10-6 Profit & loss, Sources and Uses of Funds, Repayment of Loans

10-6-1 Profit & Loss

(1) As mentioned in the previous chapter, income (revenues from water fees) in the first ten years (1985 ∿ 1995) increases at an annual rate of 14.2 % and 5.6 % yearly for the next ten years.

(2) On the other hand, expenditures estimated to total 8.32 million pesos in 1985 are expected to increase five fold to 45.10 million pesos by the year 2005 due to the escalation of costs and increased water demand.

(2) After subtracting expenditures from revenues, operating profit is estimated from minimum 1.86 million pesos to maximum 34.74 million pesos.

(4) However for the first eight years of operation (1985 ∿ 1993), the public corporation will be heavily burdened by amortization of loans to finance the facilities and interest. The expenditures will exceed revenues which will then result in insufficient operating funds and require a government loan, typically at an interest rate of 9 %. Consequently, the repayment of this government loan will be an additional burden.

It is expected that the first profitable year of operation will be 1994 due to a rise in water rates (increased income) and decrease in miscellaneous (non-business) expenditures. Cumulative losses shall take another four years to recover and after 1998, it will be possible to maintain internal reserves.

(5) In this study, it was assumed that 30 % of the overall funds will be borrowed on an 8 % interest rate. However if borrowings at 8 % interest exceed 30 % then the only way by which interest and loans can be paid is to raise the price of water. (Note: For the unit price of water for 1985 ∿ 1989 based on 1982 prices an increment would be required amounting to 1.339 which is equivalent to a 10.2 %

yearly price increase.). In this case, ability of the local residents and industries to pay such increments becomes a major problem.

Therefore it is most desirable that between 100 % to 70 % of the funds for the initial construction of the facilities have a low interest rate.

Table 10-23 Profit and Loss Statement

(Unit: ₱1000, at current price)

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Overating Revenue	10,181.9	12,039.9	12,518.3	18,895.9	20,922.6	21,185.2	28,316.3	28,438.3	28,581.3	38,237.3	38,484.4
Revenue from Industrial Water	8,981.0	10,600.5	11,017.7	16,805.8	18,558.7	18,719.4	24,921.7	24,921.7	24,921.7	33,163.5	33,163.5
Revenue from Domestic Water	1,138.4	1,356.0	1,408.2	1,949.9	2,199.0	2,289.5	3,137.4	3,246.9	3,377.0	4,680.6	4,910.7
Through House Connection	308.1	432.9	504.5	771.4	956.3	1,080.3	1,596.0	1,771.1	1,952.2	2,864.7	3,157.4
Through Public Faucet	830.3	923.1	903.7	1,178.5	1,242.7	1,209.2	1,541.4	1,475.8	1,424.8	1,815.9	1,753.3
Revenue from Water for Commerce	62.5	83.4	92.4	140.2	164.9	176.3	257.2	269.7	282.6	393.2	410.2
Operating Expenses	8,318.2	9,486.9	10,133.5	11,488.9	12,996.9	Δ13,960.2	14,911.5	15,968.7	17,133.8	15,424.2	19,851.4
Maintenance and Management Cost	3,884.8	5,053.5	5,700.1	7,055.5	1,563.5	9,990.1	10,441.4	11,498.6	12,663.7	13,954.1	15,381.3
Personnel Cost	184.5	265.7	332.4	398.2	386.0	586.6	685.2	800.1	934.2	1,091.2	1, 74.3
Electric Energy	3,398.8	4,393.5	4,985.9	6,116.9	7,407.1	1,127.4	8,878.0	9,703.8	10,602.7	11,585.0	12,657.1
Fuel	30.7	33.7	36.9	40.5	44.3	48.6	52.6	57.0	61.7	66.9	72.4
Chemicals	104.1	122.2	134.4	148.3	170.7	187.4	204.7	223.5	244.3	267.0	291.9
Material for Maintenance	59.4	84.5	102.4	123.3	159.1	187.3	216.1	249.5	288.0	332.5	383.8
Stored Material	107.3	153.9	188.1	228.3	296.3	352.8	404.8	464.7	432.8	611.5	701.8
Depreciation	4,431.4	4,433.4	4,433.4	4,433.4	9,443.4	4,470.1	4,470.1	4,470.1	4,470.1	4,470.1	4,470.1
Operating Profit	1,863.7	2,553.0	2,384.8	7,407.0	7,925.7	7,225.0	13,404.8	12,469.6	11,447.5	19,813.1	18,633.0
Non-Operating Revenue	90.6	90.0	89.3	88.5	87.6	272.0	269.7	267.0	264.2	261.1	484.4
Interest on House Connection Construction Cost	90.6	90.0	89.3	88.5	87.6	272.0	269.7	267.0	264.2	261.1	484.4
Interest on Internal revenue											
Non-Operating Expense	10,599.2	11,199.5	11,879.2	12,179.2	12,470.9	13,068.7	12,950.2	12,917.7	12,987.7	12,324.9	11,949.9
Interest on Construction Cost of facilities	9,646.7	9,370.1	9,079.0	8,772.8	8,450.9	8,110.7	7,752.8	7,375.4	6,977.4	6,557.4	6,114.1
Interest on House Connection Construction Cost	90.6	90.0	89.3	88.5	87.6	272.0	269.7	267.0	264.2	261.1	484.4
Interest on loan from Government	861.9	1,739.4	2,710.9	3,317.9	3,932.9	4,686.0	4,927.7	5,275.3	5,746.1	5,506.4	5,351.4
Ordinary Profit	Δ 8,644.9	Δ 8,556.5	Δ 9,405.1	Δ 4,683.7	Δ 4,451.6	Δ 5,571.7	724.3	Δ 181.1	Δ 1,276.0	7,749.3	7,167.5
(accumulated)	Δ 8,644.9	Δ17,201.4	Δ26,606.5	Δ31,290.2	Δ35,747.8	Δ41,319.5	Δ40,595.2	Δ40,776.3	Δ42,052.3	Δ34,303.0	Δ27,135.5
Internal Reserve											
(accumulated)											

(Continued)

(Unit: ₱1000, at current price)

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Operating Revenue	35,666.0	51,727.0	52,004.5	52,369.2	64,571.4	64,862.2	65,195.2	65,543.1	65,986.8	66,498.2
Revenue from Industrial Water	33,163.5	44,146.2	44,146.2	44,146.2	54,071.9	54,071.9	54,071.9	54,071.9	54,071.9	54,071.9
Revenue from Domestic Water	5,064.0	6,956.3	7,223.7	7,544.3	9,657.0	9,900.3	10,182.9	10,533.3	10,924.2	11,441.4
Through House Connection	3,399.5	4,871.0	5,244.1	5,680.8	7,490.3	7,961.3	8,461.6	8,992.8	9,556.7	10,217.6
Through Public Faucet	1,664.5	2,085.3	1,979.6	1,863.5	2,166.7	1,939.0	1,721.3	1,540.5	1,367.5	1,223.8
Revenue from Water for Commerce	438.5	624.5	634.6	678.7	842.5	890.0	940 4	937.9	990.7	984.9
Operating Expense	21,385.3	23,198.3	25,072.0	27,142.0	29,335.7	32,313.4	35,046.0	38,056.0	41,435.7	45,097.3
Maintenance and Management Cost	16,915.2	18,674.9	20,548.6	22,618.6	24,904.6	27,382.3	30,114.9	33,124.9	36,447.6	40,109.2
Personnel Cost	1,463.7	1,681.3	1,581.0	2,218.2	2,547.5	2,903.7	3,309.7	3,771.7	4,309.7	4,900.7
Electirc Energy	13,817.2	15,086.6	16,469.0	17,979.4	19,626.4	21,428.0	23,396.1	25,543.5	27,888.4	30,445.6
Fuel	78.5	148.5	160.9	174.4	188.8	204.5	221.6	240.0	259.9	281.5
Chemicals	319.1	349.1	381.8	417.5	456.9	499.5	545.8	596.5	692.3	713.1
Material for maintenance	437.6	498.9	568.8	648.2	739.6	739.6	836.6	946.5	1,070.7	1,371.5
Stored material	799.1	910.4	1,037.1	1,180.9	1,345.4	1,510.0	1,695.2	1,902.5	2,135.6	2,396.8
Depreciation	4,470.1	4,523.4	4,523.4	4,523.4	4,931.1	4,931.1	4,931.1	4,931.1	4,988.1	4,988.1
Operating Profit	17,280.7	28,528.7	26,932.5	25,227.2	34,735.7	32.548.8	30,149.2	27,487.1	24,551.1	21,400.9
Non-Operating Revenue	479.0	473.2	467.0	460.0	844.7	833.7	1,479.2	2,109.2	2,750.1	4,012.2
Interest on House Connection Construction Cost	479.0	473.2	467.0	460.0	844.7	833.7	830.6	808.6	794.1	1,396.3
Interest on Internal Reserve							648.6	1,300.6	1,956.0	2,615.9
Non-Operating Expense	11,428.9	9,916.3	8,370.9	6,856.6	5,498.6	3,703.6	3,044.3	2,327.2	1,576.7	1,396.3
Interest on Construction Cost of Facilities	5,645.8	5,151.0	4,627.9	4,074.7	3,489.5	2,869.9	2,213.7	1,518.6	781.6	
Interest on House Connection Construction Cost	479.0	473.2	467.0	460.0	844.7	833.7	830.6	808.6	794.1	1,396.3
Interest on Loan from Government	5,304.1	4,292.1	1,276.0	2,321.9	1,164.4					
Ordinary Profit	6,330.8	19,085.6	19,028.6	18,830.6	30,081.8	29,678.9	28,584.1	27,269.1	25,725.5	24,016.8
(accumulated)	20,804.7	1,719.1	17,309.5	36,140.1	66,221.9	95,906.8	124,484.9	151,754.0	177,479.5	201,496.3
Internal Reserve			5,200.5	5,236.9	6,457.1	6,486.2	6,519.5	6,554.3	6,598.7	6,649.8
(accumulated)			5,200.5	10,437.4	16,894.5	23,380.7	29,900.2	36,454.5	43,053.2	49,703.0

Table 10-24 Fund Barrowed for Construction of Facilities, Remaining Amount to be Repayed and Burden of Interest

(Unit: ₱ 1000)

Kind of Fund / Year	Fund with annual interest rate of 3.5%			Fund with annual interest rate of 8.0%			Total Burden of Interest
	Amount (Annual amount of amortization)	Remaining amount (at end of year)	Burden of interest	Amount (Annual amount of amortization)	Remaining amount (at end of year)	Burden of interest	
	·139,230.5 (9,796.4)			59,690.2 (6,077.5)			
1985		134,307.2	4,873.1		58,366.3	4,773.6	9,646.7
1986		129,211.6	4,700.8		56,958.1	4,669.3	9,370.1
1987		123,937.6	4,522.4		55,437.3	4,556.6	9,079.0
1988		118,479.0	4,337.8		53,794.8	4,435.0	8,772.8
1989		112,829.3	4,146.8		52,020.8	4,303.6	8,450.4
1990		106,982.0	3,949.0		50,105.0	4,161.7	8,110.7
1991		100,929.9	3,744.4		48,035.9	4,008.4	7,752.8
1992		94,666.1	3,532.5		45,801.3	3,842.9	7,375.4
1993		88,183.0	3,313.3		43,387.9	3,664.1	6,977.4
1994		81,473.0	3,086.4		40,781.4	3,471.0	6,557.4
1995		74,528.1	2,851.6		37,966.4	3,262.5	6,114.1
1996		67,340.2	2,608.5		34,926.2	3,037.3	5,645.8
1997		59,900.7	2,356.9		31,642.8	2,794.1	5,151.0
1998		52,200.9	2,096.5		28,096.8	2,531.4	4,627.9
1999		44,231.5	1,827.0		24,267.0	2,247.7	4,074.7
2000		35,983.2	1,548.1		20,130.9	1,941.4	3,489.5
2001		27,446.2	1,259.4		15,663.8	1,610.5	2,869.9
2002		18,610.4	960.6		10,839.4	1,253.1	2,213.7
2003		9,465.4	651.4		5,629.1	867.2	1,518.6
2004		0	331.3		0	450.3	781.6

10-6-2 Sources and Uses of Funds

(1) For the first six years of operation, 1985 ∿ 1990 operating funds must come from government loans (assumed to have an interest rate of 9 %). The cumulative amount of such funds totals 39.5 million pesos and the interest totals 56.75 million pesos. Eleven years (1991 ∿ 2001) is needed to amortize this loan.

(2) It may be inferred that the repayment of the loan from 1984 ∿ 2004, in spite of profits gained, makes this a difficult period particularly for the smooth flow of operating funds.

(3) In spite of the above severe situation. It is possible to repay the loan during the 20 year period; however, it would be more desirable, from the viewpoint of sources and uses of funds and profit if the government loan had a grace period of 4 to 5 years and if the loan for operating funds were at lower rates of interest.

Table 10-25 Source and Use of Fund

(Unit: ₱1000, at current price)

Year	1983年	1984年	1985年	1986年	1987年	1988年	1989年	1990年	1991年	1992年	1993年	1994年
Source of Fund	66,383.3	133,539.8	15,971.9	15,971.9	15,971.9	15,971.9	18,031.0	16,429.3	18,173.3	17,238.1	16,216.0	27,099.5
Internal Fund			6,395.1	7,084.4	6,916.2	11,938.4	12,457.1	11,993.5	18,173.3	17,238.1	16,216.0	24,581.6
Operating Profit			1,863.7	2,553.0	2,384.8	7,407.0	7,925.7	7,225.0	13,404.8	12,469.6	11,447.5	19,813.1
Interest on Internal Reserve												
Depreciation			4,433.4	4,433.4	4,933.4	4,433.4	4,433.4	4,470.1	4,470.1	4,470.1	4,470.1	4,470.1
Amortization of House Connection			98.0	98.0	98.0	98.0	98.0	298.4	298.4	298.4	298.4	298.4
External Fund	66,383.3	133,539.8	9,576.8	8,887.5	9,055.7	4,033.5	5,573.9	4,335.8				2,517.9
Construction Cost of Facilities	66,383.3	132,532.4										
Construction Cost of House Connection		1,007.4					2,059.1					2,517.9
Loan from Government			9,576.8	8,887.5	9,055.7	4,033.5	3,514.8	4,435.8				
Use of Fund	66,383.3	133,539.8	15,971.9	15,971.9	15,971.9	15,971.9	18,031.0	16,429.3	18,173.3	17,238.1	16,216.0	27,099.5
Construction and Replacement	66,383.3	133,539.8					2,059.1	257.0				2,517.9
Construction and Replacement	66,383.3	132,532.4						257.0				
House Connection Construction Cost of		1,007.4					2,059.1					2,517.9
Repayment of Loan			15,971.9	15,971.9	15,971.9	15,971.9	15,971.9	16,172.3	18,173.3	17,238.1	16,216.0	24,581.6
Construction Cost of Facilities			15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9
Construction Cost of House Connection			98.0	98.0	98.0	98.0	98.0	298.4	298.4	298.4	298.4	298.4
Loan from Government									2,001.0	1,065.8	43.7	8,409.3
Excess and Deficiency of Fund	0	0	0	0	0	0	0	0	0	0	0	0
(accumulated)												

Loan from Government to be repayed			10,438.7	21,055.6	32,832.2	40,183.6	47,631.3	56,753.1	59,679.8	63,889.3	69,591.7	66,688.8
Loan accumulated			9,576.8	19,326.2	30,121.3	36,865.7	43,698.4	52,067.1	54,752.1	58,614.0	63,845.6	61,182.4
Interest on the Loan			861.9	1,739.4	2,710.9	3,317.9	3,932.9	4,686.0	4,927.7	5,275.3	5,746.1	5,506.4

(Cont'd)

Year	1995年	1996年	1997年	1998年	1999年	2000年	2001年	2002年	2003年	2004年	2005年
Source of Fund	23,646.6	22,294.3	33,595.6	31,999.4	34,651.9	40,634.5	38,447.6	36,696.6	34,686.5	39,327.7	30,640.8
Internal Fund	23,646.6	22,294.3	33,595.6	31,999.4	30,294.1	40,634.5	38,447.6	36,696.6	34,586.5	32,462.9	30,640.8
Operating Profit	18,633.0	17,280.7	28,528.7	26,932.5	25,227.2	34,735.7	32,548.8	30,149.2	27,487.1	24,551.1	21,400.9
Interest on Internal Reserve								648.6	1,300.6	1,956.0	2,615.9
Depreciation	4,470.1	4,470.1	4,523.4	4,523.4	4,523.9	4,931.1	4,931.1	4,931.1	4,931.1	4,988.1	4,988.1
Amortization of House Connection	543.5	543.5	543.5	543.5	543.5	967.7	967.7	967.7	967.7	967.7	1,635.9
External Fund					4,357.8					6,864.8	
Construction Cost of Facilities											
Construction Cost of House Connection					4,357.8					6,864.8	
Loan from Government											
Use of Fund	23,646.6	22,294.3	33,595.6	31,999.4	34,651.9	40,634.5	24,779.9	16,841.6	16,841.6	24,735.6	1,635.9
Construction and Replacement			629.9		4,357.8	8,610.0				7,894.0	
Construction and Replacement			629.9			8,610.0				1,029.2	
House Connection					4,357.8					6,864.8	
Construction Cost of Repayment of Loan	23,646.6	22,294.3	32,965.7	31,999.4	30,294.1	32,024.5	29,779.9	16,841.6	16,841.6	16,841.6	1,635.9
Construction Cost of Facilities	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	15,873.9	
Construction Cost of House Connection	543.5	543.5	543.5	543.5	593.5	967.7	967.7	967.7	967.7	967.7	1,635.9
Loan from Government	7,229.2	5,876.9	16,548.3	15,562.0	13,876.7	15,152.9	12,938.3				
Excess and Deficiency of Fund	0	0	0	0	0	0	3,667.7	19,855.0	17,844.9	14,592.1	29,004.9
(accumulated)							6,486.2	13,005.7	19,560.0	26,158.7	32,808.5

Loan from Government to be repayed	64,811.0	64,238.2	51,982.0	39,676.0	28,121.2	14,102.7					
Loan accumulated	59,459.6	58,934.1	47,689.9	36,400.0	25,799.3	12,938.3					
Interest on the Loan	5,351.4	5,304.1	4,292.1	3,276.0	2,321.9	1,164.4					

10-7 Cost Benefit Analysis

10-7-1 Financial Internal Rate of Return (Base Case)

The cash flow of the base case, based on the table on surces and uses of funds, is shown in the following table.

The FIRR for the Base Case is 7.9 %.

Hence, it can be said that this project is definitely feasible.

TAble 10-26 Cash Inflow and Outflow

(Unit: ₱100, at current price)

	Cash Inflow			Cash Outflow	Net Cash
		Amortization of Construction Cost	Increase and Decrease of Fund	Construction and (Replasement of Fascilities)	Inflow
Year					
1983				66383.3	-66383.3
1984				132532.4	-132532.4
1985	6297.1	15873.9	-9576.8		6297.1
1986	6986.4	15873.9	-8887.5		6986.4
1987	6818.2	15873.9	-9055.7		6818.2
1988	11840.4	15873.9	-4033.5		11840.4
1989	12359.1	15873.9	-3514.8		12359.1
1990	11438.1	15873.9	-4178.8	257	11181.1
1991	17874.9	15873.9	2001		17874.9
1992	16939.7	15873.9	1065.8		16939.7
1993	15917.6	15873.9	43.7		15917.6
1994	24283.2	15873.9	8409.3		24283.2
1995	23103.1	15873.9	7229.2		23103.1
1996	21750.8	15873.9	5876.9		21750.8
1997	33052.1	15873.9	17178.2	629.9	32422.2
1998	31455.9	15873.9	15582		31455.9
1999	29750.6	15873.9	13876.7		29750.6
2000	39666.8	15873.9	23792.9	8610	31056.8
2001	37479.9	15873.9	21606		37479.9
2002	35728.9	15873.9	19855		35728.9
2003	33718.8	15873.9	17844.9		33718.8
2004	31495.2	15873.9	15621.3	1029.2	30466
2005	29004.9		29004.9	-112698.3	141703.2

10-7-2 Sensitivity Analysis

A: A Review of Four Cases

Case 1 : Conditions

- Supply of industrial water only
- Loans for initial construction at 8 % interest

1. Initial Construction Costs, Replacement Costs, Maintenance & Operating Costs

A comparison between the Base Case & Case 1 in term of construction costs, replacement costs and maintenance & operating costs is shown below.

(Unit: 1000 pesos, cumulative rates from 1985 ∿ 2000)

		Initial Construction Costs	Replacement Costs	Maintenance & Operating Costs
Current Prices	(Case (A)	198,900.7	10,526.1	374,527.4
	Case (1) (B)	151,095.4	5,635.7	240.640.6
	(B)/(A) (%)	76.0	53.5	64.3
1982 Prices	Base Case (C)	170,398.0	2,615.3	102,746.5
	Case (1) (D)	130,165.3	1,390.7	68,459.3
	(D)/(C) (%)	76.4	53.2	66.6

Case 1 when compared to the Base Case shows a 23 ∿ 24 % decrease in initial construction costs and a 33 ∿ 35 % decrease in maintenance & operating costs. However, it should be noted that the decrease comes from a 20% decrease in the amount of water supply; thus the financial efficiency of Case 1 is higher than the Base Case.

On the one hand, the total interest cost of construction of facilities is higher than in the Base Case since the project is funded from loans with 8 % interest. However, the yearly amortization of construction costs amount to approximately the same amount as in the Base

Case as shown below.

Annual Repayment of Construction Costs

Base Case	-	15,873.9
Case 1	-	15,389.4

Hence, whatever advantages are gained by reducing the size of the facilities and maintenance & operation, these are offset by the high rates of interest of the loans for the construction of facilities.

2. Unit Price of Industrial Water

If the breakeven parameters of the Base Case are applied to Case 1, the unit price of industrial water would be shown below:

Unit Price of Industrial Water

Unit: current price, peso/cum.

Case / Year	Base Case	Case 1
1982	1.123	1.121
1985 ∿ 1987	1.504	1.492
1988 ∿ 1990	2.001	1.986
1991 ∿ 1993	2.664	2.643
1994 ∿ 1996	3.545	3.615
1997 ∿ 1999	4.719	4.812
2000 ∿ 2002	5.780	5.731
2003 ∿ 2005	5.780	5.731

From the above, it can be seen that the unit price of water is almost the same as that of the Base Case. This means that the charges which users of industrial water have to bear are very similar for the two cases.

However, one obvious difference between the cases is the absence of potable sanitary water supply to the residents of the area along with all its substantial welfare benefits.

Case 2 : Conditions

- Supply of both industrial water & potable water (same Base Case)
- Total cost of initial construction raised from loans with 8 % interest rate
- Water rate for the 1985 ∿ 87 period set at ₱5.00/ month/household

1. Price of Industrial and Domestic Water Supply

(1) Price of potable water is assumed to be P5.00/ month/household for the period between 1985 ∿ 1987.

(2) The revenues from water rates in this case are assumed to be kept at the same level as in the Base Case (i.e., changing once in 3 years).

Based on the above two assumptions, water prices in both cases are shown below:

(Unit: Peso/cum., current price)

Kind of Water / Case / Year		Industrial Water		Other Water Supply (domestic, institutional, commercial)	
		Base Case	Case 2	Base Case	Case 2
1982		1.123	1.504	0.776	0.209
1985	1987	1.504	1.651	1.039	0.278
1988	1990	2.001	2.185	1.383	0.368
1991	1993	2.664	2.938	1.841	0.494
1994	1996	3.545	3.960	2.450	0.664
1997	1999	4.719	5.332	3.261	0.894
2000	2002	5.780	6.618	3.994	1.109
2003	2005	5.780	6.618	3.994	1.109

(1) If the unit price of potable water is kept at a low rate of ₱5.00/month/household for the period between 1985 ∿ 1987 (and after this period the rate of increase is the same as

industrial water), income from water supply will definitely be insufficient to cover cashflows. In order to supplement this deficiency, the price of industrial water will have to be raised above the level of the

P0.15/cum. and for 2003 ∿ 2005, ₱0.84/cum. additional will be required.

(2) If for the period between 1985 ∿ 1987, the price of water is set according to the residents' wishes at ₱0.278/cum., the price of water is expected to reach ₱1.11/cum. by the year 2000.

This price is definitely very cheap when compared to the prices of other commodities which are expected to escalate. This, being the case, abuse in the use of water is bound to occur.

2. Breakeven points for this case are listed below.

Item / Case	First Year of Ordinary Profit	Dissolution of Cumulative Loss	Repayment of Government Loan
Base Case	1994	1998	2001
Case 2	1997	after 2005. By the end of 2005, cumulative loss still total 49.72 million pesos.	after 2005. By the end of 2005, the balance of gov't. loan still remains at 165.48 million pesos.

The main difference between Case 2 and the Base Case is that the total initial cost of construction in borrowed at interest rate of 8 %.

As a result, the yearly amortization payment increases as follows:

Base Case - 15,873.9 (Unit: thousand pesos)
Case 2 - 20,258.5

The difference of 4.40 million pesos will force the operating entity to borrow from the government. Compared to the Base
a vicious cashflow cycle with a heavy interest burden and unceasing payments of government loans.

In order to end this vicious cycle, the following policies must be adopted:

(1) Raising of funds for initial construction from low-interest loans thereby decreasing the yearly amortization rates.

(2) Raising the unit price of industrial & potable water. If the price of water supplied is raised enough margin should be calculated between the actual rate and user's ability to pay. It is doubtful whether the price of industrial water can be raised any further.

An evaluation of Case 2 is as follows:

(1) Compared to the Base Case, Case 2 definitely lightens the water expenses of residents, and at the same time it does not heavily add to the burden of industrial water users.

(2) However, this puts the operating entity into a precarious position, since for the period between 1985 ∿ 2005 (21 years) it will continuously be burdened with debt repayments.

Considering the replacement costs of the total facilities which must be borne by the operating entity after the year 2005, it is inevitable that the operating entity will fall into bankruptcy.

Case 3 : Conditions

- Supply of industrial water and potable water (same as Base Case)
- Interest rates on funds for initial construction costs are as follows:

  Loan A : 3.5 % interest rate - 70 %
  Loan B : 8.0 % interest rate - 30 %

- Water rate for the period between 1985 ∿ 1967 is set at ₱5.00/month/household

1. Unit Price of Industrial & Domestic Water Supply

   Unit price of water is the same as in Case 2.

2. Breakeven points are similar to that of the Base Case Comparison Between Case 3 and Base Case:

   (1) Financially, both cases are similar

   (2) Because of the low water rates, the water expenses of residents in reduced and economic benefits are increased.

   (3) The additional burden on industrial water users is not very heavy, thereby making this case more ideal for them.

Case 4 : Conditions

- Supply of industrial water and potable water (same as Base Case)
- Funds for initial construction are to be raised as follows:

  Loan A - 3.5 % interest - 50 %
  Loan B - 8.0 % interest - 50 %

- Unit price of water based on the cashflow requirements of the operating entity, ability of industrial & other water users to pay, etc. (Same as Base Case)

1. Unit Price of Industrial Water & Water Supply

(Unit: ₱/m^3)

Case / Classification		Base Case	Case 4
1982 Prices	Average Unit Price	1.055	1.111
	Industrial Water	1.123	1.183
	Average Price of Domestic Water	0.776	0.817
	House Connection Rate	0.802	0.845
	Public Faucet Rate	0.723	0.761
1985 ∿ 1987	Average Unit Price		
	Industrial Water Rate	1.504	1.584
	Average Price of Domestic Water	1.039	1.094
	House Connection Rate	1.074	1.131
	Public Faucet Rate	0.968	1.019

(1) The unit price of water supplied during the period between 1985 ∿ 1987 is slightly higher than that of the Base Case. (₱0.06 ∿ 0.08/cum.)

(2) From the ability of users to pay, the price of water (₱240.00/year/household) nearly approaches the ceiling rate of ₱275.00 year/household. The price of water amounts to 88 % of maximum limit of users to pay whereas it is 84 % for the Base Case. Furthermore,if the amortization for the construction of the house connection network (₱74.10/year/house connection) is added to this amount, it definitely exceeds the maximum limit of users to pay.

Consequently, in order to avoid poor funding conditions and to keep the cashflow in balance, it is necessary to set the price of water high. In term of the users ability to pay for water, it would be impractical to recommend this case.

2. Yearly amortization for initial construction costs and breakeven points are summarized below:

(Unit: ₱1000)

	Base Case	Case 4
Amortization	15,873.9	17,126.6
First year of Ordinary Profit	Year 1994	Year 1994
Cumulative Loss Dissolved	Year 1998	Year 2000
Gov't Loan Repaid	Year 2001	Year 2004

Although the hypothetical, income from water rates collected may lead one to believe that both Case 4 and the Base Case are identical, it is clear that the financial situation of Case 4 looks grim and will extend two to three years beyond similar times in the Base Case.

B. Summary of Sensitivity Analysis Results

- Positioning the Base Case -

The following observations were made from the study of the Base Case and the four alternative cases:

(1) The financial situation and unit price of industrial water for Case 1 & the Base Case are similar. Since the costs of the two cases are almost the same, it would be more beneficial if the operating entity could obtain low-interest funds and avoid borrowing funds to meet interest payments. The amount thus saved could be used in financing water supply to the communities. In other words, the price to be paid for high interest rates is equivalent to the amount that is to be used to construct the domestic water supply.

(2) If both domestic and industrial water systems were financed from loans on a commercial base (as in Case 2), it would be impossible for the operating entity to exist over the long run. Therefore, to improve the

financal condition of the operating entity and prepare for expansion of water services, it is necessary to obtain low interest loans.

(3) In order to get the utmost benefit from the expenses, the price of water has to be raised to a reasonable level (from 1985 to 2000 - 10% rate of increase), otherwise, financial problems occur. In order to lessen the burden of payment for the communities, it is necessary to pass this burden to industrial water rates; however, care should be taken in fixing the water price so that the gap between the water rates for industrial water and domestic water supply will not be very wide. In Cases 2 & 3, the burden borne by industrial water is justified.

However, it is not necessary to lower the water rates for domestic water supply to the low levels in Cases 2 & 3. The price of water for domestic water supply should be fixed in such a way that any abuse in the use of water is discouraged.

In the Base Case, it is water supply for communities which is the largest benefit particularly since in the setting the price of water, as exemplified by Case 3, water is distributed at a very cheap price.

10-7-3 Summary of the Financial Analysis (Focus on Base Case)

A. Characteristics of the Base Case (in the sensitivity analysis)

(1) Domestic water supply and not the industrial water will chiefly benefit in this case.

(2) In fixing the unit price of water for the Base Case, the factors considered were the balance of income & expenses for the operating entity, the ability of users to shoulder the cost of industrial water and domestic water supply, and the redistribution of income. Aside from these factors, the opinions of the community

residents were also taken into account therefore making the benefits of the system more favorable to the residents.

(3) If both industrial and domestic water supply are financed with loans on a commercial basis the project would eventually go into bankruptcy.

Therefore for the long term solvency of the operating entity, the Base Case is most suitable.

B. Features of the Base Case

(1) The management for the distribution of industrial water and water supply should be handled by a public corporation. PASAR will charge of procuring funds for the construction of necessary water supply facilities. A newly created public corporation will then purchase the facilities from PASAR and with fixed installment payments made on an annual basis for 20 years (Note: Yearly amortization = ₱15,972,000).

(2) FIRR in 7.9 %, therefore, this case is financially feasible.

(3) Sources of funds shall be foreign and domestic. The operating entity shall repay the costs incurred for the construction of facilities and the cost of borrowing operating capital.

The breakdown by source of funds is shown below:

Kinds of funds	Amount of funds (₱1000)	Source of Funding	Time of funding	Remarks
Funds for construction of facilities	198,900.7 (current price) 170,398.0 (at 1982 constant price)	Overseas	1983, 1984	
Operating Funds	56,753.1	Domestic	1985 - 1990	Annual interest rate : 9%

Funds for the construction of a house connection network shall be obtained from a government loan to be paid back by the consumers within 30 years (including interest).

(4) The unit price of water shown below was calculated based on the balance between operating revenues and expenses, redistribution of income and ability of consumers to pay the rate.

Unit Water Rate Cost Summary

(Unit: ₱/m^3, current price)

Period	Industrial water	Water supply through house connection	Water supply through public faucet	Remarks	
				Growth Index	Annual growth rate (%)
1982	1.123	0.802	0.723	1.000	
1985 1987	1.504	1.074	0.968	1.339	10.2%
1988 1990	2.001	1.429	0.288	1.782	10.0
1991 1993	2.664	1.902	1.715	2.372	10.0
1994 1996	3.545	2.532	2.283	3.157	10.0
1997 1999	4.719	3.370	3.038	4.202	10.0
2000 2002	5.780	4.128	3.721	5.147	7.0
2003 2005	5.780	4.128	3.721	5.147	0

The above prices must be qualified in the following respects:

i. With these prices, the revenues and expenses of the operating entity balance for 21 years, on the assumption that the forecasted demand for water supply will be realized.

ii. In setting the above prices, the redistribution of income and the user income level have been taken into account in addition to the conditions described in para i above.

iii. The water rate which is calculated on the basis of the unit water price is much higher than the existing water rate (₱ 5~10/month/household), and is near the maximum rate which can be afforded by users in terms of their household income.

iv. Therefore, at the time of setting the actual unit water price, it will be necessary to give a careful consideration to user opinions in the area in addition to the main factors and conditions described in para i and ii above.

And also, it is essential for the actual water unit price to be high enough to prevent users from abusing the water supply.

(5) It is possible to defray the costs of facilities in 20 years - (1985 - 2004) at 4 fixed amortization rate of ₱159,720,000 except for the first few years of operation when revenues from water sales cannot cover the amortization payments.

(6) The annual amortization rate is relatively large in comparison to the annual revenues for the first five to six years of operation. Therefore, during the first term, the operating entity will be saddled by repayment of both the construction costs and government loan.

This financial situation is picture below:

First year to have ordinary profit	1994	10th year after start of operations
Year when cumulative loss is dissolved	1998	14th year after start of operations
Year when gov't loan is repaid	2001	17th year after start of operations

(7) This study proposes to look into the following matters further:

(i) For the Base case, a breakdown of the funds as follows:

Loan with 3.5 % interest - 70 %

Loan with 8.0 % interest = 30 %

(ii) Start of amortization to be postponed for another five or six years.

(iii) Lower interest rates for government loans obtained to provide the operating funds.

CHAPTER 11 ECONOMIC ANALYSIS

Chapter 11 ECONOMIC ANALYSIS

11-1 Impact on Regional Development

Isabel and Merida, the proposed service rea, for the past ten years have had a stagnant population mainly because of the lack of growth of industries in the area. Moreover, the water supply in the area does not satisfy sanitary standards and therefore, needs improvement.

The present project aims to supply a fixed amount of sanitary water to the residents (labelled as "domestic water") and to provide industrial water which is indispensable to industrial growth and production. Thus, this project is expected to contribute greatly to the acceleration of industrial growth of the area, as well as to regional and national economic growth.

Foremost among the benefits for the area is public hygiene. The supply of hygienic, sanitary water automatically brings about savings in time previously lost due to illness, economic loss from death and a reduction in the amount of medical fees and expenses. The decrease in the number of deaths and illnesses will motivate people in the area. Needless to say, distribution of sanitary water improves the people's life style and environment and upgrades living standards. Also, it brings about intangible benefits which cannot be measured in monetary terms.

Another benefit which stems from the fixed low unit price of water is consumer suprlus gained by the residents. A third benefit comes from the installation of fire hydrants which reduces the rate of fire losses. Finally, the supply of industrial water triggers industrial development which creates numerous employment opportunities thereby initiating economic growth. Hence, stabilization of the people's livelihood is brought about.

One of the national socio-economic benefits provided by this project is its contribution to the productivity of the country.

The supply of industrial water triggen industrial production and industrialization for the country. The industrialization of the

area would contribute to an increase in the gross national product.

The socio-economic benefits, directly and indirectly contribute to the national economy.

This project is definitely in line with the government policy of promoting regional development. The realization of this project is therefore indispensable to the industrial development of the area.

11-2 Economic Benefits

This project is expected to contribute greatly to the socio-economy of the region as well as to the national economy. In the case of economic analysis, economic benefits are viewed from the standpoint of possible contribution to the national economy. It should be noted that in choosing the numerous economic benefits generated from this project, the following criteria were satisfied:

(1) from the socio-economic standpoint, as much as possible the direct benefits were emphasized.

(2) indirect benefits which strongly contribute to the socio-economy of the region were also mentioned.

(3) tangible effects which can be measured quantitatively are mentioned.

It is also necessary to bear in mind the following points in the economic analysis. The prices quoted for the ecomic analysis have been revised to 1982 prices (with the exception of one section computed at 1983 prices). Moreover, future escalation was not taken into account. Accounting prices have been used in the estimation of the economic costs.

11-2-1 Improvement of Regional Welfare

A. Medical and Hygienic Benefits for the Region:

1. Effects of Construction of Waterworks on Environmental Sanitation and Medical Treatment

As mentioned in Chapter 3, facilities for environmental sanitation are lacking in the proposed service areas. The survey revealed that most of the residents depend on public faucets for their water requirements and that only 10 % of the population at present are served by house connections. A limited number of households are equipped with an improved water depositing lavatory, but the existence of lavatories in most houses is highly

doubtful. Moreover, water quality tests showed that the water supplied to the barangays from springs and wells are contaminated and unfit for drinking.

This area is characterized by high mortality rates from diseases of the respiratory system followed by those of the digestive system. There is a close correlation between the quality of drinking water and the prevalence of digestive infections. Therefore, the improvement of water supply would naturally reduce the incidence of digestive infections. It does not follow that the improvement of facilities would insure the prevention of diseases. It is, however, imperative that these facilities are properly maintained and administrated through the following means.

(1) Securing of a reservoir

(2) Sufficient disinfection facilities (effective chlorination is essential to reduce the concentration of free residual chlorine to 0.1 ∿ 0.2 ppm)

(3) Appointment of a full-time administrator of the water supply system.

With regard to the expenses for medical treatment, this study revealed that ₱400 - ₱800 per week is normally spent on outpatient treatment and hospitalization bills. This amount corresponds to 2.72 ∿ 5.0 % of the annual income per household. (Note : in the case of Japan, it corresponds to 0.4 ∿ 1.8 % of the annual income).

Hence, medical expenses occupy too large a percentage of the annual income.

Thus, enormous savings can be made on medical expenses if the quality of drinking water is improved.

(c) Delivery of Babies

Charge of delivery ₱350 ∿ 500

Accommodation charge (Electric fan, 2-beds room)

₱35 x 7 days = ₱245

Cahrge for laboratory examination

Pregnancy test	₱40
VDRL	₱50

Total charge ₱685 ∿ 835

(2) In the case of Japan:

a. Infectious diseases (Gastroenteritis, Tuberculosis)

Outpatient treatment ¥ 2,831 /day x 7 days = ¥19,817

Inpatient treatment ¥ 8,444 /day x 7 days = ¥39,108

b. Upper Respiratory Tract Infection

Outpatient treatment ¥ 2,561 /day x 7 days = ¥17,927

Inpatient treatment ¥11,657 /day x 7 days = ¥81,599

2. Projection Methods

(1) The Framework of Projection

For the environmental sanitation and medical treatment, the following factors were taken into account in the projection of economic benefits.

(1) Cost of time loss from diseases

(2) Cost of economic loss from deaths

(3) Savings from reduction of medical fees

In order to offset the lack of data, and to bring uniformity to the inconsistencies of available data, the estimates were based on the following premises:

(a) ratio of potential disease victims

$$\left(\frac{\text{no. of victims x no. of times taken ill}}{\text{population}}\right)$$

and ratio of those receiving treatment for the diseases is equal.

(b) from the supply of clean drinking water, a 30 % decrease in diseases directly related to water supply is assumed.

(2) Formula for the Projections

The effects of this project are demonstrated from two cases; namely,

(a) the realization of the water supply scheme

(b) without the water supply scheme

The effects are differences obtained from (a) minus (b). Prices are at 1982 rates. The actual calculation are shown below:

$$\begin{pmatrix}\text{Cost of time}\\ \text{loss from}\\ \text{diseases}\end{pmatrix}_t = \begin{pmatrix}\text{employee}\end{pmatrix}_t \times \begin{pmatrix}\text{ratio of diseases}\\ \text{caught chiefly}\\ \text{from water supply}\end{pmatrix}_t \times \begin{pmatrix}\text{daily minimum}\\ \text{wage}\end{pmatrix}_{1982}$$

x No. of days treated

$$\begin{pmatrix}\text{Cost of}\\ \text{economic loss}\\ \text{from deaths}\end{pmatrix} = \begin{pmatrix}\text{employee}\end{pmatrix}_t \times \begin{pmatrix}\text{ratio of deaths}\\ \text{caused by}\\ \text{water supply}\end{pmatrix}_t \times \begin{pmatrix}\text{expected income}\\ \text{had death not}\\ \text{occurred}\end{pmatrix}_{1982}$$

$$\begin{pmatrix}\text{Reduction of}\\ \text{medical}\\ \text{fee}\end{pmatrix} = \begin{pmatrix}\text{popula-}\\ \text{tion}\end{pmatrix}_t \times \begin{pmatrix}\text{ratio of}\\ \text{diseases caused}\\ \text{by respiratory}\\ \text{diseases}\end{pmatrix} \times \begin{pmatrix}\text{cost of medical}\\ \text{fee per treat-}\\ \text{ment of diseases}\end{pmatrix}_{1982}$$

Note : $t = 1985 \sim 2005$

(3) Essential Factors for the Projection of Economic Benefits

(i) Ratio of diseases principally caused by water supply

According to the data received from Ormoc General Hospital and OSPA Farmers Medical Center, the member of cases of water-supply caused diseases such as diarrhea, gastroenteritis are shown below.

1982 - Present (estimate - 26.7* (for every 1000 persons)

1985 - Onwards	18.7 (for every 1000 per persons)	
Effects of this project	8.0 (")	

* Note: The patients treated in the two hospitals mentioned are estimated to come from the City of Ormoc, & the municipalities of Merida & Isabel)

(ii) Mortality Rate From Diseases caused by Water Supply

1982	0.26*	(per 1000 persons)
1985 - Onwards	0.18	(")
Effects of this project	0.08	(")

* Note : Source of data: Tacloban Office

(iii) Daily Minimum Wage Level

1982 price index ₱36.49/day*

* Note: Non-agriculture laborers/workers outside Metromanila receive ₱30.76/day (as of March 1981) and estimates are based on this figure.

(iv) Expected income had death not occurred

1982 price index ₱210,000.00*

* Note:

₱36.49/day x 24 days/month x 12 months x 20 years

(v) No. of days for treatment of diseases

8.5 days*

* Note: Hospitalization required : 7 days
Outpatient treatment 10 days

(vi) Medical cost per treatment:

1982 price index : ₱59.50

Note : 0.4 x ₱640.00/less than one week hospitalization + 0.6 x ₱395.00/Commute to hospital for one week (7 days) x $\frac{10}{7}$

3. Results of Projected Economic Benefits From This Project:

The implementation of this project brings about a savings of approximately 300,000 ∿ 500,000 pesos per year (1982 price index) for the residents. It also brings down the rate of mortality, morbidity and fatality from digestive-system related diseases. In total, for 21 years, the period between 1985 ∿ 2005, the amount of savings is estimated to reach ₱9,090,000 (1982 price index)

Table 11-1 Economic Benefit from Water Supply on Peoples' Health in the Area

(Unit: ₱1000, in 1982 price)

Year	Total	Time Loss due to illness	Economic Loss & Re-ing from Death	Decrease of Medical Fees
1985	301.6	22.6	152.9	126.1
86	353.9	26.5	179.8	147.6
87	358.2	26.8	181.5	149.9
88	364.3	27.2	184.1	153.0
89	400.9	29.9	202.3	168.7
1990	406.5	30.2	204.6	171.7
91	412.2	30.5	206.5	175.2
92	417.8	30.7	208.4	178.7
93	423.6	31.0	210.3	182.3
94	429.6	31.3	212.3	186.0
1995	439.7	32.1	217.8	189.8
96	446.6	32.5	220.4	193.7
97	453.6	32.9	223.0	197.7
98	460.7	33.3	225.7	201.7
99	468.0	33.7	228.4	205.9
2000	475.5	34.1	231.3	210.1
1	482.2	34.5	233.8	213.9
2	488.7	34.9	236.4	217.4
3	495.5	35.3	239.1	221.1
4	502.4	35.7	241.8	224.9
2005	509.4	36.1	244.5	228.8
1985 ∿ 2005 Total	9,090.9	661.8	4,484.9	3,944.2

B. Consumer Surplus:

Consumer surplus refers to the excess amount a consumer is willing to pay for the price of goods when the actual price is below the amount he is willing to pay.

1. Calculation of the Residents Willingness to Pay and the Consumer Surplus

The present survey revealed that the residents were willing to pay between ₱5 ∿ 10 pesos/month/household for water supply services. In some places, it is as low as ₱1. ∿ 2.00. Because of the conditions in the area, it is unfortunate that the survey team was not able to obtain data for the residents' willingness to pay. Thus, this still remains unclear.

However, the computation of consumer surplus was based on the following assumptions:

(1) The water demand of the residents and the water demand projected by this study is in agreement.

(2) The unit price of domestic water deduced from the "Willingness to Pay" is placed at ₱1.593/cum. This price also coincides with the price, the operating entity will need to balance operating revenues and expenses over the next 21 years. (Refer to Chapter 10-4)

The computation used in determining the consumer surplus is shown below

$$\begin{pmatrix}\text{Consumer}\\ \text{Surplus}\end{pmatrix} = \begin{pmatrix}\text{(Unit}\\ 1.593 \text{ price } -\\ \text{projected)}\end{pmatrix} \times \begin{pmatrix}\text{Amount of water}\\ \text{consumption}\\ \text{(projected)}\end{pmatrix}$$

2. Consumer Surplus Total Benefit

The above formula was used in computing the consumer surplus for the period between 1985 ∿ 2005 and indicates a total value of ₱31,020,000 (1982 price index) can be attained in 21 years.

The following table shows the exact amount.

Table 11-2 Consumer Surplus to Water Supply

(Unit: Thousand pesos, 1982 price)

Item / Year	Total	House Connection			Public Faucet
			Domestic Water	Commercial Water	Domestic Water
1985	852.0	226.7	188.5	38.2	625.3
1986	1,011.2	316.0	264.8	51.0	695.2
1987	1,045.7	365.1	308.6	56.5	680.6
1988	1,086.1	419.1	354.6	64.5	667.0
1989	1,218.8	515.5	439.7	75.8	703.3
1990	1,262.2	577.8	496.7	81.1	684.4
1991	1,295.3	640.1	551.3	88.8	655.2
1992	1,332.3	705.0	611.8	93.2	627.3
1993	1,377.7	772.0	674.3	97.6	605.7
1994	1,425.2	845.4	743.3	102.0	579.8
1995	1,485.6	925.7	819.3	106.4	559.9
1996	1,527.4	995.9	882.1	113.8	531.5
1997	1,571.8	1,071.4	949.6	121.7	500.4
1998	1,621.1	1,146.1	1,022.4	123.7	475.0
1999	1,687.1	1,239.9	1,107.5	132.3	447.2
2000	1,750.8	1,326.3	1,192.1	134.1	424.5
2001	1,788.6	1,408.7	1,267.1	141.6	379.9
2002	1,833.6	1,496.4	1,346.7	149.7	337.2
2003	1,882.3	1,580.5	1,431.3	149.3	301.8
2004	1,946.6	1,678.7	1,521.0	157.7	267.9
2005	2,022.8	1,783.0	1,626.2	156.8	239.8
1985 ∿ 2000 Cumulative Total	31,024.2	20,035.3	17,798.9	2,235.8	10,988.9

Note : ₱1.593 - Unit price of water (estimated)
- Domestic water, Commercial water : ₱0.657/cum.
- Public faucet/ domestic water : ₱0.729/cum.

C. Reduction of Losses from Fires

This project plans to install one fire hydrant for every 100 households. This will definitely reduce the number

of fires and diminish losses resulting from fire.

1. Method Used For Projection

The following factors were considered in estimating the above benefits.

(1) Outbreak of fires - 0.75 %

(2) The potential cost of damages caused by fire is computed through the following formula:

Cost of Potential Loss =
No. of Households x ₱28,000.00 x 0.75 %

(3) The cost of potential damage is expected to decrease as a result of the use of fire hydrants by 50 % so the following formula is adopted.

$$\text{Reduced Fire Losses From Use of Fire Hydrants} = \text{Cost of Potential Damages From Fires} \times 50\ \%$$

Note: Source of Date: LWUA Manual.

2. Effects of the Projected Benefit

Fire hydrants shall be installed during the years between 1985 ∿ 2005 for a period of 21 years. The amount of savings resulting from their existence and use is anticipated to reach approximately ₱18,490,000.00 (1982 price index).

Table 11-3 Reduction of Fire Losses and Damages from Installation of Fire Hydrants

(Unit: ₱1000, in 1982 price)

Year	Reduction of Fire Losses and Damages from Instal- of Fire Hydrant	(for reference)		
		Number of Household	Property of People (₱1000)	Potential Losses and Damages (₱1000)
1983	645.3	6,146	172,088	1,290.7
86	748.5	7,129	199,612	1,497.1
87	751.7	7,159	200,452	1,503.4
83	758.3	7,222	202,216	1,516.6
84	826.8	7,874	220,472	1,653.5
1990	832.5	7,929	222,012	1,665.1
91	839.5	7,995	223,860	1,679.0
92	846.4	8,061	225,708	1,692.8
93	853.4	8,128	227,584	1,706.9
94	860.6	8,196	229,488	1,721.2
1993	867.7	8,264	231,392	1,735.4
96	885.4	8,432	236,096	1,770.7
97	903.4	8,604	240,912	1,806.8
98	921.8	8,779	245,812	1,893.6
99	940.6	8,958	250,829	1,881.2
2000	959,7	9,140	255,920	1,919.4
1	976.2	9,297	260,316	1,952.4
2	992.9	9,456	264,768	1,985.8
3	1,009.9	9,618	259,304	2,019.8
4	1,027.1	9,782	273,895	2,054.2
2005	1,044.8	9,930	278,600	2,089.5
1985∿2000 Total	18,492.5			

D. Effects of Increase in Regional Employment

1. Rationale for Labor Investment Benefit

In principle, labor, together with capital and land are factors of production. From this standpoint, use of labor is seen as an economic cost.

On one hand, increased employment and rigional development make up the main policy of most developing countries. Therefore, it is understandable that these countries would utilize surplus labor in order to bring about economic benefits. The survey shows that for the present project, the necessary labor for the construction of facilities and the supply of industrial and potable water is treated as an economic cost; however, the provision of industrial water generates productive activities which will require labor and therefore, the latter is viewed as as an economic benefits.

A large percentage of unkilled labor can be employed for productive activities. From the point of view of the operating entity, unskilled labor is regarded as an economic cost, but from the standpoint of the national economy, use of unskilled labor is a means of reducing the high unemployment rate.

On the other hand, it should be noted that the location of the proposed area is such that it is difficult to attract laborers and workers.

the high unemployment rate. On the other hand, it should be noted that the location of the proposed area is such that it is difficult to attract laborers and workers.

Moreover, the employment of skilled labor in the proposed area would bring about negative effects in that it would diminish the supply of skilled labor in other regions. For this study, this negative effect is excluded from the evaluation.

2. Necessary Calculation Variables

In projecting the economic benefits arising from the increase of employment opportunities, the necessary labor wages are listed below

Average Annual Salary (Per Laborer)*

(Unit: Peso, 1982 prices)

PASAR	₱17,498
PHILPHOS	₱18,772
WHARF	₱17,290
Primary & Secondary Industries	₱16,900
Tertiary Industry	₱13,000

*Note: Based on the following premises:

a Monthly salaries for

Skilled labor - ₱3,000

Unskilled labor - ₱1,000

b One-month bonus was added.

c Ratio of employed skilled and unskilled labor for each industry was taken into account.

3. Results of Projections

The supply of industrial water makes it possible for industrial production to be increased. As a result, this could initiate productive activities in other industrial sectors, thereby bringing about employment growth. The effects of this growth are shown in the next table. (Table 11-4)

From this table the following conclusions can be deduced:.

(1) By 1985, increased employment would amount to ₱4,400,000 (1982 price index), and is expected to reach ₱63,500,000 by the year 2005.

(2) From the year 1990, employment in the tertiary sector generated by the industrial production of PASAR and PHILPHOS would be significant.

Table 11-4 Increase of Employments in Industries to be brought by Supply of Industrial Water

(Unit: Million Pesos, in 1982 price)

Year	Total	PASAR	PHILPHOS	Port	Other Secondary Industry	Tertiary Industry
1984						
1985	4.40	0	2.48	1.92		
86	12.77	6.35	2.48	3.94		
87	14.20	6.35	2.48	3.94	0.42	1.01
88	16.46	6.35	2.80	4.18	0.88	2.25
89	27.28	9.50	2.80	6.22	1.35	7.41
1990	29.14	9.50	2.80	6.22	1.88	8.74
91	30.46	9.50	2.80	6.22	2.24	9.70
92	31.95	9.50	2.80	6.22	2.67	10.76
93	33.65	9.50	2.80	6.22	3.19	11.94
94	35.57	9.50	2.80	6.22	3.80	13.25
1995	40.55	9.50	3.72	6.95	4.95	15.43
96	42.42	9.50	3.72	6.95	5.60	16.65
97	44.47	9.50	3.72	6.95	6.33	17.97
98	46.72	9.50	3.72	6.95	7.15	19.40
99	49.18	9.50	3.72	6.95	8.08	20.93
2000	51.90	9.50	3.72	6.95	9.14	22.59
1	53.90	9.50	3.72	6.95	10.07	23.66
2	56.05	9.50	3.72	6.95	11.09	24.79
3	58.35	9.50	3.72	6.95	12.21	25.97
4	60.83	9.50	3.72	6.95	13.45	27.21
2005	63.49	9.50	3.72	6.95	14.82	28.50

11-2-2 Cumulative Effects on Domestic Industrial Production from Demand for Domestic Materials by the Construction & Maintenance of Water Supply Scheme

The materials necessary for the construction of the facilities include both local and imported items. In the case of domestic materials, project demand will increase production in related industries resulting in creation of new added value. This serves as another additional economic effect especially significant for a country which aims to achieve economic growth.

1. Projection Method

The following formula has been adopted:

$$\begin{bmatrix}\text{Present}\\ \text{Economic}\\ \text{Benefit}\end{bmatrix} = \begin{bmatrix}\text{Amount of}\\ \text{Materials}\\ \text{Derived}\\ \text{Locally}\end{bmatrix} \times \left(1 - \begin{matrix}\text{indirect}\\ \text{tax ratio}\end{matrix}\right) \times \begin{bmatrix}\text{Generated}\\ \text{Coefficient}\end{bmatrix} \times \begin{bmatrix}\text{Ratio of}\\ \text{Gross Added}\\ \text{Value}\end{bmatrix}$$

2. Necessary Calculations

(1) Estimate of indirect tax ratio

According to the National Internal Revenue Code of 1977, the tax ratio of the sales divided by ordinary profit is assumed to be 5 ∿ 6 %. In additon, commodity tax and income tax are taken into account so it is safe to assume that in relation to the sales, the indirect tax ratio (including direct tax) is about 10 %.

(2) Generated Coefficient & Ratio of Gross Added Value:

Generated coefficient refers to a unit increase due to the final demand of a certain industry which in turn induces other related industries to increase production as well.

Generated coefficient is defined as follows:

Table 11-5 Benefit on Domestic Industries from Production of Materials for Construction of Facilities and Operation

(Unit: ₱1000, in 1982 price)

Year	Total	Domestic Materials for Construction	Domestic Materials for Operation
1983	18,258.5	18,258.5	
84	40,127.3	40,127.3	
1985	2,011.2		2,011.2
1986	2,371.7		2,371.7
87	2,469.2		2,469.2
88	2,765.7		2,765.7
89	3,071.0		3,071.0
1990	3,180.5	60.5	3,120.0
91	3,154.6		3,154.6
92	3,190.0		3,190.0
93	3,226.2		3,226.2
94	3,263.4		3,263.4
1995	3,301.4		3,301.4
96	3,350.1		3,350.1
97	3,488.3	90.7	3,397.6
98	3,421.7		3,421.7
99	3,467.3		3,467.3
2000	3,908.2	397.1	3,511.1
1	3,554.3		3,554.3
2	3,598.2		3,598.2
3	3,643.2		3,643.2
4	3,779.6	90.7	3,688.9
2005	3,750.5		3,750.5
1983 ∿ 2000 Total	126,352.1	59,024.8	67,327.3

induced amount of production in the related industries $\frac{\cdot}{\cdot}$ additional final demand of a certain industry

On the other hand, the ratio of gross added value (1.0 - ratio of raw materials) is composed of wages, profit, depreciation, etc.

Based on the 1969 input/output table of Philippine industries, each industry has different values; thus for the purposes of this study, the following values are quoted:

Philippines:

Generated coefficient	- 1.5
Ratio of gross added value	- 0.7

In comparison to Japan, the figures are listed below:

Generated coefficient	- 2.5
Ratio of gross added value	- 0.5

3. Implications of the Projections:

The construction and maintenance of the water supply facilities is expected to contribute to the industrial production of the Philippines. For the years 1983 ∿ 2005, a period of 23 years, the total benefit is expected to reach ₱126,350,000 (1982 prices). This is equivalent to 46 % of total construction and total maintenance costs.

Table 11-6 Amount of Domestic Materials to be demanded by Construction and Replacement of Facilities

(Unit: ₱1000, in 1982 price)

Year / Facilities	Total	1983	1984
Well	6,389.7	2,121.1	4,242.2
Transmission	43,488.1	14,496.1	28,992.0
Distribution	8,273.9	2,704.0	5,408.1
Office Building	423.0		423.0
Operation Center	964.0		232.0
Vehicle	256.0		
Contengency 1/	3,165.4		3,165.4
Total	62,460.1	19,321.2	42,462.7

1/ This is estimated on the base of ratio of amount of domest domestic material to construction costs (excluding vehicle) (39.2%).

< After 1985 >

Well	26.4 (2000)
Distribution	161.8 (2000)
Operation Center	232.0 (2000)
Vehicle	64.0 (1990), 96.0 (1997), 96.0 (2004)

Note: Numerals in parentheses: point of time of appearance.

Table 11-7 Amount of Domestic Materials to be demanded by Operation of the Facilities

(Unit: ₱1000, in 1982 price)

Year	Total	Electric Energy	Fuel	Chemicals	Materials for Maintenances	Stores Materials
1985	2,128.3	2,007.6	9.1	56.5	27.6	17.5
86	2,509.7	2,388.7	9.1	61.6	36.4	23.0
87	2,612.9	2,473.2	9.1	62.9	40.9	25.9
88	2,926.7	2,787.9	9.1	64.3	45.6	28.9
89	3,249.7	3,092.3	9.1	68.6	54.4	34.4
1990	3,301.6	3,134.5	9.1	69.9	59.5	37.7
91	3,338.2	3,162.3	9.1	71.5	64.1	40.3
92	3,375.7	3,190.4	9.1	73.2	69.1	43.0
93	3,414.0	3,218.7	9.1	74.9	74.5	45.9
94	3,453.3	3,247.3	9.1	76.6	80.3	49.1
1995	3,493.5	3,276.1	9.1	78.4	86.6	52.4
96	3,545.1	3,308.1	9.1	80.2	92.1	55.6
97	3,595.3	3,340.4	15.9	82.1	98.0	58.9
98	3,620.8	3,370.0	15.9	84.0	104.3	62.5
99	3,669.1	3,905.9	15.9	85.9	111.0	66.3
2000	3,715.5	3,439.2	15.9	87.9	118.1	70.3
1	3,761.2	3,473.2	15.9	89.9	124.6	73.5
2	3,807.6	3,507.5	15.9	91.3	131.5	76.8
3	3,855.2	3,542.2	15.9	93.9	138.8	80.3
4	3,903.6	3,577.2	15.9	96.0	146.5	83.9
2005	3,968.8	3,612.5	15.9	98.1	154.6	87.7
1985 ∿ 2000 Total	71,245.8	66,575.2	50.0	1,648.2	1,858.5	1,113.9

11-3 Econmic Costs

11-3-1 Economic Costs & Accounting Price (Shadow Price)

From the point of view of the national economy, the construction costs, replacement costs, and management costs are considered to be economic costs. These factors were discussed in the previous chapter on financial analysis. Although the economic costs are considered the same, a marked difference comes to light when seen from the point of view of the operating entity versus the national economy.

For example, in the case of imported materials to be used in construction, replacement and maintenance, these are treated as normal, ordinary financial costs in the financial analysis. However, in economic terms, the importation of these materials affects the foreign reserves of the country. If the country's foreign reserves are low, controls and import limitations have to be exercised. The importation of these materials can creat to be exercised. The importation of these materials can create direct negative effects on the local industries. Thus, it is necessary to look into the amount of loss or damage caused by such importation when evaluating the amount of imported materials. Furthermore, in the financial analysis, the cost of materials including the taxes incurred are considered to be financial costs, However, for the national economy, the indirect taxes (including other taxes) are considered to be funds transferred from the operating entity to the government. Hence, the cost of materials without taxes is considered to be the economic cost.

In addition to the above arguments, the following factors need to be re-evaluated for the economic analysis:

(a) foreign labor utilized for this project (evaluation of the percentage of technical transfer)

(b) domestic skilled labor (negative effects on other projects and industries)

(c) domestic unskilled labor (reduction in the rate of unemployment)

As exemplified by the above factors, although financial and economic factors are similar, the interpretations and analysis thereof differs especially in the case of the economic analysis which has relevance to the national economy. In grasping and understanding the Accounting price (also known as shadow price), it is necessary to bear this difference in mind.

Due to the restrictions and limitations in data and information in this survey, the Accounting Price is adopted for the following:

(1) imported materials

(2) local materials

Their accounting prices are listed below:

$$\text{Accounting Price of Imported Materials} = \text{Financial Amount of Imported Materials} \times 1.3^{*a}$$

$$\text{Accounting Price of Local Materials} = \text{Financial Amount of Local Materials} \times (1.0 - 0.1)^{*b}$$

*Note: a Based on LWUA Standard Mannual. Moreover, the coefficient was computed from the input/output table (1969).

b Ratio of Indirect Tax. Refer to 11-2-2.

11-3-2 Economic Costs

Based on the previously mentioned methods, the projected economic costs added to the burden of interest from construction costs are summarized below as the total economic costs:

Construction costs	Cumulative total 1983 ∿ 2005 184,415.2	Remarks Adoption of accounting price
Value of Remaining Facilities	98,478.4	"
Maintenance Costs	102,644.3	"
Intererest for Construction Costs	63,373.9	
Total	251,955.0	

Note: Unit 1000 pesos 1982 prices

The annual breakdown of economic costs is shown in the following tables. (Tables 11-8, 11-9 & 11-10).

Table 11-8 Economic Costs of this Project

(Unit: ₱1000, in 1982 price)

Year		Construction and Replacement	Operating Expenses	Burden of Interest on Construction Cost
1983	63,553.6	63,553.6		
84	117,805.8	117,805.8		
1985	10,542.9		2,886.8	7,656.1
86	10,396.7		3,445.6	6,951.1
87	9,921.7		3,625.6	6,296.1
88	9,723.8		4,038.3	5,685.5
89	9,612.2		4,493.8	5,118.4
1990	9.288.4	143.4	4,554.9	4,590.1
91	8,779.9		4,640.7	4,139.2
92	8,445.4		4,729.8	3,715.6
93	8,138.5		4,822.2	3,316.3
94	7,857.9		4,918.7	2,939.2
1995	7,605.2		5,018.9	2,586.3
96	7,358.4		5,105.5	2,252.9
97	7,368.4	215.1	5,214.6	1,938.7
98	6,948.2		5,304.8	1,643.4
99	6,768.5		5,103.4	1,365.1
2000	9,087.9	2,982.2	5,502.8	1,102.9
1	6,449.9		5,594.2	855.7
2	6,310.8		5,688.1	622.7
3	6,187.9		5,784.9	403.0
4	6,295.0	215.1	5,884.3	195.6
2005	5,986.9		5,986.9	
(2006)	▲98,478.4	▲98,478.9		
Total	251,955.0	85,936.8	102,644.3	63,373.9

Table 11-9 Economic Costs of Construction and Replacement of Facilities

(Unit: ₩1000, in 1982 price)

Facilities \ Point of time of appearance		1983		1984		1990		1997		2000		2004		Totel	
		Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Well	Equipment-Materials	1,909.0	735.4	3,818.0	15,788.7					23.8	1,374.2			5,750.8	18,098.3
	Labor	696.3		1,392.5						26.4				2,115.2	
	Others		700.9		1,401.9						52.9				2,155.7
	Total	4,041.6		22,601.1						1,477.3				28,120.0	
Trans-mission	Equipment-Materials	13,046.5	25,710.1	26,092.8	22,865.8									39,139.3	48,575.9
	Labor	3,930.5		7,861.1										11,791.6	
	Others		,5,088.5		10,177.0										15,265.5
	Total	47,775.6		66,996.7										114,772.3	
Distri-bution	Equipment-Materials	2,433.6	1,704.0	4,867.3	3,408.2					45.6	286.0			7,446.5	5,398.2
	Labor	699.9		1,339.8						38.2				2,077.9	
	Others		923.6		1,847.1						12.4				2,783.1
	Total	5,761.1		11,462.4						482.2				17,705.7	
Office Building	Equipment-Materials			380.7	102.7									380.7	102.7
	Labor			81.0										81.0	
	Others				52.0										52.0
	Total			616.4										616.4	
Operation Center	Equipment-Materials			208.8	198.9					208.8	198.9			417.6	397.8
	Labor			79.0						79.0				158.0	
	Others				36.0						36.0				72.0
	Total			522.7						522.7				1,045.4	
Vehicle	Equipment-Material					57.6	85.8	86.4	128.7			86.4	128.7	230.4	343.2
	Labor														
	Others														
	Total					143.4		215.1				215.1		573.6	
Con-tengency	Equipment-Material			2,843.9	3,818.6									2,848.9	3,818.6
	Labor			1,963.8										1,963.8	
	Others														
	Total			8,631.3										8,631.3	
Total	Equipment-Material	17,389.1	28,149.5	38,216.5	46,382.9	57.6	85.8	86.4	128.7	378.2	1,859.1	86.4	128.7	56,214.2	76,734.7
	Labor	5,326.7		12,717.2						143.6				18,187.5	
	Others		6,713.0		13,514.0						101.3				20,328.3
	Total	57,578.3		110,830.6		143.4		215.1		2,482.2		215.1		171,464.7	

Table 11-10 Economic Costs of Operation of Faciliteis

(Unit: ₱1000, in 1982 price)

	Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Personnel Cost	Labor	138.6	184.8	211.2	331.0	257.4	283.8	301.3	319.9	334.6	360.6	382.8	399.7	417.9	435.8
Electric Energy	Domestic Materials	1,815.8	2,149.8	2,234.9	2,509.1	2,783.1	2,821.1	2,846.1	2,871.4	2,896.8	2,922.6	2,948.5	2,977.3	3,006.4	3,033.0
	Imported Materials	676.9	801.5	844.0	935.4	1,037.9	1,004.8	1,023.0	1,041.5	1,060.3	1,079.5	1,099.0	1,109.7	1,120.6	1,131.6
	Total	2,492.7	2,951.1	3,078.9	3,444.5	3,820.5	3,825.9	3,869.1	3,912.9	3,957.1	4,002.1	4,047.5	4,087.0	4,127.0	4,164.6
Fuel	Domestic Materials	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	14.3	14.3
	Imported Materials	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	30.0	30.9
	Total	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	45.2	45.2
Chemicals	Domestic Materials	50.9	55.4	56.6	57.9	61.7	62.9	64.4	65.9	67.4	68.9	70.6	72.2	73.9	75.6
	Imported Materials	31.5	34.3	35.0	35.9	38.2	39.0	39.9	40.8	41.8	42.7	43.7	44.7	45.7	46.8
	Total	82.4	89.7	91.6	90.8	99.9	101.9	104.3	106.7	109.2	111.6	114.3	116.9	119.6	112.4
Materials for Maintenance	Domestic Materials	24.8	32.8	36.8	41.0	49.0	53.6	57.7	62.2	67.1	72.3	77.9	82.9	88.2	43.9
	Imported Materials	23.9	31.5	35.4	39.5	47.1	51.5	55.5	59.9	64.5	69.6	75.0	79.8	84.9	90.4
	Total	48.7	64.3	72.2	80.5	96.1	105.1	113.2	122.1	131.6	141.9	152.9	162.7	173.1	184.3
Stored Materials	Domestic Materials	15.8	20.7	23.3	26.0	31.0	33.9	36.3	38.7	41.3	44.2	47.2	50.0	53.0	56.3
	Imported Materials	82.7	109.1	122.5	136.6	163.0	178.4	190.6	203.6	217.5	232.7	248.3	263.3	279.3	296.2
	Total	98.5	129.8	145.8	162.6	194.0	212.3	226.9	242.3	258.8	276.6	295.5	313.3	332.3	352.5
Total	Labor	137.6	134.8	211.2	231.0	257.4	283.8	301.3	319.9	339.6	360.6	382.8	399.7	417.9	435.8
	Domestic Materials	1,915.5	2,266.9	2,359.8	2,642.2	2,933.0	2,979.7	3,012.7	3,046.4	3,080.8	3,116.2	3,152.4	3,190.6	3,235.8	3,273.1
	Imported Materials	832.7	993.9	1,054.6	1,165.1	1,303.4	1,791.4	1,326.7	1,363.5	1,401.8	1,441.9	1,483.7	1,515.2	1,561.4	1,595.9
	Total	2,886.8	3,445.6	3,625.6	4,038.3	4,493.8	4,554.9	4,640.7	4,729.8	4,822.2	4,918.7	5,018.9	5,105.5	5,214.6	5,304.8

(Continued)

Year		1999	2000	2001	2002	2003	2004	2005	Total
Personnel Cost	Labor	455.1	475.2	492.9	510.2	538.7	547.8	567.6	7,740.9
Electric Energy	Domestic Materials	3,065.3	3,045.3	3,125.9	3,156.8	3,188.0	3,219.5	3,251.3	59,918.0
	Imported Materials	1,142.6	1,153.8	1,165.2	1,176.7	1,188.4	1,200.1	1,212.0	22,203.8
	Total	4,207.9	4,249.1	4,291.1	4,333.5	4,376.4	4,419.6	4,463.3	82,121.8
Fuel	Domestic Materials	14.3	14.3	14.3	14.3	14.3	14.3	14.3	227.1
	Imported Materials	30.9	30.9	30.9	30.9	30.9	30.9	30.9	490.5
	Total	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2
Chemicals	Domestic Materials	77.3	79.1	80.9	92.6	84.5	36.4	88.3	1,483.4
	Imported Materials	47.9	49.0	50.0	51.2	52.3	53.9	54.6	918.4
	Total	125.2	128.1	130.9	133.8	136.8	139.8	142.9	2,401.8
Materials for Maintenance	Domestic Materials	99.9	106.3	112.1	118.4	124.9	131.9	139.1	1,672.8
	Imported Materials	96.2	102.4	108.1	114.0	120.3	127.0	134.0	1,610.5
	Total	196.1	208.7	220.2	232.4	245.2	258.9	273.1	3,283.3
Stored Materials	Domestic Materials	59.7	63.3	66.2	69.1	72.3	75.5	78.9	1,002.7
	Imported Materials	314.2	333.2	348.2	363.9	380.3	377.5	415.4	5,276.2
	Total	373.9	396.5	414.4	433.0	452.6	473.0	494.3	6,278.9
Total	Labor	455.1	475.2	492.4	510.2	528.7	547.8	567.6	7,840.9
	Domestic Materials	3,316.5	3,358.3	3,399.4	3,441.2	3,484.0	3,527.6	3,571.9	64,304.0
	Imported Materials	1,631.8	1,669.3	1,702.4	1,736.7	1,772.2	1,808.9	1,846.9	30,999.4
	Total	5,403.4	5,502.8	5,594.2	5,688.1	5,784.9	5,884.3	5,986.4	102,644.3

11-4 Cost Benefit Analysis

11-4-1 Summary of Economic Costs and Benefits

The case mentioned in Sections 1 & 2 of this chapter, in the sensitivity analysis is referred to as the Base Case. The economic costs and benefits of this perticular case are summarized in the following table 11-11.

The net economic benefit (= economic benefits - economic costs) of the Base Case for the years 1983 and, 1984 (construction period) and 1986 are negative, but for the rest of the design period it is expected to be positive.

Table 11-11 Economic Benefits and Costs in Base Case

(Unit: ₱1000, 1982 price)

	Economic Benefit A						Economic Cost B	Net Economic Benefit A-B
Year		Medical Effect	Consumers Surplus	Reduction of Fire Losses	Increase of Employment	Increase of Added Value		
1983	18258.5					18258.4	63553.6	-45295.
1984	40127.3					40127.3	117806	-77679.
1985	8210.1	301.6	852	645.3	4400	2011.2	10542.9	-2332.8
1986	17255.3	353.9	1011.2	748.5	12770	2371.7	10396.7	6858.6
1987	18824.8	358.2	1045.7	751.7	14200	2469.2	9921.7	8903.1
1988	21434.4	364.3	1086.1	758.3	16460	2765.7	9723.8	11710.6
1989	32797.5	400.9	1218.8	826.8	27280	3071	9612.2	23185.3
1990	34821.7	406.5	1262.2	832.5	29140	3180.5	9288.4	25533.3
1991	36341.6	412.2	1295.3	839.5	30640	3154.6	8779.9	27561.7
1992	37736.5	417.8	1332.3	846.4	31950	3190	8445.4	29291.1
1993	39530.9	423.6	1377.7	853.4	33650	3226.2	8138.5	31392.4
1994	41548.8	429.6	1425.2	860.6	35570	3263.4	7857.9	33690.9
1995	46644.4	439.7	1485.6	867.7	40550	3301.4	7605.2	39039.2
1996	48629.5	446.6	1527.4	885.4	42420	3350.1	7358.4	41271.1
1997	50887.1	453.6	1571.8	903.4	44470	3488.3	7368.4	43518.7
1998	53145.3	460.7	1621.1	921.8	46720	3421.7	6948.2	46197.1
1999	55743	468	1687.1	940.6	49180	3467.3	6768.5	48974.5
2000	58994.2	475.5	1750.8	959.7	51900	3908.2	9087.9	49906.3
2001	60701.3	482.2	1788.6	976.2	53900	3554.3	6449.9	54251.4
2002	62963.4	488.7	1833.6	992.9	56050	3598.2	6310.8	56652.6
2003	65380.9	495.5	1882.3	1009.9	58350	3643.2	6187.9	59193
2004	68085.7	502.4	1946.6	1027.1	60830	3779.6	6295	61790.7
2005	70817.5	509.4	2022.8	1044.8	63490	3750.5	5986.4	64831.1
2006							-98478.	98478.4
Total	988880	9090.9	31024.2	18492.5	803920	126352	251955	736925

Table 11-12 Economic Benefit and Costs in Cases of Decrease and Increase of Construction and Replacement Costs of Facilities

(Unit: ₱1000, 1982 price)

	10% Decrease of Construction and Replacement Costs			10% Increase of Construction and Replacement Costs		
Year	Economic Benefits	Economic Costs	Net Economic Benefits	Economic Benefits	Economic Costs	Net Economic Benefits
1983	16432.7	57198.2	-40765.5	20084.4	69909	-49824.6
1984	36114.5	106025.2	-69910.7	44140	129586.4	-85446.4
1985	8210.1	9777.3	-1567.2	8210.1	11308.5	-3098.4
1986	17255.3	9701.6	7553.7	17255.3	11091.8	6163.5
1987	18824.8	9292	9532.8	18824.8	10551.2	8273.6
1988	21434.4	9155.3	12279.1	21434.4	10292.4	11142
1989	32797.5	9100.4	23697.1	32797.5	10124	22673.5
1990	34815.7	8815.1	26000.6	34827.7	9761.7	25066
1991	36341.6	8366	27975.6	36341.6	9193.8	27147.8
1992	37736.5	8073.8	29662.7	37736.5	8817	28919.5
1993	39530.9	7806.9	31724	39530.9	8470.1	31060.8
1994	41548.8	7564	33984.8	41548.8	8151.8	33397
1995	46644.4	7346.6	39297.8	46644.4	7863.8	38780.6
1996	48629.5	7133.1	41496.4	48629.5	7583.7	41045.8
1997	50878	7153	43725	50896.2	7583.8	43312.4
1998	53145.3	6783.9	46361.4	53145.3	7112.5	46032.8
1999	55743	6632	49111	55743	6905	48838
2000	58954.5	8729.4	50225.1	59033.9	9446.4	49587.5
2001	60701.3	6364.3	54337	60701.3	6535.5	54165.8
2002	62963.4	6248.5	56714.9	62963.4	6373.1	56590.3
2003	65380.9	6147.6	59233.3	65380.9	6228.2	59152.7
2004	68076.6	6253.9	61822.7	68094.8	6336.1	61758.7
2005	70817.5	5986.4	64831.1	70817.5	5986.4	64831.1
2006		-88630.6	88630.6		-108326.2	108326.2
Total	982977.2	237023.9	745953.3	994782.2	266886	727896.2