Thailand

Three Provincial Cities Water Supply Expansion Project, Three Southern Provincial Cities Water Supply Expansion Project

Field Survey: July-August 2003

1. Project Profile and Japan's ODA Loan

Chiang Mai、Ubon Ratchathani、Suphan Buri (3 Regional Cities)
Phetchaburi、Surat Thani、Phatthalung (3 Southern Regional Cities)

Phetchaburi Water treatment plant

1.1 Background

The Government of Thailand endeavored to improve the country's standard of living by building infrastructure in the provinces under its Seventh Five-year Plan (1992-1996). In the plan, fully-equipped waterworks were considered vital from the standpoint of public sanitation for ensuring a safe water supply and an indispensable part of infrastructure construction for the development of commercial and industrial activities. The goal of the Seventh Five-year Plan with regard to waterworks infrastructure was to increase water supply to 3.3 million m^3/day (1.7 million m^3/day in Bangkok metropolitan area and 1.6 million m^3/day in other areas) by expanding facilities during the time period of the plan and also by reducing leakage at existing facilities. The Provincial Waterworks Authority (PWA) is aiming to fully equip waterworks in regions where water shortages are considered likely to become serious in the near future, in accordance with the above plan.

1.2 Objectives

Among the waterworks projects being implemented by the PWA, the objective is to improve the function of and expand the waterworks in six cities, Chiang Mai, Ubon Ratchathani, Suphan Buri, Phetchaburi, Surat Thani, and Phatthalung, and to endeavor to respond to future increases in water demand and improve sanitation conditions by expanding the coverage of waterworks.

1.3 Output

Waterworks Expansion Project in 3 Regional Cities

(1) Chiang Mai
① Expansion of water treatment plant（48,000 m^3/day）
② Expansion of distribution pipes（approx. 107.2 km）
(2) Ubon Ratchathani
① Expansion of water treatment plant（24,000 m^3/day）
② Expansion of distribution pipes (approx. 60.5 km）
(3) Suphan Buri
① Construction of 2 deep wells（6,400 m^3/day）
② Expansion of distribution pipes（approx. 10.7 km）

Waterworks Expansion Project in 3 Southern Regional Cities

(1) Phetchaburi
① Construction of water intake facilities
② Expansion of water treatment plant（40,800 m^3/day）
③ Expansion of pump station
④ Expansion of Water Pipes and Conduits（approx. 185 km）
(2) Surat Thani
① Construction of water intake facilities
② Expansion of water treatment plant（44,400 m^3/day）
③ Expansion of Pump Station
④ Expansion of distribution pipes（approx.121 km）
(3) Phatthalung
① Rehabilitation of water source pump
② Expansion of water treatment plant（9,600 m^3/day）
③ Expansion of pump station
④ Expansion of distribution pipes（approx. 23 km）

1.4 Borrower/Executing Agency

Provincial Waterworks Authority (PWA)

1.5 Outline of Loan Agreement

L/A No. TXVII-8、TXVIII-8	Waterworks Expansion Project in 3 Regional Cities	Waterworks Expansion Project in 3 Southern Regional Cities
Loan Amount/Loan Disbursed Amount	4,754 million yen ／2,422 million yen	4,228 million yen ／2,362 million yen
Exchange of Notes/Loan Agreement	December 1992 ／January 1993	September 1993 ／September 1993
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	3.0%、 25 years (7 years) General Untied	3.0%、 25 years (7 years) General Untied
Final Disbursement Date	May 2000	January 2001

2. Results and Evaluation

2.1 Relevance

At the time of appraisal, it can be said that the waterworks engineering project was consistent with "improving the standard of living through development of regional infrastructure" and "increasing the amount of the water supply" as stated in the Seventh National Economic and Social Development Plan (1992-1996) and that the relevance of the project plan was high.

Moreover, this project is consistent with "improving the standard of living through engineering of regional economic and social infrastructure" and "relieving water shortages" as stated in the Ninth National Economic and Social Development Plan (2002-2006) underway at the time of this project's ex-poste evaluation, and so its relevance persists.

2.2 Efficiency

2.2.1 Output

In all 6 cities, the project was completed according to plan with no changes in the capacity at any of the treatment plants. In response to altered conditions, adjustments were made to the plan for water distribution pipes; i.e. an 83 km extension was made at Phetchaburi, a 10 km extension was made at Phatthalung, and a 25 km reduction was made at Surat Thani.

2.2.2 Project Period

Waterworks Expansion Project in 3 Regional Cities

According to the original plan, the project was scheduled from January 1993 to May 1996, a period of 41 months. However, in actuality it required from January 1993 to March 2000, a period of 87 months.

Waterworks Expansion Project in 3 Southern Regional Cities

According to the original plan, the project was scheduled from September 1993 to July 1997, a period of 47 months. However, in actuality it required from September 1993 to April 2001, a period of 92 months.

Both projects overran their schedules by nearly four years. The main reasons for the delay were postponement in the budget expenditures of the executing agencies due to the Economic Crisis in 1997-1998 and adjustments in output.

2.2.3 Project Cost

Waterworks Expansion Project in 3 Regional Cities

The planned project cost was 7,792 million yen, but the actual project cost was 4,863 million yen.

Waterworks Expansion Project in 3 Southern Regional Cities

The planned project cost was 7,365 million yen, but the actual project cost was 3,883 million yen.

The project cost for both projects was lower than planned, and this was due to efficient ordering through competitive bidding, etc.

2.3 Effectiveness

Because there were no data at PWA on daily maximum water supply amounts and because we could not obtain adequate data on waterworks coverage rates and the size of the population supplied with water, we attempt an analysis below utilizing data on daily average water supply amounts and the results of studies of beneficiaries.

2.3.1 Usage Condition of Filtration Facilities

The total water supply capacity of the treatment facilities has expanded in each of the six cities following the completion of the project. When the total water supply capacity planned for the target date of 2005 based on water demand forecasts in each region is compared with the actual level of water supply capacity in 2002、Suphan Buri, Surat Thani, and Phatthalung have already achieved the planned level. The facilities at Chiang Mai, Ubon Ratchathani, and Phetchaburi already possess water supply capacities equivalent to 70% to 90% of the 2005 plan level, and they are generally performing satisfactorily. (see Figure 1)

Moreover, when daily average water supply amount is compared with the demand forecast level (in the plan for 2005), Suphan Buri is already achieving 1.6 times the planned level, and Ubon Ratchathani, Phetchaburi, Surat Thani, and Phatthalung are achieving approximately 80% of the planned level. These are appropriate figures for the current point in time considering that two years still remain until the planned target date (2005) and that the project was completed four years behind the original schedule. Only in Chiang Mai is the level achieved slightly low compared to other regions, at approximately 60% of the planned level; however, this is due to limitations enforced by the Royal Irrigation Department (RID) on the amount of water that can be taken from Mae Kwang reservoir. (The plan is to supply water from other regions into Mae Kwang reservoir in the future.)

Figure 1: Comparison of Planned Levels and Actual Levels of Treatment Facilities Capacity and Daily Average Water Supplied

Location	Indicators	Unit	1990	Plan in 2005	Actual in 2002	% in achievement
Chian Mai	Treatment capacity	m3/d	64,900	110,400	108,240	96%
	Daily Average Water Supplied	m3/d	47,240	85,960	54,838	63.7%
Ubon Ratchathani	Treatment capacity	m3/d	31,000	53,300	48,000	90%
	Daily Average Water Supplied	m3/d	20,840	40,970	32,101	78.3%
Suphan Buri	Treatment capacity	m3/d	6,960	11,100	24,240	218%
	Daily Average Water Supplied	m3/d	7,780	8,220	13,648	166%
Phetchaburi	Treatment capacity	m3/d	12,720	53,520	40,800	76%
	Daily Average Water Supplied	m3/d	18,204	35,834	28,880	80%
Surat Thani	Treatment capacity	m3/d	25,440	66,000	66,000	100%
	Daily Average Water Supplied	m3/d	23,222	43,398	35,920	83%
Phatthalung	Treatment capacity	m3/d	6,000	15,000	17,280	115.2%
	Daily Average Water Supplied	m3/d	4,933	10,047	8,140	81%

Source: Current levels and goal levels are from JBIC appraisal materials; actual levels are from PWA materials.

Interviews with Beneficiaries: Cases in Ubon Ratchathani, Phetchaburi, Phatthalung

(1) Method of Interview Study

Interview studies were conducted in Ubon Ratchathani, Phetchaburi, and Phatthalung to verify in detail the effectiveness and impact of this project from the standpoint of the beneficiaries (i.e. the users of PWA water services). These three interview locations were chosen with consideration for the difference in the scope of the project at these sites, geographical distribution (northeast, west, south), and the fact that two projects cover the project regions. In each of the project regions, we further specified zones that receive the benefits of this project's facilities and conducted a sampling study by doing random interviews in each zone. In conducting sampling, the goals were (1) to include different types of users in consideration of the fact that 70% to 80% of waterworks users in each region are households and 15% to 20% are government institutions and small companies, etc., (2) to include both pre-existing users who used PWA services prior to this project and new users who began using PWA services following this project, (3) to obtain a sample of 100 or more persons in each region. The sample size obtained in each region is as shown on Figure 1.1, and ultimately the total sample size was 332 persons.

Figure A: Sample Size of Interviews by Region

Region	Household		Corporate		Government		Total
	New	Existing	New	Existing	Existing	New	
Ubon Ratchathani	29	39	19	20	2	2	111
Phetchaburi	7	70	9	19	-	6	111
Phatthalung	18	40	15	32	-	5	110
Total	54	149	43	71	2	13	332

Source：PWA

(2) Water Source

Figure B indicates the water sources prior to the launch of waterworks services through this project. The regional variations are striking. Whereas in Ubon Ratchathani and Phatthalung "wells" and "other sources" were particularly used, in Phetchaburi not only "wells" and "other sources" but also "rivers/reservoirs" and "rainwater" were largely used, showing usage of all water sources in this region.

Figure B: Water Sources Prior to Usage of PWA Water(multiple responses possible)

Water Source	Ubon Ratchathani	Phatthalung	Phetchaburi
Well	**57%**	**36%**	**22%**
River/Reservoir	**0%**	**3%**	**38%**
Rainwater	**17%**	**5%**	**39%**
Other*	**45%**	**57%**	**41%**

*"Other" indicates that water was used from facilities not targeted by this project (in short, PWA services from other regions, etc.)

(3) Purpose of Water Usage

As seen in Figure C, nearly all people in all the regions use PWA water for cleaning and bathing, etc. In usage for cooking and drinking, there is variation among the regions. In Phetchaburi, the highest level of people, 80%, use the water for cooking and drinking; in Phatthalung, 54%; and in Ubon Ratchathani, 60%. The difference in usage for cooking and drinking is considered to be due to variation in water quality. Also, it is not the case that people who use the water for cooking and drinking are using it directly out of the tap. Almost all people either use filters or allow the water to set so the sediment settles. Almost all people who do not use piped water for cooking and drinking use water they purchase elsewhere for cooking and drinking.

Figure C: Purpose of Water Usage (multiple responses possible)

Usage	Ubon Ratchathani				Phatthalung				Phetchaburi			
	Household	Corporat	Governm	Total	Household	Corpora	Govern	Total	Household	Corpor	Govern	Total
Cooking/Drinkin	66%	51%	50%	**60%**	53%	57%	40%	**55%**	83%	68%	100%	80%
Cleaning	100%	95%	100%	**98%**	95%	94%	100%	**95%**	99%	96%	100%	98%
Bathing, etc.	99%	92%	100%	**96%**	95%	94%	100%	**95%**	99%	93%	100%	97%
Commercial	0%	49%	0%	**17%**	0%	19%	0%	**8%**	0%	32%	0%	8%

(4) Water Quality and Water Volume

Regarding the volume of water used, many interviewees expressed the opinion that their usage volume had not changed significantly after the project. However, approximately 40% replied that their usage volume had increased (Figure D). With regard to the taste of the water, in Phetchaburi a relatively large proportion of people were of the opinion that the taste had improved; however, in Ubon Ratchathani and Phatthalung, many people were of the opinion that the taste had not changed. With regard to the smell of the water, views differed in each region. In Ubon Ratchathani, no one

responded that the smell had improved, but in Phetchaburi one in two responded that the smell had improved. Phatthalung was in between the two, with more than one in four responding that an improving trend was noticeable. Regarding the color of the water, many in Phatthalung and Phetchaburi responded that there were improvements, but in Ubon Ratchathani many responses were obtained that the water color has a strong tendency to be worse. Regarding water pressure, whereas in Ubon Ratchathani no one responded that water pressure had improved, in Phatthalung and particularly in Phetchaburi, many were of the opinion that water pressure had improved. Also, at all locations many noted that they have not experienced leakages (around their dwellings). (Reasons pointed out by the beneficiaries for the low water quality in Ubon Ratchathani are "river flooding during monsoon season" and "the bad condition of the water pipes."

Figure D: Water Quality and Water Volume

Criteria	Ubon Ratchthani				Phatthalung				Phetchaburi			
	Household	Corpora	Governm	Total	Household	Corpora	Govern	Total	Household	Corpora	Govern	Total
Water Usage												
Increased	33.8%	59.0%	100.0%	**45.0%**	34.5%	44.7%	60.0%	**40.0%**	42.9%	35.7%	50.0%	**41.4%**
No Change	57.4%	41.0%	0.0%	**49.5%**	56.9%	42.6%	40.0%	**50.0%**	51.9%	57.1%	33.3%	**52.3%**
Decreased	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Taste												
Improved	**0.0%**	**0.0%**	**0.0%**	**0.0%**	17.2%	10.6%	40.0%	**15.5%**	55.8%	32.1%	33.3%	**48.6%**
No Change	45.6%	30.8%	25.0%	**39.6%**	55.2%	44.7%	0.0%	**48.2%**	35.1%	28.6%	50.0%	**34.2%**
Worsened	19.1%	25.6%	25.0%	**21.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Smell												
Improved	**0.0%**	**0.0%**	**0.0%**	**0.0%**	29.3%	21.3%	20.0%	**25.5%**	63.6%	42.9%	33.3%	**56.8%**
No Change	61.8%	35.9%	50.0%	**52.3%**	51.7%	38.3%	60.0%	**46.4%**	35.1%	32.1%	50.0%	**35.1%**
Worsened	26.5%	53.8%	50.0%	**36.9%**	19.0%	12.8%	20.0%	**25.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Color												
Clearer	30.9%	20.5%	0.0%	**26.1%**	50.0%	34.0%	20.0%	**41.8%**	83.1%	71.4%	66.7%	**79.3%**
No Change	19.1%	0.0%	0.0%	**11.7%**	19.0%	19.1%	40.0%	**20.0%**	13.0%	14.3%	33.3%	**14.4%**
Worsened	50.0%	79.5%	100.0%	**62.2%**	29.3%	44.7%	40.0%	**36.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Water Press.												
Improved	**0.0%**	**0.0%**	**0.0%**	**0.0%**	32.8%	31.9%	20.0%	**31.8%**	67.5%	60.7%	66.7%	**65.8%**
No Change	38.2%	33.3%	75.0%	**37.8%**	50.0%	44.7%	80.0%	**49.1%**	24.7%	25.0%	16.7%	**24.3%**
Worsened	41.2%	66.7%	25.0%	**49.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Leakage												
Yes	14.7%	23.1%	75.0%	**19.8%**	24.1%	19.1%	20.0%	**21.8%**	14.3%	10.7%	33.3%	**14.4%**
No	83.8%	76.9%	25.0%	**79.3%**	72.4%	78.7%	80.0%	**75.5%**	84.4%	82.1%	66.7%	**82.9%**

Note: 0% in the Figure above includes "no response" and "unclear response."

(5) Impact

The positive impact of this project is extremely well recognized (Figure E). Agreement that the project reduces the amount of work required for securing water, saves time, and also improves sanitation is at the 80% to 90% level. On the other hand, approximately 30% of respondents contend that there was no impact or that the impact was negative. The main example of negative impact pointed out by many who noted such impact was the incurrence of additional expenses due to the project.

Figure E: Impact due to this Project (multiple responses possible)

	Ubon Ratchathani				Phatthalung				Phetchaburi			
	Household	Corporate	Governm	Total	Household	Corpora	Govern	Total	Household	Corpora	Governm	Total
Positive Impact												
Reduction of Work	79.4%	97.4%	100.0%	**86.5%**	86.2%	83.0%	80.0%	**84.5%**	97.4%	85.7%	100.0%	**94.6%**
Time-saving	91.2%	100.0%	100.0%	**94.6%**	81.0%	78.7%	80.0%	**80.0%**	98.7%	96.4%	100.0%	**98.2%**
Sanitation Improvement Improvement	76.5%	87.2%	100.0%	**81.1%**	81.0%	78.7%	60.0%	**79.1%**	97.4%	96.4%	100.0%	**97.3%**
No Impact												
	4.4%	0.0%	0.0%	**2.7%**	39.7%	21.3%	20.0%	**30.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Negative Impact												
Incurrence of Expenses	30.9%	41.0%	50.0%	**35.1%**	41.4%	21.3%	0.0%	**30.9%**	37.7%	21.4%	16.7%	**32.4%**

2.3.2 Recalculation of the Financial Internal Rate of Return (FIRR)

When FIRR was recalculated for each region of the project with criteria utilized at the time of appraisal, the levels were lower than those in the plan at the time of appraisal, as shown in the results of Figure 2. This is a result of increases in operation and maintenance expenses in response to the actual performance.

Figure 2: FIRR Results for Each Region

Region	At Appraisal	At Ex-Post Evaluation
Chiang Mai	3.09%	1.06%
Ubon Ratchathani	6.89%	0.35%
Suphan Buri	1.17%	0.18%
Petchaburi	6.21%	2.19%
Surat Thani	9.84%	4.48%
Phatthalung	6.92%	2.00%

-Assumptions
Project life: 30 years from start of investment
Benefits: Increase in revenue from water fees through this project
Cost: Investment expenses as well as operation and management expenses

2.4 Impact

2.4.1 Improvement in Sanitation Condition

In the results of the interview study with beneficiaries, as shown in Figure E in the boxed article above, 79%-97% of respondents in all areas pointed out “improvement in sanitation” as a positive impact of this project. However, in the results of the hearings conducted at the time of the study, no impact on the reduction of water-borne infectious diseases could be confirmed.

2.4.2 Contributions to Improvement of Quality of Life and Industrial Development

Improvements in some facets of the quality of life are recognizable due to the expansion of

the tap water supply. As displayed in Figure E in the boxed article above, an significantly large number of respondents in the interview study in each region noted that the project "led to time-saving" and a "reduction in the work" involved in securing water. It appears that the project led to a reduction in time and labor spent hauling water, since prior to the launch of PWA services, the main water sources were wells, and in some regions, rivers and reservoirs, etc.

2.5 Sustainability

2.5.1 Executing Agency

（1）Technical Capacity

The PWA headquarter's training and human resources development division is in charge of planning and implementing training for personnel nationwide. There are training centers located in Chiang Mai, Khon Kaen, and Songkhla, where courses concerning technology, operation, and management (technological control of leakage, laying water pipes, operation and management skills, etc.) are implemented.

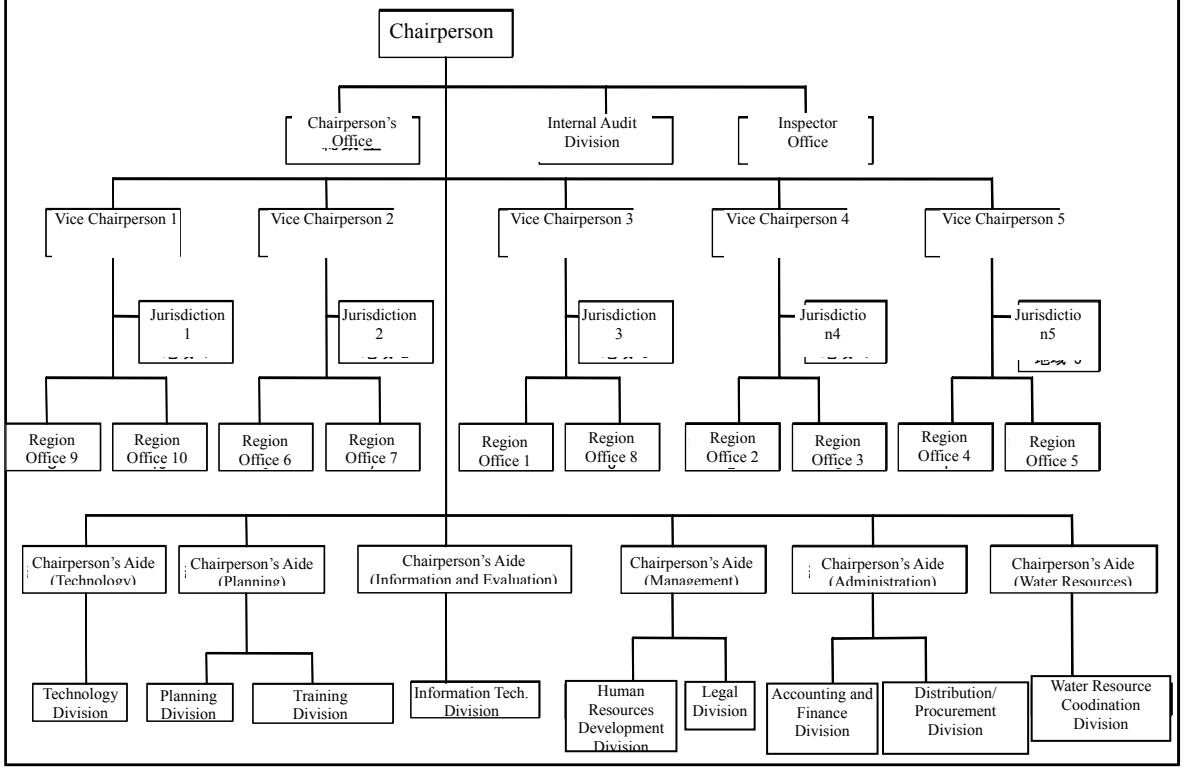
However, in the latest study, it was found that a number of malfunctions were not being handled swiftly because the PWA was in the midst of shifting toward privatization and of reducing staff in accordance with promoting the outsourcing of operation and management activities.

（2）O & M System

The PWA was established in 1973. It was reorganized in October 2002, and under the chairperson, there are five vice chairpersons, each in charge of their regions of jurisdiction (with two region offices). The chairperson's aides are in charge of technology, planning, information technology, management, administration, and the water resource divisions at the headquarters (see Chart 1). In charge of the operation and management of the facilities of this project is an organization divided into the prefectural-level PWA offices, water treatment department, leakage control department, management department, and water fee collection department.

The total number of PWA employees (as of the end of FY2002) was 6,139 persons, a figure of approximately 1,000 less than the 7,210 persons who were employed there at the close of FY1999. This reduction is due to the fact that PWA is implementing an early retirement system as it shifts toward privatization. (It was decided at a Cabinet meeting on August 20, 2002, that PWA's stock will be listed on the exchange in mid-2004.) Meanwhile, during this period the number of PWA customer has been increasing, with the number of customers per staff member growing from 219 customers/staff in 1999 to 301 customers/staff in 2002. Henceforth, PWA plans to consign operation and management activities to outside private companies.

Chart1 : PWA Organization Chart (as of October 2002)



(3) Financial Status

The PWA had a deficit from 1999 through 2000. However, every year the losses shrank, and the company made a profit in 2001 (see Figure 3).

O&M expenses are allocated to each region by the headquarters, divided into emergency expenses (for moving water pipes when roads are built, etc.) as well as regular operation expenses and investment expenses. However, in addition to the lack of flexibility for using funds allocated in one category in another category instead, the actual allocation amounts are insufficient for resolving the problems, and so PWA is currently studying how to make the budget system and management more efficient when it is privatized.

Figure 3: Profit and Loss Statement

(units: thousand bahts)

Item	1999	2000	2001
1. Sales	5,346,670	5,906,180	6,536,652
Water Fee Income	5,173,259	5,722,494	6,335,956
Connection Fees	173,411	183,685	200,695
2. Sales Cost, Sales, General, and Admin. Expense	4,964,255	5,438,681	5,725,000
3. Operating Profit	382,415	467,498	811,652
4. Non-operating Income	316,452	241,991	319,205
5. Non-operating Expenditure	1,376,871	1,203,557	1,081,948

6. Current Net Profit	△678,003	△494,056	48,908

Figure 4: Balance Sheet

(units: thousand bahts)

Item	1999	2000	2001
1. Current Assets	3,658,115	3,824,280	4,028,291
Cash Deposits	2,449,901	2,723,183	2,998,716
Other Current Assets	1,208,214	1,101,097	1,029,575
2. Fixed Assets	29,499,643	33,395,616	36,044,630
Buildings, Facilities, Furnishings, Etc.	28,501,069	32,429,292	35,124,120
Other Fixed Assets	998,574	966,324	920,510
Total Assets	33,157,758	37,219,896	40,072,921
1. Current Liabilities	4,292,572	2,885,325	3,343,832
Current Portion of Long-Term Debt	3,326,805	2,077,235	2,170,803
Other Current Liabilities	965,767	808,090	1,173,029
2. Fixed Liabilities	10,789,759	13,750,944	13,589,643
Long-Term Debt	3,839,527	3,329,557	3,284,336
PWA Bonds	6,386,610	9,886,610	9,736,810
Other Fixed Liabilities	563,622	534,777	568,497
Total Liabilities	15,082,331	16,636,269	16,933,475
1. Capital	18,817,363	21,805,913	24,297,374
2. Undivided Profit	△507,540	△1,021,292	□972,384
3. Other Liabilities	△234,396	△200,994	△185,544
Total Capital	18,075,427	20,583,627	23,139,446
Total Capital and Liabilities	33,157,758	37,219,896	40,072,921

2.5.2 O&M Status

No particular problems were found at the time of the study. (Regarding water conduits, some remaining asbestos pipes were being replaced.)

3. Feedback

3.1 Lesson Learned

None in particular.

3.2 Recommendations

None in particular.

Comparison of Original and Actual Scope

Waterworks Expansion Project in 3 Regional Cities

Item	Planned	Actual
① Output		
Chiang Mai		
1. Expansion of water treatment plant	48,000 m^3/day	Same as left
2. Expansion of water distribution pipes	107.2km	
Ubon Ratchathani		
1.Expansion of water treatment plant	24,000 m^3/day	Same as left
2. Expansion of water distribution pipes	60.5 km	52.7 km
Suphan Buri		
1. Construction of 2 deep wells	2 wells totaling 6,400 m^3/day	Same as left
2. Expansion of distribution pipes	10.7 km	10.4 km
② Project Period		
1. Selection of consultants	October 1992-Sept. 1993	July 1993-February 1995
2. Consulting services	October 1993- May 1996	February 1995-April 2000
3. Bidding on main construction	November 1992–Jan. 1994	November 1994–February 1995
4. Implementation of main construction	February 1994-May 1996	February 1996-March 2000
•Chiang Mai	February 1994-May 1996	February 1996-October 1999
•Ubon Ratchathani	February 1994-May 1996	February 1996-March 2000
•Suphan Buri	February 1994-March 1995	February 1996-July 1997
5. Completion	May 1996	March 2000
③ Project Cost		
Foreign Currency	4.754 million yen	2.422 million yen
Local Currency	3.038 million yen (596 million bahts)	2.441 million yen (697 million bahts)
Total	7.792 million yen	4.863 million yen
ODA Loan Portion	4.754 million yen	2.422 million yen
Exchange Rate	1 baht ＝5.1 yen (as of 1993)	1 bahts ＝3.5 yen (average for 1993-2000)

Waterworks Expansion Project in 3 Southern Regional Cities

Item	Planned	Actual
① Output		
Phetchaburi		
1. Construction of water source intake facilities	-Filtration facilities capacity 40,800 m^3/day	Same as left
2. Expansion of water treatment plant		
3. Expansion of pump station		
4. Expansion of water distribution pipes	185 km	150.59km+117.78km(additional construction to replace superannuated pipes)= 268.37 km
Surat Thani		
1. Construction of water source intake facilities	-Filtration facilities capacity 44,400 m^3/day	same as left
2. Expansion of water treatment plant		
3. Construction of pump station	121 km	96 km
4. Installation of water distribution pipes		
Phatthalung		
1. Rehabilitation of water source pump	-Filtration facilities capacity 9,600 m^3/day	same as left
2. Expansion of water treatment plant		
3. Construction of water pump station		
4. Installation of water distribution pipes	23 km	33 km
② Project Period		
1. Selection of consultants	July 1993-July 1994	April 1994-April 1996
2. Consulting Services	August 1994-July 1997	May 1996-March 2000
3. Bidding on main construction	August 1994-June 1995	July 1995-January 1997
4. Implementation of main construction	June 1995-May 1997	February 1997-December 1999
•Phetchaburi	June 1995-May 1997	February 1997-December 1999
(additional construction)	—	September 2000-April 2001
•Surat Thani	June 1995-May 1997	February 1997-October 1999
•Phatthalung	June 1995-May 1996	February 1997-December 1999
5. Completion	July 1997	April 2001
③ Project Cost		
Foreign Currency	2.922 million	2.362 million yen
Local Currency	4.443 million (1.005 million bahts)	1.521 million yen (471 million bahts)
Total	7.365 million yen	3.883 million yen
ODA Loan Portion	4.228 million yen	2.362 million yen
Exchange Rate	1 baht =4.42 yen (as of June 1993)	1 baht =3.23 yen (average from 1993- 2000)

Third Party Evaluator's Opinion on
Three Provincial Cities Water Supply Expansion Project,
Three Southern Provincial Cities Water Supply Expansion

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Efficiency

Insofar as efficiency of any project is measured by the completion of the projects within allocated or requested budget, then the six provincial waterworks projects can be considered efficient. This can be misleading, as the completion of the project which has happened long after the date specified in the project proposal would incur time-loss and revenue-loss from the use of resulting water services. As it turns out, the six provincial waterworks projects were late in their completion, with the First Project experiencing 46 months overdue (or 112 per cent of the original completion time), and the Second Project experiencing 45 months overdue (or about 96 per cent of the original completion time). In other words, the two projects together suffered more than double time-overrun.

The cost saving due to under-expenditure from the original cost estimates cannot be said to be completely attributable to efficiency in project management. On the contrary, under-expenditure could be said to come from the delay in, and the problems of, project implementation. As in the case of these two sets of projects, the First Project expended only 2,422 million yen or slightly more than half of the original budget approval. And the Second Project expended only 2,362 million yen or about 56 per cent of the original budget approval. It was possible also that this under-expenditure came from the original cost estimates that were higher than what they should be (some would call this a built-in cost-overrun). Although the original output estimates have more or less been achieved, the quality of these outputs may be subject to questions.

According to the officer in charge of overseeing the operations of these two projects, some problems in implementation stemmed from the lack of knowledge and coordination between the project planners and designers in Bangkok, and the project implementers in the field. Such problems as the seasonal weather conditions, the existence of old water pipes which obstructed the construction of the new ones, the inflexibility on the use of fund for different or changed conditions at the sites, had all contributed to the delay in the completion of the projects.

In all, the efficiency of these waterworks expansion projects lies not so much on the concept of the project, but on the implementation of the projects on the part of the operating agency, which in this case, the Provincial Waterworks Authority (PWA) of Thailand. Similar situations exist in most other government agencies doing these kinds of public projects in Thailand, so there is nothing particularly wrong with the PWA. The situations today have improved over those ten years ago, as the implementers maintain stricter discipline in following the timetable of work, and ensuring the outcome of the projects.

Impact

Despite possible reservations on the efficiency of the projects, it can be argued that the benefits accrued to the customers of these waterworks expansion projects were quite large. The comparison between 'with' and 'without' situations often cannot be measured in terms monetary losses and gains alone, but in terms of enjoyment or convenience in life that the availability of these water services have brought to the people in the local areas.