



Completion Report

Loan Number: 1710
August 2008

Lao People's Democratic Republic: Water Supply and Sanitation Sector Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – kip (KN)

		At Appraisal (30 September 1999)	At Project Completion (31 December 2007)
KN1.00	=	\$0.00011	\$0.000106
\$1.00	=	KN9,280	KN9,434

ABBREVIATIONS

ADB	–	Asian Development Bank
CAPP	–	community awareness and participation program
DHUP	–	Department of Housing and Urban Planning
DMF	–	design and monitoring framework
EIRR	–	economic internal rate of return
Lao PDR	–	Lao People's Democratic Republic
NGO	–	nongovernment organization
NORAD	–	Norwegian Agency for Development Cooperation
O&M	–	operation and maintenance
PIU	–	project implementation unit
PMU	–	project management unit
PNP	–	provincial nam papa (provincial water supply company)
PRC	–	People's Republic of China
UXO	–	unexploded ordnance
WASA	–	Water Supply Authority
WSS	–	water supply and sanitation

NOTES

- (i) The fiscal year (FY) of the Government ends on 30 September.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	Lao People's Democratic Republic (Lao PDR)
2.	Loan Number	1710
3.	Project Title	Water Supply and Sanitation Sector Project
4.	Borrower	Lao PDR
5.	Executing Agency	Ministry of Communications, Transport, Posts and Construction
6.	Original Loan Amount	SDR14.591 million (\$20 million equivalent)
7.	Net Loan Amount	SDR14.284 million (\$20.72 million equivalent)
8.	Project Completion Report Number	PCR:LAO 1044

B. Loan Data

1.	Appraisal	
	– Date Started	02 August 1999
	– Date Completed	18 August 1999
2.	Loan Negotiations	
	– Date Started	27 September 1999
	– Date Completed	28 September 1999
3.	Date of Board Approval	16 November 1999
4.	Date of Loan Agreement	14 March 2000
5.	Date of Loan Effectiveness	
	– In Loan Agreement	12 June 2000
	– Actual	10 July 2000
	– Number of Extensions	1
6.	Closing Date	
	– In Loan Agreement	30 June 2006
	– Actual	29 July 2008
	– Number of Extensions	2
7.	Terms of Loan	
	– Service Charge	1.0% per year (construction period) 1.5% per year (operation period)
	– Maturity	32 years
	– Grace Period	8 years
8.	Terms of Relending	
	– Interest Rate	6.4% per year
	– Maturity	25 years
	– Grace Period	6 years
	– Second-Step Borrower	Provincial nam papas (provincial water supply companies)
9.	Disbursements	
a.	Dates	

	Initial Disbursement	Final Disbursement	Time Interval
	25 September 2000	April 21 2008	91 months
	Effective Date	Actual Closing Date	Time Interval
	10 July 2000	29 July 2008	97 months

b. Amount (\$)					
Category or Subloan	Original Allocation	Last Revised Allocation ^a	Net Amount Available	Amount Disbursed	Undisbursed Balance
01 Civil works					
01A Water supply & sanitations small towns	8,296,594	13,557,891	13,557,171	13,040,839	516,332
01B Vientiane water supply ^a	3,857,715	0	0	0	0
02 Equipment & materials					
02A CAPP	240,481	194,932	194,945	212,500	(17,555)
02B Small towns	831,663	324,661	321,746	369,373	(47,626)
02C Vientiane ^a	531,062	0	0	0	0
02D PMU & PIUs	480,962	2,579,405	2,579,346	2,602,329	(22,983)
02E WASA ^a	10,020	0	0	0	0
03 UXO Clearance^b	280,561	0	0	0	0
04 Consulting services					
04A Design & supervision	2,304,610	3,584,501	3,584,367	3,531,683	52,683
04B Capacity building ^a	1,172,346	0	0	0	0
04C CAPP	410,822	237,749	237,735	221,785	15,950
04D UXO Services	70,141	204,110	204,110	204,110	0
05 IDC	1,513,024	540,667	540,667	540,667	0
Total^c	20,000,000	21,223,916	21,220,087	20,723,287	496,801

CAPP = community awareness and participation program, IDC = interest during construction, PIU = project implementation unit, PMU = project management unit, UXO = unexploded ordnance, WASA = water supply authority.

^a Categories 01B, 02C, 02E, 03, 04B deleted from ADB financing, and amounts reallocated.

^b Reallocated to category 04D Uxo Services.

^c Totals differ due to varying SDR/US\$ exchange rate.

10. Local Costs (Financed)	
- Amount (\$)	2.80 million
- Percentage of Local Costs	49%
- Percentage of Total Cost	12%

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	16.50	17.92
Local Currency Cost	8.50	5.51
Total	25.00	23.43

2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower-Financed	4.02	2.57
Beneficiaries ^a	0.10	0.14
ADB-Financed	18.50	20.18
Total	22.62	22.89
IDC Costs		
Borrower-Financed	0.89	0.00
ADB-Financed	1.49	0.54
Total	25.00	23.43

ADB = Asian Development Bank, IDC = interest during construction.

^a Based on actual ADB financing for revolving fund for sanitation, where beneficiaries would provide labor cost estimated at 49% of the total project cost.

3. Cost Breakdown, by Project Component (\$ million)

Component	Appraisal Estimate	Actual
A. Community Awareness and Participation Equipment and Materials	0.42	0.35
B. Improved Water Supply and Sanitation		
Land Acquisition	0.98	0 ^a
Civil Works	9.90	15.56
Materials and Equipment	1.00	2.14
C. Vientiane Water Supply Extension	5.17	0 ^b
D. Institutional Strengthening and Capacity Building		
Incremental Administration	0.46	0.43
PMU and PNP Equipment	0.48	0.46
WASA Equipment	0.01	0 ^c
UXO Clearance	0.27	0
E. Consulting Services		
Design and Supervision	2.29	3.53
Capacity Building	1.16	0 ^c
NGOs for CAPP	0.42	0.22
UXO Services	0.08	0.20
Subtotal	22.62	22.89
IDC (ADB \$1.48 million, Government \$0.89 million)	2.38	0.54 (ADB)
Total	25.00	23.43

Note: exclude Government IDC.

AFD = Agence Française de Développement, CAPP = community awareness and participation program, NGO = nongovernment organization, NORAD = Norwegian Agency for Development Cooperation, PMU = project management unit, PNP = provincial nam papa (provincial water supply company), UXO = unexploded ordnance, WASA = Water Supply Authority.

^a Actual cost to the Government was \$777.00.

^b ADB financing canceled; financed instead by AFD.

^c ADB financing canceled; financed instead by NORAD.

4. Project Schedule

Item	Appraisal Estimate	Actual
Consulting Contracts		
a. Feasibility Studies, Design, and Construction Supervision	July 2000	9 October 2000
b. Capacity Building (financed by NORAD)	September 2000	12 September 2000
c. UXO Mitigation	April 2001	1 February 2001
d. Community Awareness and Participation Program	April 2000	21 May 2001

Item	Appraisal Estimate	Actual
Civil Works Contracts		
Phase I (5 towns)		
a. Prequalification and Bidding	Mar 2001–Feb 2002	Feb 2002–Dec 2002
b. Construction	Mar 2002–Jun 2004	Dec 2002–Oct 2004
c. Commissioning	Apr 2004–Sep 2004	Apr 2004–Nov 2004
Phase IIa (7 towns)		
a. Prequalification and Bidding	Jul 2002–Jun 2003	Apr 2003–Mar 2004
b. Construction	Jul 2003–Sep 2005	Mar 2004–Jul 2006
c. Commissioning	Jul 2005–Dec 2005	Nov 2005–Aug 2006
Phase IIb (3 towns)		
a. Prequalification and Bidding		Apr 2005–Jul 2005
b. Construction		Aug 2005–Nov 2006
c. Commissioning		Aug 2006–Feb 2007
Phase III (rehabilitation, 3 towns)		
a. Prequalification and Bidding		May 2006–Dec 2006
b. Construction		Oct 2006–Sep 2007
c. Commissioning		Mar 2007–Sep 2007

NORAD = Norwegian Agency for Development Cooperation, UXO = unexploded ordnance.

5. Project Performance Report Ratings

Implementation Period	Rating	
	Development Objectives	Implementation Progress
From 30 November 1999 to 31 December 1999	Satisfactory	Satisfactory
From 1 January 2000 to 31 December 2000	Satisfactory	Satisfactory
From 1 January 2001 to 31 July 2001	Satisfactory	Satisfactory
From 1 August 2001 to 31 October 2006	Highly Satisfactory	Satisfactory
From 1 November 2006 to 31 May 2007	Highly Satisfactory	Highly Satisfactory
From 30 June 2007 to 31 October 2007	Satisfactory	Satisfactory
From 1 November 2007 to 31 November 2007	Partly Satisfactory	Satisfactory
From 31 December 2007 to 31 March 2008	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members ^a
Fact Finding	8–28 April 1999	2	42	a, b
Appraisal	2–18 August 1999	1	17	a
Inception	23–27 October 2000	1	5	a
Review 1	2–4 May 2001	1	3	c
Review 2	27 August–7 September 2001	1	11	d
Review 3	8–17 May 2002	1	10	a
Review 4	9–13 December 2002	1	5	d
Review 5	22 September–3 October 2003	1	12	d
Midterm Review	29 March–8 April 2004	3	30	d, e, f
Review 7	12–23 June 2005	2	20	e, f

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members^a
Review 8	20–28 March 2006	1	9	d
Review 9	13–17 November 2006	2	10	e, g
Review 10	11–20 June 2007	4	22	e, g, h, i
Special Project Administration	26–28 August 2007	1	2	g
Final Review	4–7 December 2007	2	8	e, g
Project Completion Review ^b	24 April–2 May 2008	3	24	e, g, j

^a a = senior project engineer, b = social development specialist, c = senior project specialist, d = principal project specialist, e = project administration officer, f = project economist, g = water supply and sanitation specialist, h = ADB Social Sectors Division director, i = social sector specialist, j = financial and economic analyst.

^b The project completion report was prepared by Paul van Klaveren (water supply and sanitation specialist / mission leader), Adelaida O. Mortell (project administration officer), and Agnes B. Palacio (financial and economic analyst / staff consultant).



PEOPLE'S
REPUBLIC OF
CHINA

LAO PEOPLE'S DEMOCRATIC REPUBLIC
**WATER SUPPLY AND SANITATION
SECTOR PROJECT**
(as completed)

MYANMAR
Mekong River

BOKEO
Tonpheung
Houayxay

Louang-Namtha
EQUANG-NAMTHA

Boun Nua
Phongsali
PHONGSALI

Xai
Nambak
LOUANGPHRABANG

Xam-Nua
Viengxai
HOUAPHAN

Xaignabouli
Xaignabouli

Louangphrabang
Kham
VIENTIANE
Xaisomboun

Pek
Phousauan
XIANGKHOANG

BOLIKHAMXAY

Paklay
VIENTIANE
VIENTIANE MUNICIPAL

Phonhong
Pakxan

VIET NAM

Gulf of Tonkin

THAILAND

Thakhek
Nongbok
Outhoumphon
Kaysonphomvihan

Lau Xao
KHAMMOUAN

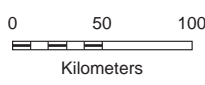
SAVANNAKHET

Salavan
Khongkedon
SALAVAN
XEKONG

Pakxe
CHAMPASAK

Lamam
ATTAPU

Khong
Phonthong
CAMBODIA



- National Capital
 - Provincial Capital
 - Subproject Town/Village
 - National Road
 - Paved Provincial Road
 - River
 - Provincial Boundary
 - International Boundary
- Boundaries are not necessarily authoritative.

102°00'E

106°00'E

I. PROJECT DESCRIPTION

1. Providing water supply and sanitation to small towns is one of the strategies adopted by the Government of the Lao People's Democratic Republic (Lao PDR) for equitable development across the country. The lack of basic infrastructure such as water supply systems in these small towns constrains their economic development. Moreover, unsanitary facilities and lack of hygiene awareness undermine the Government's efforts to improve the people's health. In October 1999, the Asian Development Bank (ADB) approved the Water Supply and Sanitation Sector Project¹ to sustain improvements in environmental health and the quality of life for the urban communities in small towns. The Executing Agency was the Department of Housing and Urban Planning (DHUP) of the Ministry of Public Works and Transport, formerly known as the Ministry of Communications, Transport, Posts and Construction. The design and monitoring framework (DMF) is in Appendix 1.

2. The purpose of the Project was to provide 24-hour, potable water at affordable tariffs to 12 of the highest-priority small towns and to parts of the capital, Vientiane. The Project was designed to deliver the following outputs: (i) effective regulation of the water supply and sanitation (WSS) sector, and (ii) potable water supply for 80% and hygienic sanitation for 75% of the population of the project towns.

3. As planned, the Project would: (i) establish a regulatory framework for the urban water supply sector, (ii) develop sustainable operational frameworks for the decentralized management of water supply, (iii) build the capacity of provincial *nam papas* (PNPs—provincial water supply companies), (iv) construct water supply and sanitation systems in 12 of the highest-priority small towns, and (v) expand the water supply distribution system and sanitation facilities in Vientiane. In typically tertiary-level small-town communities with populations of 4,000 to 12,000, and up to 20,000 in a few, the Project was to serve about 100,000 people. The Vientiane subproject covered the peri-urban areas of the city, with a population of around 100,000, of which an additional 65,000 were to benefit from the Project.

4. The Project had four parts. Part A, the community awareness and participation program (CAPP), covered community awareness, participation, and education in the implementation and management of the project facilities, and in environmental sanitation and health. In part B, the Project would implement piped water supply systems and sanitation improvements in 12 small towns.² In part C, it would expand the Vientiane water supply system, establish sanitary on-plot treatment units, and construct localized communal drainage networks.³ Part D involved (i) capacity building for project management, the establishment and operation of a regulatory authority, and capacity building in financial management and operation and maintenance (O&M) for the PNPs (footnote 3); (ii) the preparation of feasibility studies; (iii) the preparation of subproject appraisal reports; (iv) detailed engineering design, (v) construction supervision, (vi) the preparation of a program for the disposal of unexploded ordnance (UXO); and (vii) the preparation of the CAPP.

¹ ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Sector Loan to the Lao People's Democratic Republic for the Water Supply and Sanitation Sector Project*. Manila.

² Loan savings enabled the addition of eight other towns.

³ ADB financing for part C and item (i) of part D was subsequently canceled, after the Government entered into formal financing agreements with the Agence Française de Développement (AFD) and the Norwegian Agency for Development Cooperation (NORAD) for these activities. The unused loan amount was reallocated to the construction and rehabilitation of additional water supply systems in part B.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. The country operational strategy that ADB adopted for Lao PDR in 1996 gave priority to sustainable economic growth and development through infrastructure investments with an impact on the local economy. In parallel, it emphasized the need for a policy and institutional framework within which an increase in aggregate income would translate into balanced, equitable, and sustainable growth. The 1999–2001 country assistance plan affirmed the rightness of this strategy. At the time of project appraisal, ADB's strategy in the urban WSS sector conformed to the Government's priorities, and focused on the economic development of small towns. The objective and design of the Project matched the Government's and ADB's priorities.

6. The Project helped the Government develop an appropriate policy and institutional framework to ensure that investments were equitably distributed and sustainable, by (i) establishing the Water Supply Authority (WASA); and (ii) supporting its effective operation through the issue of operational guidelines, and through capacity building. The framework was thus set for the expansion of water supply services throughout the country, at levels that both the Government and the communities could afford. Within this framework, the Project supported the strengthening of the WSS sector to achieve adequate cost recovery and develop capable PNPs.

7. The Project was formulated as a sector loan covering 3 years (2000–2002) of the Government's sector investment plan to 2020.⁴ Its design was based on feasibility studies of five small towns and Vientiane, and incorporated stakeholder participation, socioeconomic and environmental assessments, demand analysis, and analyses of tariff affordability and the beneficiaries' willingness to pay. The Government and ADB agreed on the criteria for selecting subprojects,⁵ the appraisal standards, and a framework for subproject approval.

8. During project processing the Agence Française de Développement (AFD) expressed interest in providing a tied grant for the works under part C (Vientiane water supply system expansion and sanitation), including the associated consulting services for detailed design and construction supervision. The Norwegian Agency for Development Cooperation (NORAD), on the other hand, was interested in financing, also with a tied grant, the capacity building of WASA and the project management unit (PMU), including management systems, staff training and workshops, financial management operations, regulatory controls and guidelines, and status report. On 10 April 2001, ADB Management approved the cancellation of ADB financing for all of these activities.⁶

⁴ The sector investment plan was part of the 1999 policy statement of the Government on water supply (Decision 37/PM).

⁵ To be selected, a subproject had to (i) be in an area with no significant formal water supply system; (ii) be backed by a written commitment from the provincial government and PNP to the Government's water supply sector policy, and specifically to tariff reform and the ADB-approved sanitation regulations; (iii) be included as a high priority in the Government's water supply sector investment plan; (iv) not be considered for funding by a external agency other than ADB; (v) be located in a small town with a population density greater than 30 persons per hectare and a projected population of 4,000–20,000 by 2010, and with a government-approved urban development plan; (vi) not require significant land acquisition or resettlement of people occupying or using the land; and (vii) have an economic internal rate of return (EIRR) of at least 12%.

⁶ ADB. 2001. *Major Change in Scope in Loan 1710-LAO: Water Supply and Sanitation Sector Project*. Manila, 10 April.

B. Project Outputs

1. Output 1: Effective Regulation of the Sector

9. Effective regulation of the water supply sector was to be achieved through the following targets: (i) the announcement of WASA staff and board members' names and composition by June 2000, (ii) the holding of regulatory board meetings by October 2000, (iii) the establishment of operating guidelines and regulatory policy by December 2000, and (iv) PNP and government compliance with policies and regulations by the midterm review.

10. These targets were only partly achieved. WASA was established through Prime Ministerial Decision No. 37/PM of 30 September 1999 defining the Government's policy on the management and development of the water supply sector, and the mandate and key functions of the authority were prescribed in Prime Ministerial Decree No. 191/PM of 1 July 2005 regulating urban water supply operations. But no board was appointed, and guidelines on tariff policy, regulatory accounting, and tariff-setting methods were drafted but not finalized.

11. Although WASA was not established as a regulatory body, it was able to carry out one specific task of a regulatory body: the review of the tariff structure and the recommendation of new tariffs. Nevertheless, the targets set in the DMF and the effective regulation of the sector were not achieved.

12. The intended output was to be achieved with the help of consulting services under part D, package B (capacity building for the water supply sector), financed by NORAD. The services were completed in March 2005, after the drafting of Prime Ministerial Decree No.191/PM. The output was only partly achieved because of lack of support from the Government for the establishment of a regulatory agency. This lack of support should have been identified as a risk in the project design, which should have included mitigation measures.

2. Output 2: Potable Water Supply and Sanitation Coverage

13. The project target was to provide potable water to 80% and hygienic sanitation to 75% of the population in the project towns—about 100,000 people in all in small towns and about 65,000 in Vientiane. As the Vientiane component was dropped from ADB financing, the Project was able to (i) construct new water supply systems in three more towns, and (ii) rehabilitate the water supply systems in five others. No new population coverage target was set after this change.

**Table 1: Water Supply Coverage, Production, and Consumption⁷
in the 15 Project Towns**

Project Towns ^a	Domestic Service Connections (no.)	Service Area Population (2008)		Coverage ^b (%)	Production (m ³ /day)		Consumption (liters per capita per day)
		Total	Served		Designed	Actual	
Phase I Towns							
Tonpheung	685	5,047	4,521	90	864	377	83
Bounneua	974	5,306	5,306	100	1,478	198	37
Nambak	1,208	8,451	7,973	94	1,485	781	98
Nongbok	804	7,236	6,428	89	812	337	52
Outhoumphone	1,595	17,121	10,527	61	3,487	1,156	110
Subtotal, Phase I	5,266	43,161	34,756	81	8,126	2,850	
Phase IIa Towns							
Viengxay	430	5,064	2,838	56	1,500	360	127
Muangkham	946	9,251	6,244	67	2,143	250	40
Paklay	1,224	11,006	8,078	73	2,160	1,131	140
Km 52	529	22,476	3,491	16	2,670	800	229
Khongsedone	859	11,692	5,669	48	1,210	585	103
Phonthong	868	9,406	5,729	61	2,100	295	51
Samakhixay	1,832	15,166	12,091	80	3,084	2,950	244
Subtotal, Phase IIa	6,688	84,061	44,141	53	14,867	6,371	
Phase IIb Towns							
Hongsa	530	7,640	3,498	46	1,345	318	91
Khong	392	6,511	2,587	40	1,762	560	216
Laksao	259	2,159	1,709	79	425	133	78
Subtotal, Phase IIb	1,181	16,310	7,795	48	3,532	1,011	
Total	13,135	143,532	86,691	60	25,497	10,232	

^a The Project was implemented in three phases: phase 1 subprojects were designed during the project preparatory technical assistance, phase IIa subprojects after the loan took effect, and phase IIb subprojects after ADB loan financing for the Vientiane subproject was canceled.

^b Coverage is the number of people served as a percentage of the total population

Source: Ministry of Public Works and Transport

14. Table 1 shows the extent to which the water supply targets were achieved. The new water supply systems serve about 87,000 people in the 15 project towns, 13% below the target set for the first 12 towns. The coverage target was achieved in the phase I towns (81%) but not in phases IIa (53%) and IIb (48%). The overall water supply coverage rate is 60%, below the target of 80%.

15. The treatment capacity constructed was about 25,000 cubic meters per day, enough to provide more than 200,000 persons with 120 liters of water per day. To meet the projected targets, the number of connections would have to be increased by about 35%.

⁷ The consumption rate, in liters per capita per day, is based on number of people served and treatment plant production. Hence, the consumption rate includes physical and apparent losses, and the actual consumption rate will be lower than the calculated rate.

Table 2: Sanitation Coverage in the 15 Project Towns

Towns	Households in service area ^a	No. of Latrines present			Coverage (%)		
		Financed by others	Financed by ADB	Total	Financed by others ^b	Financed by ADB ^c	Total ^d
Phase I Towns							
Tonpheung	765	50	214	264	7	28	35
Bounneua	804	416	157	573	52	20	71
Nambak	1,280	344	392	736	27	31	57
Nongbok	1,096	354	219	573	32	20	52
Outhoumphone	2,594	1,049	158	1,207	40	6	47
Subtotal, Phase I	6,540	2,213	1,140	3,353	34	17	51
Phase IIa Towns							
Viengxay	767	414	115	529	54	15	69
Muangkham	1,402	643	235	878	46	17	63
Paklay	1,668	228	80	308	14	5	18
Km 52	3,405	295	97	392	9	3	12
Khongsedone	1,772	114	166	280	6	9	16
Phonthong	1,425	659	123	782	46	9	55
Samakhixay	2,298	215	214	429	9	9	19
Subtotal, Phase IIa	12,737	2,568	1,030	3,598	20	8	28
Phase IIb Towns							
Hongsao	1,158	47	140	187	4	12	16
Laksao	987	83	208	291	8	21	29
Khong	327	12	68	80	4	21	24
Subtotal, Phase IIb	2,471	142	416	558	6	17	23
Total	21,747	4,923	2,586	7,509	23	12	35

Source: Ministry of Public Works and Transport

^a Service area population divided by an average household size of 6.6 persons

^b The number of latrines financed by sources other than the Project as a percentage of the number of households in the service area

^c The number of latrines financed by the Project as a percentage of the number of households in the service area

^d The total number of latrines as a percentage of the number of households in the service area

16. Table 2 shows that a total of 2,586 latrines, covering 12% of the population, were built and financed with the ADB loan. About 4,923 other latrines were built and financed by the people themselves or with assistance from other development partners, according to the DHUP. The current total of about 7,500 brings the overall coverage to only 35%, well below the targeted 75%.

17. This intended output was to be achieved through the CAPP, which involved (i) setting up water supply and sanitation (WSS) user groups, (ii) training WSS user group members in good sanitation and hygiene practices, (iii) carrying out sanitation campaigns in the villages, and (iv) establishing sanitation revolving funds for latrine construction.

18. The revolving funds, administered by the PNPs, were not put to the best use. Once loans were repaid, no new ones were disbursed. This was because the PNPs lacked understanding of the purpose of the revolving fund, and the potential beneficiaries considered the repayment installments too high. After the consultants left the Project, the DHUP organized several meetings with the PNPs to inform them about (i) the purpose of the revolving fund, and (ii) the possibility of longer repayment periods. The Project also provided more funds to boost disbursements. Nevertheless, disbursements remained low.

C. Project Costs

19. At appraisal, the cost of the Project was estimated at \$25.0 million, of which \$16.5 million (about 66%) was in foreign exchange, including \$1.5 million for service charges and interest during construction; and \$8.5 million (about 34%) was in local currency, including customs duties and taxes of about \$2.4 million. The beneficiaries were expected to contribute \$0.1 million in the form of labor in the construction of the sanitation facilities. The ADB loan funds of \$20.0 million equivalent were expected to cover 80% of the total project cost. Details of the appraised and actual project costs and financing are in Appendix 2.

20. The unused loan amounts that resulted from the transfer of part C and the capacity-building services in part D to cofinancing were reallocated to additional water supply and sanitation projects under part B (\$7.2 million in total).

21. The actual project cost at completion was \$23.4 million equivalent—\$17.9 million in foreign exchange cost (76%) and \$5.5 million in local currency (24%). ADB financed \$20.7 million equivalent (88%) of the total project cost. The Government funded the remaining local costs of \$2.6 million equivalent, while the beneficiaries contributed \$0.1 million. The unused loan amount of \$0.5 million was canceled.

22. The works contracts and materials for the water supply and sanitation systems were estimated at \$15.9 million. At completion, the construction of 15 new water supply systems, the rehabilitation of systems in five subproject towns, and the stockpile of distribution materials for house connections cost a total of \$17.7 million.

23. The estimated cost of CAPP at appraisal was \$0.5 million, compared with actual expenditures of \$0.2 million. The savings were due to the recruitment of individual consultants instead of nongovernment organizations (NGOs).

24. The implementation assistance, estimated at \$2.3 million, cost \$3.5 million. The increase was due to preparation of (i) feasibility studies, (ii) hydrogeological studies, and (iii) detailed design of the water supply systems, for the eight towns which were added to the Project.

25. The transfer of parts of the Project to NORAD and ADF increased the available loan funds by 36%, and allowed the construction of additional water supply works and an increase in overall treatment capacity. Since additional design and supervision services were also required, the consulting costs increased by 44%. The actual costs did not exceed the original cost estimates.

D. Disbursements

26. Disbursements were slow in the early stages of implementation, but picked up once the water supply works began, in 2003. There was no further delay in disbursement. The loan was disbursed according to ADB's *Loan Disbursement Handbook* (2007, as amended from time to time) through direct payment for both civil works and consulting services. A total of \$20.7 million was disbursed.

27. An imprest account with an initial \$100,000 was opened in August 2000 and provided the necessary flexibility in implementation. The turnover ratio was 2.42 in 2003 and 3.02 in 2005. After that, the imprest account ceiling was increased to \$400,000.

28. The Government generally provided the necessary counterpart funds on time, except in early 2004, when there was a shortage of counterpart funds. The Department of External Finance Relations of the Ministry of Finance therefore allowed the provincial government to exempt contractors from the turnover tax, profit tax, and personal income tax and reduced the counterpart fund contribution by the same amount.

E. Project Schedule

29. The Board approved the loan on 16 November 1999 and the Loan Agreement was signed on 14 March 2000 and took effect on 10 July 2000. The original loan closing date was 30 June 2006, but, at the request of the Government, an extension of 1 year, to 30 June 2007, was approved to allow the rehabilitation of the water supply systems. A second extension of 6 months, to 31 December 2007, was approved to allow time to (i) complete the construction works in Sayaboury, (ii) correct the works in Outhomphone, (iii) increase the number of latrines, and (iv) increase the number of household connections. The 18-month extension was due partly to the expansion of the scope of works, and partly to delays in achieving the physical outputs. The actual and appraisal implementation schedules are compared in Appendix 3.

F. Implementation Arrangements

30. In accordance with the loan covenants, a PMU within the DHUP was made responsible for implementing the Project. For all practical purposes, the PMU performed all general project management functions, with the DHUP director general taking part in all formal decisions. A project implementation unit (PIU) in each project province carried out the project implementation directives issued by the PMU through the director of the provincial department of public works and transport.⁸

31. The Project used a participatory approach. The results of the feasibility studies of the water supply works were presented and discussed with stakeholders during workshops in each project town. The CAPP provided for a project that was responsive to the communities' needs. It was designed to be implemented by local NGOs, but no suitable NGO could be identified during project implementation. The international and national consultants that were recruited in their place were not permanently based in the project areas, and therefore could not provide continuous support to the PIUs. This reduced the efficiency and sustainability of their outputs, slowed the implementation of the sanitation works, and diminished the effectiveness of the revolving fund.

32. The implementation arrangements were suitable and adequate for the construction of the water supply works. But the PNPs and provincial governments gave insufficient attention to achieving projected outputs, and to complying with the loan covenants.

G. Conditions and Covenants

33. The status of compliance with the loan covenants is summarized in Appendix 4. Of the 18 key covenants in the Loan Agreement, 11 were complied with. Three others were partly complied with. Deferred payment for water connection (schedule 6, para. 8) proved to be ineffective and few people availed themselves of this scheme. Instead the Project provided additional materials to the PNPs so prospective users could be connected without having to pay in advance. The sanitation assistance fund (schedule 6, para. 9) was discontinued by the PNPs

⁸ Formerly the department of communication, transport, posts and construction.

after the CAPP consultant left the Project, and additional funds were provided to allow the project targets to be achieved. Regarding the maintenance of accounts receivable (schedule 6, para. 13b), five of the 17 PNPs had accounts receivable beyond the 90-day maximum. Detailed information on accounts receivable can be found in Appendix 5. These four covenants were not complied with:

- (i) **Water tariff structures and increases (schedule 6, para. 10a).** Water tariffs in all project towns were adjusted during project implementation. Yet all PNPs were still experiencing financial losses at the end of 2006.
- (ii) **Cash balance and audit (schedule 6, para. 10b):** The PNPs were to maintain positive cash balances at the end of each fiscal year. However, the 2005 and 2006 financial statements showed negative cash balances.
- (iii) **Debt service ratio of PNPs in phase I towns (schedule 6, para. 11a):** The PNPs in phase I towns were to achieve a debt service coverage ratio (DSCR) of at least 1.2 by 2006. But all the PNPs reported a negative net operating income in 2006, and had a DSCR of less than 1.0.
- (iv) **Separate depreciation schedules (schedule 6, para. 14b):** With the handover of the project assets to the PNPs in five phase I towns and seven phase IIa towns, the PNPs were required to prepare separate depreciation schedules. These schedules were not included in the financial statements of 2006, contrary to ADB's request.

34. Noncompliance with the four covenants was due to poor financial management by the PNPs. Higher water tariffs and lower operational expenditures would have yielded a positive cash balance and higher DSCRs. The separate depreciation schedules were not prepared because it was not clear to the PNPs that these would assist in the calculation of appropriate water tariffs.

H. Consultant Recruitment and Procurement

35. Consultant recruitment and procurement followed ADB's *Guidelines on the Use of Consultants*. Procedures acceptable to ADB were adopted in (i) the prequalification of specialized consultant firms, (ii) the selection of individual consultants, and (iii) the tendering and award of the consultants' contracts.

36. Norconsult, in association with the Lao PDR consulting firms SK Consultants and STS Consultants, assisted DHUP and the PNPs in implementing the Project by preparing the feasibility studies and detailed technical designs, and supervising the construction of the water supply works. The consultants were mobilized in October 2000 and left the Project on 30 June 2007. The hiring of the consultants was delayed, as ADB did not approve DHUP's request for a reduction in the consulting services, estimated at 420 person-months—55 person-months international and 365 person-months national. The final total, after the project scope was extended to cover eight more towns, was 735 person-months—78 person-months international and 657 person-months national. The implementation assistance was satisfactory, and the outputs, such as the feasibility studies and detailed designs, were submitted on time.

37. The Lao PDR firm Milsearch-BPKP was contracted to provide UXO mitigation services. The services were provided intermittently, as the feasibility study and detailed design progressed, and continued when necessary during construction planning and implementation. The tasks during the feasibility stage were: (i) a desk review of the likelihood of UXO contamination in the project towns, and (ii) reconnaissance and pathfinding for all proposed

works. No deep search was required in areas proposed for drilling and large foundations. The services were completed satisfactorily in December 2004.

38. For the CAPP, individual consultants were hired for 7 months of international and 196 months of national consulting services. The services, which started in May 2001 and were completed in October 2006, were not completed satisfactorily. The revolving fund was not established and the sanitation output targets were not achieved.

39. Procurement for the water supply works conformed to ADB's *Procurement Guidelines*. The Project as designed involved the procurement of the works in the first five towns as one package. During implementation it was agreed that procurement should be done separately for each town, as the towns were far apart and their geological conditions differed. Of the 20 works contracts, 15 were awarded through international competitive bidding and 5 through national competitive bidding. Seventeen of the 20 contracts were awarded to Lao PDR contractors, and the rest to contractors from the People's Republic of China (PRC). The supply contracts for equipment, materials, and vehicles were awarded through international shopping. Procurement for minor works and for the supply of tools and materials was done through national competitive bidding or direct purchase. All contract values were within the consultants' estimates. No substantial contract variations were required.

I. Performance of Consultants, Contractors, and Suppliers

40. The performance of the consultants was generally satisfactory. Effective working relationships with the PMU and other agencies were established. The feasibility studies and design documents were of good quality and were submitted on time. The construction supervisors were knowledgeable and were able to establish good working relationships with the contractors. The CAPP consultants, however, could not establish an effective sanitation revolving fund.

41. Overall, the performance of the contractors was satisfactory. While most did not have appropriate experience in water supply, were unfamiliar with ADB's procurement process, and did not understand the contract conditions and technical specifications, in the course of project implementation the contractors improved their performance and completed the works on time and at the required quality.

42. An exception was the contractors from the PRC, who tended to subcontract all or large parts of the works to often inexperienced subcontractors, mostly from southern PRC. The low bid prices from these companies affected the quality of the works and kept several from reaching the expected quality. Moreover, the contractors and their representatives spoke poor English and Lao, complicating the communication with the consultants, the PMU, and the PIUs.

43. The suppliers of mechanical equipment, pipes, and fittings contracted directly with the contractors. Their performance was satisfactory.

J. Performance of the Borrower and the Executing Agency

44. Overall, the performance of the Borrower, DHUP, and the PNPs was satisfactory. The Borrower performed in accordance with the provisions of the Loan Agreement, giving high priority to the Project in allocating local counterpart funds. The local staff recruited for the PMU received training in project management before the Project and also during its implementation, and their project management skills significantly improved. Training provided by the Project to

the PNPs in O&M, monitoring, contract execution, accounting, and financial management resulted in satisfactory project implementation by the PNPs.

45. Less satisfactory was project performance monitoring by the PMU, which was too concerned with contracting and disbursements and paid little or no attention to monitoring project outputs, outcome, and impact. Also, the PMU should have made sure the PNPs and provincial departments of public works and transport understood their obligations to achieve the defined outputs and comply with the covenants in the Loan Agreement. The training of PNPs was found to be deficient in two project towns, where the water supply system broke down within 2 years of commissioning. In both cases, incorrect maintenance of deep wells was at fault.

K. Performance of the Asian Development Bank

46. The overall performance of ADB was satisfactory. ADB fielded 12 review missions over 7 years, to evaluate the progress of policy reforms and project implementation. The missions undertook field visits; consulted with beneficiaries, DHUP, and the consultants; and discussed policies needed to facilitate and speed up loan disbursement. In the final year a special administrative mission discussed actions that would guarantee the achievement of the project outputs. ADB provided additional funding for (i) the sanitation revolving fund, to extend the payback period and lower installments; (ii) the purchase of pipes and fittings for the house connections; and (iii) the purchase of new pumps for the two towns where the systems needed rehabilitation.

47. However, the frequent turnover of ADB project officers reduced the effectiveness of ADB's assistance. Furthermore, ADB should have been more firm in insisting on government compliance with the loan conditions, and should have recognized the important role of the provincial governments and their active involvement in project implementation.

III. EVALUATION OF PERFORMANCE

A. Relevance

48. The Project remains relevant in achieving the national development vision and goals of Lao PDR as presented in its Sixth National Socio-Economic Development Plan (2006–2010) and the national growth and poverty reduction strategy, in which the Government affirms its goal of reaching its Millennium Development Goal targets.

49. Since the responsibility for providing potable water and hygienic sanitation was decentralized to the PNPs prior to the start of Project, the PNPs and the provincial governments should have been included more directly in project design and implementation, through consultation workshops and frequent progress meetings.

B. Effectiveness in Achieving Outcome

50. The Project provided potable water supply to the target communities at affordable prices. According to the Project outcome, water was to be available at sufficient pressure, quantity, and quality 24 hours a day, and monthly water bills were to be less than 5% of the monthly household income. No specific performance indicators were listed.

51. The Project is rated less effective since its outcome was only partly achieved. From a visual inspection of the treatment facilities, and the fact that most of the treatment plants operate

only intermittently, it may be concluded that the water provided to consumers is not potable all of the time, although no data on its bacteriologic quality are available. Data on the pressure at service connections are not available either. The facilities, however, provide water in sufficient quantity to the consumers. WASA's recommendation to increase the tariff was not followed until the first quarter of 2008. The increases have significantly raised the monthly water bills for domestic users, which currently range from 4.1% to 6.8% of average monthly household income, higher than the target outcome.

52. The outcome was to be achieved through the following outputs: (i) effective regulation of the sector, (ii) the provision of potable water supply to 80% of the target communities, and (iii) the provision of sanitation to 75% of the target communities.

53. These outputs were only partly achieved. The regulatory framework was only partially effective, since WASA did not attain independence and the guidelines were not finalized. The water supply coverage ratio was 60%, versus the projected 80%. The total latrine coverage ratio was 35%, versus the projected 75%.

C. Efficiency in Achieving Outcome and Outputs

54. Overall, the Project was less efficient in achieving its expected outcome and outputs. The reevaluation of economic internal rates of return (EIRRs) for the five towns under phase I showed that, except for one town, the works are economically viable, with EIRRs equal to or higher than the opportunity cost of capital of 12%. However, the EIRRs are lower than those calculated at project appraisal in 1999, because of the higher project costs and lower-than-projected revenues. An extreme case is Nongbok, where the actual EIRR is only 2.3%, compared with 15.5% at appraisal. A comparative summary of the EIRRs for the five towns is presented in Table 3, and the details of the evaluation are given in Appendix 6.

Table 3: Comparative EIRR Results for Phase I Towns

Town	EIRR at Project Appraisal (%)	EIRR at Project Completion (%)
Tonpheung	21.4	16.7
Bounneua	15.6	12.0
Nambak	18.2	16.1
Nongbok	15.5	2.3
Outhoumphone	20.9	17.5

Source: Asian Development Bank

55. Funds were used efficiently. A total of \$4.2 million (18%) went to project management. The average cost, based on actual costs, was \$1,047 per service connection, about the same as the original estimate of \$1,049.

56. Project implementation is rated less efficient. Although project contracting and disbursement were fairly efficient, and more works were contracted than originally foreseen, a 1-year extension was required to complete the works. Initially DHUP and ADB put too little emphasis on the achievement of the actual outcome and outputs. Only in the last phase of the Project were attempts made to increase the water supply and sanitation coverage ratios, requiring an additional half-year extension.

D. Preliminary Assessment of Sustainability

57. Overall, the Project is rated less likely to be sustainable. The sustainability of the Project depends on the technical and financial sustainability of the subprojects, which depends in turn on the human and financial resources of the PNPs. The Project used the method of rapid sand filtration to treat surface water, but the technology is not being applied optimally and the water produced is not likely to be potable all the time. Nevertheless, the PNPs are able to operate and maintain the facilities and produce clean water suitable for domestic use but not for drinking. During project implementation the capacity of the operating staff improved, as evidenced by the repairs and improvements made at the treatment plants and the use of the laboratories.

58. None of the Project's water supply facilities generate enough revenues to cover operating expenses, debt service, and full depreciation. The financial sustainability of the works therefore depends on the ability of the PNPs to subsidize the operation of the water supply facilities. The introduction of new province-wide tariffs on 1 April 2008 is expected to improve the financial performance of the PNPs. The significantly higher water tariffs should generate enough funds to recover all O&M costs and cover depreciation, debt service, a reasonable proportion of future capital expenditures, and taxes. Updated water tariffs for the 17 PNPs are in Appendix 7.

E. Impact

59. **Environmental Impact.** The Project was foreseen to improve the environment through better management of water and sanitation. The improved sanitation facilities have had a positive environmental impact, and the anticipated negative environmental impact has been limited to (i) a lower groundwater table, (ii) the disposal of sludge and filter backwash water from the water treatment plant, and (iii) wastewater pollution from the increased volumes of water. Environmental management plans, with guidelines for groundwater protection, have been prepared. The negative environmental impact has been minimized through appropriate design and construction.

60. **Socioeconomic Impact.** The Project was designed to improve the health of people in small towns by providing safe water supply and sanitation, and to ensure equitable access to these services by limiting the cost of the services for the poor. In general, by increasing access to improved water supply and sanitation, reducing water-related diseases, increasing hygiene awareness, and promoting more hygienic practices, the Project has had a positive socioeconomic impact, resulting in improved health and quality of life.

61. The impact on the poor has been less than intended, however. The deferred payment system for water supply connections to poor households and the sanitation revolving funds have not been fully used. The accessibility of the services to the poor is therefore limited. Likewise, the revision of water tariffs in the first quarter of 2008 has significantly increased the monthly water bill for domestic users.

62. **Land Acquisition and Resettlement Impact.** Some acquisition of land was expected. A short land acquisition and resettlement plan (LARP) was therefore prepared for the Project. As the planned infrastructure and the alignment of transmission pipes for all subprojects were on unoccupied land, no resettlement was required. Land acquisition was carried out only in Tonpheung. The implementation of the LARP was monitored by the district resettlement committees, the PMU, the PIUs, and the consultants. The LARP was implemented satisfactorily and the resettlement impact was limited.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

63. The Project is considered relevant though less effective, less efficient, and less likely to be sustainable. Its overall performance is therefore rated only partly successful. Sustainability will require (i) increased support and commitment from the Government and the PNPs; (ii) continued training of operational and management staff, especially in minimizing non-revenue water and improving asset management, to improve operating performance and technical sustainability; and (iii) higher revenues, through the sale of more water and an increase in water tariffs.

B. Lessons Learned

64. **Noncompliance with Financial Loan Covenants.** The Loan Agreement included covenants on water tariff increases, sufficient to cover O&M, depreciation, and debt service. These covenants and the WASA recommendations on tariff increases were not followed, contributing substantially to the poor financial position of the PNPs and the Project's low ratings for efficiency and sustainability. If the water tariffs had been increased before investments were made in water supply facilities, the Project would have been financially viable and sustainable.

65. **Low Connection Rates Caused by High Connection Charges Up-front.** Distribution mains, but not service mains, were part of the Project at the start. The PNPs were to provide the service connections and charge consumers in advance at marked-up rates. These rates made the connections less attractive. Moreover, given the low tariffs, the PNPs could not generate enough revenues to lay service mains and facilitate the connections. The project towns have low connection rates as a result.

66. **Low Awareness of Loan Obligations, Leading to Low Project Ratings.** The PNPs and provincial governors were apparently unaware of their obligations under the Loan Agreement between ADB and the Government, particularly with respect to tariffs, financial sustainability, and outputs to be achieved. This led to low achievement of the outputs and noncompliance with financial covenants.

67. **Continuous Support Needed for Effective Community Participation.** The CAPP appeared to be less effective, considering the low level of disbursements from the revolving fund and the slow implementation of the sanitation works. This was because the consultants were not based in the project area and could not provide continuous support to the newly formed WSS user groups.

C. Recommendations

1. Project-Related

68. **Sector Regulation.** Although WASA was created and it carried out tariff reviews and reform, a fully effective regulatory framework was not established. In order for the regulation to be effective, the Government needs to further clarify the role and responsibilities of WASA, make its guidelines more effective, strengthen its staff, and establish WASA as an independent regulator as soon as possible.

69. **Stakeholder Involvement.** More participation is required of the PNPs, regional and local governments, and communities in the development and implementation of water supply and sanitation projects. The Government needs to ensure that agreements on the relevant loan provisions and covenants, on issues such as arrears collection plans, tariffs, and water supply and sanitation investment targets, are included in subsidiary loan agreements between the Government and the PNPs.

70. **Financing of Service Connections.** Individual water supply connection costs should be regarded as real costs to be charged to the consumers. Charging these costs through up-front payment will limit the number of connections and raise the issue of ownership of the materials. A more appropriate approach would be for the PNPs to keep ownership of the assets and charge the depreciation cost by building this into the water tariffs or by imposing a flat rental fee. Future projects with outputs that relate to the number of people served or connections made should include the supply of materials and installation of these connections. If not yet included, nonconnection should be identified as a risk, and mitigation measures should be defined.

71. **Per Capita Water Consumption Rates.** Per capita consumption in eight of the towns is much lower than the per capita consumption figure that was used in calculating the design capacity—normally set at 120 liters per capita per day. Although this is an acceptable international norm and is supported by real data, this rate should be used with caution and reassessed for each case, considering affordability and the availability of alternative sources. The availability of other clean water sources, such as the river, especially during the dry season when turbidity is low, accounts for low consumption. In the wet season, actual consumption may be close to the norm and the technical design capacity and investment cost may not be affected. However, lower actual consumption will affect the revenue component of the financial analysis. A sensitivity analysis to evaluate this effect is therefore recommended.

72. **Financial Sustainability.** The sustainability of subsidized water supply systems needs to be focused on the PNPs as business and operating entities, and not just on the subprojects. These water supply schemes will not be viable unless the operating entity is a viable enterprise able to provide the required subsidies. Therefore, the adoption of the WASA-recommended water tariffs needs to be followed by further actions including the improvement of the operating efficiency and corporate management of the PNPs, the development of leadership, and capacity building of the sector. This is essential in achieving high service levels and the financial sustainability of the PNPs. Future urban water supply projects should base investment decisions on the debt service capacity of the water companies and their commitment to increasing tariffs, if necessary, before any construction begins.

73. With the acceptance of the new tariffs and continued support from the Government in improving the capacity of the PNPs, financial sustainability should eventually be achieved. However, as the operations of past years have shown, tariff increases could also further discourage prospective users from connecting. In the same way, users who are already connected may opt to use alternative water sources, thereby further reducing per capita water consumption. These issues should be considered when designing a new project.

74. **Need to Limit the Number of Covenants.** The Loan Agreement included too many different covenants dealing with the same issue—the financial sustainability of the water companies—leading to confusion and difficulties in monitoring. The covenants included absolute deadlines, which were not achieved because of delays in physical construction. Relative deadlines, such as years following completion, would have been more appropriate.

75. **Follow-Up and Future Monitoring.** The following lessons learned and recommendations from the Project were incorporated in the design and implementation arrangements for the ongoing ADB-funded Northern and Central Region Water Supply and Sanitation Sector Project and the planned Small Towns Water Supply and Sanitation Sector Project:

- (i) Tariff increases must precede subproject implementation.
- (ii) All service mains will be laid under the civil works contract to facilitate connections.
- (iii) According to a new connection policy, all residential connections will be provided free to those who apply during construction.
- (iv) Meetings and workshops are routinely held in Vientiane and in the districts and provinces to determine development priorities, build consensus on designs, share information on conditions in loan agreements and subsidiary loan agreements, and explain project impact.
- (v) All the relevant conditions in the Loan Agreement, on such issues as arrears collection plans, tariffs, and sanitation regulations, have been incorporated into the subsidiary loan agreement between the Ministry of Finance and the PNP.

76. ADB's continued involvement in the urban water supply sector of Lao PDR, through ongoing and planned projects, allows it to continue monitoring the status of the recommendations from the Project.

2. General

77. **Design and Monitoring Framework Performance Targets.** The DMF did not provide specific performance indicators for the planned outcome, and its achievement can therefore not be monitored. It is also unclear how the outputs were expected to contribute to the outcome. DMFs should clearly show how outputs contribute to the outcome, and have specific and measurable indicators.

78. The performance indicators in the DMF include coverage percentages to be achieved by specific dates. Monitoring of coverage ratios is complicated, since it requires the monitoring of population growth as well. Better indicators are treatment capacity and number of connections, and quantity of water sold. The dates should be relative to the progress of the physical construction, such as the commissioning date or the loan closing date.

79. **Monitoring of Project Performance.** Project performance monitoring was too focused on contracting and disbursement, and paid little or no attention to monitoring project outputs, outcome, and impact. The Government and ADB have to confirm that the responsible stakeholders are sufficiently aware of their obligations and must insist on compliance with covenants. Compliance should be a criterion for providing funds for physical works, if possible. Lower turnover in project officers is required to reduce loss of project memory.

80. **NGO Involvement in Project Implementation.** The setting up of WSS user groups is often not effective in involving the community throughout a project. Once the construction starts, these groups disband. More effective is the involvement of community organizations in training, awareness raising, and sanitation implementation, preferably through local NGOs. If such NGOs cannot be found, the local community can be involved through local consultants and community workers.

81. **Subcontracting of Works.** Subcontracting of works should be limited, and bid and unit prices should be realistic. Previous work experience with similar contract conditions should be weighted appropriately. The selection and involvement of capable consultants with a proven track record, and provided with sufficient resources, is essential in avoiding low-quality works and delays.

Design Summary	Performance Indicators/Targets	Project Monitoring Mechanisms	Assumptions
Activities/Inputs 1. Community awareness and participation program 2. Civil works contracts and supply of materials 3. Implementation assistance	NGO services, valued at \$0.5 million Civil works contracts and supply contracts, valued at \$15.9 million Consulting services for design and construction supervision, valued at \$2.3 million Capacity-building services, valued at \$1.2 million, in (i) financial management, (ii) operation and maintenance, and (iii) regulation Consulting services, valued at \$0.1 million, for unexploded ordnance disposal	NGO reports and surveys, and loan review missions Loan review missions Loan review missions Loan review missions	Community maintains its commitment to the Project.

NGO = nongovernment organization, PNP = provincial nam papa (provincial water supply company), PPAR = project performance audit report, UNICEF = United Nations Children's Fund, WASA = Water Supply Authority.

APPRAISED AND ACTUAL PROJECT COSTS AND FINANCING
(\$'000)

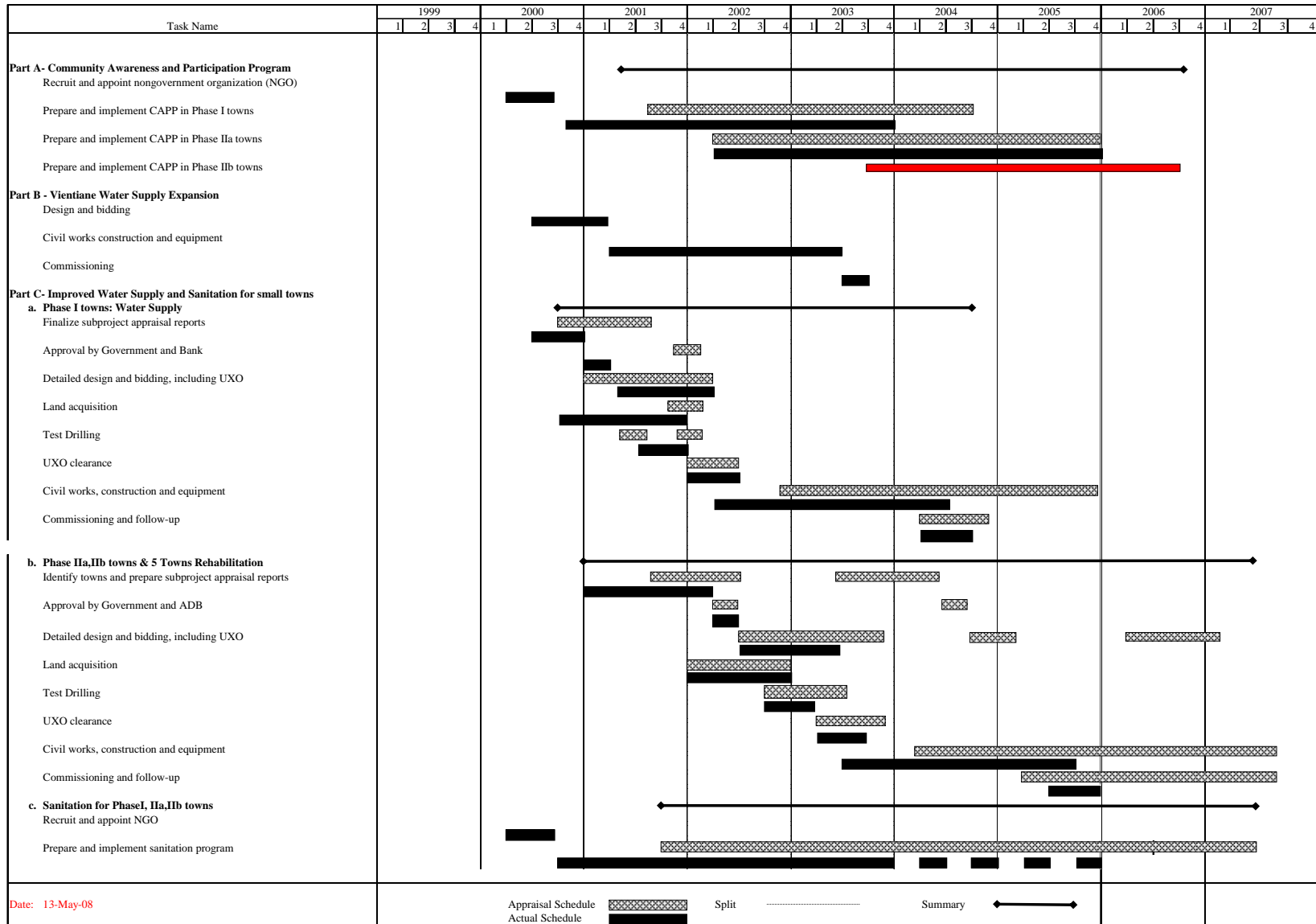
Component	Appraisal Estimate			Actual				Total
	Foreign	Local	Total	ADB		Gov't	Beneficiaries	
				Foreign	Local	Local	Local	
A. Community Awareness and Participation								
Equipment and Materials	0.24	0.17	0.42	0.21	0.00	0.00	0.14	0.35
B. Improved Water Supply and Sanitation for Small Towns								
Land Acquisition	0.00	0.98	0.98	0.00	0.00	0.00	0.00	0.00
Civil Works	6.90	3.00	9.90	10.87	2.17	2.52	0.00	15.56
Materials and Equipment	0.83	0.17	1.00	2.14	0.00	0.00	0.00	2.14
C. Vientiane Water Supply Extension								
Land Acquisition	0.00	0.13	0.13					
Civil Works	3.33	1.12	4.45					
Materials and Equipment	0.53	0.06	0.59					
D. Institutional Strengthening and Capacity Building								
Incremental Administration	0.00	0.46	0.46	0.09	0.29	0.06	0.00	0.43
PMU and PNP Equipment	0.48	0.00	0.48	0.46	0.00	0.00	0.00	0.46
WASA Equipment	0.01	0.00	0.01					
UXO Clearance	0.10	0.18	0.28					
E. Consulting Services								
Design and Supervision	1.31	0.99	2.19	3.45	0.08	0.00	0.00	3.53
Capacity Building	0.96	0.21	1.16					
NGOs for the CAPP	0.24	0.17	0.42	0.10	0.12	0.00	0.00	0.22
UXO Services	0.02	0.05	0.08	0.06	0.14	0.00	0.00	0.20
Subtotal ^a	14.94	7.68	22.62	17.38	2.80	2.57	0.14	22.89
IDC	1.48	0.89	2.38	0.54				0.54
TOTAL			25.00	17.92	2.80	2.58	0.14	23.43

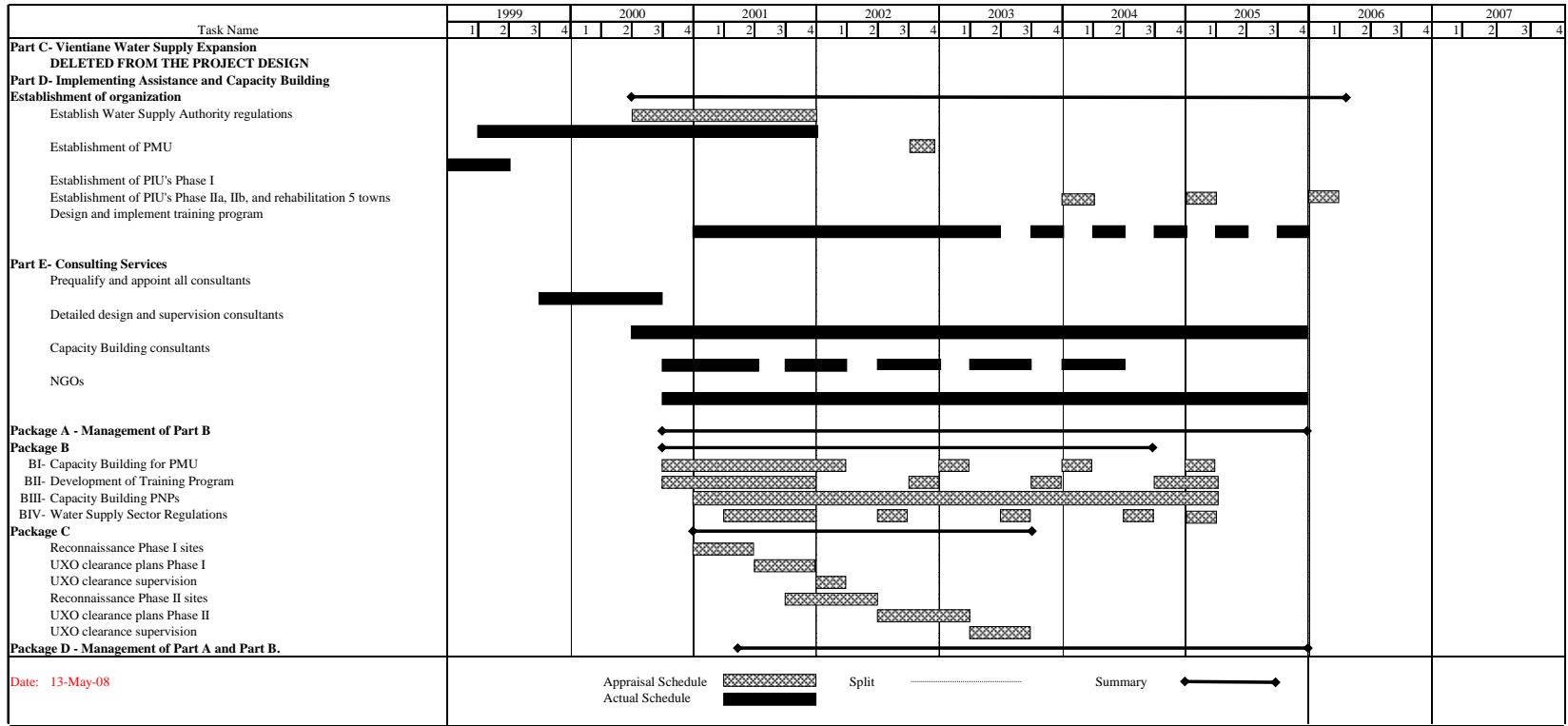
ADB = Asian Development Bank, CAPP = community awareness and participation program, IDC = interest during construction, NGO = nongovernment organization,

PMU = project management unit, PNP = provincial nam papa, UXO = unexploded ordnance, WASA = water supply authority.

^a Figures may not add up due to rounding off.

IMPLEMENTATION SCHEDULE





STATUS OF COMPLIANCE WITH LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
Reporting Requirements		
Progress reports. Submit to ADB quarterly progress reports (PR) on implementation of Project and operation and management of project facilities	Article IV, Section 4.07 b	Complied with. First progress report was submitted January 2001 and each quarter thereafter up to the 3rd quarter of 2007.
Audited financial statements. Submit to ADB certified copies of audited project accounts and financial statements and the report of the auditors in English less than 12 months after end of fiscal year	Article IV, Section 4.06, b	Complied with.
Project Implementation		
PIUs in subproject provinces established in relevant PNPs prior to implementation of any subproject, PIU to be staffed with a Project Manager, Deputy Project Manager and adequate number of staff with relevant experience	Schedule 6, para. 3	Complied with. PIUs established in all project towns.
Social		
Resettlement. PMU to prepared resettlement plans for each subproject where land acquisition and resettlement is required, in accordance with ADB guidelines. Submit plan to ADB together with subproject appraisal report.	Schedule 6, para. 7	Complied with. No resettlement necessary.
Financing Support Schemes		
Deferred payment for water connection. PNP to provide deferred payment to subproject beneficiaries who cannot pay for water connection all at once.	Schedule 6, para. 8	Partly complied with. Deferred payment system in place. ADB recommended that materials and equipment be provided free to encourage connection to the system, but this was not followed.
Sanitation assistance fund. Credit for sanitation improvement will be provided to low-income households from a sanitation assistance fund	Schedule 6, para. 9	Partly complied with. The sanitation revolving fund will be continued to achieve the targeted number of latrines.

Covenant	Reference in Loan Agreement	Status of Compliance
PNP Tariffs and Financial Ratios^a		
Water tariff structures and increases.^b PNP to adopt structures and increases as agreed between provincial governments and ADB, in line with guidelines and regulations issued by WASA. Levels sufficient to recover all O&M cost and amount equal to 15% of debt service requirements	Schedule 6, para. 10a	Not complied with. Tariffs were not increased in line with WASA recommendations.
Cash balance and audit. PNP to maintain positive cash balance at the end of each fiscal year. Annual audit of operation of sanitation assistance fund and related financial statements.	Schedule 6, para. 10b	Not complied with. 2005 and 2006 statements show negative cash balances.
Debt-service ratio for small towns. PNP to maintain a debt-service coverage ratio of at least 1.2:1 from 2006 for phase I towns and 2009 for phase II towns.	Schedule 6, para. 11a	Not complied with.
Annual tariff increases. PNP for Bokeo, Khammouane, Savannakhet, Luang Prabang, and Phonsaly shall raise tariffs annually in accordance with schedule agreed with ADB, to meet specified weighted average levels by 2003.	Schedule 6, para. 12a	Complied with. Level met by all PNPs.
Maintain level of accounts receivable. Level of accounts receivable at less than 90 days of annual sales, commencing 2000. Lao PDR to pay for defaulting government agencies.	Schedule 6, para. 13b	Partly complied with. PNPs of Attapeu, Champasak Pongsaly, Borikhamxay, and Oudomxay have more than 90 days of accounts receivable.
Withdrawals and Disbursements		
(i) Subsidiary loan agreement between borrower and relevant PNP fully executed, delivered, effective, and binding on the Parties.	Schedule 3, para. 6a(i)	Complied with.
(ii) ADB approval of subproject	Schedule 3, para 6a(ii)	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
(iii) Arrears collection plan. Plan on arrears collection for PNPs to be agreed upon between MCTPC and ADB, prior to disbursement of funds for relevant subprojects.	Schedule 6, para, 13a	Complied with. Guidelines were prepared under package B assistance; PNPs did follow up in 2007.
Accounting		
Records and accounts. DHUP to maintain records and accounts adequate to identify goods and services and other expenditure financed under the Project from loan proceeds.	Article IV, section 4.06b	Complied with.
Submission of financial statements by PNP. PNPs to submit within 3 months of end of fiscal year a balance statement of sources and application of funds, and financial projections for consolidated operations.	Schedule 6, para. 14a	Complied with.
Separate depreciation schedule. PNPs to establish separate depreciation schedule for new investment under the subprojects.	Schedule 6, para. 14b	Partly complied with. Physical assets have been transferred to PNPs for phase I towns and phase IIa towns. Phase IIb towns have yet to establish separate depreciation schedules. Further training of PNP accounting staff is needed to meet this covenant.
Project performance and benefit monitoring and evaluation. In consultation with ADB, PMU to develop a system for regular participatory benefit monitoring and evaluation of project performance and impact (PPMS and BME).	Schedule 6, para. 15	Complied with. M&E indicators and questionnaires have been developed; baseline survey carried out in phase I and IIa towns.

ADB = Asian Development Bank; BME = benefit monitoring and evaluation; DHUP = Department of Housing and Urban Planning; M&E = monitoring and evaluation; MCPTC = Ministry of Communications, Transport, Posts and Construction; O&M = operation & maintenance; PIU = project implementation unit; PMU = project management unit; PNP = provincial nam papa; PPMS = project performance monitoring system; WASA = Water Supply Authority.

^a The fiscal year (FY) for the provincial nam papas (PNPs—provincial water supply companies) follows the calendar year.

^b WASA believes that with the adopted tariffs three of the seventeen PNPs—Champasack, Luangprabang and Vientiane—should be able to achieve immediate full cost recovery including returns on capital. In addition, Borikhamxay, Khammuane, Oudomxay, Saravane, Sekong, and Xiengkhuang would be expected to recover full depreciation by 2010 although not necessarily generating the full returns on capital. For the rest of the PNPs, the level of depreciation recovery is expected to vary from 50% to marginally under 100%.

DATA ON MAINTENANCE OF ACCOUNTS RECEIVABLES (as of December 2007)

No.	Category	Total Water Sales in 2007 (Kip)	Arrears/ Receivable (Kip)	Percentage	Accounts Receivable (No. of Days)
I. Nam Papa Attapeu					
1	Domestic		37,026,122	23%	
2	Government Office		78,317,578	48%	
3	Commercial		16,171,291	10%	
4	Industrial , Hotel		31,193,640	19%	
	Total	472,563,446	162,708,631		126
II. Nam Papa Bokeo					
1	Domestic		40,318,761	34%	
2	Government Office		60,835,683	51%	
3	Commercial		6,058,815	5%	
4	Industrial , Hotel		10,919,659	9%	
	Total	915,904,260	118,132,918		47
III. Nam Papa Champasak					
1	Domestic		973,652,188	23%	
2	Government Office		2,716,841,879	64%	
3	Commercial		389,372,479	9%	
4	Industrial , Hotel		176,250,724	4%	
	Total	7,185,779,765	4,256,117,270		216
IV. Nam Papa Houaphanh					
1	Domestic		10,437,384	31%	
2	Government Office		17,865,562	53%	
3	Commercial		5,573,990	16%	
4	Industrial , Hotel			0%	
	Total	938,111,547	33,876,936		13
V. Nam Papa Khammouan					
1	Domestic		62,727,113	11%	
2	Government Office		457,508,797	82%	
3	Commercial		29,569,060	5%	
4	Industrial , Hotel		6,328,670	1%	
	Total	2,761,308,700	556,133,640		74
VI. Nam Papa Luangprabang					
1	Domestic		95,198,910	9%	
2	Government Office		831,120,040	80%	
3	Commercial		21,639,200	2%	
4	Industrial , Hotel		90,949,050	9%	
	Total	4,919,551,962	1,038,907,200		77
VII. Nam Papa Saravan					
1	Domestic		269,378,168	84%	
2	Government Office		806,586	0%	
3	Commercial		50,334,616	16%	
4	Industrial , Hotel			0%	
	Total	1,835,412,600	320,519,370		64
VIII. Nam Papa Savannakhet					
1	Domestic		273,341,018	36%	
2	Government Office		370,948,590	49%	
3	Commercial			0%	
4	Industrial , Hotel		108,997,860	14%	
	Total	6,442,205,100	753,287,468		43

No.	Category	Total Water Sales in 2007 (Kip)	Arrears/ Receivable (Kip)	Percentage	Accounts Receivable (No. of Days)
IX. Nam Papa Vientiane					
1	Domestic		37,188,600	7%	
2	Government Office		432,153,148	84%	
3	Commercial		16,778,020	3%	
4	Industrial , Hotel		27,972,500	5%	
	Total	2,198,273,676	514,092,268		85
X. Nam Papa Xayaboury					
1	Domestic		117,116,213	38%	
2	Government Office		156,592,850	50%	
3	Commercial		7,134,945	2%	
4	Industrial , Hotel		27,636,665	9%	
5	Foreign		3,659,390	1%	
	Total	1,418,681,700	312,140,063		80
XI. Nam Papa Xiengkhouang					
1	Domestic		18,278,850	9%	
2	Government Office		162,261,800	82%	
3	Commercial		17,409,000	9%	
4	Industrial , Hotel			0%	
	Total	1,375,481,044	197,949,650		53
XII. Nam Papa Phongsaly					
1	Domestic		533,563,000	94%	
2	Government Office		23,040,000	4%	
3	Commercial			0%	
4	Industrial , Hotel		12,600,000	2%	
	Total	417,196,000	569,203,000		498
XIII. Nam Papa Borikhamxay					
1	Domestic		448,661,197	49%	
2	Government Office		174,658,772	19%	
3	Commercial		-	0%	
4	Industrial , Hotel		288,314,408	32%	
	Total	1,381,664,204	911,634,377		241
XIV. Nam Papa Luangnamtha					
1	Domestic		10,873,600	1%	
2	Government Office		14,207,350	2%	
3	Commercial		1,733,500	0%	
4	Industrial , Hotel		3,978,850	0%	
	Total	427,927,850	30,793,300		26
XV. Nam Papa Oudomxay					
1	Domestic		298,880,222	33%	
2	Government Office		-	0%	
3	Commercial		153,834,398	17%	
4	Industrial , Hotel		-	0%	
	Total	1,607,242,640	452,714,620		103
XVI. Nam Papa Sekong					
1	Domestic		1,669,290	0%	
2	Government Office		43,522,887	5%	
3	Commercial		-	0%	
4	Industrial , Hotel		-	0%	
	Total	975,847,204	45,192,177		17

ECONOMIC AND FINANCIAL SUSTAINABILITY REEVALUATION

A. General

1. Economic analysis was carried out for the five phase 1 project towns during appraisal. For the Project Completion Review Mission, the economic internal rate of return (EIRR) for each of the project components was recalculated with updated data. The methodology applied in the reevaluation was similar to that used at appraisal and followed the Asian Development Bank's (ADB's) guidelines for financial and economic analysis, as well as its framework for appraising urban development projects.¹

2. The financial analysis focused on assessing the financial sustainability of the operations of the five water supply systems at project completion. This assessment was done in accordance with the appropriate ADB guidelines.² The project cost, water tariff level, operating cost, and revenue estimates and the financing plan were updated, on the basis of the financial reports gathered during the mission. Similarly, the affordability of water tariffs to the target beneficiaries was reviewed.

B. Major Assumptions

3. The methodology and assumptions used in the economic evaluation of the project components generally followed those used in the feasibility studies on the components. The economic benefits were quantified through a comparison of with- and without-Project scenarios. Costs and benefits were measured at border price equivalent values, with the use of the domestic price numeraire, and were expressed in 2008 constant prices in kip. The life of each component was assumed to be 30 years, with no salvage value. The economic opportunity cost of capital was assumed to be 12%.

4. The economic and financial analyses applied only to the incremental investment made and to benefits achieved under the Project and not to the entire operations of the provincial water companies, or provincial nam papas (PNPs). The major assumptions applied in the analysis were: (i) a period of analysis of 20 years after project implementation, (ii) incremental costs and revenue expressed in kip in constant 2008 prices, and (iii) operating lives of the investments ranging from 20 years to 40 years with no residual value.

5. The assessment of past financial performance was based on the financial statements provided by the PNPs for 2004 to 2007. Projected income statements and cash flows were calculated to assess the future financial performance of the PNPs, and these data were used to consider the effects of depreciation, loan repayments, and new tariff rates. Major assumptions used in those projections included tariff increases in accordance with the tariff review prepared by the Water Supply Authority (WASA) for the 17 PNPs.³

¹ ADB. 2005. *Financial Management and Analysis of Projects*. Manila; ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila; ADB. 1994. *Framework for the Economic and Financial Appraisal of Urban Development Sector Projects*. Manila.

² ADB. 2002. *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB*. Manila.

³ Water Supply Authority. 2007. 2008–2010 Tariff Review. Prepared with the assistance of COWI AS (Norway) and funding from the Norwegian Agency for Development Cooperation. October. This tariff review was based on the draft water tariff determination guidelines and the government-approved national water tariff policy.

C. Economic Analysis

6. The economic costs of capital works were computed from the actual disbursements for the Project during the implementation period, with the following adjustments: (i) taxes, duties, and subsidies were excluded; (ii) tradable input was valued at the domestic price numeraire, with a shadow exchange rate factor of 1.11; (iii) unskilled labor was subjected to a shadow price of 0.65 of the market price to reflect the level of underemployment of unskilled labor in the country; and (iv) land was valued at the market price, which was considered to best reflect its opportunity cost. It was further assumed that the economic life of the Project would be 30 years, from 2002 to 2032, after which all project assets were assigned a zero salvage value.

7. The benefits associated with the economic analysis were resource cost savings from non-incremental water consumed (from alternative sources such as river, shallow wells, standpipes, and water vendors) due to the switch to the new water supply system. The resource cost savings were estimated by multiplying the quantity of water consumed without the Project by the average economic supply price in the without-Project situation. The average economic supply price comprised the cost of buying, collecting, treating, and storing water.

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

9. The recalculated EIRRs in the five project towns ranged from 2.3% to 17.3%, compared with 15.5% to 21.4% estimated during appraisal. The recalculated EIRRs were lower than those estimated at appraisal mainly because of the higher project costs, lower water consumption, and fewer service connections. The recalculated EIRRs compared with those estimated at appraisal are shown in Table A6.1.

Table A6.1: Comparative EIRR Results for Phase I Towns

Town	EIRR at Project Appraisal (%)	EIRR at Project Completion (%)
Tonpheung	21.4	16.7
Bounneua	15.6	12.0
Nambak	18.2	16.1
Nongbok	15.5	2.3
Outhoumphone	20.9	17.5

EIRR = economic internal rate of return

D. Financial Sustainability Analysis

10. Financial analysis was undertaken to establish the financial status of the PNPs.⁴ In line with the Government's decentralization policy on water supply operations, PNPs are required to be financially self-supporting as far as possible, and not to depend on budget allocations to meet any shortfall in revenues.

⁴ The PNPs with core subprojects within their provincial jurisdiction are Bokeo (Ton Pheung subproject), Khammouan (Nong Bok subproject), Luang Prabang (Nambak subproject), Phongsali (Boun Neua subproject), and Savannakhet (Outhoumphone subproject).

11. For the small towns component, financial projections were prepared separately for each subproject town. The subproject towns prepare annual income statements and balance sheets together with their annual budget requirements. Depreciation is provided for in the accounts, but in some cases not at sufficient levels to finance the replacement of major assets.

12. Capital costs were revised on the basis of actual project expenditures incurred from 2002 to 2004. The actual operating and maintenance expenses from 2004 to 2007 were provided by the project towns. The operation and maintenance (O&M) costs for the following years were projected and based on constant 2004 prices. All mechanical and electronic components were assumed to have a life of 20 years, whereas civil works were assumed to have a life of 40 years.

13. O&M costs included expenses for personnel, electricity, chemicals, and administration, among other operating expenses. Electricity expenses consisted of the costs of electricity directly required for the production of water. Chemical expenses comprised the cost of aluminum sulfate, chlorine, polymer, and lime used in the production and treatment of water. Expenses for electricity and chemicals were assumed to increase in direct proportion to the increase in the volume of water produced, plus an annual inflation factor.

14. Fifteen percent of the loan funds of ADB were lent by the Government to the PNPs at an interest rate of 6.4% per year, with repayment of loan principal over 25 years inclusive of a 5-year grace period. The foreign exchange risk is borne by the Government.

15. PNPs have five kinds of service connections: domestic, government, commercial, hotel and industrial, and foreign users. All customers use water taps and are connected directly to the water system. No standpipe exists in any of the project towns. The majority of the customers are domestic and account for 70% to 80% of water sold. Collection ratios for domestic consumers are reportedly good but collection from government departments and offices is very poor, making up most of the arrears payment.

16. The method for tariff rates varies from block tariffs to fixed rates. Adjustments were recently made in water tariffs, which include adjustments for the next 2 years, 2009 and 2010. The new water tariffs for 2005 that were used in the financial analysis are presented in Table A6.2.

Table A6.2: Comparative Water Tariff (2008)

Province	Approved Effectivity	Consumption Level	Domestic	Non-Domestic			Foreign
				Government	Commercial	Industrial/Hotels	
Tonpheung	January 31, 2008		2,880	3,200	3,520	3,520	3,520
Nongbok	March 3, 2008		2,300	3,050	3,250	3,750	3,750
Nambak	February 18, 2008			1,500	1,700	1,900	1,900
		0 – 10 m ³	1,000				
		11 – 30 m ³	1,100				
		31 – 50 m ³	1,200				
		> 50 m ³	1,300				
Bounneua	March 20, 2008		3,500	3,700	3,900	4,100	3,900
Outhomphone	March 21, 2008			2,000	3,500	4,500	4,500
		0 – 10 m ³	1,400				
		11 – 30 m ³	1,700				
		31 – 50 m ³	2,200				

17. The financial statements show that the performance of the subproject towns was less than satisfactory. For the last 2 to 3 years of operation, all of them have been subsidized by the PNPs.

18. The introduction of new tariffs is expected to lead to higher net income ratios and improved financial performance for the PNPs. Water tariffs will be raised to levels that will at least allow the recovery of all O&M costs and cover depreciation, debt service, and a reasonable proportion of future capital expenditures, plus taxes and dividends. If the tariffs are not increased in line with increasing expenses, the financial sustainability of these PNPs will be weak, as they will not have sufficient funds to repay their debts. If this happens, the Government will have no option but to continue supporting these PNPs for the next several years.

E. Affordability Analysis

19. The revised water tariffs during the first quarter of 2008 have significantly increased the monthly water bills for domestic users. According to information gathered from the PNPs, the new water tariffs would range from 4.1% to 6.8% of average monthly household income. For Nambak and Outhomphone, the monthly water bill is within the acceptable rate of 5% of household income. For Nongbok, Bounneua and Tonpheung, the new water tariffs will be higher than 5% of household income. Details are presented in Table A6.3.

Table A6.3: Affordability of Water Tariffs to Domestic Users

Domestic Water Tariff (Kip/m³)	Tonpheung	Nongbok	Nambak	Bounneua	Outhomphone
Fixed Rate	2,880	2,300		3,500	
0 – 10 m ³			1,000		1,400
11 – 30 m ³			1,100		1,700
31 – 50 m ³			1,200		2,200
> 50 m ³			1,300		3,000
Ave. per capita water consumption (lcd)	60	60	95	40	66
Ave. monthly household water consumption (m ³ /HH/month)	12	12	19	8	13
Ave. monthly water bill (Kip/month)	34,214	27,324	19,691	27,720	19,216
Ave. monthly income/HH (Kip/month)	500,000	500,000	480,000	500,000	420,000
Percentage of monthly HH income (%)	6.8%	5.5%	4.1%	5.5%	4.6%

20. The increase in water tariff is intended to improve the financial performance of the PNPs. However, as their operations in the past years have shown, the increase could also further discourage prospective users from connecting to the system because of their unwillingness to pay the higher water tariffs. In the same way, users who are already connected to the system may opt to use alternative water sources, thereby further limiting per capita water consumption from the water system to a lower rate than what was projected during the feasibility study.

Table A6.4: Economic Reevaluation – Tonpheung (in US\$)

Year	Total Water Produced	Total Water Consumed	Gross Benefits		NTL	Total Benefit	Project Economic Cost			Net Economic Benefit
			Non incremental	Incremental			Investment	O&M Excl. Depre.	Total	
2002	-	-	-	-	-	-	122,563	-	122,563	(122,563)
2003	-	-	-	-	-	-	305,038	-	305,038	(305,038)
2004	13,831	12,574	8,228	4,443	1,458	14,130	166,384	5,110	171,494	(157,364)
2005	99,454	78,675	38,940	4,894	5,464	49,298	-	5,066	5,066	44,232
2006	115,696	86,545	67,229	3,257	9,886	80,372	-	13,068	13,068	67,304
2007	147,418	117,935	82,141	3,960	11,294	97,395	32,292	14,963	47,255	50,139
2008	177,148	141,718	86,382	14,308	13,035	113,724	-	15,478	15,478	98,246
2009	208,528	166,823	90,841	25,433	14,989	131,263	-	16,068	16,068	115,195
2010	241,632	193,306	95,532	38,361	17,193	151,086	-	16,743	16,743	134,343
2011	275,192	220,154	99,976	51,044	19,362	170,381	-	17,494	17,494	152,888
2012	310,279	248,223	104,628	50,139	19,859	174,626	-	18,346	18,346	156,279
2013	346,949	277,559	109,495	49,169	20,377	179,041	-	19,315	19,315	159,727
2014	355,622	284,498	114,590	48,131	20,916	183,636	-	19,844	19,844	163,792
2015	364,513	291,610	119,921	47,020	21,477	188,418	-	20,424	20,424	167,994
2016	373,626	298,901	125,500	45,832	22,062	193,394	-	21,060	21,060	172,334
2017	382,966	306,373	131,339	44,565	22,671	198,575	-	21,758	21,758	176,817
2018	392,540	314,032	137,450	43,213	23,305	203,968	-	22,524	22,524	181,443
2019	402,354	321,883	143,845	41,772	23,966	209,583	-	23,366	23,366	186,217
2020	412,413	329,930	150,537	40,238	24,654	215,429	-	24,289	24,289	191,140
2021	422,723	338,179	157,541	38,606	25,371	221,518	-	25,304	25,304	196,214
2022	433,291	346,633	164,870	36,870	26,118	227,859	-	26,418	26,418	201,441
2023	444,124	355,299	172,541	35,026	26,897	234,464	-	27,642	27,642	206,822
2024	455,227	364,181	180,568	33,068	27,709	241,345	-	28,988	28,988	212,357
2025	466,607	373,286	188,969	30,989	28,555	248,513	-	30,467	30,467	218,046
2026	478,272	382,618	197,761	28,784	29,437	255,982	-	32,093	32,093	223,889
2027	490,229	392,183	206,962	26,447	30,356	263,765	-	33,881	33,881	229,884
2028	502,485	401,988	216,591	23,970	31,315	271,876	-	35,847	35,847	236,029
2029	515,047	412,038	226,668	21,347	32,314	280,329	-	38,009	38,009	242,320
2030	527,923	422,339	237,213	18,570	33,357	289,140	-	40,388	40,388	248,753
2031	541,121	432,897	248,250	15,632	34,444	298,325	-	43,004	43,004	255,321
2032	554,649	443,720	259,800	12,524	35,578	307,901	-	45,883	45,883	262,018
NPV at 12%	1,459,894	1,165,014	576,081	156,757	94,799	827,637	487,394	100,947	588,342	689,289
Economic Internal Rate of Return (EIRR)										16.69%

Table A6.6: Economic Reevaluation – Nambak (in U\$)

Year	Total Water Produced	Total Water Consumed	Gross Benefits			NTL	Total Benefit	Investment	Project Economic Cost		Net Economic Benefit
			Non incremental	Incremental					O&M Excl. Depre.	Total	
2002	-	-	-	-	-	-	-	228,772	-	228,772	(228,772)
2003	-	-	-	-	-	-	-	675,840	-	675,840	(675,840)
2004	39,449	35,862	48,154	5,775	6,823	60,752	368,640	-	5,110	373,750	(312,998)
2005	145,030	113,513	62,850	8,661	10,385	81,897	-	-	20,594	20,594	61,302
2006	184,490	156,436	66,909	22,936	11,280	101,125	-	-	22,194	22,194	78,930
2007	401,240	320,992	132,976	51,316	24,481	208,774	-	-	31,880	31,880	176,893
2008	433,443	346,755	139,469	59,839	26,433	225,741	-	-	33,667	33,667	192,074
2009	468,769	375,015	146,813	75,301	29,251	251,365	-	-	28,942	28,942	222,423
2010	505,824	404,659	154,544	88,560	31,920	275,024	-	-	30,686	30,686	244,338
2011	542,036	433,629	161,893	100,227	34,378	296,497	-	-	32,587	32,587	263,910
2012	579,743	463,795	169,591	112,732	36,988	319,311	-	-	34,732	34,732	284,579
2013	594,237	475,390	177,655	117,528	38,685	333,868	-	-	36,345	36,345	297,523
2014	609,093	487,274	186,102	122,539	40,461	349,102	-	-	38,118	38,118	310,984
2015	624,320	499,456	194,952	127,773	42,320	365,044	-	-	40,067	40,067	324,977
2016	639,928	511,943	204,222	133,241	44,265	381,728	-	-	42,209	42,209	339,519
2017	655,926	524,741	213,932	138,954	46,302	399,188	-	-	44,564	44,564	354,624
2018	672,325	537,860	224,105	144,923	48,434	417,461	-	-	47,154	47,154	370,307
2019	689,133	551,306	234,761	151,160	50,665	436,585	-	-	50,002	50,002	386,583
2020	706,361	565,089	245,924	157,677	53,000	456,601	-	-	53,135	53,135	403,465
2021	724,020	579,216	257,618	164,487	55,445	477,549	-	-	56,582	56,582	420,967
2022	742,120	593,696	269,867	171,604	58,004	499,475	-	-	60,374	60,374	439,101
2023	760,673	608,539	282,699	179,041	60,683	522,424	-	-	64,546	64,546	457,878
2024	779,690	623,752	296,142	186,815	63,487	546,443	-	-	69,137	69,137	477,306
2025	799,183	639,346	310,223	194,939	66,423	571,585	-	-	74,190	74,190	497,395
2026	819,162	655,330	324,974	203,431	69,496	597,901	-	-	79,751	79,751	518,150
2027	839,641	671,713	340,427	212,307	72,713	625,446	-	-	85,872	85,872	539,574
2028	860,632	688,506	356,614	221,585	76,080	654,279	-	-	92,610	92,610	561,669
2029	882,148	705,718	373,571	231,284	79,606	684,461	-	-	100,027	100,027	584,434
2030	904,202	723,361	391,335	241,423	83,297	716,055	-	-	108,193	108,193	607,861
2031	926,807	741,445	409,943	252,023	87,161	749,126	-	-	117,184	117,184	631,942
2032	949,977	759,982	429,435	263,104	91,207	783,747	-	-	127,084	(347,066)	1,130,812
NPV at 12%	2,736,889	2,195,997	937,313	510,748	190,541	1,638,602	1,005,427	-	209,224	1,214,651	1,423,875
Economic Internal Rate of Return (EIRR)											16.1%

Table A6.8: Economic Reevaluation – Outhoumphe (in U\$)

Year	Total Water Produced	Total Water Consumed	Gross Benefits		NTL	Total Benefit	Investment	Project Economic Cost		Net Economic Benefit
			Non incremental	Incremental				O&M Excl. Depre.	Total	
2002	-	47,492	25,205	-	-	25,205	268,828	-	268,828	(243,623)
2003	-	47,492	25,609	3,233	-	28,842	878,280	-	878,280	(849,438)
2004	71,547	53,661	26,018	5,127	4,752	35,898	479,062	5,110	484,172	(448,274)
2005	339,721	213,582	116,057	16,123	25,340	157,520	-	20,664	20,664	136,856
2006	343,493	287,791	152,599	25,720	24,206	202,525	-	35,943	35,943	166,582
2007	352,832	296,378	169,815	22,424	26,155	218,395	-	40,801	40,801	177,594
2008	427,437	359,047	198,687	37,442	31,418	267,547	-	48,626	48,626	218,921
2009	544,025	456,981	226,500	65,448	38,474	330,422	-	61,032	61,032	269,390
2010	677,563	569,153	256,631	100,872	46,685	404,188	-	76,597	76,597	327,591
2011	826,788	694,502	288,384	140,304	55,755	484,443	-	95,703	95,703	388,739
2012	1,044,068	835,254	322,586	186,463	69,487	578,536	-	124,414	124,414	454,122
2013	1,167,458	933,966	337,917	225,781	76,629	640,327	-	146,256	146,256	494,071
2014	1,196,644	957,315	353,984	232,913	79,876	666,772	-	159,300	159,300	507,473
2015	1,226,560	981,248	370,821	240,264	83,265	694,350	-	173,663	173,663	520,687
2016	1,257,224	1,005,779	388,466	247,841	86,802	723,108	-	189,479	189,479	533,629
2017	1,288,655	1,030,924	406,957	255,651	90,493	753,101	-	206,897	206,897	546,204
2018	1,320,871	1,056,697	426,334	263,701	94,347	784,382	-	226,079	226,079	558,303
2019	1,353,893	1,083,114	446,641	271,997	98,369	817,007	-	247,204	247,204	569,803
2020	1,387,740	1,110,192	467,921	280,547	102,568	851,036	-	270,471	270,471	580,565
2021	1,422,434	1,137,947	490,222	289,359	106,951	886,532	-	296,097	296,097	590,435
2022	1,457,995	1,166,396	513,592	298,439	111,526	923,557	-	324,322	324,322	599,235
2023	1,494,444	1,195,556	538,082	307,796	116,303	962,181	-	355,411	355,411	606,770
2024	1,531,806	1,225,444	563,746	317,438	121,290	1,002,474	-	389,656	389,656	612,819
2025	1,570,101	1,256,081	590,641	327,372	126,497	1,044,509	-	427,376	427,376	617,133
2026	1,609,353	1,287,483	618,824	337,607	131,933	1,088,364	-	468,927	468,927	619,437
2027	1,649,587	1,319,670	648,359	348,151	137,610	1,134,119	-	514,698	514,698	619,421
2028	1,690,827	1,352,661	679,308	359,013	143,536	1,181,858	-	565,119	565,119	616,739
2029	1,733,097	1,386,478	711,741	370,202	149,725	1,231,669	-	620,663	620,663	611,006
2030	1,776,425	1,421,140	745,729	381,728	156,188	1,283,644	-	681,851	681,851	601,792
2031	1,820,835	1,456,668	781,344	393,598	162,936	1,337,878	-	749,259	749,259	588,619
2032	1,866,356	1,493,085	818,666	405,823	169,983	1,394,473	-	823,520	823,520	570,953
NPV at 12%	4,614,125	3,783,502	1,678,345	773,305	331,352	2,783,002	-	727,207	727,207	1,454,414
Economic Internal Rate of Return (EIRR)										17.5%

**DATA ON UPDATED WATER TARIFFS
(as of May 2008)**

Province	Approved Effectivity	Consumption Level	Domestic	Non- Domestic			Foreign
				Government	Commercial	Industrial/ Hotels	
Bokeo	January 31, 2008		2,880	3,200	3,520	3,520	3,520
Khannoauane	March 3, 2008		2,300	3,050	3,250	3,750	3,750
Luangprabang	February 18, 2008			1,500	1,700	1,900	1,900
		0 - 10 m ³	1,000				
		11 - 30 m ³	1,100				
		31 - 50 m ³	1,200				
		> 50 m ³	1,300				
Phongsaly	March 20, 2008		3,500	3,700	3,900	4,100	3,900
Savannakhet	March 21, 2008			2,000	3,500	4,500	4,500
		0 - 10 m ³	1,400				
		11 - 30 m ³	1,700				
		31 - 50 m ³	2,200				
		> 50 m ³	3,000				
Houaphan	December 4, 2007		2,116	2,525	3,158	3,158	3,158
Xiengkhouang	March 3, 2008						
		0 - 25 m ³	2,400	2,400	2,400	2,400	2,400
		> 25 m ³	3,600	3,600	3,600	3,600	3,600
		Retail	6,000	6,000	6,000	6,000	6,000
Xayaboury	November 30, 2007		2,500	2,900	3,200	3,500	3,500
Vientiane	February 18, 2008						
		1 - 05 m ³	1,800	1,800	1,800	1,800	1,800
		6 - 10 m ³	2,300	2,300	2,300	2,300	2,300
		11 - 25 m ³	2,700	2,700	2,700	2,700	2,700
		> 25 m ³	3,000	3,000	3,000	3,000	3,000
Saravane	February 18, 2008						
		1 - 05 m ³	1,500				
		6 - 10 m ³	2,000				
		11 - 20 m ³	2,500				
		> 20 m ³	3,000				
		1 - 10 m ³		3,500	3,500	3,500	3,500
		11 - 15 m ³		4,000	4,000	4,000	4,000
		16 - 25 m ³		4,500	4,500	4,500	4,500
		> 25 m ³		5,000	5,000	5,000	5,000
Champasack	February 20, 2008		3,000	3,000	3,000	3,000	3,000
Attapeu							
Bolikhamxay	March 3, 2008		2,550	2,800	2,900	2,900	2,900
Luanhnamtha	January 31, 2008		900	2,000	2,500	2,500	2,500
Oudomxay	February 18, 2008						
		1 - 05 m ³	7,470				
		6 - 30 m ³	1,808				
		> 30 m ³	2,121				
		1 - 10 m ³		3,077	3,371	3,371	3,371
		11 - 50 m ³		3,956	4,334	4,334	4,334
		> 50 m ³		4,644	5,088	5,088	5,088
Sekong	March 25, 2008						
		1 - 10 m ³	1,900				
		11 - 20 m ³	2,650				
		21 - 30 m ³	3,600				
		1 - 20 m ³		2,800	2,800	2,800	2,800
		21 - 40 m ³		3,700	3,700	3,700	3,700
		> 40 m ³		4,400	4,400	4,400	4,400