincial people's committees (PPCs), government public infrastructure (including water supply) departments, specialized government water supply agencies, the Ministry of Health, and the National Statistics Office.

2. Due to a lack of benefit monitoring and evaluation (BME) data, especially on socioeconomic issues, a counterfactual analysis was implemented by conducting socioeconomic surveys. After a careful review of the project files and past records, OEM focused its impact assessment on two project towns (Tuyen Quang and Dong Hoi) and two non-project towns in the vicinity (Son Duong and Ba Don). The main objectives were to examine (i) project impact in the project towns versus non-project towns, and (ii) project effectiveness. As there were time and budget constraints to do a full evaluation of all seven towns, which were widely dispersed across the country, an in-depth analysis was conducted for two towns, Tuyen Quang and Dong Hoi. The former had a design change and the latter experienced significant delays in the initial civil works stage. Other important criteria for selecting the two towns were: (i) the towns must be from each from the two major consultant packages (A and B), and (ii) one town must be served by groundwater and one by surface water. In addition, Tuyen Quang, was the only town that did not have a new water treatment plant, while Dong Hoi was one of four towns with resettlement issues. A review of project files and the PCR indicated Tuyen Quang experienced the most problems in terms of engineering elements and financial management. In this way OED would be able to extract lessons from the implantation difficulties faced by the project. In the four towns visited (including the two neighboring non-project towns), OEM had discussions with PPC officials, water supply company (WSC) management and staff, the Viet Nam Women's Union (VWU), preventive health care unit staff, and beneficiaries. The OEM also observed and visited the offices, water treatment plant facilities, water tanks, and reservoirs; and conducted interviews with beneficiaries.

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[1] ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Second Provincial Towns Water Supply and Sanitation Project* (Loan 1514-VIE). Manila.

[2] The main reasons for the cautious concurrence were: (i) the absence of good benefit monitoring and evaluation records meant no survey data were available regarding the impact of the Project on beneficiaries; (ii) the Project was delayed by 4 years; and (iii) the Project was the second-phase intervention by ADB in this sector (see para. 7)—there was no adequate PPTA for this specific project, and no associated capacity-building small-scale technical assistance (SSTA) was made available when the lack of project implementation capacity became apparent during processing.

[3] The mission comprised T. Ueda, Senior Evaluation Specialist/Mission Leader; A. Morales, Evaluation Officer; M.E. Napud, Urban Economist (international consultant); and H.V. Van, Water and Sanitation Engineer (local consultant).

B. Expected Results and Program Objectives

3. The objectives of the Project were to address infrastructure and environmental deficiencies that constrained access by communities to safe water and sanitation in the seven provincial capital towns: Tuyen Quang, Ninh Binh, Vinh, Dong Hoi, Dong Ha, Qui Nhon, and Ben Tre. The Project was conceived in the context of the Government's overarching emphasis on providing safe water as a basic human need, and on improving public health. The Project had four components: part A—public environmental education program (PEEP); part B—water supply systems development; part C—environmental sanitation improvements; and part D—implementation assistance and institutional strengthening. At the time of processing, the project document lacked a detailed design and monitoring framework, which is mandatory for recent ADB projects. Based on the design and monitoring framework developed during project completion, the publicly available public health data did not clearly show overall health improvement impacts at the provincial level, but the occurrence of waterborne disease (especially diarrhea) was reduced in project towns. With respect to outcomes: (i) the Project attained the targeted number of water supply connections, (ii) the public environmental education program was effective, and (iii) the local water supply company engineering and financial management capacity have been enhanced. However, the sanitation improvement component yielded less than original planned, and the financial performance of the water supply companies is below original estimates (fewer households were connected by 2008 than expected, and current tariffs are lower than was projected).

II. DESIGN AND IMPLEMENTATION

A. Formulation

4. In July 1990, a water supply and sanitation sector study was conducted by the Government with support from the United Nations Development Programme (UNDP) and the World Bank.[4] The study estimated that only about 100 out of the country's 463 urban centers with a population exceeding 5,000 had piped water supply systems. Collectively these systems served about 7 million people or 44% of the urban population. Based on the study, the Government and donors, agreed to prioritize 27 provincial capitals for water supply improvements. Among the 27 towns, ADB agreed to take up the first batch of 6 capitals;[5] for the second phase (the Project), ADB selected seven towns for the project preparatory technical assistance (PPTA) and eventual investment. The seven towns were selected based on the condition of the existing water supply and sanitation facilities, the level of coverage available to the population, the economic importance of the towns in terms of national development, and the availability of international aid.

B. Rationale

5. The rationale at the time of processing was that the towns covered under the Project had been accorded priority by the Government for the rehabilitation and expansion of water supply and sanitation facilities due to their rapidly deteriorating environmental health conditions. The existing piped water supply facilities were constructed in the 1930s and 1960s. Nonrevenue water (NRW) in these towns ranged from 33% to 57%. ADB's operational strategy for Viet Nam

[4] UNDP and World Bank. 1990. *Viet Nam Water Supply and Sanitation Sector Study: Asian Water Supply and Sanitation Sector Development Project.* Bangkok (RAS/75/160 Bangkok Unit).

[5] ADB. 1995. *Report and Recommendation of the President on a Proposed Loan and* T*echnical Assistance Grant*s *to the Socialist Republic of Viet Nam for the Provincial Towns Water Supply and Sanitation Project* (Loan 1361-VIE). Manila.

recognized the role of environmental improvements and the development of human resources in the growth of the country's economy. Among the policy changes targeted was allowing the WSCs full autonomy to operate as commercial entities, while vesting PPCs with regulatory functions.

C. Cost, Financing, and Executing Arrangements

6. At appraisal, the Project was estimated to cost $92 million comprising $47.13 million in foreign exchange and $44.87 million in local currency (Appendix 2). ADB provided a loan of $69 million from its special funds resources to cover 75% of the total project cost, including the entire foreign exchange cost of $47.13 million and $21.87 million of the local currency costs. At project completion in June 2005, the actual cost of the Project was $71.97 million, with a foreign exchange cost of $50.82 million and a local currency cost of $21.15 million equivalent. ADB financed $59.27 million (82% of the total cost), of which $50.82 million was for foreign exchange costs and $8.45 million for local currency costs. The Government's counterpart contribution totaled $12.07 million, or 18%. According to the PCR, beneficiaries made partial but unquantifiable contributions to improvement of their sanitation facilities. With special drawing rights (SDR) depreciation, the net value of the ADB loan declined to $65.75 million at project completion. The unused loan amount of SDR4,519,053.34 (about $6.48 million) was canceled on 29 March 2006.

7. The Project had one Executing Agency (EA) in Ha Noi, and seven implementing agencies (the WSCs[6] located in each project town). The Ministry of Construction (MOC), through the Management Board for Water Supply and Sanitation Development Projects,[7] expanded its existing central project management unit (CPMU), established under the first-phase project (footnote 5), to handle overall project implementation. The CPMU was headed by a full-time project director and assisted by a deputy project director and staff, including an accountant. A provincial project implementation office (PPIO) was established to assist the WSC in implementing the Project at the provincial level and in coordinating with the CPMU. PPIOs were headed by WSC directors or deputy directors.

D. Procurement, Construction, and Scheduling

8. The procurement of goods and related services was in accordance with both the existing ADB procurement guidelines[8] and the Government's procurement regulations at the time of project implementation. Based on an extensive review of the project files, the OEM concurs with the PCR finding that the project was protracted due to significant delays in the procurement of civil works and materials, which occurred as a result of (i) a failure of bidding, due to either the absence or small number of responsive bidders, and exorbitant bids (Appendix 3);[9] (ii) a lack of familiarity with ADB procurement procedures; (iii) lengthy government procedures;[10] (iv) lengthy periods required for review and approval of bid documents and technical proposals and designs

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[6] At the time of processing, the term "water supply and drainage company" (WSDC) was used in the report and recommendation of the president (RRP) and back-to-office reports (BTOR).

[7] This has been reorganized as Management Board of Urban Technical Infrastructure Development Projects (MBUTIDP) at the time of OEM.

[8] ADB. 1979. *Guidelines on the Use of Consultants by the Asian Development Bank and Its Borrowers*. Manila; and ADB. 1981. *Guidelines for Procurement under Asian Development Bank Loans*. Manila.

[9] ICB contract no. CW2B for design and construction of water treatment facilities, which took more than 3 years from the date of first bid invitation until the contract was awarded. Re-bidding took place; bids were invited three times, as no responsive bid was received in the first instance, and negotiations with the sole responsive bidder failed in the second. Contracts were awarded only in September 2003 (Appendix 3). See para. 25 for details.

[10] See para. 45 (ii).

by PPIOs, including late submissions of bid evaluation reports; (v) staff turnover, particularly at PPIOs after the 1999 elections; (vi) a long time lag for consultants to incorporate bidding procedures and revise designs due to their limited staff resources; and (vii) the "bunching effect" of several international competitive bids (ICBs) being processed and reviewed by CPMU at almost the same time, when there were limited EA staff and resources. These are not unique to the Project, but many externally funded infrastructure projects faced similar problems during the 1990s to the early 2000s, when the Government received considerable assistance for the first time.

9. **Scheduling and Construction**. Procurement problems undoubtedly contributed to the delay in the overall project schedule. The Project was to be implemented over 5 years, with original physical completion scheduled for 30 June 2002. The Project was extended twice to accommodate delays, was physically closed on 30 June 2005, and financially closed on 29 March 2006. Although this was not made explicit in the PCR, project records reveal that construction was delayed due to the unsatisfactory performance of some contractors and the delay of government counterpart funds for some contracts, which may have limited on-site human resources and slowed procurement of raw materials. The past loan review missions also revealed that construction in some areas was unsatisfactory. Records indicate that a contractor subcontracted his work under his contract to two firms, whose construction work was not well managed. The OEM noted that in some areas—particularly Tuyen Quang—water quality problems arose during implementation, and some wells were not functioning to their full capacity, a concern that was raised even before project completion.

E. Design Changes

10. In terms of project outputs, there were no major deviations with respect to the PEEP (part A). With respect to water supply development (part B), however, one town—Tuyen Quang—did not construct a new water treatment plant (WTP) with a capacity of 12,500 cubic meters per day (m^3/day) capacity, as originally envisaged; instead, the town's existing WTP was rehabilitated from a capacity of 4,000 m^3/day capacity to 12,500 m^3/day, and new auxiliary buildings, such as an administrative building, pumping station, and laboratory, were constructed. The consultant and WSC agreed to the rehabilitation during the detailed design phase, as the existing water wells met the national water quality standard, and it was assumed that the new wells to be drilled nearby would produce water of the same quality. However, the town's new wells contained excessive levels of iron and manganese, and the town was not able to secure a reliable source of water. The six other project towns were able to develop reliable sources of water that meet the water demands targeted for 2011. Of the seven towns, two—Ben Tre and Dong Ha—had existing WTPs that used surface water, while two others—Qui Nhon and Tuyen Quang—developed groundwater sources by constructing 43 boreholes. The remaining three towns (Dong Hoi, Ninh Binh, and Vinh) developed surface water, either from a river or a lake, by constructing new raw water intake structures or refurbishing existing structures with new intake pumps. In addition, despite a PPTA report[11] recommendation that towns should retain public standpipes in some areas to serve poorer households, all seven towns decided to abolish them completely as network coverage gradually expanded. Both the MOC in Ha Noi and WSC officials mentioned that public water taps were losing money. In Viet Nam's social context, even the poorest will be able to pay their water bills, due to the low tariff; during OEM visits, what would be considered typical slum communities were almost nonexistent in the seven project towns.

[11] PPTA report for Second Provincial Towns Water Supply and Sanitation Project (TA 2146-VIE).

11. Part D included consulting services for project implementation management, training for WSC and PPIO staff, and other implementation support. The personnel inputs estimated at appraisal totaled 1,395 person-months over a period of 57 months, consisting of 180 person-months of international and 1,215 person-months of national consultant inputs. However, the service period was extended considerably to over 84 months, from April 1998 to June 2005, with a total of 1,887 person-months of inputs, including 238 person-months of international and 1,649 person-months of national services. The increase in consulting services resulted from project implementation delays, and caused a substantial (26.6%) increase in the cost of consulting services, from the $5.45 million estimated at appraisal to $6.91 million.

F. Outputs

12. The details of the project outputs as achieved in the two towns visited against the targets set out at appraisal are provided in Appendix 4 and summarized below.

1. Part A: Public Environmental Education Program

13. The PEEP involved wide-ranging participation, including communities, PPCs, VWUs,[12] local preventive health care units, and two United Nations volunteers (UNVs). More than 150 "motivators" (from wards and communes) and 2,000 people, including schoolchildren, participated in various activities in each town. The activities included workshops and events that (i) focused on the importance of maintaining hygiene in homes and proper discharge of household water, (ii) promoted installation of septic tanks, (iii) delivered a simple message campaign on washing hands before meals, and (iv) included painting contests for schoolchildren and educational films on safe water and sanitation. OEM confirmed that the UNV management in the project towns was highly appreciative of both the Project's efforts to highlight the importance of public hygiene and the actual water supply and sewer expansion investments.

14. These efforts already formed the core of local activities undertaken by the VWUs, but the Project's PEEP provided a boost to the existing initiatives, including additional audience exposure and learning opportunities for VWU members. VWU is a highly organized association under the guidance of the PPC, which receives adequate funding from the Communist Party. Discussions during the OEM revealed that ADB loan proceeds were used only for the costs of workshops, study tours and recruitment of the UNVs; other costs were borne by regular VWU core resources. The study tour to Ninh Binh was organized to enable other communities to learn from that city's PEEP, which was performing outreach through additional organizations—such as farmer's and youth unions—that ran campaigns. PEEP did not begin until July 2001 in package B towns, when a baseline survey was conducted to assess the sanitation status of each town and identify priority issues for the program. Dong Hoi's PEEP began very slowly but gained momentum in 2003 as motivators were selected and trained. The Dong Hoi VWU encouraged people to use the newly installed toilet and septic tank, and to dispose of garbage properly. As a result of the program, around 80% of all households in Dong Hoi currently have septic systems.

15. The public awareness campaign is still ongoing as part of a larger effort[13] in Viet Nam to raise both awareness on various issues and people's standard of living. The OEM mission observed many billboards focusing on public hygiene and preventive health care. The outbreaks of

[12] VWUs are directly linked to the standing committee of Communist Party in Ha Noi. As part of VWU's regular activities, the Government extends expert and financial support to provincial VWUs, which is disseminated to cities and villages.

[13] Including VWU, there are many socially organized associations (e.g., Farmer's Union, Teacher's Union) that run awareness raising campaigns on social causes (e.g., health, traffic, corruption).

severe acute respiratory syndrome (SARS) and avian influenza experienced by Viet Nam in recent years has made the local population highly receptive to public awareness campaigns.

2. Part B: Water Supply Systems Development

16. The two project towns now have an almost continuously available water supply with adequate pressure that (at a minimum) meets national water quality standards; prior to the Project, water was usually available on alternate days for limited hours. The CPMU confirmed that the other project towns also have drinkable water available on a continuous basis. Water storage reservoirs with a total capacity of 20,000 m^3 were constructed in each of the project towns to ensure water is continuously available. Part B of the Project included rehabilitating and expanding water supply systems, reducing NRW, and improving service levels. It aimed to achieve provision of improved access to safe water to communities in the seven project towns by 2011.

17. All project towns had their existing WTPs rehabilitated or upgraded to enable them to be operated at their original design capacity. Tuyen Quang is currently running at 56% of installed capacity, with sufficient volume to satisfy projected demand for 2015. On top of it, all towns except Tuyen Quang had new WTPs constructed. In Tuyen Quang, total production of treated water almost tripled, producing an additional 135,000 m^3 of treated water per day, compared to the pre-project total daily production capacity of around 70,000 m^3. House connections totaled some 15,726 as of May 2008. As a result, service coverage has reached 97% in the urban center, 61% in suburban areas, and 20% in the adjacent districts of Yen Son and Son Duong. Overall, service coverage is 46%. Before the project, service coverage in the urban center was 45%, and in the suburban areas 7%, for an overall coverage of 26%. Yen Son and Son Duong were not served before the Project. The amount of water supplied per capita has increased from an average of 67 liters per capita per day (lpcd) to 101 lpcd.

18. Tuyen Quang residents voiced concerns over three water quality issues—notably iron and manganese particles, turbidity and *E. coli*—but these can be addressed.[14] WSC and the provincial government asserted that the local health unit's test passed the Ministry of Health's national standard for drinking water, and maintained that it was drinkable without boiling (one of the 11 wells has an iron content of more than 0.5 milligrams per liter (mg/l), and is not used at present). The three water quality problems must be addressed using different treatments and processes. The water's iron content may not pose immediate health concerns, but is perceived very negatively by consumers, due to the possible poor taste and red staining of clothes washed in the water, which leave the impression that the water may not be treated properly. If iron concentrations are low, a fairly simple additional treatment will substantially reduce the number of suspended particles, and can also address turbidity. The management of Tuyen Quang WSC was aware of the problem during implementation, but maintained that water quality was within acceptable norms, and not as bad as consumers claimed. A review of ADB mission reports indicated that reports filed as early as August 2005 indicated that well water quality was not satisfactory, due to the ferrous content and turbidity (muddy water).[15] This can be addressed by inspecting and replacing or upgrading the

[14] In the loan review mission of August 2005, the visiting ADB mission to Tuyen Quang noted: "quality of works undertaken for well field, in particular well operation buildings and installed pipes associated with pumps, are not very satisfactory with steel coupling rusted, poor drainage system, and poor concreting works. Although the issues of high ferrous content and muddy conditions for wells Nos. 3, 9, and 11 had been raised by previous missions, no measures or actions were taken for addressing them."

[15] The BTOR of March 2005 reported that Tuyen Quang, Nghe An, and Binh Dinh had serious lack of counterpart funding regarding payment to the contractor. No fluoridation is done in Tuyen Quang and Dong Hoi WTPs. In Tuyen Quang, based on mixed water samples of wells, the concentration of fluoride is 0.97 mg/l, which meets the national guidelines of 0.7–1.5 mg/l.

existing screen filters; options also exist for further deep well rehabilitation. The PPTA report stated that dysentery and diarrhea were very common in Tuyen Quang, and that non-piped water sources were bacteriologically unsafe for human consumption; it recommended that all existing dugwells be disinfected at regular intervals by town authorities. This indicates that some of the problems now facing Tuyen Quang were known before the Project. To achieve the same quality of service enjoyed by the other project towns required closely assessing water quality in Tuyen Quang and eradicating suspect bacteria by eliminating the contamination source, but efforts in this regard during project preparation and early stages of implementation were inadequate.

19. As of June 2006, the rate of NRW in the seven project towns ranged from 21% to 30%, a decrease from 33% to 57% in 1996. As of May 2008 the NRW rate in Tuyen Quang is 20.5%, and in Dong Hoi 23%. The reduction was mainly achieved through (i) installation of new pipes with proper joints in the main reticulation lines, (ii) installation of bulk meters in key connections and monitoring the incoming and outflow levels, and (iii) installation of individual meters. Old pipes are a major cause of the remaining leakage.

20. **Connection Fee and Water Tariff**. In Viet Nam, the cost of connection is based on physical location of the household—i.e., the linear distance from the nearest distribution pipeline—resulting in a higher cost for communities far from the existing network, such as isolated farm houses. The OEM found that some residents are unable to pay. In Ba Dong, for example, the average connection fee is around D1 million ($62), which should be repaid within 3 months. In Dong Hoi, one family with 4 members, paid D2 million ($124) for connection, but in general, the connection fee for household customers ranged from D700,000 to D1.2 million ($43–$75). This is roughly equivalent to 15–25 months of water bills, slightly higher than many countries in South Asia, where the figures are usually around 10 months, but lower than some Southeast Asian countries (e.g., capital cities of Cambodia and the Philippines, where connections fees are around 20 and 50 months, respectively). The median tariff in Tuyen Quang is D30,000/month, and in Dong Hoi, over D40,000 for households. The water tariff level is almost at par with other Southeast Asian countries, (e.g., Cambodia, Indonesia, and Thailand). Thus the initial connection fee is slightly higher than in other countries, but once connected, the tariff level is not high (this is the case when the tariffs are compared to the average income in the country).[16] Dong Hoi has three water tariff categories: (i) households, (ii) industry, and (iii) institutions. Dong Hoi WSC proposed an increase in the household tariff to D4,200/m^3, but the tariff approved for 2008 was only D3,300. In Dong Hoi, water consumption has increased from 25 to 98 l/capita/day. The tariff structure is flat, i.e., linear to volume, and there is no block tariff in Viet Nam.[17]

Table 1: Tuyen Quang Household Water Tariff Historical Increase

Year	1995	2002	2004	2006	2008
D/m^3	1500	1700	2000	2400	3300[a]

D = dong, m^3 = cubit meters.
[a] This was approved but not implemented because of expected high inflation in 2008.
Source: Tuyen Quang PPC record.

[16] Water tariff and connection figures in other countries are compared with data in McIntosh, A.C. 2003. *Asian Water Supplies—Reaching the Urban Poor*. Manila: ADB and International Water Association.

[17] The BTOR from the loan review mission of February 1999 mentioned that "block tariffs to be agreed with the Bank are to be introduced by the WSCs by June 1997," but there is currently no block tariff by consumption per se, only by different household types (household, shops and school, state institutes, business and production).

3. Part C: Environmental Sanitation Improvements

21. Part C included constructing 65.2 kilometers (km) and rehabilitating 65.1 km of primary, secondary, and tertiary drainage systems, improving sanitation systems, and introducing septage management systems. About 44.9 km of drain pipes and culverts were newly installed, while 23 km (or about one third of the 62 km of newly planned sewer and drainage systems for all seven towns) were canceled, as they had been constructed under separate projects by different donors or excluded from the revised city plan. Responsibility for drainage maintenance differs across provinces, and the WSC is not always responsible. The WSC in Dong Hoi was in charge of drainage, but this was not the case in Tuyen Quang. In Dong Hoi, no major drainage work was done, as the town was receiving another comprehensive drainage-related grant project from the World Bank; major works were still ongoing at the time of the OEM.

22. A total of 14,170 toilets with septic tanks were installed, compared with 11,540 units envisaged at project inception. The ADB loan covered less than 30% of the cost needed to purchase septic tanks, with the remaining portion lent from Viet Nam Bank for Social Policy at an interest rate of 0.68% per month. Even poor households were able to install the septic tanks as low interest loans were provided to cover up to D1.8 million ($111) of the septic tank cost of D4 million–D5 million (around $300). The two project towns have confirmed that the cost of cleaning the septic tanks is fully borne by the consumers, with no subsidy. The OEM confirmed that in both towns visited, no households had yet cleaned their septic tanks, as they believed the tank was large enough to last for more than 5 years; in contrast, businesses (e.g., restaurants) cleaned the tanks every 3 years on average, and factories every 6 months. There is no campaign or awareness program on regular septic tank cleaning. Small businesses and households would have paid D400,000 ($25) for cleaning. The Dong Hoi PPIO said that in Dong Hoi, installation of septic tanks focused on “environmentally sensitive” areas.

4. Part D: Implementation Assistance and Institutional Strengthening

23. Consultant inputs were prolonged due to the delayed project implementation, resulting in a substantial increase (26.6%) over the original consultancy budget, and a delay of 3.5 years compared to the original schedule. According to the fifth joint portfolio review report,[18] a 1% increase in the disbursement rate of the five development banks would mean additional investment of $500 million over the Socioeconomic Development Plan 2006–2010 period. The cost of project implementation delay is a major concern for all external funding agencies. At the start of project implementation, PPIO staff were inexperienced and had limited understanding about ADB’s regulations and guidelines in procurement and bid evaluation, as only limited training under the technical assistance (TA) that was attached to the first-phase project. The CPMU was responsible for procuring all civil works and supplying materials and equipment under ICB and international shopping procedures. Minor civil works, such as site surveys, rehabilitation of water supply facilities, installation of water distribution pipes, and installation of septic tanks were undertaken by the PPIOs through local competitive bidding (LCB) and force account.[19] No changes in implementation arrangements occurred during the project implementation period.

24. **Benefit Monitoring and Evaluation**. The performance on BME was mixed at best. Although the importance of monitoring and evaluation was emphasized in the original PPTA

[18] ODA Interministerial Task Force. 2007. *Fifth Joint Portfolio Performance Review*. Hai Phong. Reviewed jointly by ADB, Agence Française de Développement, Japan Bank for International Cooperation, German development cooperation through KfW, and the World Bank.

[19] In the Project, force account was allowed for procurement: (i) below $100,000; and (ii) with the prior approval of CPMU.

report and in the RRP, it was not emphasized during the early implementation stage; BME suffered as a result of the delayed recruitment of project management support consultants. There was no evidence that an initial detailed baseline survey was performed in any of the project towns. When the two project management support consultant teams arrived, computer software was provided to all towns that focused on WSC water supply business performance indicators—i.e., number of connections, tariffs collected, staff numbers, and technical and financial data—but did not encompass socioeconomic or health dimensions. Therefore, the Project's impact cannot be verified through the BME data produced by PPIOs. The OEM also found that: (i) the software ceased functioning after 1 year in Tuyen Quang, and BME was not produced from the latter part of the Project; and (ii) all towns have now shifted to a new World Bank-supported management information system called "benchmarking data," which is encouraged by all WSCs, including private sector operators. The Project's BME was discontinued by project completion.

G. Consultants

25. The consultants are not entirely responsible for the delayed procurement, but some must be attributed to the detailed design process involving technical and engineering issues. In the case of the first ICB contract (CW1A, for principal water and sanitation works), the review and revision of the detailed design and preparation of bidding documents took almost 2 years. Main reasons for the delay were that (i) the Government and consultant did not initially agree on the detailed design and bill of quantity, (ii) the Government took prolonged time to approve the detailed design, and (iii) each step of the Government's approval processes required unanimous endorsement of all attendees, and very often setting the dates for all attendees to convene such meetings took long. Contracts were awarded only in September 2003, almost 3 years after the first bidding was invited in November 2000 (Appendix 3). The records of bidding responses and changes in the bidding packages to attract more bidders with an appropriate price range and technical expertise indicate that if technical requirements are not properly factored in and packaged at the appropriate contract size, repeated delays will occur. In addition, the CPMU (the Government) should have addressed concerns raised regarding water quality issues in Tuyen Quang, and incorporated higher treatment processes or changed wells during the detailed design. The justification made by the detailed design consultant was that they followed the recommendation made during the PPTA (schematic design), which suggested treatment was unnecessary, but issues relating to turbidity and high iron content were already emerging during the detailed design phase. The detailed-design consultant took no initiative during the detailed design stage to add some treatment facilities, despite the fact the problem had already been observed.

26. Other issues also came to light during the review of the project files. Two consultant teams had different approaches to acting on the CPMU requests, with one frequently asking for an increase in the contract, while the other accommodated requests with greater flexibility. With respect to approaches to reducing NRW, one review mission report stated that "consultants were not advising the PPIOs with step-by-step guidance," and that some PPIOs were not sure what steps to take. In addition, contract managers (especially at Qui Nhon and Ben Tre) changed too frequently.[20] Significant time elapsed with no advance in the civil works due to the vacuum in the team leadership.

[20] Loan review of November 2004.

H. Loan Covenants

27. The PCR reported that compliance with major loan covenants was generally satisfactory. The covenant on involuntary resettlement was complied with at the time of OEM, but three other covenants remain partly complied with (Appendix 5): (i) the merger between WSC and the Urban Public Environment Company (UPEC) is not taking place; (ii) tariff rates have been recently capped (from March–June 2008) by the central government due to inflation; (iii) as of 2007, Tuyen Quang, Ninh Binh, and Dong Hoi had not met the requirement that the debt service ratio not exceed 1.2 to 1; and (iv) the action plan combining the previous conditions on tariff increases and the debt service ratio has not been complied with. The tariff and debt service ratio issues are both related to the Project's financial sustainability, and full compliance would have enhanced sustainability. Because of the present lower-than-planned tariff, to fully repay the loan and accrue cash for future expansion and maintenance all project towns will have to increase tariffs quickly and considerably in the near future, which is a major challenge (Appendix 8).

I. Policy Framework

28. Several key sector policies, decrees and guidelines were issued by the Government during and after the Project, some as result of discussions with ADB during project preparation and implementation. In response to the Project's covenant no. 19, a policy was issued on 18 March 1998 providing guidance and drawing up appropriate investment plans for development of the national urban water supply system until the year 2020. The policy provides overall sectoral goals by 2020 of urban network water coverage of 80%, with a supply level of 80–100 l/capita/day. It also contains a NRW reduction target for year 2010 of 30% in new urban areas, and stresses that WSCs will be public utilities fully supported by water supply charges (both for operation and maintenance and capital investment). Key decrees were also issued in 2006, including Decree No. 131 (Regulation on Management and Utilization of Official Development Assistance [ODA]), issued by the Prime Minister's office.[21] The decree provides legal power to line agencies, including the PPC, to take the lead role in appraising and requesting ODA projects and subprojects, making investment decisions, selecting contractors, and monitoring and supervising the performance of project owners within the parameter of existing legal regulations on investment and construction management.[22] The Ministry of Planning and Investment (MPI) is the main responsible ministry.[23]

[21] Decentralization of the procurement approval came into effect through (i) the 1 September 1999 Decree No.88/1999/CP, promulgating regulations on bidding; and (ii) amendment through Decree No. 14/2000/CP on 5 May 2000 to include provisions to facilitate decentralization. The two decrees came into effect on 26 May 2000, upon issuance by the MPI of Circular No. 04/2000TT providing implementation guidance.

[22] According to the Fifth Joint Portfolio Performance Review of May 2007 (page ii): "there has been significant progress in implementation of the recommendations, including the increased decentralization allowed for in the newly issued Decree 131/2006/ND-CP on ODA management and utilization, and other important changes to the legal framework, e.g., the new Procurement Law/Decree, the new Budget Law and the new Law on Environment. These legal changes have all served to strengthen project, fiduciary and safeguards management in Viet Nam."

[23] Other decrees and instruction from the Government have impacted the sector, including the Interministerial Instruction No. 59 of October 1996, which allowed WSC to use operating revenues for operation and maintenance of its treatment facilities, assuring the financial viability of WSCs. The Government has issued various new policies and strategies concerning sewerage during 1999–2000: (i) the orientation plan for development of urban sewerage and drainage system 2020; (ii) the strategy for solid waste management in urban centers and industrial zones to 2020 (No. 59, April 9, 2007); and (iii) the national rural water supply and sanitation strategy, and MOC and provincial regulations setting forth sanitation standards were instrumental in encouraging people to install septic tanks. The sanitation strategy was prepared by the Finnish Department for International Development Cooperation (FINNIDA), while the tariff study was prepared with ADB TA on National Water Tariff Policy Study (1998-VIE).

III. PERFORMANCE ASSESSMENT

A. Overall Assessment

29. The Project is rated "successful" despite the 4-year implementation delay (Appendix 6). The OEM concurs with the PCR finding that all seven towns achieved their physical targets as of project completion. Since preparation of the PCR, the OEM visited two project towns (Tuyen Quang and Dong Hoi) and verified they had further extended the water supply network coverage (under the main component B). At the time of PCR, 78.6% of the urban population (equal to 8,656 households) in Tuyen Quang was served by the network; the OEM found that as of April 2008, 97% of those in urban wards (or 16,069 households) were covered. Similarly, in Dong Hoi, the 47.8% coverage (5,979 households) in five urban wards quoted in the PCR increased to 100% coverage (or 15,500 households). Notably, even after the Project was closed, the two WSCs have continued to expand their supply coverage in their respective towns, surpassing the initial project target (for project completion) in terms of households covered. Coverage is increasing at a similar pace in the five other project towns.

Table 2: Assessment of Overall Performance of the Second Provincial Towns Water Supply and Sanitation Project

Criterion	Weight (%)	Assessment	Rating Value	Weighted Rating
Relevance	20	Highly Relevant	3	0.6
Effectiveness	30	Effective	2	0.6
Efficiency	30	Less Efficient	1	0.3
Sustainability	20	Sustainable	3	0.6
Overall Rating		Successful		2.1

Source: Evaluation team.

B. Relevance

30. The project is rated "highly relevant."

(i) The Project underpinned the Government's water supply and sanitation sector targets and goals. The project has been replicated through other ADB projects in the country.

(ii) The Project was relevant to the Government's priorities at appraisal and remains so at the time of evaluation. It responded to the people's need for clean and safe water, and project outcomes and outputs were well identified at the time of design.

(iii) It was consistent with the ADB country strategy for Viet Nam to improve the standard of infrastructure and public services, which contributes to a general improvement in the environment and living standards, and benefits the targeted project area through gains in overall public infrastructure.

(iv) At the time of project processing, links between the Project and ADB's strategic objectives were identified in four areas: (i) human resources development through PEEP; (ii) environmental improvements through improved sanitation; and (iii) women in development and poverty reduction, through (a) alleviation of women's hardship in fetching and treating water, and (b) improvements in access to water by the poor. The Project did not fully implement the sanitation component for various reasons, but generally addressed the relevant developmental objectives through water supply infrastructure improvements.

C. Effectiveness

31. The Project is rated "highly effective."

(i) The Project was effective as the envisioned outcomes were achieved. The physical targets indicate that the objectives were generally met in all seven towns.
(ii) Part A (PEEP) was a success, primarily because it was affiliated with a very organized VWU. The willingness of community members to pay increased water tariffs and install septic tanks serves as a proxy for community awareness, and indicates project beneficiaries appreciated the importance of public hygiene and the resultant reduction in diarrhea. The VWU management gave high praise to the Project's contribution through PEEP.
(iii) Part B (water supply systems development) resulted in the nearly continuous availability of potable water in all seven project towns, with water system coverage of approximately 80% in urban and suburban areas. Increased water consumption is another indicator for consumer satisfaction. In terms of technical quality, newly installed pipelines and the treatment plant facility are of good quality, although not much time has elapsed for their evaluation.
(iv) The Project's water supply improvements are well appreciated by the consumers in the seven towns, and the tariff collection rate is nearly 100%.
(v) Part C (environmental sanitation improvements) achieved the original target in terms of the number of septic tanks installed.

D. Efficiency

32. The Project is rated "less efficient."

(i) The Project suffered a significant delay in overall project implementation, as the ICB contracts, and especially key civil works for the water treatment plants, were not signed until 2004. Construction did not begin until later in 2004 (the project's 9th year), and was particularly delayed in the southern towns. As a result, the forecasts for number of household connections and financial standing of the WSCs for 2008 have not been achieved. In this regard, the implementation process was "inefficient."
(ii) Based on the economic internal rate of return (EIRR) recalculation, the project was "efficient." The EIRR 2 years after Project completion is still higher than 12%; the Project remained economically viable, in part due to the absence of financial charges for ADF loans during implementation delays. The average EIRR for the seven project towns was estimated at 13.98%, compared with 16.79% at project completion (Appendix 7). Although the project implementation delays reduced the project benefits compared to those projected at appraisal, this was compensated for in part by the lower-than-projected cost of the capital works.[24] The EIRR for the individual project towns ranged from 12.19% to 17.95%. The EIRR for Tuyen Quang calculated by the OEM was lower than the appraisal estimate, and below the figure calculated at completion due to (a) lower-than-projected tariff rates and (b) the use in the PCR of higher figures for water volume sold in 2005–2006 than was actually the case.

[24] Winning bids were lower than budgeted as contractors tried to outbid each other.

(iii) The EIRR for Vinh was also lower than the PCR estimates due to the use of excessively high estimates of water volume sold for 2005–2006 in the PCR. At the time of the OEM, the water volume consumed in Vinh in 2008 was much lower than the figure projected at the time of the PCR for 2008, which means that the coverage expansion plan was too optimistic, and the WSC's revenue was lower. Economic benefits identified during project appraisal were realized. Households connected to the piped water system have stopped drawing water from wells and rivers.

E. Sustainability

33. The Project is rated "likely sustainable."

(i) All necessary plans, legislation and decrees have been issued for water supply, sanitation and solid waste. Some elements of some decrees are note yet in force (e.g., there is no PPC subsidy to WSCs, where there is shortfall due to the cap on water tariffs), but in general, all necessary legislation has been introduced to grant WSCs sufficient financial and administrative authority to run their businesses.

(ii) The water supply systems in most of the towns currently operate at below their designed capacity, as they are designed for the target year of 2011. This was confirmed in Dong Hoi, which was utilizing just one of the four pumps installed through the Project. In fact, at the current pace of development, by 2011 Tuyen Quang would be using just 71% of installed capacity, while in Dong Hoi utilization would equal 44%, meaning water treatment capacity is well above demand. All machines and equipment were well maintained, and repairs have been made as needed to keep all facilities in order.

(iii) In general, from a technical (engineering) perspective, the treatment plant and other facilities are properly maintained and run. Poor water quality in Tuyen Quang resulting from the high iron content of the soil remains a major concern.

(iv) The financial reevaluation of the water supply component resulted in an average financial internal rate of return (FIRR) of 5.59% for the seven project towns (Appendix 8), below the PCR average of 7.68%. The weighted average cost of capital (WACC) was recalculated, because the subsidiary loan interest rate was reduced to 5% for Dong Hoi, Ninh Binh, Vinh, Dong Ha, Qui Nhon and Ben Tre, with a 0.2% service charge for Tuyen Quang. This resulted in a WACC of 4.48% for the six project towns and 1.67% for Tuyen Quang. The FIRR for each of the seven project towns was estimated to be above the WACC, indicating that the use of financial resources to finance capital works was in the acceptable range.

(v) The NRW ratio has dropped to 20.5% in Tuyen Quang and 23% in Dong Hoi. MOC also confirmed that the NRW in other towns was below 30%. Also, electricity costs for pumping are around 12%–16% of total operation costs, and can be covered adequately by the water tariff.

(vi) WSC staff numbers were increased to ensure proper operation of the new water supply works and to expand distribution networks for new consumers. All are regular staff members, with salaries based on performance. The consumer–staff ratio is 133:1 in Tuyen Quang, and 146:1 in Dong Hoi (a ratio above 100 is desirable, which is one indicator that human resources are used efficiently).

(vii) Profitability is not assured. Water tariff rate increases projected during project appraisal did not materialize. Despite this, net income was realized in all project

towns from 2005 to 2007 except Dong Ha,[25] which registered a net loss in 2006 and 2007. One reason for the positive financial result in the six project towns is that repair and maintenance costs were minimal over the last 3 years (ranging from 3% to 11% of total operating costs), because the water systems are relatively new. However, this situation will change when the system becomes older and subloan principal repayments become due in 2008. To ensure financial sustainability of the water supply system, a tariff increase should be seriously addressed by both the central and provincial governments. For the water operation to be sustainable, the proposed water tariff increase as indicated in Table 8.6 in Appendix 8 should be implemented. For increasing the water tariff, WSCs need approvals from their respective PPCs. However, generally, PPCs are "reluctant" to charge,[26] and currently, are just willing to subsidize from provincial general tax revenue for gaps in the tariff revenue and the operations costs. Also, WSCs are engaged in other side-businesses, which include construction and real-estate activities. While financially, the present books are sound, sooner or later, PPCs should comply with the principle in the joint circular issued by MOC and Ministry of Finance (2004). Tariff has to be set on the basis of "full cost-recovery with a reasonable profit."

(viii) Therefore, technically and institutionally, the Project has good prospects to be sustainable, but in terms of financial sustainability, most of the seven towns will be facing a challenging task to cover costs for adequate maintenance when facilities begin to wear, and for capital for expansion and renovation.

IV. OTHER ASSESSMENTS

A. Impacts

1. Impacts on the Millennium Development Goals

34. The OEM examined whether the Project contributed to Viet Nam's achievement of the relevant targets of the Millennium Development Goals (MDGs). Available government data do not indicate the Project had a discernable impact on either MDG target 4a (reduce by two-thirds, between 1990 and 2015, the under-five mortality rate) or MDG target 7c (halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation). The Ministry of Health and the National Statistics Office were not able to release specific monitoring data directly applicable to the MDGs at provincial or city level. Table A7.2 (Appendix 7) shows the reduction in morbidity rates (all ages) from diarrhea and dysentery in Tuyen Quang, and Table A7.3 (Appendix 7) the reduction in morbidity from diarrhea only in Dong Hoi City in 2001–2007. In Dong Hoi diarrhea-related morbidity has exhibited a general downward trend, but a consistent reduction was not observed in Tuyen Quang during the period. The same is true for provincial data, which examined trends in morbidity and mortality rates in the seven provinces containing the seven project towns (Appendix 9). The data traces morbidity and mortality rates for diarrhea, cholera, typhoid, dysentery, and amoebic dysentery. Some waterborne diseases showed consistent reduction, e.g., dysentery and amoebic dysentery in Tuyen Quang Province and regular diarrhea and amoebic-dysentery in Quang Binh Province (where Dong Hoi is located). However, dysentery in Quang Binh Province is still fluctuating, and the record in 2005 was generally worse nationally than 2004 and 2006. There were more

[25] Water tariff increase approved was less than the proposed rate, which was designed to cover all costs.
[26] This trend of PPCs unwilling to raise tariff was also observed in the ongoing Sector Assistance Program Evaluation for Viet Nam's Urban Development and Water Supply sectors. The report is expected in 2009.

typhoons and natural disasters in 2005, which caused more floods, and resulted in more cases of waterborne diseases. The Government needs to exert more effort at both central and provincial levels to succeed in more generally reducing waterborne diseases.

2. Social Impact

35. **Resettlement**. Overall, only 14 households were affected by resettlement as a result of the Project. Of these, OEM confirmed during the visit to Dong Hoi that seven households (brick factory workers) have been compensated following Government and ADB guidelines, with no outstanding issues. MOC officials confirmed that the remaining seven households also followed the same rules and guidelines. The OEM observed that the seven affected households were relocated to a few hundred meters from the original location, allowed to live close to each other, and a relocation and temporary inconvenience compensation package was prepared in response to the requests of affected households. Asset value evaluation was adequately addressed, including orchard trees and other auxiliary structures.

36. **Gender**. Before the Project, it was the task of women to fetch water for cooking and cleaning from wells and streams. Water availability was limited (to 4 days/week, 2–3 hours/day) even for households with water, while water is now continuously available. During the focus group and beneficiary interviews, local residents said they appreciated the constant water flow, and voiced delight that they no longer have to worry about obtaining decent water from potentially contaminated sources. Water quality in Tuyen Quang is not entirely satisfactory, as many consumers regularly observe suspended particles, a reddish color in washed laundry items, and the bitter taste of iron. The WSC maintains that biochemical oxygen demand and chemical oxygen demand both meet the Government's national standard for drinking water. The water's high iron content does affect the color and smell of the water, but data indicate general compliance with standards, and drinking the water will not negatively impact the health of residents.[27]

3. Poverty Impact

37. Some support was offered to the poor for the initial water supply connection fees and septic tank purchasing costs, through concessional loans extended by WSCs from the Viet Nam Bank for Social Policy, with VWU endorsement, and extended repayment periods (3 months for septic tanks). The repayment scheme was to repay D75,000 ($4.65) per month, with full repayment in 24 months (total $111). More than 90% of the households have already repaid. Water supply and septic tank connections were done according to the geographical proximity to the main trunkline that was installed, and the WSC and PPC made concerted efforts to include all households in the targeted zones by offering installments and a deferred repayment scheme. [28]

4. Environmental Impact

38. No adverse effect to the environment was observed as a result of the Project; however, the scope was reduced in part C, and the direct impact of the Project to the environment was

[27] Some households are installing filter themselves. These cost D4 million–D5 million ($248–$310) for a good US model, while mass-market filters cost D400,000–D500,000 ($31). The color and rusting that result from the high iron content has caused some households to change their water tank every 6 months, at a cost of around D1,500,000 ($93) per tank.

[28] Some households, especially in agricultural communities in border areas or far from the city center were not connected, and some are lower income households. However, they were not connected not because they were poor, but according to the WSC development plan technical requirements, due to distance from the main line.

thus less than originally envisaged. Projects undertaken by other development partners (mainly the World Bank) to expand drainage and sewer lines were still ongoing at the time of the OEM.[29] Despite septic tank installation efforts, as of April 2008, sewage coverage in Tuyen Quang remained at just 17% of households. Of the remainder, about 41% use septic tanks, while the balance discharge their waste to drains, rivers and open fields. There is room for improvement with respect to sanitation generally in Viet Nam. Although the awareness campaign on the installation of septic tanks has been successful, no financial incentives exist to install septic tanks, other than the loan for the poor offered by the Viet Nam Bank for Social Policy. A flat charge of 8% of their water bill is levied as an environment protection tax on households who have installed septic tanks, and consumers are well aware of this tax, according to the results of the socioeconomic survey. Tax revenues allow towns to accrue resources to gradually improve the sanitation situation. The survey noted a perception by some local residents that the Project had positively contributed to the reduced flooding occurrence, but the official record is not kept by the local authorities (Appendix 10). In addition, the Part A PEEP exercise was effective for the general population to understand the value of water connection to their well being and improved health.

B. Asian Development Bank Performance

39. ADB's performance is rated "partly satisfactory." As the months passed by in the early phase, it was apparent that the Government needed more consultants to steer the detailed design and evaluation of bids. ADB should have urged the Government to accept additional consultant input early on. It became apparent early in the Project that (i) the PPIO staff had insufficient capacity to prepare requests for proposals and evaluate bidding documents; and (ii) the Government approval process was very extensive, with PPIO and MOC not pushing for expeditious processing of documents within the government system. On multiple (more than six) occasions ADB review mission reports adopted an optimistic outlook regarding Government approvals; each time, in the next mission, the ADB officer had to face the prospect of further delay. Low PPIO supervision and monitoring capacity resulted in low-quality execution of civil works by the contractors. Concerns expressed by ADB management should have been thoroughly communicated to the Government, and an increase in international consultant input to review the PPIO structure was needed as early as the midterm review period. The OEM also noted the existence of a considerable language barrier, which was apparent during the early implementation phase. It was very difficult for government staff to review and provide comments on standard ADB contracts and bidding documents, and ADB could have extended extra help in translation to ease the difficulty. All of these can be grouped as "initial learning curve" lessons, and many could not have been foreseen at the time of project preparation, but ADB could have acted to address the issues during implementation.

40. As the delay was prolonged, the Government requested for unbundling into smaller ones of a number of larger procurement packages. The number of responsive bids may have increased, but it also fragmented the civil works. In some components, it had a negative impact on the quality, and increased the workload of the CPMU, which also compounded further delays in the later years.[30] The procurement package breakdown changed from 9 ICB, 2 international

[29] In Dong Hoi, there was scope reduction in the drainage component, as it was originally envisaged that 10 km of drains would be laid out through the Project, but the actual delivery through the Project was 5.5 km of concrete pipes. The reasons for the reduction were: (i) a delay in contract CW1A and (ii) another project from World Bank with a $38 million grant.

[30] This issue of unbundling procurement packages is quite regular phenomena in Viet Nam operations in urban sector, and will be examined in the Sector Assessment Performance Evaluation, which will be conducted in late 2008.

shopping, and 4 other types (including LCB and force account) of packages to 7 ICB and 20 LCB packages. The Government strongly requested that contracts be broken down into smaller contracts, which ADB approved. The capacity assessment during project preparation, especially on appropriate packaging of procurement, was insufficient. ADB should have either not allowed procurement packages to be fragmented, or should instead have designed smaller packages from the outset. In addition, there was prolonged communication between ADB and the Government on the institutional merger between the WSC and sanitation agency (UPEC), which was one of the covenants, eventually not met. Through the review of all review mission reports, ADB's position on unmet covenants, especially on the merger between WSC and UPEC, was not consistent, with a differing understanding and position taken by the four project officers during the implementation period. The covenant was never met, and the Government explained at an early stage (July 1999) that WSCs are under the provincial government, while UPEC was under the municipality; the Government indicated that position could not be changed. However, some ADB mission leaders pursued the merger when they assumed control over the Project, as they did not fully understand the Project's background. In addition, BME compliance was stated as being met in the first year, but the midterm review indicated BME had not been properly established, and proper and regular monitoring was never established within the WSC or institutionalized within CPMU. The EA and PPIOs took BME to be an "ADB-driven" requirement, never fully understanding the value of the impact monitoring. The data was not systematically collected by the PMU, and the BME did not incorporate the PPTA recommendation that it include socioeconomic and public health-related data.

41. **Cost of Septic Tank and ADB Coverage**. OEM also found that there was confusion in the project files regarding the cost of septic tanks and reduction of ADB loan proceeds coverage. In the loan review mission of December 2000, it was reported that the cost of the septic tank dropped from $303–$395 to $75–$86 per unit, while the average unit cost actually remained at the $300 level; because of the ADB coverage shift, the remaining balance had to be paid by the consumers, either outright or by availing themselves of other locally available loans. The final result, in terms of the number of units installed, in effect exceeded the original goal due to the reduced ADB coverage per unit.

C. Borrower Performance

42. **Frequent Change of Provincial Staff**. The Government's performance is rated "generally satisfactory," taking into account that this was one of its early urban sector ADB projects, with which MOC had little experience. However, the Government could have performed better in some areas. ADB's Viet Nam Resident Mission (VRM) indicated that the CPMU has accumulated adequate experience, as some key officials are still working for the unit, but this is not the case in the provinces. Staff turnover at the PPIOs is very high, and people in the provincial job markets are very mobile. A 26 September 2000 review mission report indicated that four water supply and drainage company directors at PPIOs had changed, and the ADB mission observed that some of them did not understand the Project.

43. **Procurement Package Changes**. Initially, the CPMU's inexperience with procurement matters and ADB procedures was the main cause for the implementation delays, but as the CPMU gained experience and skills, the main cause of the systematic delay shifted to the government approval processes: (i) some requirements were very rigid, such as the need for all ICB procurements to receive unanimous approval by all seven PPIO directors; and (ii) the requirement that the MPI and Prime Minister's Office approve procurement, in addition to the MOC. Although some changes have been implemented (e.g., the Prime Minister's Office approval

requirement was upgraded to D75 billion),[31] approvals by the Prime Minister's Office can add 2–3 weeks or more on average to the time needed for approval. Thus the problem still exists.

V. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS

A. Issues

44. The main issues are as follows:

(i) **WSC autonomy and tariff increases**. The Government needs to clearly delineate which ministry has overriding authority on tariff controls, and should pursue complete autonomy for the PPC for tariff setting. The line of authority and tariff-setting autonomy should be consistent and clear: Interministerial instruction no. 59 (No. 59/2007/ND-CP, October 1996) has given power to WSCs to project and introduce tariff increases, with the approval of the local PPC. However, the central Government (i.e., the Prime Minister's Office and MPI) can impose a cap on the water tariff increase. Although the current cap extends only from March to June 2008, there is a longer term impact on WSC management. The original tariff increase projected during appraisal has been delayed for 2–3 years; and now with the current cap, a WSC had no option but to keep the existing tariff. Many WSCs, including those in the project towns, will not be able to cover maintenance, planned expansion, and renovation if the tariff is kept at the present low level (as some WSCs do not factor in depreciation and loan debt-service costs fully). The immediate effect of the cap was to make short-to-medium term scheduling impossible, and require rescheduling of the tariff increase. Some WSCs are extremely successful, and have sound communication with consumers, but the maturity and performance of each WSC differ. While providing technical guidance to WSCs is the responsibility of MOC, the regulatory responsibility for water tariffs lies with MPI. The two ministries should have a common long-term strategy for financial sustainability and grant WSCs a degree of business independence. The charges levied by other utilities, such as electricity and communication (telephone), are rising much faster, and water tariff increases to date have been small and conservative.

(ii) **Government approval process**. The approval process in Viet Nam was very extensive during project implementation, which has implications for future projects and the ongoing portfolio of ADB operations in Viet Nam. Both the Government and the international aid community should continuously discuss how approval time can be reduced, as this is almost a constant impediment to any infrastructure-related project. The OEM also confirmed (and this was verified by the Fifth Joint ODA Portfolio Report, para. 24) that provincial committees remain hesitant to accept the newly acquired ODA implementation responsibility, and instead seek approval of the ministries involved, still causing major delays.

(iii) **Retention of capable staff at PPIO**. The OEM observed that there is adequate institutional memory accumulated in the central management and/or coordination

[31] This came into effect close to the time of the midterm review in June-July 2000. Although some other countries also require the Prime Minister's Office's or another high office's endorsement, the minimum amount is much higher, and initial endorsement within the line ministry's control does not usually require unanimous approval, but is given on a majority or "consensus" basis.

unit in MOC since project directors and some staff have been trained on externally assisted project implementation and civil works procurement, and are still working. However, in the provinces, many staff at PPIOs have left the office with the completion of the Project; furthermore, the PPIO directors had been seconded from the respective PPCs and have departed due to regular rotation in the PPC personnel shuffle. Thus, it is difficult to institutionalize the capacity-building efforts extended by the Project in the provincial and municipal governments. Part of the problem lies with the fact that salaries are low, and there is high turnover in the job markets in the provinces.

(iv) **Sludge treatment**. WSCs should introduce standard guidelines on the proper disposal of treated sludge from treatment plants. The OEM observed during visits to water treatment plants that sludge produced by the plants was casually disposed of with little consideration or control. Proper disposal of the sludge is important to mitigate environmental impacts. Some WSCs also lose the opportunity to raise additional revenue. Depending on its content, some sludge can be effectively used as fertilizer by selling it to farmers' associations, except if it contains pollutants. In general, sewerage and drainage remain significantly underinvested compared with water supply, even after the Project's infrastructure improvements.

B. Lessons

45. The Project's experience points to a number of lessons with regards to WSC operation, including those given below.

(i) **When coordinating with other agencies in the recruitment of consultants, rigorous needs assessment and quality control are needed to meet VWU's high standards.** For future ADB or other externally assisted programs, projects need to contain strong added value and to introduce new ideas, as VWU is already a highly effective and organized institution. VWU can effectively engage the local population and industries and raise awareness about public services, health, and hygiene. The organization has strong links to the PPCs and to central ministries in the capital, including the Ministry of Women. VWU has been running its regular activities on public hygiene without the Project's financial support. The OEM could not confirm the effectiveness of the UNVs (paid with ADB loan proceeds).

(ii) **MOC needs to draws up a long-term strategy on (a) which agency will be responsible for the development and maintenance of drainage, (b) whether sewerage operations need to be integrated with water supply, or kept separate, and (c) how to sustain the technical and financial burden of the sewerage**, either from local taxes or a specific tariff. In Dong Hoi, the WSC has taken over drainage development and maintenance, but sewerage still lies with UPEC. There is administrative difficulty in merging the WSC and UPEC unless the drainage network properly covers the whole town. There is also a risk to public health if household and industry discharges obstruct the water supply network or water table. At the moment, there is no cohesive status in terms of who takes the responsibility for drainage and sewerage, as the OEM observed some of the financially strong WSCs taking up the drainage responsibility, with

O&M expenses covered under the combined tariff mainly from water; but some smaller or weaker WSCs are not taking the drainage responsibility.

(iii) **There is a need to maintain various project impact data, including health and socioeconomic data, to continuously monitor improvements in the public health and livelihood that social infrastructure projects will yield.** Many departments within the provincial government are "compartmentalized"; for example, the health department is not aware of projects in the construction department. During the project preparation stage, the health department is involved in the design, but once the construction work starts, health department officials are no longer involved in the water supply and maintenance of the new water treatment plant. Overall, the provincial governments do not seem to regard water supply projects as improving the general public livelihood; thus, project benefit monitoring initiatives are not embraced by the provincial authorities or management of water supply agencies. The CPMU in Ha Noi did not compile, keep, or archive the data, and all towns discontinued the output, as ADB "no longer required it." There was a strong sense that BME was imposed by ADB, and that ownership of the data did not lie with the WSCs or PPCs. The central government and ADB need to continue engaging the higher authorities at the provincial level to understand the importance of such benefit monitoring schemes.

(iv) **Both the central government and responsible WSCs need to take concrete actions to improve water quality and address consumers' complaints.** Soils in Viet Nam contain high amounts of iron and manganese, especially in the northern part of the country. MOC is directing the WSCs to follow up on the issue through an official letter. However, the WSCs need more step-by-step technical and financial support and guidance from higher authorities, as the problem is not limited to one location (high-iron levels were also observed in Ba Don). Iron and manganese removal should not be done at the household level, as proper mineral filters are expensive and need constant replacement. The water should be treated at source; conventional absorption and ion-exchange technology can be used to achieve significant mineral removal. Iron and manganese can also be eliminated or minimized through (a) installation of proper filter screens, and (b) rehabilitation and regeneration of deep wells.

(v) **Where bacteria-related cases are occurring, WSCs should push for (a) an extensive monitoring system on well water quality; (b) daily microbiological testing at random sites; and (c) most importantly, public release of results to satisfy the general public's concerns.** The source of contamination needs urgent investigation and removal. Although water tests are conducted with the cooperation of local preventive health care unit staff on a monthly basis at the minimum, the level of public disclosure was not clearly explained to the OEM, and residents continued to request such disclosure. In Tuyen Quang, some residents have also raised concerns that water may be polluted by *E. coli*.

(vi) **Currently, all expenses associated with septic tank installation and maintenance are fully borne by households, and where there is no sewer system development plan in sight, the provincial government needs to strategize how to achieve greater sanitation coverage to improve local hygiene conditions, including extension of financial incentives.** During the

Project, there were campaigns to install septic tanks, and for low-income people, limited concessional loans were offered from a specialized government-owned bank with a longer repayment schedule. To further propagate the coverage, provincial governments need to extend further incentives including an initial subsidy for the connection, and regular cleaning of the tanks.

C. Follow-Up Actions

46. The evaluation has raised several issues that require follow-up actions by the Government. OED understands that ADB remains committed to supporting water supply and municipal sanitation development, improvement, and management in Viet Nam; hence the evaluation recommends that ADB use the findings of the evaluation in its policy dialogue with MOC. Some major follow-up actions discussed during the OEM, with time lines (presented in the Executive Summary) are as follows:

(i) Water quality problems and consumers' complaints in Tuyen Quang need an immediate follow up by (a) MOC, giving clear technical guidance on how iron and manganese can be removed or tackled at source; and (b) the municipality, to draw up an action plan to take concrete steps following the Government's guidelines (2009);

(iii) MOC needs to draw a clear roadmap for national sanitation targets, including both drainage and sewerage, and this should be translated into concrete investment plans (2009);

(iii) MOC needs to draw up a long-term strategy concerning (a) which agency will be responsible for the development and maintenance of drainage; (b) whether sewerage operations need to be integrated with water supply, or kept separate; and (c) how to sustain the technical and financial burden of the sewerage, either from local taxes or specific tariffs (2009–2010);

(iv) The Government and external partners (in ADB, VRM can lead in the discussion) need to continuously discuss and agree on ways to streamline the Government's approval process in externally funded infrastructure projects, particularly on ICB for civil works procurement (2009–2010).

PROJECT DESIGN AND MONITORING FRAMEWORK AND ASSESSMENT RESULTS AT PROJECT COMPLETION AND PERFORMANCE EVALUATION

Design Summary	Expected Results	PCR Assessment Results	PPER Assessment Results and Comments
Impacts Improved public health and urban environment	• By 2011, 100% of the urban and suburban population will have access to adequate fresh water supplied by the WSCs. About 80% of consumers will be supplied through individual metered connections and 20% through metered public standpipes.	• The PCR confirmed that 75% of the population had access to fresh water supplied by the WSC in Tuyen Quang. OEM confirmed that as of May 2008, in Tuyen Quang 97% of the urban center is covered, 61% of suburban areas and 20% of the adjacent districts of Yen Son and Son Duong. Overall coverage within the town is 46%. • For Dong Hoi, it was 64% during PCR. At the time of the OEM, 100% of the city (5 wards) had piped water connections and 60% of communes (2) were connected. Overall, piped connections cover 67% of households and institutions.	• At the city center, both cities have attained close to 100% coverage, however, within the city boundaries, some areas distant from the main trunkline network have not been covered by the Project. This is particularly the case for households engaged in agriculture, which have little disposable income.
	• Substantial declines achieved in the incidence of waterborne disease and infant mortality.	• Local preventive health care unit staff claimed that the incidence of acute waterborne diseases was reduced, and complaints regarding water quality had greatly subsided.	• Dong Hoi data showed some level of general improvement with respect to waterborne diseases, but Tuyen Quang health data does not show a consistent improvement, and the Ministry of Health's provincial data does not

Design Summary	Expected Results	PCR Assessment Results	PPER Assessment Results and Comments
			verify that a reduction in waterborne diseases has occurred.
	• Substantial reductions achieved in the threats to aquatic ecosystems from urban water pollution		• The drainage component was substantially reduced as project towns obtained grant funding from a different donor agency.
Outcomes Enhanced public awareness on hygiene and sanitation	• Continuing public involvement in the planning, design, and implementation of the project towns' public water supply and sanitation systems.	• Communities, including Vietnam Women's Union, continuously involved in water supply and sanitation activities.	• The Project has been beneficial to morale, and provided study trips and workshops for public hygiene awareness. The Project also encouraged installation of new septic tanks.
	• Widespread public support for WSCs as evidenced by the adoption of tariffs for full cost recovery.	• With public support, including from the provincial people committees, tariff rates have been adjusted, but have not yet reached sufficient levels.	• WSCs have been implementing tariff increases, but excessive domestic inflation has caused the Ministry of Finance to place a national cap on short-term increases in 2008. Significant and regular tariff increases are necessary for WSCs to be self-sustaining, and to enable them to repay the ADB subsidiary loan.
Improved access to safe water	• Average domestic consumption of fresh water increased to 100 liters (l) per capita per day in urban and suburban areas of project towns.	• Average, daily per capita domestic water consumption is estimated at 92 l in Tuyen Quang, 82 l in Ninh Binh, 120 l in Vinh, 135 l in Dong Hoi, 110 l in Dong Ha, 88 l in	• Tuyen Quang average daily per capita water consumption has increased from 67 l (pre-project) to 101 l (post-project). In Dong Hoi, the figure rose from 25 l to 98 l.

Design Summary	Expected Results	PCR Assessment Results	PPER Assessment Results and Comments
		Qui Nhon and 100 l in Ben Tre.	
	• Project towns' nonrevenue water (NRW) (due to leakage, faulty meters, etc.) reduced from 33%–57% in 1996 to less than 35% by 2002. (Note: The industry standard should be lower, perhaps by 20%–25%).	• NRW has been reduced to the following levels: 28% in Tuyen Quang, 30% in Ninh Binh, 25% in Vinh, 25% in Dong Hoi, 26% in Dong Ha, 30% in Qui Nhon, and 21% in Ben Tre.	• In Tuyen Quang, NRW was reduced from 50% to 20.5%, and in Dong Hoi, from 45% to 23%.
	• Town water supply systems continue to receive adequate periodic and special maintenance during and beyond the project implementation period.	• The water supply systems are well maintained in all towns except Tuyen Quang.	• OEM confirmed that there are water quality and customer complaints in Tuyen Quang, which can be addressed.
Improved urban environment	• Flooding incidence reduced.	• Likely being reduced with the improved drainage system, but impact varies by town as investment in this category was limited.	• OEM was unable to confirm whether the flood occurrence reduced as a result of the Project. The drainage component of the Project was substantially reduced due to other external assistance, and the Project had limited impact in this area.
Strengthened existing sector institutions	• Existing sector institutions are strengthened in respect to financial and maintenance management.	• Installation of computerized billing and operation monitoring systems and training of WSC staff resulted in improved financial and maintenance management.	• The review of financial statements and records has confirmed that they are meeting usual global standards and the Project has strengthened WSC financial management capacity.

Design Summary	Expected Results	PCR Assessment Results	PPER Assessment Results and Comments
	• Project towns' WSCs achieve full cost recovery, including adequate income to ensure continuing system operation and maintenance (O&M) and upgrades.	• Project towns' WSCs were yet to achieve full cost recovery, including adequate income to ensure continuing system O&M and upgrades.	• Tariffs have increased as planned, but there is presently a cap on further increases. Some WSCs are costing depreciation costs (70%), but others are unable to do so.
	• Policy reform to enforce improved sanitation standards is effective.	• Ministry of Construction and provincial regulations to enforce installation of septic.	• The orientation plan for the development of an urban sewerage and drainage system 2020 has provided the impetus for the septic tank installation, but detailed operational guideline has not been issued; there is no public subsidy for installation and maintenance; and no guidance on regular cleaning.

ADB = Asian Development Bank, lpcd = liters per capita per day, NRW = nonrevenue water, OEM = operations evaluation mission, O&M = operation and maintenance, PCR = project completion report, PPER = project performance evaluation report, WSC = water supply company.

APPRAISAL AND ACTUAL PROJECT COSTS

A. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimates	Actual
Foreign Exchange Cost	47.13	50.82
Local Currency Cost	44.87	21.15
Total	**92.00**	**71.97**

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
A. Implementation Costs		
ADB-Financed	67.22	57.62
Borrower-Financed	19.68	12.70
Beneficiaries-Financed	3.32	0.00
Subtotal	**90.22**	**70.32**
B. Interest During Construction		
ADB-Financed	1.78	1.65
Borrower-Financed	0.00	0.00
Subtotal	**1.78**	**1.65**
Total	**92.00**	**71.97**

ADB = Asian Development Bank.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
Part A: Public Environmental Education Program		
ADB-Financed	0.72	0.31
Borrower-Financed	0.00	0.00
Subtotal	0.72	0.31
Part B: Water Supply Systems Development		
ADB-Financed	47.48	37.83
Borrower-Financed	6.43	9.62
Subtotal		
Part C: Environmental Sanitation Improvements		
ADB-financed	9.06	7.55
Borrower-financed	1.29	1.88
Beneficiaries	3.32	
Subtotal	13.67	9.43
Part D: Implementation Assistance and Institutional Strengthening		
Consulting Services		
ADB-Financed	5.51	6.75
Borrower-Financed	0.22	0.83

Component	Appraisal Estimate	Actual
Incremental Administration		
ADB-Financed	0.32	1.11
Borrower-financed	1.16	0.27
Force Account Equipment		
ADB-Financed	1.27	2.51
Borrower-Financed	0.02	0.11
Other Costs		
ADB-Financed	2.86	1.57
Borrower-Financed	0.02	0.11
Service Charge on Bank Loan	1.78	1.65
Interest during Construction	10.55	0
Beneficiary-Financed Sanitation Facilities	3.32	
Subtotals		
ADB-Financed	**69.00**	**59.27**
Borrower-Financed	**19.68**	**12.71**
Beneficiary	**3.32**	
Total	**92.00**	**71.97**

ADB = Asian Development Bank.
Source: ADB. 2006. *Project Completion Report on the Second Provincial Towns Water Supply and Sanitation Project*. Manila.

4. Cost Breakdown by Category ($ million)

Category	Appraisal Estimate	Actual
A. Base Cost		
1. Land	0.24	0.95
2. Civil Works	48.63	21.85
3. Equipment and Materials	12.16	35.58
4. Consulting Services	5.03	7.66
5. Incremental Administration	2.72	1.94
6. Institutional Development and Strengthening	0.00	2.26
7. Other costs	0.00	0.08
Subtotal (A)	**68.76**	**70.32**
B. Contingencies		
1. Physical	4.75	0.00
2. Price	6.15	0.00
Subtotal (B)	**10.91**	**0.00**
Total Base Cost	**79.67**	**70.32**
C. Interest and Service Charge		
1. Interest During Construction	10.55	0.00
2. Service Charge on Bank Loan	1.78	1.65
Total Project Cost	**92.00**	**71.97**

MAJOR INTERNATIONAL COMPETITIVE BIDDING CONTRACTS FOR CIVIL WORKS

No.	ICB EA Contract Number	Major Task	Contract Signed Date	Completion Date	Original Amount	Disbursed Amount ($)
1	B/99/ICB/DH6B	Priority Rehabilitation Works: Dong Hoi	10-Nov-99	01-Sep-00	D3,485,889,687	242,691
2	B/00/ICB/CW2A	Design and Construction of Water Treatment Plant and Ancillary Works: Package A Towns	06-Dec-01	31-Dec-04	$1,674,496	1,676,802
3	B/00/ICB/CW2A	Design and Construction of Water Treatment Plant and Ancillary Works: Package A Towns	06-Dec-01	31-Dec-04	D1,856,088,577	118,989
4	B/00/ICB/CW1A and Supplement No.3	Principal Water and Sanitation Works: Package A	30-Jul-02	31-Jan-04	D43,302,055,249	2,777,016
5	B/00/ICB/CW1BA and Supplement No. 2 and 3	Principal Water and Sanitation Works: Package B	30-Jul-02	31-Jan-04	D38,387,481,412	2,443,620
6	B/00/ICB/CW2B-B1+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B1 Dong Hoi	26-Sep-03	30-Jun-05	$917,268	922,348
7	B/00/ICB/CW2B-B1+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B1 Dong Hoi	26-Sep-03	30-Jun-05	D1,557,813,408	98,436
8	B/00/ICB/CW2B-B2+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B2 Dong Ha	26-Sep-03	30-Jun-05	$397,729	399,420
9	B/00/ICB/CW2B-B2+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B2 Dong Ha	26-Sep-03	30-Jun-05	D3,252,731,614	206,523

No.	ICB EA Contract Number	Major Task	Contract Signed Date	Completion Date	Original Amount	Disbursed Amount ($)
10	B/00/ICB/CW2B-B3+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B3 Quy Nhon	26-Sep-03	30-Jun-05	$581,167	579,352
11	B/00/ICB/CW2B-B3+Supplement No.3	Design and Construction of Water Treatment Plant and Ancillary Works: Package B3 Quy Nhon	26-Sep-03	30-Jun-05	D781,199,902	49,269
12	Various	Design and Construction of Water Treatment Plant and Ancillary Works: Package B4 Ben Tre Province	26-Sep-03	30-Jun-05	$482,479	480,943
13	Various	Design and Construction of Water Treatment Plant and Ancillary Works: Package B4 Ben Tre Province	26-Sep-03	30-Jun-05	D499,940,977	31,540
					Total	**10,026,949**

EA = executing agency, ICB = international competitive bidding.
Source: Asian Development Bank Mainframe LFIS database.

SUMMARY OF PHYSICAL ACCOMPLISHMENT: TUYEN QUANG AND DONG HOI

Table A4.1: Main Findings in Tuyen Quang

Project's Engineering Output:

Part B: Water Supply Improvement

(i) Constructed eleven new boreholes with associated pumping stations.
(ii) Installed 3.278 km of 150–400 mm diameter raw water pipes.
(iii) Rehabilitated and upgraded existing water treatment plant (WTP) to produce 12,500 m^3/day.
(iv) Constructed new administration building, workshop, pumping station, and laboratory to serve the upgraded existing WTP.
(v) Constructed 1,000 m^3 of new storage, as well as 23.4 km of transmission and distribution pipes.
(vi) Installed 8,656 house connections.
(vii) Rehabilitated 5.45 km of drainage system.
(viii) Provided equipment and training.
(ix) Tuyen Quang WTP lacks water treatment works, and has sedimentation and filtration only. Water supply system in Tuyen Quang is rather simple.

Some Observations:

(i) Water quality analysis results (the samples were taken in 1,000 m^3 storage, wells no. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11; water taps in Minh Xuan, Phan Thiet, Tan Quang wards; and Nong Tien, Hung Thanh, Trang Da, and Y La communes) during 8 November 2006–22 November 2006 by the Tuyen Quang Center of Preventive Medicine. The Department of Health noted that water quality does not satisfy national standard for drinking water. According to the survey of the OEM on 100 questionnaires, results revealed that 18% say the water quality was rather bad, and 49% said the water is sometimes not clean.
(ii) Two general water meters in Tuyen Quang WTP were broken. CPMU sent official letters to the contractor and requested repairs before 15 March 2005, but they were not repaired. Without good general water meters, it is difficult to calculate NRW.

Part C : Environmental Sanitation Improvement

(i) Rehabilitated 8.5 km of drainpipes.
(ii) Constructed 5.5 km of new sewers and drains; sanitation facilities improvements.
(iii) Provided one desludging truck.
(iv) Installed 1,898 septic tanks.

Coverage and Per Capita Water Supply	
Before the project, total number of water connections was 3,072 in 1994, consisting of 2,958 households and about 114 commercial, industrial and institutional customers. Coverage was 26% of the service area. Daily per capita consumption, because of limited supply, was just 67 liters (l).	As of April 2008 the total number of water connections reached 16,069, consisting of 15,726 households (98%), 130 commercial customers (0.8%) and 213 government institutions (1.2%). New connections, on average, number 1,800/year. Coverage is about 97% in the urban area (wards), 70% in the suburban area (communes) and about 20% in the adjacent rural areas. Overall coverage is 70% of the service area. Daily per capita consumption is about 100 l.

Water Source and Production	
a. Volume	
Before the project, the source of potable water was four deep wells with a combined total capacity of 3,800 m^3/day (1995). Actual water production was 3,698 m^3/day.	The project installed 11 new deep wells with a combined total capacity of 17,500 m^3/day (existing wells were closed). WSDC currently uses only six wells (wells no. 2, 4, 5, 6, 8, and 11) out of the 11 new wells, or about 51% of total capacity to serve existing demands. Current capacity is designed to meet water demand until 2015. Water is supplies continuously (24 hours/day, 7 days/week). Actual water production is 10,020 m^3/day (April 2008).
b. Quality	
Prior to the project, well water was reported to be of good quality, and although high in bicarbonate and iron it met national standards. The well fields are located in the Lo River Basin and the recharge is from the river through highly porous media, with water quality dependent on the river water quality.	According to consumers water quality is poor on certain days, with mud, iron, manganese and chloride present in the water. The water is not treated before being distributed to consumers.[1] Mud in water tanks and calcium deposits in cooking pots were observed during visits to some households in the service area. WSDC became aware of the high iron and manganese contents of the new wells only after project completion in June 2005. The iron content ranges from 0.3–0.7 milligrams/l (mg/l), while the national standard is less than 0.5 mg/l. About 30% of consumers complain about the water quality, and concerns are mentioned verbally to the meter readers. Despite the poor water quality in some areas, consumers continue to pay their bills on time. The WSDC plans to build a WTP to remove the iron in the water (calcium and manganese cannot be removed by the proposed WTP). The estimated investment is D8 billion–D10 billion. Funds will be sourced from a local development bank at an interest rate of 0.70% per month, payable in 5 years. The WSDC Director said that Ministry of Finance approval is not needed for WSDC to avail of the new loan. Estimated completion of the WTP is the end of 2008. Planned capacity is 13,500 m^3/day.
c. Nonrevenue Water	
Before the project, 1,838 m^3 of water was sold per day, while production was 3,698 m^3/day. NRW accounted for about 50% of production,	After project completion, NRW was reduced annually, reaching about 20.5% as of April 2008. Actual water production is 10,020 m^3/day, with 7,967 m^3 of water

[1] During the detailed design stage, water quality testing was done for 3 consecutive months on the three existing wells. Soil and geological tests were performed for the 11 new deep wells, but no water quality testing was undertaken, because of the proximity of the new wells to the three existing wells (two of the new wells are just 5 meters (m) from the existing wells, one is 15 m away, and eight are 300 m from the existing wells). The consultants recommended not building a water treatment plant because the tests of the three existing wells found water quality to be good. The existing wells were closed after project commissioning.

and resulted from leakage in the pipeline, intermittent supply and lump sum assessment of nonmetered consumption.	sold per day.
d. Tariff	
Water tariff (1994): D1,000/m^3 for households and D1,200/m^3 for commercial and/or industrial customers.	Water tariff (May 2008): D2,400/m^3 for households (maximum of 3 m^3/person/month), D2,600/m^3 for consumption in excess of 3 m^3/person/month; D4,500/m^3 for commercial customers; D3,800/m^3 for state enterprises; and D2,700/m^3 for government institutions.
e. Revenue	
Total annual revenue in 1994 was D742 million, while net loss was D20 million.	In 2007 total annual revenue was D6,819 million and net income D321 million.
Personnel and Management and Billing and Collection	
The water supply operation had 72 staff and the construction and well drilling business activities of the WSDC had 29. The connection to staff ratio was 72:1.	There are 155 staff, including 120 for the water supply operation and 35 for the construction and well drilling business activities of the WSDC. The connection to staff ratio is 133:1. Billing and collection are now computerized. Distribution of bills and collection of payment is done door to door with a 100% collection rate. The water supply is disconnected if consumers cannot pay 1 month after the due date.
Benefit Monitoring and Evaluation	
The BME was used for just 2 years; WSDC stopped using it because of a software problem, and will adopt a monitoring system prescribed by the Government (using new World Bank and ADB benchmarking indicators). The Project BME system had more indicators than was considered necessary, and the company lacks staff to monitor all indicators.	
Resettlement	
No resettlement was required for the project in Tuyen Quang.	
Subloan Terms	
New subloan terms (between the Ministry of Finance and WSDC) were approved on 28 April 2008 based on the request from the water supply companies. Terms are as follows: 20 years to pay, service charge of 0.20%/year, payment commences 15 January 2008 and ends 15 July 2027. Principal amount outstanding for Tuyen Quang WSDC is D39.21 billion. Loan payment is about D1.32 billion/year for the first 10 years and D2.68 billion/year for the second 10 years. The original subloan terms were as follows: 25 years to pay including 5-year grace period, interest rate of 6.8% per annum.	
Women's Participation in Project	
The Vietnam Women's Union contributed greatly to the education program and continues to advocate on water-related matters after the end of the Project.	

ADB = Asian Development Bank, BME = benefit monitoring and evaluation, CPMU = central project management unit, D = dong, km = kilometer, l = liter, m^3 = cubic meter, m = meter, mg = milligram, mm = millimeter, NRW = nonrevenue water, OEM = Operations Evaluation Mission, WSDC = water supply and drainage company, WTP = water treatment plant,
Source: ADB evaluation team.

Figure A4.1: Water Wells in Tuyen Quang

Source: Evaluation team.

Figure A4.2: Inside Tuyen Quang Pumping Station

Source: Evaluation team.

Table A4.2: Main Findings in Dong Hoi

Project's Engineering Output:

Part B: Water Supply Improvement

(i) Dredged and cleaned the Bau Tro Lake basin.
(ii) Refurbished pumping station and installed pumping equipment at Phu Vinh reservoir.
(iii) Constructed 365 m of 500 mm diameter raw water pipeline.
(iv) Undertook mechanical and electrical upgrading of WTP to the nominal production capacity of 9,000 m^3 per day and rehabilitated the reservoir.
(v) Constructed new WTP (19,000 $m^{3/}$day).
(vi) Constructed two reservoirs (2,000 m^3 each) and 57.24 km of distribution mains.
(vii) Installed 5,979 house connections.
(viii) Provided equipment and conducted training as envisaged.
(ix) Installed 45.78 km of tertiary pipes (15–100 mm in diameter).

Adopted Treatment Process:

Elements include: (i) coagulation by mixing with an alum solution, (ii) air separation and flocculation with a sludge blanket, (iii) horizontal sedimentation, (iv) filtration through rapid sand gravity filters, and (v) disinfection by chlorination.

Some Observations:

(i) Phu Vinh WTP is at an elevation of 23 m, but the elevation of Dong Hoi City is 2–3 m. The pumping station capacity 19,000 $m^{3/}$day consisting of five pumps (two pumps for backwash with flow quantity (Q) = 800 $m^{3/}$hour and pressure height (H) = 14 m; three pumps for domestic water with flow Q = 600 m^3/hour and pressure H = 36 m). During minimum water demand the pressure in water network is high, consumes uneconomical electricity. The WSC should design a pipe connection between the backwash pump and the water network to reduce electricity consumption.
(ii) Procurement: Provision of equipment by the contractor (Wabag) was slow and inaccurate, for example, PN6 valves were required but PN10 valves were provided.
(iii) The administrative house constructed for the Phu Vinh WTP is overly large and use is currently very limited.

Part C : Environmental Sanitation Improvement

(i) Inspected 25 km of existing drainage pipes and rehabilitated 2 km.
(ii) Constructed 5.5 km of concrete pipes.
(iii) Provided one dislodging truck, which was transferred to the urban drainage company (UPEC).
(iv) Installed 250 septic tanks.
(v) Introduced new regulation introduced in April 2006.

Coverage and per Capita Supply	
Before the project, only 26% of households in Dong Hoi were connected to the piped water supply system and the per capita supply was 25 l/day, primarily because of limited coverage and high loss. The PPTA survey reported that customer water demand was not being met due to inadequate supply main diameter and water pressure. The WSDC's main constraint was funding to change supply lines to a larger diameter, and the limited extension of the distribution network.	At the time of the OEM, 100% of the city (five wards) was served with a piped water connection and 60% of the communes (two) were connected. Overall, piped connections cover 67% of households and institutions. Per capita water supply increased to 120 liters/day. There are three types of water users: (i) industrial, institutional, and commercial users; (ii) residential consumers; and (iii) nonpaying consumers. As of 2008, there are 15,500 connections comprising 14,820 households (95.6%) and 680 institutions (4.4%). This was a 23% increase from the total number of connections in 2006 (12,567). NRW has declined from 45% before the project to only 20%–23% at present.
Water Source and Production	
a. Volume	
Before the project, potable water was drawn from the surface water of Bau Tro lake, a rainwater impounded reservoir, with a capacity ranging from 700,000 to 2 million m^3. Raw water was obtained through a 250 mm diameter cast iron pipe 80 m in length, and conveyed through a treatment plant. The raw water system was built in 1985 and had deteriorated. The intake house was equipped with three pumps with a designed capacity of 9,000	The Project was responsible for dredging and cleaning Bau and Trau lakes, and maximum pump capacity (9,000 m^3) is now fully attained. A water treatment plant with a capacity of 19,000 m^3 was built under the project and was functioning well at the time of the OEM. The existing source is also being utilized for irrigation as needed, particularly during the dry season. Water is available continuously (24 hours/day, 7 days/week).

m^3/day. However, production had dropped to just 4,000 m^3/day, and the system needed to be rehabilitated. The water supply was unclean, irregular and area scheduling was practiced.	
b. Quality	
Prior to the project, water was treated in a plant located in Hai Thanh ward using sand gravity filters without coagulation and sedimentation and was collected in a clear water reservoir before pumping to the supply network. The water treatment plant did improve water quality, based on regular examinations conducted by the local preventive health care unit.	Data on water quality before and after the project were obtained showing water quality improved and meets the national standard.
c. Nonrevenue Water	
Before the project, the volume of water produced was 1.46 million m^3/year, with 807,800 million m^3 recorded as being supplied, with losses of 45%. Losses were caused by processing, pipeline leakage, defective meter readings, and lump sum consumption for nonmetered connections.	Under the Project the installation of new pipes, meters and reductions in illegal connections decreased nonrevenue water to 20%–23%.
d. Tariff	
The existing tariff rate (as of June 2006) is D3,300/m^3 for households, D6,000 for businesses, and D9,000 for institutions. Further tariff increases were temporarily suspended due to Viet Nam's high inflation. Tariffs are within the range allowed by the Government. Proposals for tariff increases are submitted to the PPC for approval. An 8% environmental fee is already imputed in the tariff rate to support a PPC drainage maintenance fund. The connection fee is ranges from D700,000 to D1 million, depending on distance to the residence. Meter tamperers are billed using their average consumption, and the company pursues them to settle their accounts. Only 70% of depreciation is covered by the tariff rate. It is estimated that D4,200/m^3 is needed to cover full depreciation.	
Personnel and Management and Billing and Collection	
The company maintains 142 staff and is operating solely on the basis of its receipts, with no government subsidy. Billing and collection are similar to pre-project conditions, with consumption measured using a water meter. Bill collection is done by company staff at a staff–customer ratio of 1:1000. A bank performs collections for institutional accounts.	
Benefit Monitoring and Evaluation	
WSDC discontinued use of the ADB project BME system after project completion. It will adopt a monitoring system prescribed by the Government (using new World Bank and ADB benchmarking indicators). The ADB project system had more indicators than was necessary, and the company lacked staff to monitor all indicators. The systems are very similar, but the new BME system ranks companies, which is helpful for the WSDC.	
Resettlement	
Resettlement posed minimal problems. Seven affected households were resettled to locations neighboring their original residences, and have not been adversely affected.	

Procurement
For future projects, more accurate design and costing is critical. Local bidders now have the technical capacity and experience to compete with international contractors.
Women Participation in Project
The Vietnam Women's Union contributed greatly to the education program and continues to advocate on water-related matters after the end of the Project.

ADB = Asian Development Bank, BME = benefit monitoring and evaluation, D = dong, km = kilometer, l = liter, m^3 = cubic meter, m = meter, mm = millimeter, NRW = nonrevenue water, OEM = Operations Evaluation Mission, PPC = provincial people's committee, PPTA = project preparatory technical assistance, WSC = water supply company, WSDC = water supply and drainage company, WTP = water treatment plant.
Source: ADB evaluation team.

Figure A4.3: Water Treatment Plant in Dong Hoi

Source: Evaluation team.

Figure A4.4: Cleaned and Dredged Bau Trau Water Reservoir

Source: Evaluation team.

LOAN COVENANT STATUS
(As of July 2008)

Covenant	Reference in Loan Agreement	Status of Compliance
Project Execution and Coordination		
1. MOC, as the executing agency, shall be responsible for overall implementation of the project. Management Board for water supply and sanitation development project shall appoint a suitably qualified project director and staff and resources are assigned exclusively to the project. The CPMU shall be involved in the operation, coordination and management of all project activities.	Schedule 6, Paragraph 1	Complied with. A qualified project director and 11 staff were assigned at commencement of the Project in 1997 until its closure in 2006.
2. Each WSC shall be the implementing agency for respective project towns. Separate PPIOs shall be established, and are headed by suitably qualified and experience project managers.	Schedule 6, Paragraph 2	PPIOs were established in each of seven WSCs with suitably qualified project managers and 10 staff, on average.
3. A PSC shall be established in Ha Noi. The PSC shall be chaired by a vice-minister of MOC, and comprise representatives from MPI, MOF, State Bank of Viet Nam, the Ministry of Science, Technology and Environment and the VWU, and the vice-chairmen of the PPCs of the project towns. The PSC shall meet at least once every quarter and more frequently if needed.	Schedule 6, Paragraph 3	The PSC was established on 11 August 1997 to provide guidance to the Project. The PSC met regularly every 6 months or as needed.
Land		
4. The Borrower shall ensure that all land, rights in land or rights-of-way, and other rights or privileges are promptly acquired or otherwise made available, and in any event within the time specified in the Land Acquisition Schedule agreed with the Bank.	Schedule 6, Paragraph 4	Complied with. Land acquisition and resettlement were required for Ben Tre, Dong Hoi, and Vinh and these were all settled. Site clearance for water treatment plants, as well as for transmission and distribution pipelines in the other towns, were generally made in a timely manner.

Covenant	Reference in Loan Agreement	Status of Compliance
Operation and Maintenance		
5. The Borrower shall cause each WSC to take responsibility for the management and O&M of their respective Project facilities after Project implementation.	Schedule 6, Paragraph 5	Complied with. The WSCs have been authorized by the provincial governors (Instruction No. 59, dated October 1996) to use operating revenues to operate and maintain the treatment facilities, thereby helping to ensure the financial viability of the Project.
6. The Borrower shall ensure each WSC to draw up an operational program to reduce NRW to achieve a 30% target by December 2001. The individual program shall be reviewed by CPMU and forwarded to ADB for review by June 1997.	Schedule 6, Paragraph 6	Complied with. NRW reduction programs were submitted to ADB. As of June 2006, NRW is estimated to be less than 30% in all the project towns. This was verified in the two towns visited by the OEM.
7. The Borrower shall develop operational and financial guidelines and procedures to enable the WSCs to provide integrated water supply, drainage and sanitation services, and by 31 December 1997, shall ensure the operational integration of WSCs and UPWECs through the development and implementation of appropriate operating and financial procedures for the integrated delivery of water and sanitation services.	Schedule 6, Paragraph 7	Partly complied with. ADB was informed by the Executing Agency through its letter dated 22 December 2003 about difficulties in fully implementing this covenant during the project period due to an administrative reason. WSCs are for-profit enterprises with financial autonomy under the provincial governments, while the UPWECs operate without cost recovery under the municipal governments. Although some towns had started to make operational integration of the two functions, it is limited to water delivery and drainage only based on interviews by the OEM.
8. The Borrower shall ensure that each WSC upgrades the sanitation facilities of low-income households within its area to meet prescribed standards on the basis of full cost recovery. Each WSC shall	Schedule 6, Paragraph 8	Complied with. A loan amounting to D1.5 million–D2.0 million was provided to each of the beneficiary households. As a result, about

Covenant	Reference in Loan Agreement	Status of Compliance
require the householders to make a down payment of at least 50 % of the estimated cost of upgrading and to pay the remaining amount over the following 36 months. For this purpose, WSCs shall develop appropriate application and accounting procedures.		15,000 households used the loans to upgrade their sanitation facilities. The loans were fully recovered from the beneficiaries.
Cost Recovery and Tariffs		
9. The Borrower shall ensure that each WSC adjust its water tariffs based on the recommendations of the National Water Tariff Policy study so that (i) the water tariffs agreed with the Bank shall be introduced by 1 June 1997; (ii) tariffs will be so set as to recover at least all O&M costs and interest charges, and depreciation or debt services whichever is higher, a reasonable proportion of future capital expenditure, and Government taxes and dividends; and (iii) tariffs will be reviewed and adjusted annually on the basis of proposals made by the WSCs and approved by the PPCs.	Schedule 6, Paragraph 9	Partly complied with. Tariffs were reviewed annually and adjusted. Since 1998, tariffs have been raised from 20% to 60% at a 2-year interval. The proposed rates for 2006–2008 were not followed. As of May 2008 for instance, existing rate for Tuyen Quang is D2,400 and D3,300 for Dong Hoi. Proposed tariff increases were placed on halt given the current inflation rate in the country.
10. By 31 December 1997, the Borrower shall ensure that the WSCs have taken all necessary steps to (i) maintain a positive cash flow at all times, and (ii) keep accounts receivable, at all times, to no more than 60 days of sales equivalent.	Schedule 6, Paragraph 10	Complied with. All the WSCs achieved the accounts receivable no more than 60 days of sales equivalent. Their revenues cover O&M costs and depreciation of old equipment. If depreciation of new equipments and debt service are included into financial statements, all the WSCs cannot maintain positive cash flow unless tariffs will be increased more than proposed.
Financial Ratios		
11. The Borrower shall ensure that the WSCs take all necessary steps to achieve and maintain at a minimum a debt service coverage rate of 1.2:1 in accordance with the following schedule: by 31 December 2003 in the case of Tuyen Quang and	Schedule 6, Paragraph 11	Partly complied with late. Tuyen Quang, due to the low service charge carried by the loan showed that its 2009 internal cash flow will have a DSR of 1.53. Dong Hoi will be

Covenant	Reference in Loan Agreement	Status of Compliance
Qui Nhon, by 31 December 2004 in the case of Dong Ha, by 31 December 2005 in the case of Ben Tre, Dong Hoi and Ninh Binh, and by 31 December 2006 in the case of Vinh.		able to establish a DSR of at least 1.2 by 2012 while Ninh Binh, Vinh, Dong Ha, Qui Nhon and Ben Tre will attain the required ratio by 2011. Prior to these years, internal cash flow, will only cover 20% to 97% of interest and principal amount to be paid.
Benefit Monitoring and Evaluation		
12. A BME program shall be designed, developed and commissioned by the WSCs who will be assisted by the design consultants. BME activities shall be carried out by the WSCs, including the establishment of benchmarks through initial baseline physical and socioeconomic surveys, data collection and analysis. Surveys shall be carried out annually to determine changes in key indicators. The CPMU shall, within 6 months of the effective date, submit a detailed implementation plan for monitoring benefits and for preparing benchmark information for ADB's review and concurrence. The CPMU shall submit annual BME reports throughout Project implementation.	Schedule 6, Paragraph 12	Complied with. The BME software was installed in each of the project towns on 31 December 1999. BME reports from all the project towns and the consolidation report prepared by the project consultants were, in general, submitted satisfactorily.
Environment and Public Participation		
13. The Borrower shall cause each WSC to ensure that beneficiaries are required to comply with regulations to (i) connect their household sullage drains to the existing drainage system or the new facilities constructed under the Project, (ii) connect household septic tanks to the municipal drainage systems, and (iii) provide a septic tank in each household or business location.	Schedule 6, Paragraph 13	Complied with. The drainage systems were improved, septic tanks were installed, and households' sullage drains and septic tanks were connected to the municipal drainage systems, where available, as required by the provincial regulations.
14. The Borrower shall ensure that the CPMU through each PPIO delivers an environmental education program as designed by the consultants and the community is kept informed of Project related decisions. The PPIOs shall	Schedule 6, Paragraph 14	Complied with. The program was satisfactorily implemented. Many communities and organizations participated, including VWUs and nongovernment organizations.

Covenant	Reference in Loan Agreement	Status of Compliance
establish a dialogue with the VWU and other nongovernment organizations in the respective areas and make arrangements for designing, producing and sharing information material as well as hold monthly coordination meetings.		
15. The Borrower shall ensure that the CPMU shall have, in addition to other staff, two full-time staff members specifically assigned to coordinate the Public Environment Education Program, and that each PPIO shall have, in addition to other staff, two full time staff specifically assigned to the implementation of the Program. The two staff members of the CPMU shall be a UN Volunteer and Senior Public Environment Education Officer from the VWU.	Schedule 6, Paragraph 15	Complied with. All staff were assigned as envisaged.
16. The Borrower shall ensure that the beneficiaries are actively engaged in the planning, decision making, implementation and monitoring of the Project.	Schedule 6, Paragraph 16	Complied with. Beneficiaries actively participated in various project activities including group meetings, street campaigning, etc.
Midterm Review		
17. A comprehensive midterm review shall be carried out after about 2 years from the effective date. The review will critically evaluate the status of implementation, the delivery of the PEEP, the efficacy of the existing and implementing agencies, the implementation of institutional and policy reform, and the sustainability of benefits.	Schedule 6, Paragraph 17	Complied with. The midterm review was undertaken from 27 June to 13 July 2000.
Institutional and Policy Reform		
18. By 31 December 1997, the Borrower shall establish a department in MOC for coordinating water supply and sanitation sector development and for regulating tariff policies, technical standards, service levels, and human resources development.	Schedule 6, Paragraph 18	Complied with late. The department was established under MOC's decision dated 19 May 2003.

Covenant	Reference in Loan Agreement	Status of Compliance
19. By 30 June 1997, the Borrower shall develop and adopt a National Water Supply and Sanitation Sector Policy, indicating sector institutional, physical and financial objectives, strategies to achieve them, and the resources to be provided for doing so.	Schedule 6, Paragraph 19	Complied with late. A national orientation plan for water supply to year 2010 was issued in 1998.
Institutional, Policy, Operational and Financial Action Plan		
20. The Borrower shall ensure that the Action Plan on institutional, policy, operational and financial objective to be achieved, as agreed with ADB, is implemented in conjunction with the Project, and the actions specified therein shall be implemented as a component to the covenants included in this Schedule. The Action Plan shall be reviewed annually in consultation with ADB.	Schedule 6, Paragraph 20	Partly complied with. The action plan on financial objectives, such as tariff adjustments and a debt service ratio of 1.2:1.0 was not fully achieved in some of the towns.

ADB = Asian Development Bank, BME = benefit monitoring and evaluation, CPMU = central project management unit, MOC = Ministry of Construction, MOF = Ministry of Finance, MPI = Ministry of Planning and Investment, NRW = non-revenue water, O&M = operation and maintenance, OEM = Operations Evaluation Mission, PEEP = Public Environment Education Program, PPC = provincial people's committee, PPIO = provincial project implementation office, PSC = project steering committee, UPWEC = Urban Public Works and Environmental Company, VWU = Viet Nam Women's Union, WSC = water supply company.

RATING MATRIX OF CORE EVALUATION CRITERIA

Table A6.1: Rating Matrix

Criterion	Weight (%)	Definition	Rating Description	Rating Value
1. Relevance	20	Relevance is the consistency of a project's impact and outcome with the government's development strategy, the Asian Development Bank's lending strategy for the country, and the Asian Development Bank's strategic objectives at the time of approval and evaluation and the adequacy of the design.	Highly relevant Relevant Partly relevant Irrelevant	3 2 1 0
2. Effectiveness	30	Effectiveness describes the extent to which the outcome, as specified in the design and monitoring framework, either as agreed at approval or as subsequently modified, has been achieved.	Highly effective Effective Less effective Ineffective	3 2 1 0
3. Efficiency	30	Efficiency describes, ex post, how economically resources have been converted to results, using the economic internal rate of return, or cost-effectiveness, of the investment or other indicators as a measure and the resilience to risk of the net benefit flows over time.	Highly efficient Efficient Less efficient Inefficient	3 2 1 0
4. Sustainability	20	Sustainability considers the likelihood that human, institutional, financial, and other resources are sufficient to maintain the outcome over its economic life.	Most likely Likely Less likely Unlikely	3 2 1 0
Overall Assessment (weighted average of above criteria)	Highly Successful: Overall weighted average is greater than or equal to 2.7. Successful: Overall weighted average is greater than or equal to 1.6 and less than 2.7. Partly Successful: Overall weighted average is greater than or equal to 0.8 and less than 1.6. Unsuccessful: Overall weighted average is less than 0.8.			

Source: ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila.

Table A6.2: Assessment of the Project's Overall Performance

Criterion	Weight (%)	Assessment	Rating Value	Weighted Rating
Relevance	20	Highly relevant	3	0.6
Effectiveness	30	Highly effective	3	0.9
Efficiency	30	Less efficient	1	0.3
Sustainability	20	Likely Sustainable	2	0.4
Overall Rating		Successful		2.2

Source: Evaluation team.

ECONOMIC REEVALUATION

A. General

1. The economic assessment prepared for the project evaluation used the same Asian Development Bank (ADB) guidelines[1] as were used in preparing economic assessments during the project appraisal and project completion report (PCR) phases. The Project's physical works were completed in June 2005, allowing 2.5 years of full operations prior to the project evaluation. This assessment is thus based on the actual cost and benefits realized in the 2.5 years of operation (mid-2005 to 2007), and a projection of the cost and benefits and revenue from 2008 to 2030. The Project's physical components included rehabilitation and/or improvement of the water supply and sanitation systems in the project area. The sanitation component included construction of septic tanks in households in the project area and connection of wastewater pipes to the drainage system. This economic analysis was limited to the water supply component, as were the project appraisal and project completion assessments.

B. Methodology and Assumptions

2. The methodology and assumptions used in the post-project economic evaluation were the same as those applied during the project appraisal and post-project completion evaluations. The analysis compared the benefits and costs in the "with-project" and "without-project" scenarios. The economic benefits include incremental benefits to the water supply companies (WSCs) due to more water being available for distribution to consumers, and resource cost savings for consumers who avail of the piped water supply from the WSCs. Economic costs were derived from the financial costs by removing taxes and duties. The standard conversion factor used is 0.96, the same factor used during the project appraisal.

3. The following local inflation rates[2] were used: 1.54% in 2001, 3.80% in 2002, 3.10% in 2003, 7.80% in 2004, 8.30% in 2005, 7.50% in 2006, 8.35% in 2007, 18.30% in 2008, 10.20% in 2009 and 5.00% thereafter. The exchange rate used was D16,100 = $1.

4. The economic life of the Project is 25 years. Capital assets were assumed to have no salvage value at the end of the economic life. The economic opportunity cost of capital (EOCC) used is 12%, the same rate used in the PCR. The rate used during the appraisal was 10%. It was assumed that without the project, deterioration of the water supply system for all subprojects would occur by 2015. All benefits and costs are expressed in constant December 2007 prices.

5. The economic analysis includes the evaluation of economic benefits and costs resulting from the implementation of the Project. To the extent possible, benefits and costs identified are quantified and valued. Where quantification is not possible, a qualitative analysis is presented in the report.

C. Economic Benefits

6. The economic benefits identified include (i) reduction in nonrevenue water (NRW) resulting in more water being available for consumption; (ii) reduction in the cost of treating

[1] ADB. 1999. *Handbook for the Economic Analysis of Water Supply Projects.* Manila.
[2] ADB. 2007. *Asian Development Outlook 2007*. Manila.

water from alternative sources; and (iii) resource costs savings from constructing and maintaining storage facilities and the time savings associated with water collection. The resource cost savings quantified during the project appraisal were used and were expressed in December 2007 prices. Table A7.1 shows the respective resource cost savings for each subproject. For non-household consumers, the resource cost savings were assumed at 25% of that of the households.

Table A7.1: Resource Cost Savings

Project Town	Resource Cost Savings (D1,000/year/household)
Tuyen Quang	604
Dong Hoi	545
Ninh Binh	575
Vinh	545
Dong Ha	516
Qui Nhon	545
Ben Tre	560

D = dong.
Source: Feasibility Study Report. 1996. ADB TA 2146-VIE.

7. The other benefit identified but was not quantified is the savings in medical costs and time due to reduced morbidity rate caused by waterborne diseases. Tables A7.2 and A7.3 below show the reported cases of diarrhea and dysentery in Tuyen Quang and Dong Hoi.

Table A7.2: Waterborne Diseases, Tuyen Quang Town

Year	Reported Cases (Morbidity)	
	Diarrhea	Dysentery
2007	122	10
2006	166	0
2005	263	12
2004	227	9
2003	187	9
2002	207	11
2001	195	16

Source: Center for Preventive Medicine, Tuyen Quang.

Table A7.3: Waterborne Diseases, Dong Hoi City

Year	Reported Cases (Morbidity) Diarrhea	Remarks
2007	520	
2006	540	
2005	556	
2004	441	
2003	810	(includes cholera)
2002	1,128	
2001	1,428	

Source: Center for Preventive Medicine, Dong Hoi.

8. The socioeconomic survey conducted during the project performance evaluation report (PPER) mission included a question on the number of households affected by waterborne

diseases in 2007. For the two project towns of Tuyen Quang and Dong Hoi and non-project town of Son Duong, no respondent was affected by waterborne diseases in 2007. However in Ba Don, another non-project town, 14 respondents (none of whom were connected to the piped water supply system) reported that a member of their household suffered from waterborne diseases in 2007.

9. Although the direct correlation between the project benefits and the reduction in the reported cases of morbidity in the two subprojects cannot be established, the downward trend of reported cases indicates that government and multilateral agency efforts to improve the health of the population are succeeding.

D. Economic Costs

10. The economic costs include the capital investment costs, operation and maintenance (O&M) costs, and environmental costs during project construction. Total economic capital investment costs, expressed in December 2007 prices, are shown in Table A7.4.

Table A7.4: Economic Capital Costs

Project Town	Capital Costs (D million)	Capital Costs ($ million)
Tuyen Quang	80,641	5.01
Dong Hoi	135,057	8.39
Ninh Binh	78,827	4.90
Vinh	156,225	9.70
Dong Ha	92,921	5.77
Qui Nhon	124,724	7.75
Ben Tre	127,197	7.90
Total	**795,591**	**49.42**

D = dong.
Note: $1.0 = D16,100.
Source: PCR. Figures were adjusted to December 2007 prices.

E. Economic Internal Rate of Return

11. The recalculated economic internal rate of return (EIRR) for Tuyen Quang is 14.4%, compared to 20.9% at appraisal and 22.9% after project completion. The major reason for the reduced EIRR is that both tariffs and the targeted number of households served have not increased to the extent projected during appraisal. Based on the feasibility study report completed in 1996, by 2007 the average tariff rate should have been D3,890/m^3, but the actual average tariff for 2007 is only D2,544/m^3. At appraisal, the targeted total number of connections by 2007 was 16,203, but only 15,351 have been attained. During PCR preparation, the tariff rate assumed during project appraisal was corrected to reflect the actual tariff levels implemented during and after project completion, but the projected volume of water sold used in the analysis was very optimistic.[3]

12. For Dong Hoi, Ninh Binh, Dong Ha, Qui Nhon and Ben Tre, the EIRRs were near the ranges established during project appraisal and after project completion (Table A7.5). The EIRR

[3] For example, the 2007 projected volume of water sold was 95% of installed capacity, while actual water sold in 2007 was only 56% of installed capacity.

for Vinh was much lower than the PCR value, because of the overly optimistic value assumed by the PCR for the volume of water sold in Vinh.

Table A7.5: Economic Internal Rate of Return

Project Town	EIRR %			Remarks
	Project Appraisal[a]	PCR	PPER	
Tuyen Quang	20.90	22.93	14.42	Tariff assumed during appraisal was high. Assumed water volume sold in PCR was high.
Dong Hoi	11.40	13.38	12.19	
Ninh Binh	16.40	14.24	13.00	
Vinh	16.10	18.35	13.97	Assumed water volume sold in PCR was high.
Dong Ha	16.40	13.29	12.24	
Qui Nhon	18.60	20.20	17.96	
Ben Tre	11.00	14.88	12.45	
	none	**16.79**	**13.98**	

EIRR = economic internal rate of return, PCR = project completion report, PPER = project performance evaluation report.

[a] During project appraisal, the assumed EOCC was 10%, thus projected tariffs were designed to attain a return of at least 10% only.

Source: Appraisal report, PCR, and consultant's estimate.

F. Sensitivity Analysis

13. A sensitivity analysis to test the Project's economic viability was performed using the following parameters:[4] 10% decrease in revenues, 10% increase in O&M costs. The result of the sensitivity test is shown in Table A7.6.

Table A7.6: Sensitivity Test Results

Parameter	EIRR %						
	Tuyen Quang	Dong Hoi	Ninh Binh	Vinh	Dong Ha	Qui Nhon	Ben Tre
10% increase in O&M	11.40	11.57	12.43	12.57	11.53	16.52	11.97
10% decrease in benefits	10.95	11.30	12.11	12.47	11.11	16.03	11.41

EIRR = economic internal rate of return, O&M = operation and maintenance.

Source: Consultant's estimate.

14. For Tuyen Quang, Dong Hoi, Dong Ha and Ben Tre, the resulting EIRR were less than the assumed EOCC of 12%. However, when health benefits and other nonquantifiable benefits are quantified and included, the EIRR will most likely exceed 12%.

[4] Capital cost as a parameter was not tested because the project was already completed; hence the actual capital cost was used.

FINANCIAL REEVALUATION

A. General

1. The financial assessment prepared for the project evaluation used the same Asian Development Bank (ADB) guidelines[1] as were used in preparing financial assessments during the project appraisal and project completion report (PCR) phases. The Project's physical works were completed in June 2005, allowing 2.5 years of full operations prior to the project evaluation. This assessment is thus based on the actual cost and revenues realized in the 2.5 years of operation (mid-2005 to 2007), and a projection of the cost and benefits and revenue from 2008 to 2030. The physical component of the project includes rehabilitation and/or improvement of the water supply and sanitation systems in the project area. The financial assessment was conducted at the level of the project and water supply entity. The sanitation component has very limited revenue-generating opportunity, and was therefore not included in the financial analysis.

B. Methodology and Assumptions

2. The methodology and assumptions used in the financial analysis during the project appraisal and project completion phases were also applied for this post-project financial evaluation. The analysis compared the revenues and costs in the "with-project" and "without-project" scenarios. Financial revenues include net water sales[2] and new connection fees[3] while costs include capital cost, operation and maintenance (O&M) cost, and new connection installation cost. Revenues from construction activities of the water supply companies (WSCs) were not included.

3. The following local inflation rates[4] were used: 1.54% in 2001, 3.80% in 2002, 3.10% in 2003, 7.80% in 2004, 8.30% in 2005, 7.50% in 2006, 8.35% in 2007, 18.30% in 2008, 10.20% in 2009 and 5.00% thereafter. The exchange rate is D16,100 = $1.

4. The economic life of the Project is 25 years. Capital assets were assumed to have no salvage value at the end of the economic life. Income tax is 28%. It was assumed that without the Project the water supply system for all project towns will deteriorate by 2015. All revenues and costs are expressed in constant December 2007 prices.

C. Financial Analysis of the Subprojects

5. **Capital Costs**. The capital costs for the water supply component are shown in Table A8.1. Costs are expressed in December 2007 prices. Total water supply capital cost for all subprojects is D911.6 billion, equivalent to $56.6 million.

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1 ADB. 2005. *Financial Management and Analysis of Projects.* Manila.
2 More water is available due to new and improved water sources and less nonrevenue water (NRW).
3 The profit margin is small and is assumed to cancel out the cost of installation.
4 ADB. 2007. *Asian Development Outlook 2007.* Manila.

Table A8.1: Financial Capital Costs (Water Supply)

Project Town	Capital Costs (D million)	Capital Costs ($ million)
Tuyen Quang	92,401	5.74
Dong Hoi	154,753	9.61
Ninh Binh	90,322	5.61
Vinh	179,008	11.12
Dong Ha	106,472	6.61
Qui Nhon	142,912	8.88
Ben Tre	145,747	9.05
Total	**911,614**	**56.62**

$1.0 = D16,100.
Source: PCR. Figures were adjusted to December 2007 prices.

6. Due to the devaluation of the dong, the capital cost in dollar terms was less than the amount estimated during project appraisal. As a result, of the $69 million in ADB funds allocated for the project, $6.48 million was not utilized and was subsequently canceled.

7. **Operating and Maintenance Costs**. O&M costs include salary, administration, fuel, chemicals, and maintenance. In 2007, average O&M cost per cubic meter (m^3) of water produced is shown below. Projected O&M costs during the economic life of the capital investments were assumed to increase based on the inflation rate (Table A8.2).

Table A8.2: Operating and Maintenance Costs

Project Town	O&M Costs (D/m^3)
Tuyen Quang	1,398
Dong Hoi	1,904
Ninh Binh	1,518
Vinh	2,236
Dong Ha	1,934
Qui Nhon	1,980
Ben Tre	1,450

D = dong, m^3 = cubic meter, O&M = operations and maintenance.
Source: Water supply companies' financial report and PCR.

8. **Existing Tariff Rates**. The existing tariff rates for the subprojects are shown in Table A8.3. Tuyen Quang has applied for a tariff rate increase in 2008 (D3,300/m^3 for households) but implementation was deferred due to an order by the Prime Minister to cap the price of 10 essential goods, including water. The order, issued on March 2008, expired in June 2008 but it is not certain when the new rates will be implemented. Dong Hoi applied for a household tariff of D4,200/m^3 but the provincial government approved only D3,300/m^3.

Table A8.3: Existing Tariff Rate (Household)

Project Town	Tariff Rate (D/m^3)
Tuyen Quang[a]	2,400
Dong Hoi[b]	3,300
Ninh Binh[c]	2,214
Vinh[c]	2,500
Dong Ha[c]	3,500
Qui Nhon[c]	2,700
Ben Tre[c]	3,300

D = dong, m^3 = cubic meter.
[a] Effective March 2006.
[b] Effective June 2006.
[c] Effective 2005.
Source: Water supply companies' report and PCR.

9. **Weighted Average Cost of Capital**. Funding sources for the capital investment came from ADB (in the form of a loan to the Government which was onlent to the water supply companies [WSCs]), and from the national government budget. The new subloan terms[5] to the WSCs are a 0.2% service charge for Tuyen Quang and 5.0% interest (including service charge) for Dong Hoi, Ben Tre, Dong Ha, Ninh Binh, Qui Nhon, and Vinh. Repayment period is 25 years including a 5-year grace period. The opportunity cost of the government funding is assumed at 20% including risk premium. Based on a funding ratio between the ADB and the Government of 82/18, the weighted average cost of capital (WACC), at constant prices, is about 1.67% for Tuyen Quang and 4.48% for the other six subprojects (Tables A8.4 and A8.5).

Table A8.4: Weighted Average Cost of Capital for Tuyen Quang (%)

Source of Funds	% of Project Cost	Inflation Rate	Cost of Funds				WACC
			Current Prices	Tax Rate	After Tax	Constant Prices	
Equity	0	6.22	20.0	0.0	20.0	12.97	–
ADB Loan	82	0.96	0.2	28.0	0.1	(0.80)	(0.66)
Government	18	6.22	20.0	0.0	20.0	12.97	2.33
Total	**100**					**WACC**	**1.67**

– = not applicable, ( ) = negative, ADB = Asian Development Bank, WACC = weighted average cost of capital.
Source: Consultant's estimate.

Table A8.5: Weighted Average Cost of Capital for Dong Hoi, Ninh Binh, Vinh, Dong Ha, Qui Nhon, and Ben Tre

Source of Funds	% of Project Cost	Inflation Rate	Cost of Funds				WACC
			Current Prices	Tax Rate	After Tax	Constant Prices	
Equity	0	6.22	20.0	0.0	20.0	12.97	–
ADB Loan	82	0.96	5.0	28.0	3.6	2.62	2.15
Government	18	6.22	20.0	0.0	20.0	12.97	2.33
Total	**100**					**WACC**	**4.48**

– = not applicable, ADB = Asian Development Bank, WACC = weighted average cost of capital.
Source: Consultant's estimate.

[5] The original subloan terms are as follows: 25 years to pay including a 5-year grace period, interest rate of 6.8% per year.

10. **Proposed Tariff Rate Increases**. A financial projection was prepared for the subprojects to determine the required tariff rate increases to insure full cost recovery, including amortization payments on the ADB loan. The proposed tariff rate increases were designed to cover O&M, the depreciation allowance, and amortization payments. The proposed nominal tariff rate increases for the next 8 years are in Table A8.6.

Table A8.6: Proposed Tariff Rate (Household)

Subproject	Tariff Rate (D/m^3)							
	2009	2010	2011	2012	2014	2017	2020	2023
Tuyen Quang	3,300	3,300	5,000	5,000	6,000	7,500	9,400	11,709
Dong Hoi	4,300	4,300	5,400	5,500	6,400	9,300	10,900	10,900
Ninh Binh	3,000	3,000	4,000	5,000	6,000	7,500	8,500	9,500
Vinh	3,500	4,000	5,000	5,000	6,000	7,500	8,500	9,500
Dong Ha	4,000	4,000	5,000	5,000	6,000	7,500	8,500	9,500
Qui Nhon	3,300	3,300	5,000	5,000	6,000	7,500	8,500	9,500
Ben Tre	3,500	4,000	5,000	5,000	6,000	7,500	8,500	9,500

D = dong, m^3 = cubic meter.
Source: Consultant's estimate.

11. **Financial Internal Rate of Return**. Based on the financial projection, the seven project towns[6] are financially viable. The financial internal rate of return (FIRR) calculated for Tuyen Quang during project appraisal is significantly higher than that calculated in the project performance evaluation report (PPER) because the tariffs assumed during project appraisal did not materialize. The FIRR calculated for Vinh in the project completion report (PCR) exceeds the PPER FIRR because the PCR assumed an excessive volume of water sold (Table A8.7).

Table A8.7: Financial Internal Rate of Return

Project Town	FIRR (%)			Remarks
	Project Appraisal	PCR	PPER	
Tuyen Quang	7.40	5.10	5.66	Tariff assumed during appraisal was high.
Dong Hoi	6.40	6.79	4.89	
Ninh Binh	5.00	6.89	6.13	
Vinh	6.20	10.82	4.97	Assumed water volume sold in PCR was high.
Dong Ha	6.30	6.90	7.06	
Qui Nhon	6.00	5.21	5.33	
Ben Tre	3.40	8.36	6.19	
Overall	**none**	**7.68**	**5.59**	

FIRR = financial internal rate of return, PCR = project completion report, PPER = project performance evaluation report.
Source: Appraisal report, PCR, and consultant's estimate.

12. **Sensitivity Analysis**. A sensitivity analysis to test the Project's financial feasibility was performed based on the same parameters as in the economic analysis: a 10% increase in O&M costs, and a 10% decrease in revenues. The result of the sensitivity test is shown in Table A8.8.

[6] For Ninh Binh, Vinh, Dong Ha, Qui Nhon, and Ben Tre, FIRRs are rough estimates because of limited data.

Table A8.8: Sensitivity Test Results

Parameter	FIRR %						
	Tuyen Quang	Dong Hoi	Ninh Binh	Vinh	Dong Ha	Qui Nhon	Ben Tre
10% increase in O&M	4.64	4.49	5.47	2.75	6.12	3.34	5.54
10% decrease in revenues	3.93	3.74	4.96	2.40	5.57	2.40	4.76

FIRR = financial internal rate of return, O&M = operation and maintenance.
Source: Consultant's estimate.

13. **Affordability of Tariffs**. The collection efficiency of Tuyen Quang and Dong Hoi water supply operation has been close to 100% for the past 2 years. This is one indication of the affordability of the existing tariff to the customers and the effectiveness of the billing and collection system of the two companies. Based on the socioeconomic survey conducted for Tuyen Quang and Dong Hoi during the PPER mission, the ratio of monthly bills to total household income ranged from 0.33% to 2.20% in Tuyen Quang (average of 0.86%) and 0.34% to 3.47% in Dong Hoi (average of 1.12%). The 2008 household tariff in Tuyen Quang was D2,400/m^3, and in Dong Hoi D3,300/m^3.

D. Financial Assessment of Water Supply Companies[7]

1. Tuyen Quang Water Supply and Drainage Company

14. Tuyen Quang Water Supply and Drainage Company's (TQ-WSDC) revenue for 2007 was D19,650 million, while net income was D763 million.[8] The total number of metered consumers as of May 2008 was 16,069, including 15,726 households and 343 institutional and/or commercial customers. New connections in the last 3 years averaged 1,800/year. Service coverage[9] in the urban center has reached 97%, 61% in the suburban area and 20% in the adjacent districts of Yen Son and Son Duong. Overall service coverage is 46%. Before the project, service coverage in the urban center was 45% and 7% in the suburban area for an overall coverage of 26%. Yen Son and Son Duong were not served before the project. The present water tariff is D2,400/m^3 (for households), compared to D1,500/m^3 in 1994.

15. In addition to the provision of water supply, TQ-WSDC also constructs water supply systems and drills wells. In 2007, construction and well-drilling activities contributed 42% of total revenue and 48% of the total income, while the main activity, which is the provision of potable water supply to consumers, contributed only 37% of total revenue and 34% of total income. The additional income from the construction business meant the operations of TQ-WSDC in 2007 generated enough revenue to cover O&M costs and the depreciation allowance. This source of income is not reliable, however, because TQ-WSDC has to compete with other companies to win each job (Table A8.9).

[7] The owner and manager of the completed subprojects.
[8] In 1994, before the project, revenue was D742 million, net loss was D20 million and total number of consumers was 3,072.
[9] About 45% of household connections are from the urban center, 32% from the suburban area, 22% from Yen Son, and 1% from Son Duong.

Table A8.9: Financial Performance 2007 (Tuyen Quang)

Source of Revenue	Revenue		Net Income	
	D Million	% of Total	D Million	% of Total
Water Sales	6,819	36.5	256	33.6
Connection Fees	2,125	21.7	132	17.4
Construction and Well-Drilling	10,633	41.6	366	48.0
Other	72	0.3	8	1.0
Total	**19,650**	**100.0**	**763**	**100.0**

D = dong.
Source: TQ-WSDC.

16. As of May 2008, number of metered consumers reached 16,069. To meet the demands of these consumers, TQ-WSDC has so far utilized about 56% of its installed capacity of 17,500 m^3/day. The management of TQ-WSDC estimates that the existing water supply capacity can meet projected demand until 2015.

17. The summary of financial ratios for the company is shown in Table A8.10. Accounts receivable in 2005 and 2006 were low at 42 days equivalent of total revenue. This increased in 2007 to 62 days equivalent of total revenue. The debt service ratio (DSR) from 2005 to 2007 was below the ADB requirement of 1.2. The current tariff rates were implemented in 1 March 2006 and the operating ratio has risen since then, reaching about 0.97 in 2007.

Table A8.10: Financial and Operating Ratios (Tuyen Quang)

Description		2005	2006	2007
Debt-Service Coverage Ratio[a]		1.06	0.92	0.59
Days in Accounts Receivable[b]	days	42.00	42.00	62.00
Operating Ratio		0.95	0.96	0.97
Net Income/Revenue	%	6.62	4.39	3.88
Consumer/Staff Ratio		–	–	133

– = not available.
[a] Amortization payments started in 15 January 2008.
[b] 30 days is desirable.
Source: TQ-WSDC.

18. In 1995, TQ-WSDC had 72 staff, including 43 in the water supply operation and 29 in the construction business. The ratio of the number of connections to staff was 72.[10] By May 2008, staff numbers had increased to 155, including 120 for the water supply operation and 35 for the construction business. The ratio of the number of connections to staff is 133.

2. Dong Hoi (Quang Binh) Water Supply and Drainage Company

19. Dong Hoi Water Supply and Drainage Company's (DHO-WSDC) revenue for 2007 was D18,100 million while net income was D0 million.[11] Total number of metered consumers, in 2007, was 14,890. In 2007 DHO-WSDC's operation generated enough revenue to cover O&M costs, interest expense and depreciation allowance. The household water tariff is presently D3,300/m^3 (household) compared to D700/m^3 in 1994. However, the present tariff level will not be enough to cover the principal repayments[12] by 2008. According to the management of the

[10] A ratio of 100 and above is desirable.
[11] In 1994, revenue was D993 million, net income was D54 million and the total number of customers was 2,627.
[12] New subloan terms were approved on 28 April 2008 for Dong Hoi, Ben Tre, Dong Ha, Ninh Binh, Qui Nhon, and Vinh. Terms are as follows: 25 years to pay including a 5-year grace period, and interest of 5% per year.

company, the water tariff has to increase by at least D900/m^3 (household) by 2008 for the company to cover all costs, including the depreciation allowance and amortization.

20. DHO-WSDC's revenue in 2007 includes revenue from construction activity and water supply operations in four towns outside Dong Hoi City.[13] Revenue from water sales contributed 82% to the total revenue while construction activities contributed 18%.

21. Water supply installed capacity is about 28,000 m^3/day, while current demand is about 35% of total installed capacity. The management of the company estimates that the installed capacity will be able to supply future demand until the year 2020.

22. The summary of financial ratios for the company is shown in Table A8.11. DSR in 2006 was 0.86, and it increased to 1.12 in 2007. Net income was low in 2006 and 2007 due to payment of interest for the project loan. Accounts receivable in 2005 equaled 37 days equivalent of total revenues, increased to 42 days equivalent in 2006, and dropped to 24 days equivalent in 2007. Tariff rates increased in June 2006, which reduced the operating ratio to 0.79 in 2006.

23. In 1995, DHO-WSDC had 35 staff in the water supply operation. The ratio of the number of connections to staff was 75. By May 2008, the staff had increased to 141, including 106 for the water supply operation, and 35 for the construction business, and the ratio of the number of connections to staff had reached 154.

Table A8.11: Financial Ratios (Dong Hoi)

Description		2005	2006	2007
Debt Service Coverage Ratio		na	0.86	1.12
Days in Accounts Receivable	days	37.00	42.00	24.00
Operating Ratio		0.93	0.79	0.84
Net Income/Revenue	%	10.24	0.95	0.00
Consumer/Staff Ratio		–	–	154

– = not available, na = not applicable.
Source: DHO-WSDC.

3. Ben Tre Water Supply and Drainage Company

24. Ben Tre Water Supply and Drainage Company's (BT-WSDC) revenue for 2007 was D29,372 million while net income was D2,234 million.[14] BT-WSDC operations generated enough revenue in 2007 to cover O&M costs, management expenses, interest expenses, and depreciation allowance. The water tariff in 1994 was D1,600/m^3 (household).

25. The summary of financial ratios for the company is shown in Table A8.12. The debt service coverage ratio from 2005 to 2007 was consistently above the ADB threshold ratio of 1.20. Accounts receivable for 2007 was high at 74 days equivalent of revenue. Operating ratio was low at 0.80–0.86 from 2005 to 2007. However, the 2007 figure of 0.86, signals a need to increase the tariff levels by 2008 for the company to cover all operating costs, the depreciation allowance and amortization payments.

[13] The other towns in which DH-WSDC operates water supply systems were not part of the ADB Project.
[14] In 1994, revenue was D2,500 million, net income was D636 million and total number of customers was 5,903.

Table A8.12: Financial Ratios (Ben Tre)

Description		2005	2006	2007
Debt Service Coverage Ratio		1.28	1.52	2.34
Days in Accounts Receivable	days	20.00	73.00	74.00
Operating Ratio		0.80	0.84	0.86
Net Income/Revenue	%	10.14	7.08	7.61

Source: BT-WSDC.

4. Ninh Binh Water Supply and Drainage Company

26. The Ninh Binh Water Supply and Drainage Company's (NB-WSDC) revenue for 2007 was D22,173 million, while net income was D181 million.[15] NB-WSDC operations generated enough revenue in 2007 to cover O&M costs, management expenses, and the depreciation allowance.

27. The summary of financial ratios for the company is shown in Table A8.13. Accounts receivable in 2007 were high (equivalent to almost 3 months of revenue). The operating ratios have remained high in the last 3 years of operation. From 2005 to 2007, the net income, as a percentage of total revenue, has remained low at 3% and below.

Table A8.13: Financial Ratios (Ninh Binh)

Description		2005	2006	2007
Debt Service Coverage Ratio		na	0.27	0.80
Days in Accounts Receivable	days	77.00	44.00	86.00
Operating Ratio		0.96	0.98	0.96
Net Income/Revenue	%	3.00	2.92	0.82

na = not applicable.
Source: NB-WSDC.

5. Qui Nhon (Binh Dinh) Water Supply and Drainage Company

28. Qui Nhon Water Supply and Drainage Company's (QN-WSDC) revenue for 2007 was D37,434 million while net income was D1,127 million.[16] QN-WSDC operations in 2007 generated enough revenue to cover O&M costs, management expenses, and the depreciation allowance. The water tariff in 1994 was D900/m^3 (household).

29. The summary of financial ratios for the company is shown in Table A8.14. Accounts receivable in 2007 were low at 26 days equivalent of revenue. The operating ratios have remained high in the last 3 years of operation. From 2005 to 2007, the net income, as a percentage of total revenue, has remained high at about 8%–13%, because no interest payments were made during this period. Starting 2008, when interest[17] and principal repayments become due, net income is projected to fall to zero or below.

[15] In 1994, revenue was D830 million, net loss was D44 million, and the total number of customers was 3,883. Nonrevenue water was 57%.
[16] In 1994, revenue was D2,699 million, net income was D252 million, and the total number of consumers was 7,673.
[17] Total loan outstanding as of the end of 2007 is D126 billion. Estimated interest alone is D6.3 billion annually.

Table A8.14: Financial Ratios (Qui Nhon)

Description		2005	2006	2007
Debt Service Coverage Ratio		1.68	3.15	1.88
Days in Accounts Receivable	days	62.00	52.00	26.00
Operating Ratio		0.90	0.89	0.95
Net Income/Revenue	%	12.84	13.34	7.74

Source: Qui Nhon-WSDC.

6. Quang Tri (Dong Ha) Water Supply and Construction Company Ltd.

30. Quang Tri (Dong Ha) Water Supply and Construction Company Ltd. (QT-WSCCL) revenues from 2005 to 2007 were D24,700 million, D24,240 million, and D26,288 million, respectively.[18] Net 2005 income was D1,814 million, while net losses were registered in 2006 and 2007 as D5,175 million and D646 million, respectively. QT-WSCCL is also in the construction business. Revenues from this activity contributed about 60% of total revenues. QT-WSCCL revenue in 2007 was able to cover O&M costs, general administration, selling expenses and the depreciation allowance. The water tariff in 2006 was D3,500/m^3 (household).

31. The summary of financial ratios for the company is shown in Table A8.15. Accounts receivable in 2005 were low at 29 days equivalent of revenue, and increased to 37 days equivalent in 2006, and 48 days equivalent in 2007. The operating ratios have remained high in the last 3 years of operation ranging from 0.94 to 1.24. In 2005, net income, as a percentage of total revenue, was high at about 7% but dropped to a negative 21% in 2006 and negative 2% in 2007.

Table A8.15: Financial Ratios (Dong Ha)

Description		2005	2006	2007
Debt Service Coverage Ratio		na	0.86	1.34
Days in Accounts Receivable	days	29.00	37.00	48.00
Operating Ratio		0.94	1.24	1.04
Net Income (Loss)/Revenue	%	7.34	(21.35)	(2.46)

( ) = negative, na = not applicable.
Source: Dong Ha-WSDC.

7. Nghe An (Vinh) Water Supply and Drainage Company

32. Nghe An (Vinh) Water Supply and Drainage Company (NA-WSDC) revenues from 2005 to 2007 were D28,922 million, D34,056 million and D43,947 million respectively.[19] Net 2005 income was D131 million, net 2006 loss was D1,778 million and net 2007 income was D408 million. NA-WSDC revenue in 2007 was able to cover O&M costs, general administration and selling expenses and depreciation allowance and interest expense. Water tariff in 2005 was D2,500 per m^3 (household).

33. The summary of financial ratios for the company is shown in Table A8.16. Accounts receivable in 2005 is high at 65 days equivalent of revenue. This gone up to 95 days equivalent of revenue in 2006 and down to 81 days equivalent of revenue in 2007. The operating ratios have remained high in the last 3 years of operation ranging from 0.91 to 1.07. In 2005, the net

[18] In 1994, before the project, revenue was D1,172 million and net income D12 million. Households were served through standpipes.
[19] In 1994, before the project, revenue was VND2,040 million, net income was VND217 million. Households were served through house connections and standpipes.

income, as a percentage of total revenue, was low at about 0.45%, then dropped to negative 5% in 2006 and went up to 0.93% in 2007.

Table A8.16: Financial Ratios (Nghe An)

Description		2005	2006	2007
Debt-Service Coverage Ratio		0.69	0.54	1.21
Days in Accounts Receivable	days	65	95	81
Operating Ratio		1.00	1.07	0.91
Net Income (Loss)/Revenue	%	0.45	(5.22)	0.93

( ) = negative.
Source: NA-WSDC.

HEALTH STATISTICS OF INFECTIOUS DISEASES OF SEVEN PROVINCES

(Waterborne Diseases)

		Diarrhea		Cholera		Typhoid		Dysentery		Dysentery Amoeba	
No	Province	MOB	MOR	MOB	MOR	MOB	MOR	MOB	MOR	MOB	MOR
1	**Tuyên Quang**										
	2006	609.75	0.00	0.00	0.00	0.00	0.00	5.90	0.00	3.22	0.00
	2005	2,761.49	0.00	0.00	0.00	0.14	0.00	13.06	0.00	11.68	0.00
	2004	389.50	0.00	0.00	0.00	0.00	0.00	12.25	0.00	6.13	0.00
	2003	572.19	0.00	0.00	0.00	0.00	0.00	6.04	0.00	8.31	0.00
	2002	515.20	0.00	0.00	0.00	0.00	0.00	13.75	0.00	8.59	0.00
	2001	582.73	0.00	0.00	0.00	0.00	0.00	12.08	0.00	59.29	0.00
	2000	426.75	0.00	0.00	0.00	0.00	0.00	13.78	0.00	19.26	0.00
	1999	507.47	0.00	0.00	0.00	0.15	0.00	27.11	0.00	19.70	0.00
2	**Quảng Bình**										
	2006	621.36	0.00	0.00	0.00	0.00	0.00	37.34	0.00	24.62	0.00
	2005	1,029.36	0.00	0.00	0.00	0.00	0.00	86.99	0.00	38.69	0.00
	2004	799.78	0.00	0.60	0.00	0.48	0.00	71.67	0.00	23.33	0.00
	2003	1,075.57	0.00	0.00	0.00	0.84	0.00	73.41	0.00	28.34	0.00
	2002	1,078.99	0.00	0.00	0.00	0.85	0.00	75.14	0.00	32.52	0.00
	2001	1,294.96	0.00	0.00	0.00	1.49	0.00	75.14	0.00	32.81	0.00
	2000	1,996.31	0.00	0.00	0.00	0.88	0.00	79.61	0.00	45.22	0.00
	1999	1,148.31	0.00	0.00	0.00	0.00	0.00	47.49	0.00	39.55	0.00
3	**Bến Tre**										
	2006	1,440.43	0.04	0.00	0.00	2.59	0.00	13.50	0.00	1.16	0.00
	2005	2,079.14	0.00	0.00	0.00	6.09	0.00	36.60	0.00	2.93	0.00
	2004	1,785.08	0.00	0.30	0.00	6.84	0.00	44.96	0.00	7.51	0.00
	2003	1,602.73	0.00	0.00	0.00	12.20	0.00	42.50	0.00	5.84	0.00
	2002	1,659.94	0.00	0.15	0.00	12.23	0.00	55.69	0.00	13.72	0.00
	2001	1,283.76	0.00	0.00	0.00	16.51	0.00	55.99	0.00	7.23	0.00
	2000	985.96	0.00	0.00	0.00	15.88	0.00	45.56	0.00	10.02	0.00
	1999	1201.54	0.00	1.23	0.00	24.75	0.00	43.64	0.00	9.02	0.00
4	**Nghệ An**										
	2006	884.73	0.25	0.00	0.00	0.57	0.00	14.23	0.00	15.77	0.00
	2005	843.40	0.16	0.00	0.00	0.10	0.00	13.80	0.00	21.95	0.00
	2004	820.92	0.33	0.00	0.00	0.53	0.00	16.85	0.00	22.08	0.00
	2003	826.60	0.00	0.00	0.00	1.87	0.00	72.00	0.00	20.40	0.00
	2002	907.91	0.21	0.00	0.00	1.35	0.00	25.51	0.00	23.10	0.00
	2001	928.18	0.28	0.00	0.00	2.78	0.00	25.00	0.00	34.56	0.00
	2000	966.88	0.28	1.82	0.03	0.98	0.07	24.91	0.03	41.28	0.00
	1999	983.57	0.14	0.00	0.00	0.28	0.00	28.48	0.00	41.04	0.07
5	**Ninh Bình**										
	2006	932.66	0.00	0.00	0.00	1.72	0.00	3.97	0.00	4.19	0.00
	2005	1,141.90	0.00	0.00	0.00	1.52	0.00	4.66	0.00	4.66	0.00
	2004	1,197.78	0.00	0.00	0.00	6.91	0.00	9.65	0.00	6.25	0.00
	2003	1,208.03	0.00	0.00	0.00	8.94	0.00	5.63	0.00	9.38	0.00
	2002	1,239.60	0.00	0.00	0.00	18.15	0.00	3.72	0.00	6.89	0.00
	2001	1,392.17	0.00	0.00	0.00	22.79	0.00	5.09	0.00	8.30	0.00
	2000	1,545.45	0.00	0.00	0.00	16.29	0.00	5.54	0.00	7.58	0.00
	1999	1,703.01	0.00	0.00	0.00	19.23	0.00	9.50	0.00	11.42	0.00
6	**Quảng Trị**										
	2006	1,080.23	0.00	0.00	0.00	11.96	0.00	346.70	0.00	130.78	0.00
	2005	953.90	0.00	0.00	0.00	24.01	0.00	273.69	0.00	117.32	0.00
	2004	740.51	0.00	0.00	0.00	14.60	0.00	242.95	0.00	86.12	0.00
	2003	805.88	0.00	1.82	0.00	19.96	0.00	200.10	0.00	85.17	0.00
	2002	766.12	0.00	0.00	0.00	24.28	0.00	194.10	0.00	116.70	0.00
	2001	1,000.05	0.00	0.00	0.00	23.06	0.00	211.16	0.00	106.46	0.00
	2000	1,211.69	0.00	1.74	0.00	10.81	0.00	208.08	0.00	110.41	0.00
	1999	1,704.08	0.00	0.35	0.00	36.45	0.00	221.69	0.00	141.45	0.00

		Diarrhea		Cholera		Typhoid		Dysentery		Dysentery Amoeba	
No	**Province**	**MOB**	**MOR**	**MOB**	**MOR**	**MOB**	**MOR**	**MOB**	**MOR**	**MOB**	**MOR**
7	**Bình Định**										
	2006	423.93	0.00	0.00	0.00	7.54	0.00	77.80	0.00	14.44	0.00
	2005	434.97	0.00	0.00	0.00	15.77	0.00	67.89	0.00	19.73	0.00
	2004	517.63	0.00	0.00	0.000	10.35	0.00	48.28	0.00	10.16	0.00
	2003	681.00	0.00	0.00	0.00	10.24	0.00	66.99	0.00	22.11	0.00
	2002	697.68	0.00	0.00	0.00	8.27	0.00	62.67	0.00	25.61	0.00
	2001	551.20	0.00	0.00	0.00	10.13	0.00	67.60	0.00	32.35	0.00
	2000	358.99	0.00	0.00	0.00	5.20	0.00	66.12	0.00	26.62	0.00
	1999	310.60	0.00	0.00	0.00	3.35	0.00	69.06	0.00	27.45	0.00
8	**Total**	1,165.16	0.02	0.00	0.00	3.58	0.00	45.56	0.00	16.40	0.00
	2006	1,219.00	0.01	0.00	0.00	6.19	0.01	54.00	0.00	23.17	0.00
	2005	1,124.96	0.02	0.08	0.00	5.18	0.00	53.47	0.00	22.77	0.00
	2004	1,203.84	0.00	0.42	0.00	7.36	0.00	54.14	0.01	26.19	0.00
	2003	1,323.05	0.02	0.42	0.00	8.69	0.00	57.06	0.00	25.61	0.00
	2002	1,352.95	0.03	0.02	0.00	12.13	0.01	59.36	0.01	37.05	0.00
	2001	1,268.47	0.02	0.00	0.00	13.80	0.01	58.11	0.01	38.62	0.00
	2000	1,277.70	0.06	0.29	0.00	21.65	0.02	60.91	0.01	44.22	0.00
	1999										

MOB = morbidity (incident/100,000 inhabitants); MOR = mortality (deaths/100,000 inhabitants).
Source: National Statistics Office. 2007. *Statistics Report of 2007*. Health Statistics on Infectious Disease. Ha Noi.

HIGHLIGHTS OF THE SOCIOECONOMIC SURVEY

A. Background

1. The absence of a good benefit monitoring and evaluation (BME) record concerning project impacts on beneficiaries was one of the major reasons why the Operations Evaluation Department (OED) cautiously concurred with the project's successful rating at the time of the project completion report (PCR) review in September 2006. A socioeconomic survey was undertaken to address this concern during the Operations Evaluation Mission (OEM) in May 2008. The survey covered 400 households in four sample towns comprising two project towns (Tuyen Quang and Dong Hoi) and two non-project towns (Son Duong and Ba Don). The households in the two non-project towns represented the control group (they were areas where no project-related interventions took place).

B. Methodology

2. The project towns were purposively selected, based on the type of water resource and project performance at the time of the PCR. Selection of non-project towns was based on consultations with the domestic consultant and local key informants, and their proximity to and similarities with the project towns. Random sampling was used to determine the sample households. A survey questionnaire was developed, pre-tested, and translated in the local language to facilitate the interview process. The survey was conducted by a firm hired for this purpose and was facilitated by a domestic consultant. Data entry and initial processing were done in Ha Noi. The OEM conducted focus group discussions, key informant interviews, and site visits to obtain additional information and triangulate key findings. The survey sample size distribution and selected household characteristics are summarized in Tables A10.1 and A10.2.

Table A10.1: Socioeconomic Profile of Operations Evaluation Mission Survey Towns, May 2008

Characteristic	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sample Size	100		120		100		80		220		180	
Average Household Size	3.4		4.3		3.5		3.3		3.9		3.4	
% Population Resident for > 10 years	73		88		59		76		179	81	120	67
% Population Resident for > 5 years	89		97		76		90		205	93	148	82
Education												
Primary			7	6	4	4	6	8	7	3	10	6
Lower Secondary	29	29	37	31	29	29	31	39	66	30	60	33
Upper Secondary	33	33	33	28	39	39	26	33	66	30	65	36
Vocational	6	6			6	6	6	8	6	3	12	7
Tertiary	32	32	43	36	22	22	11	14	75	34	33	18
Role of Women												
As Household Head	44	44	16	13	18	18	24	30	60	27	42	23
As Income Earners	45	45	38	32	59	59	28	35	83	38	87	48

Characteristic	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Household Monthly Income (million)												
0.00–1.00	1	1	14	12	3	3	14	18	15	7	17	9
1.01–1.50	4	4	16	13	4	4	16	20	20	9	20	11
1.51–2.00	14	14	5	4	14	14	6	8	19	9	20	11
2.01–3.00	18	18	20	17	31	31	25	31	38	17	56	31
3.01–above	63	63	65	54	48	48	19	24	128	58	67	37
Household Engaged in Business												
% to Total Households	19	19	36	30	45	45	15	19	55	25	60	33

Source: Evaluation team.

Table A10.2: Land Ownership of Survey Respondents

Town	No.	Certificate [a]	%	Others	%
Dong Hoi	120	120	100	0	0
Tuyen Quang	99	94	95	5	5
Son Duong	100	55	55	45	45
Ba Don	80	80	100	0	0
Project	219	214	98	5	2
Non-Project	180	135	75	45	25

[a] Refers to Land Use Certificate.
Source: Evaluation team.

C. Household Characteristics

3. **Household Size and Education**. The average size of surveyed households in the project and non-project towns was 3.9 and 3.4 persons, respectively. Dong Hoi has the highest average household size (4.3) of the towns, which is partly attributed to the town's large population. Data revealed that residents of the project towns had stayed in their respective towns longer than the inhabitants of non-project towns. They also exhibited higher educational attainment rates at the tertiary level relative to those from non-project towns.

4. **Role of Women, Household Incomes, and Land Tenure**. Women play an increasingly important role in Vietnamese society. During the OEM, the active role of women in the Project was evident through the enormous contribution of the Viet Nam Women's Union in disseminating project information and other public awareness drives. The survey revealed that non-project towns (48%) had more women who contribute to household incomes relative to project towns (38%). This is explained by the entrepreneurial involvement of women (especially in Son Duong) who are involved in the retailing and service sectors. Most households derived income from various sources. It is not uncommon in Viet Nam for households to have more than one source of income.

5. At least 58% of households in project towns earn a minimum of D3 million/month, while only 37% of households in non-project towns earned this amount, which local experts say is the minimum amount required for a comfortable existence. The largest sources of income for both project and non-project towns were government employment and entrepreneurship, while agriculture was identified as the lowest source of household income. Almost all (98%) of households in the project towns hold land tenure certificates.

D. Water Supply and Water Expenditure

6. **Project Towns**. A majority of the respondents in both project (91%) and non-project (71%) towns sourced their water through piped water systems that deliver water to a tap in their respective houses (Table A10.3).[1] Among piped water users, water is available year round for about 16–20 hours/day and is metered. Water is used for drinking, washing and to some extent, for business. It is also stored in closed water containers by 69% of respondents. However, water quality problems persist in Tuyen Quang, where 49% of respondents felt that the water is sometimes not clean. This can be explained by the absence of a good water treatment facility in the project town. Nonetheless, based on interviews conducted by OEM, residents of project towns are in a much better position than they were prior to the Project, when water was available for limited periods on alternate days. In terms of access and safety, family members are also now not obliged to haul water, resulting in time savings.

Table A10.3: Household Respondents by Type of Water Supply, May 2008

Type of Water Supply	Towns								Project Towns		Nonproject Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Non-piped	7	7	13	11	5	5	47	59	20	9	52	29
Piped	93	93	107	89	95	95	33	41	200	91	128	71
House tap	91	98	107	100	95	100	33	100	198	99	128	100
Yard Tap	2	2	0	0	0	0	0	0	2	1	0	0
Total	**100**		**120**		**100**		**80**		**220**		**180**	

Source: Evaluation team.

7. Non-piped water users utilized open wells to access water. In Dong Hoi, of particular interest was the use of wells with electric water pumps. Water is generally available throughout the year and is usually near the kitchen area of households. Water is also used for washing and drinking. Based on the survey, the most common reason for nonconnection is the high connection cost.

8. **Non-Project Towns**. All piped water users have house taps and are metered. Some piped water users (16%) also rely on non-piped water sources. The nonavailability of piped systems in their area and the high connection costs are the main reason for nonconnection among non-piped users.

9. **Expenditure and Water Consumption**. At least 47% of water users in project towns spent more than D40,000 monthly for their water consumption, while just 25% of respondents from non-project towns spent more than D40,000/month; 65% of connected households in Dong Hoi pay this monthly rate (Table A10.4). Respondents from both project (95%) and non-project

[1] Of the 91% using piped water systems, in 2% of cases the tap is located in the yard.

(75%) towns who are connected to piped systems said that the presence of water meters had made them more aware of their water consumption and that they consequently regulate their water use (Table A10.5).

Table A10.4: Household Monthly Water Expenditure for Piped Users, by Town

Amount	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0.0–10,000	3	3	2	2	6	6	1	3	5	3	7	5
10,001–20,000	27	29	26	24	29	31	5	15	53	27	34	27
20,001–30,000	28	30	5	5	36	38	2	6	33	17	38	30
30,001–40,000	11	12	4	4	13	14	4	12	15	8	17	13
> 40,000	24	26	70	65	11	12	21	64	94	47	32	25
Total (No.)	**93**	**100**	**107**	**100**	**95**	**100**	**33**	**100**	**200**	**100**	**128**	**100**

Source: Evaluation team.

Table A10.5: Water Consumption Awareness Due to Water Meters

Town	No.	Yes	%	No	%
Dong Hoi	118	107	91	11	9
Tuyen Quang	93	93	100	0	0
Son Duong	94	94	100	0	0
Ba Don	53	21	40	32	60
Project	211	200	95	11	5
Non-Project	147	115	78	32	22

Source: Evaluation team.

E. Wastewater and Sanitation and Solid Waste

10. The Project has been responsible for the distribution of toilets and the installation of septic tanks. Seventy three percent of surveyed households in both project and non-project towns had a toilet with septic tank (Table A10.6). However, more households in the project towns (21%) have pour flush toilets, which are usually connected to septic tanks. The absence of septic tanks is explained by the prohibitive installation costs. All respondents without existing septic tanks were eager to have one installed in the future. Respondents' perceptions are divided with respect to whether toilet waste disposal is a cause of health problems (Table A10.7); this is a perennial issue in water supply and sanitation projects.

Table A10.6: Distribution by Type of Toilet

Type	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Two vault	5	5	3	3	10	10	17	21	8	4	27	15
Single vault	1	1			2	2			1	0	2	1
Bucket toilet	2	2	2	2	8	8	1	1	4	2	9	5
Septic tank	90	90	70	58	72	72	60	75	160	73	132	73
Pour flush	2	2	45	38	6	6	2	3	47	21	8	4

Type	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Biogas latrine												
Others					2	2					2	1
Total	**100**	**100**	**120**	**100**	**100**	**100**	**80**	**100**	**220**	**100**	**180**	**100**

Source: Evaluation team.

Table A10.7: Toilet Waste Disposal as Cause of Health Problems

Town	No.	Yes	%	No	%
Dong Hoi	68	60	88	8	12
Tuyen Quang	79	8	10	71	90
Son Duong	41	8	20	33	80
Ba Don	45	36	80	9	20
Project	147	68	46	79	54
Non-Project	86	44	51	42	49

Source: Evaluation team.

11. Sewage rehabilitation was another component of the Project. Respondents in project towns perceived that it was one of the major reasons why there is a decline in flooding in the area (Table A10.8). It also explains the disparity of more household bathroom wastewater going directly to sewage systems in project towns relative to non-project towns (Table A10.9). In what may be an indicator of the Project's accomplishments, 69% of project town respondents rated the quality of their drainage as fair to good, compared to 42% in non-project towns (Table A10.10). There was little difference between the project and non-project towns in terms of solid waste disposal, as solid waste is generally collected by garbage companies (Table A10.11).

Table A10.8: Reduction in Flooding Due to Sewage Rehabilitation

Town	No.	Yes	%	No	%
Dong Hoi	113	112	99	1	1
Tuyen Quang	68	61	90	7	10
All Project Towns	181	173	96	8	4

Source: Evaluation team.

Table A10.9: Destination of Wastewater from Bathrooms Across Towns

Destination	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Septic tank		0	17	14			36	46	17	8	36	20
Road	2	2			3	3	7		2	1	10	6
Pit latrine					1	1	13	16			14	8
Sewage system	84	84	79	66	57	57	21	27	163	74	78	44
Yard			2	2	6	6	1	1	2	1	7	4

Destination	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Others	14	14	21	18	33	33	1	1	35	16	34	19
Total (No.)	**100**	**100**	**119**	**100**	**100**	**100**	**79**	**100**	**219**	**100**	**179**	**100**

Source: Evaluation team.

Table A10.10: Perception on Drainage Quality, May 2008

Perception	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Good	38	39			14	16	1	1	38	18	15	10
Fair	42	43	67	57	46	53	3	4	109	51	49	32
Poor	17	18	51	43	27	31	63	94	68	32	90	58
Total (No.)	**97**	**100**	**118**	**100**	**87**	**100**	**67**	**100**	**215**	**100**	**154**	**100**

Source: Evaluation team.

Table A10.11: Solid Waste Disposal Across Towns

Method	Towns								Project Towns		Non-Project Towns	
	Tuyen Quang		Dong Hoi		Son Duong		Ba Don					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Collected by company	78	79	110	92	95	95	63	79	188	86	158	88
Collected by individual	13	13	1	1	0	0	1	1	14	6	1	1
Disposed in the river	1	1	0	0	0	0	1	1	1	0	1	1
Disposed in the drain	4	4	0	0	0	0	0	0	4	2	0	0
Disposed in a vacant land	0	0	6	5	0	0	5	6	6	3	5	3
Used as fertilizer	0	0	0	0	0	0	5	6	0	0	5	3
Others	3	3	3	3	5	5	5	6	6	3	10	6
Total (No.)	**99**	**100**	**120**	**100**	**100**	**100**	**80**	**100**	**219**	**100**	**180**	**100**

Source: Evaluation team.

F. Socioeconomic Impact

12. The OEM found the project had no adverse environmental and sociocultural impacts. The project was able to benefit the poor by improving their access to water. Although the non-project towns have also gained access to pipe systems, this was basically a result of the expansion of water supply companies that served the project towns. The water supply company (WSC) was able to serve non-project towns (e.g., Ba Don) due to experience gained through the project. The presence of water meters has had a positive impact on the regulation of water consumption, and contributed to the conservation of a scarce resource.

13. The decrease in the incidence of waterborne diseases and infant mortality cannot be directly attributed to the project. There is no significant evidence that proves this linkage. Health record trends cannot support this hypothesis and the perception of respondents also attests to

the difficulty in establishing such a causal relationship (Table A10.12), which is inherent in this type of intervention.

Table A10.12: Perception on Incidence of Sickness due to Water

Town	No.	Yes	%	No	%
Dong Hoi	117	24	21	93	79
Tuyen Quang	96	0	0	96	100
Son Duong	98	0	0	98	100
Ba Don	74	14	19	60	81
Project	213	24	11	189	89
Non-Project	172	14	8	158	92

Source: Evaluation team.

14. The awareness campaign may not be fully effective as perceived by the respondents from the project towns, but the observable and concrete results of habit improvement based on other data and the OEM findings indicate that there has been much improvement in sanitation and overall living conditions (Table A10.13); this is supported by the reduction in the incidence of flooding and improvements in drainage conditions and health practices. However, for the project to become more effective and sustainable, the revolving fund for septic tanks and toilets should be judiciously managed to spread project benefits.

Table A10.13: Awareness on ADB Project Campaigns (Project Towns)

Town	No.	Yes	%	No	%
Dong Hoi	115	61	53	54	47
Tuyen Quang	93	42	45	51	55
Total	**208**	**103**	**50**	**105**	**50**

Source: Evaluation team.

WATER SUPPLY COMPANY FINANCIAL STANDING

1. Projected financial statements were prepared for Tuyen Quang Water Supply and Drainage Company **(**TQ-WSDC) that include income statements and balance sheets. The revenues from the construction business were not included in the projection. The estimated debt service ratio (DSR) by 2008 is about 0.92, which is below the ratio of 1.2 required by Asian Development Bank (ADB) based on the loan covenant between ADB and the Government. However, from 2009 to 2020, the DSR is projected to range between 1.64 and 6.53. Starting in 2011, it is projected that TQ-WSDC will cover all operation and maintenance (O&M) costs, depreciation allowance, interest, and principal repayments.

Table 11.1: Tuyen Quang Water Supply and Drainage Company Income Statements
(D million, current prices)

	Actual/Estimated			Projected							
Item	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Water Sold (1000 m^3/day)	–	6.87	7.34	7.35	8.75	9.25	9.77	10.30	10.86	11.44	12.03
Average Tariff (D/m^3)	–	2,701	2,701	2,701	3,691	3,691	5,611	5,611	5,611	6,733	6,733
Average Tariff Increase (%)	–	–	0	0	37	0	52	0	0	20	0
Operating Revenue											
Water Sales Revenue	4,130	6,152	6,819	7,058	11,547	12,209	19,600	20,679	21,795	27,541	28,975
Less: Discount	0	0	0	0	0	0	0	0	0	0	0
Total Operating Revenue	**4,130**	**6,152**	**6,819**	**7,058**	**11,547**	**12,209**	**19,600**	**20,679**	**21,795**	**27,541**	**28,975**
Operating Expenses											
Salary Expense	0	1,902	2,108	2,579	3,100	3,469	3,922	4,457	4,835	5,241	5,732
Electricity Expense	0	1,049	1,144	1,276	1,735	1,973	2,188	2,424	2,683	2,966	3,277
Chemicals Expense	0	112	40	5	7	8	9	10	11	12	13
Maintenance Expense	0	2	13	12	27	45	62	81	101	123	147
Social Insurance Charges	0	262	315	385	462	517	585	665	721	782	855
Other Expenses	0	649	700	794	907	976	1,024	1,076	1,129	1,186	1,245
Selling Expense	0	0	0	0	0	0	0	0	0	0	0
Administration Expense	0	594	659	747	853	923	972	1,040	1,106	1,176	1,256
Total Operating Expenses	**3,779**	**4,570**	**4,979**	**5,796**	**7,090**	**7,911**	**8,763**	**9,751**	**10,586**	**11,485**	**12,524**
Income before Depreciation	**351**	**1,582**	**1,840**	**1,262**	**4,457**	**4,298**	**10,837**	**10,928**	**11,209**	**16,055**	**16,450**
Depreciation	0	1,247	1,802	2,086	2,574	2,574	2,574	2,574	2,574	2,574	2,574

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Operating Income	**351**	**335**	**38**	**(824)**	**1,883**	**1,724**	**8,263**	**8,354**	**8,635**	**13,481**	**13,876**
Non-Operating Revenue	7,190	11,087	12,831	0	0	0	0	0	0	0	0
Non-Operating Expenses	6,494	10,364	11,809	0	0	0	0	0	0	0	0
Interest & Other Financial Expenses	0	0	0	67	74	72	69	67	64	61	59
Profit Before Income Tax	**1,047**	**1,059**	**1,060**	**(892)**	**1,808**	**1,652**	**8,194**	**8,287**	**8,571**	**13,420**	**13,818**
Income Tax	298	302	297	0	506	463	2,294	2,320	2,400	3,758	3,869
Net Income	**749**	**756**	**763**	**(892)**	**1,302**	**1,189**	**5,900**	**5,967**	**6,171**	**9,662**	**9,949**

– = not available, ( ) = negative, D = dong, m^3 = cubic meter.
Source: Consultant's estimate.

Table 11.2: Tuyen Quang Water Supply and Drainage Company Balance Sheets
(D million, current prices)

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Assets											
Current Assets											
Cash and Bank	1,230	2,003	1,912	2,872	5,821	8,600	13,766	22,812	30,112	41,345	50,767
Accounts Receivable	1,288	1,984	3,346	3,481	4,745	4,683	6,444	5,665	4,777	5,282	5,160
Other Accounts Receivable	2,526	1,095	788	0	0	0	0	0	0	0	0
Inventory	8,997	9,751	7,965	7,965	7,432	7,288	7,775	7,426	7,640	7,378	8,756
Accounts Prepaid	270	101	103	267	0	0	0	0	0	0	0
Other Current Assets	4,118	4,216	2,881	2,365	2,128	2,163	2,368	2,180	2,359	2,522	2,694
Total Current Assets	**18,429**	**19,151**	**16,995**	**16,950**	**20,127**	**22,734**	**30,353**	**38,084**	**44,888**	**56,526**	**67,377**
Noncurrent Assets											
Fixed Assets	17,867	32,610	39,676	41,723	51,479	51,479	51,479	51,479	51,479	51,479	51,479
Accumulated Depreciation	(7,157)	(8,403)	(10,206)	(12,292)	(14,866)	(17,440)	(20,014)	(22,588)	(25,161)	(27,735)	(30,309)
Net Fixed Assets	10,710	24,207	29,470	29,431	36,613	34,039	31,465	28,891	26,317	23,743	21,170
Work in Progress	231	944	2,047	9,756	0	0	0	0	0	0	0
Intangible and Deferred Assets	46	43	40	45	51	55	58	61	64	67	71
Long-Term Investments	0	0	0	0	0	0	0	0	0	0	0

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Other Noncurrent Assets	76	327	275	275	275	275	275	275	275	275	275
Total Noncurrent Assets	**11,062**	**25,521**	**31,832**	**39,508**	**36,940**	**34,370**	**31,799**	**29,228**	**26,657**	**24,086**	**21,516**
Total Assets	**29,491**	**44,672**	**48,827**	**56,457**	**57,067**	**57,104**	**62,152**	**67,312**	**71,545**	**80,612**	**88,892**
Liabilities & Equity											
Current Liabilities											
Accounts Payable	3,395	1,194	72	776	967	968	1,049	1,142	827	898	976
Advances from Customers	4,157	5,579	4,420	4,420	4,420	4,420	4,420	4,420	4,420	4,420	4,420
Payable to Employees	741	3,236	3,211	2,119	2,293	2,281	2,257	2,564	2,385	2,585	2,355
Taxes Payable	149	1	101	0	139	127	629	636	658	1,029	1,060
Short-Term Loans	0	0	0	0	0	0	0	0	0	0	0
Current Portion of Long-Term Debt	0	0	1,307	1,307	1,307	1,307	1,307	1,307	1,307	1,307	1,307
Other Current Liabilities	2,959	1,807	0	682	794	971	867	960	801	870	629
Total Current Liabilities	**11,401**	**11,816**	**9,110**	**9,305**	**9,919**	**10,073**	**10,528**	**11,029**	**10,397**	**11,109**	**10,748**
Long-Term Liabilities											
ADB Loan	7,086	21,452	28,144	36,593	35,286	33,979	32,673	31,366	30,059	28,752	27,445
Other Loans	0	0	0	0	0	0	0	0	0	0	0
Provision for Unemployment Subsidies	80	99	122	0	0	0	0	0	0	0	0
Total Long-Term Debt	**7,166**	**21,551**	**28,266**	**36,593**	**35,286**	**33,979**	**32,673**	**31,366**	**30,059**	**28,752**	**27,445**
Equity											
Equity	9,660	9,898	10,032	10,032	10,032	10,032	10,032	10,032	10,032	10,032	10,032
Retained Earnings	0	0	0	(892)	410	1,600	7,499	13,466	19,637	29,300	39,249
Other	1,263	1,407	1,419	1,419	1,419	1,419	1,419	1,419	1,419	1,419	1,419
Total Equity	**10,923**	**11,305**	**11,451**	**10,560**	**11,862**	**13,051**	**18,951**	**24,917**	**31,089**	**40,751**	**50,700**
Total Liabilities + Equity	**29,491**	**44,672**	**48,827**	**56,457**	**57,067**	**57,104**	**62,152**	**67,312**	**71,545**	**80,612**	**88,892**

( ) = negative.
Source: Consultant's estimate.

2. Projected financial statements were prepared for Dong Hoi Water Supply and Drainage Company (DHO-WSDC) that exclude the revenues from the construction business. The estimated debt service ratio by 2008 is about 1.02, which is below the ratio of 1.2 required by ADB. From 2009 to 2020, DSR is projected to range between 1.58 and 6.79. Starting in 2011, DHO-WSDC is projected to cover all O&M costs, the depreciation allowance, interest, and principal repayments.

Table 11.3: Dong Hoi Water Supply and Drainage Company Income Statements
(D million, current prices)

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Water Sold (1000 m^3/day)	6.03	6.85	7.34	8.67	9.31	9.86	10.43	11.02	11.62	12.25	12.90
Average Tariff (D/m^3)	–	4,952	4,952	4,952	6,532	6,532	8,165	8,165	9,798	9,798	11,758
Average Tariff Increase (%)			0	0	32	0	25	0	20	0	20
Operating Revenue											
Water Sales Revenue	6,679	9,655	14,727	15,576	21,748	23,034	30,455	32,174	40,741	42,944	54,266
Less: VAT & Other Taxes	0	0	0	0	0	0	0	0	0	0	0
Total Operating Revenue	**6,679**	**9,655**	**14,727**	**15,576**	**21,748**	**23,034**	**30,455**	**32,174**	**40,741**	**42,944**	**54,266**
Operating Expenses											
Salary Expense	0	0	2394	2,628	3,156	3,529	3,845	4,225	4,591	4,984	5,458
Electricity Expense	0	0	1,260	1,409	1,729	1,970	2,188	2,427	2,690	2,977	3,291
Chemicals Expense	0	0	367	530	607	655	690	726	764	804	847
Maintenance Expense	0	0	0	53	108	169	232	300	375	457	546
Social Insurance Charges	0	0	713	782	940	1,051	1,145	1,258	1,367	1,484	1,625
Other Expenses	0	0	71	80	91	98	103	109	114	120	126
Selling Expense	0	0	0	0	0	0	0	0	0	0	0
Administration Expense	0	0	843	973	1,111	1,203	1,267	1,356	1,442	1,534	1,639
Total Operating Expenses	**4,681**	**9,432**	**5,647**	**6,456**	**7,744**	**8,675**	**9,469**	**10,400**	**11,343**	**12,359**	**13,532**
Income before Depreciation	**1,998**	**223**	**9,080**	**9,121**	**14,005**	**14,359**	**20,986**	**21,773**	**29,397**	**30,585**	**40,734**
Depreciation	5,256	3,011	5,595	9,183	9,183	9,183	9,183	9,183	9,183	9,183	9,183
Operating Income	**(3,258)**	**(2,788)**	**3,485**	**(62)**	**4,822**	**5,177**	**11,804**	**12,591**	**20,215**	**21,402**	**31,552**
Non-Operating Revenue	4,840	6,436	3,344	0	0	0	0	0	0	0	0
Non-Operating Expenses	0	0	3,269	0	0	0	0	0	0	0	0
Interest & Other Financial Expenses	0	3,372	3,560	4,521	4,333	4,146	3,958	3,771	3,583	3,396	3,208

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Profit Before Income Tax	**1,581**	**276**	**0**	**(4,583)**	**489**	**1,031**	**7,845**	**8,820**	**16,631**	**18,007**	**28,344**
Income Tax	443	125	0	0	137	289	2,197	2,470	4,657	5,042	7,936
Net Income	**1,139**	**151**	**0**	**(4,583)**	**352**	**742**	**5,649**	**6,350**	**11,975**	**12,965**	**20,407**

– = not available, ( ) = negative, D = Vietnamese dong, m^3 = cubic meter.
Source: Consultant's estimate.

Table 11.4: Dong Hoi Water Supply and Drainage Company Balance Sheets

(D million, current prices)

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Assets											
Current Assets											
Cash and Bank	9,794	11,010	9,012	10,342	13,484	18,571	26,293	35,022	49,379	64,853	87,113
Accounts Receivable	1,126	1,814	1,172	1,280	1,788	1,893	2,503	2,644	3,349	3,530	4,460
Other Accounts Receivable	317	175	163	0	0	0	0	0	0	0	0
Inventory	13,485	13,211	12,630	12,776	13,730	13,543	15,143	16,871	18,733	20,739	22,899
Accounts Prepaid	35	0	31	0	0	0	0	0	0	0	0
Other Current Assets	0	5,026	6,017	5,463	5,963	7,048	7,831	8,472	9,242	10,017	10,847
Total Current Assets	**24,757**	**31,236**	**29,026**	**29,861**	**34,964**	**41,055**	**51,770**	**63,009**	**80,702**	**99,139**	**125,319**
Noncurrent Assets											
Fixed Assets	31,694	173,079	182,109	183,652	183,652	183,652	183,652	183,652	183,652	183,652	183,652
Accumulated Depreciation	(5,256)	(8,267)	(13,862)	(23,044)	(32,227)	(41,409)	(50,592)	(59,775)	(68,957)	(78,140)	(87,322)
Net Fixed Assets	26,438	164,813	168,247	160,607	151,425	142,242	133,060	123,877	114,695	105,512	96,329
Work in Progress	16,717	2,725	1,543	0	0	0	0	0	0	0	0
Intangible and Deferred Assets	0	0	0	0	0	0	0	0	0	0	0
Long-Term Investments	39	39	39	44	50	54	57	60	63	66	69
Other Noncurrent Assets	0	0	0	0	0	0	0	0	0	0	0
Total Noncurrent Assets	**43,194**	**167,577**	**169,829**	**160,652**	**151,475**	**142,297**	**133,117**	**123,937**	**114,757**	**105,578**	**96,399**
Total Assets	**67,951**	**198,814**	**198,855**	**190,513**	**186,439**	**183,352**	**184,887**	**186,946**	**195,460**	**204,717**	**221,718**

Item	Actual/Estimated			Projected							
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Liabilities & Equity											
Current Liabilities											
Accounts Payable	1,620	873	235	220	263	296	323	355	389	425	466
Advances from Customers	32	173	5	5	5	5	5	5	5	5	5
Payable to Employees	338	235	382	420	504	563	614	674	733	795	871
Taxes Payable	15	56	32	0	37	79	120	135	255	276	435
Short-Term Loans	0	0	0	0	0	0	0	0	0	0	0
Current Portion of Long-Term Debt	0	0	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Other Current Liabilities	426	3,990	2,963	2,963	2,122	1,909	1,426	778	855	777	847
Total Current Liabilities	**2,430**	**5,327**	**7,367**	**7,357**	**6,682**	**6,602**	**6,238**	**5,698**	**5,986**	**6,029**	**6,373**
Long-Term Liabilities											
Project Loan	27,195	84,799	88,541	84,791	81,041	77,291	73,541	69,791	66,041	62,291	58,541
Other Loans	0	0	0	0	0	0	0	0	0	0	0
Provision for Unemployment Subsidies	0	65	45	45	45	45	45	45	45	45	45
Total Long-Term Debt	**27,195**	**84,864**	**88,586**	**84,836**	**81,086**	**77,336**	**73,586**	**69,836**	**66,086**	**62,336**	**58,586**
Equity											
Equity	28,290	103,908	99,079	99,079	99,079	99,079	99,079	99,079	99,079	99,079	99,079
Retained Earnings	0	0	0	(4,583)	(4,231)	(3,489)	2,160	8,510	20,485	33,450	53,857
Other	10,036	4,714	3,824	3,824	3,824	3,824	3,824	3,824	3,824	3,824	3,824
Total Equity	**38,326**	**108,622**	**102,902**	**98,320**	**98,672**	**99,414**	**105,062**	**111,413**	**123,387**	**136,352**	**156,759**
Total Liabilities + Equity	**67,951**	**198,814**	**198,855**	**190,513**	**186,439**	**183,352**	**184,887**	**186,946**	**195,460**	**204,717**	**221,718**

( ) = negative.
Source: Consultant's estimate.

MANAGEMENT RESPONSE TO THE PROJECT PERFORMANCE EVALUATION REPORT FOR THE SECOND PROVINCIAL TOWNS WATER SUPPLY AND SANITATION PROJECT IN VIET NAM (Loan 1514-VIE[SF])

On 26 January 2009, the Director General, Independent Evaluation Department, received the following response from the Managing Director General on behalf of Management:

1. We appreciate OED's evaluation of the Second Provincial Towns Water Supply and Sanitation Project. We are pleased with the overall Project rating of "successful". We also agree with the PPER's assessment that the Project is highly effective since it achieved all envisaged outcomes and contributed to the reduction of water borne diseases. The project is likely to have a positive impact on public health and the urban environment in the project area.

2. The PPER does not have any recommendations for ADB to follow-up. However, it suggests four issues that require follow-up actions by the Government, namely, (i) Tuyen Quang's water quality problems, (ii) lack of national sanitation targets, (iii) absence of a long-term strategy, and (iv) cumbersome approval procedures on externally funded infrastructure projects. We support all these follow-up actions by the Government and remain committed to facilitate these follow-up actions by them.

3. Regarding the long-term water supply and sanitation strategy, we note that the Government, assisted by its international development partners including ADB, is currently undertaking the Viet Nam Water Sector Review, which will result in clear and detailed agreements on the scope and development process of such a strategy. We also note that although approval processes in Viet Nam are still cumbersome and lengthy, the introduction of Government Decree 131 (2006) has led to some improvements. In addition, the capacity of the Water Supply Companies management and staff has recently improved and it has resulted in faster preparation and approval of technical design and procurement reports, as demonstrated in ongoing ADB-financed water supply projects in Viet Nam.