

TABLE J-49. EMPLOYMENT STATUS BY INDUSTRY AND REGION

Region No. and Name	Total of 15 years old and over	In the Labor Force			Total	Not in the Labor Force
		in Agriculture	Employed In Non-Agriculture	Unemployed		
A. Number of Employment (unit: '000 persons)						
1. Whole Country	52,800	9,585	19,517	1,311	20,628	12,172
2. Nat'l. Capital Region	4,414	26	2,063	421	2,484	1,930
3. I. Ilocos	2,518	755	1,334	44	1,378	940
4. II. Cagayan Valley	1,492	675	997	47	1,044	448
5. III. Central Luzon	5,295	634	1,722	121	1,843	1,452
6. IV. Southern Tagalog	4,251	972	2,345	170	2,515	1,736
7. V. Bicol	2,209	853	1,458	58	1,516	693
8. VI. Western Visayas	3,011	1,110	1,861	99	1,960	1,051
9. VII. Central Visayas	2,558	894	1,669	50	1,719	839
10. VIII. Eastern Visayas	1,850	887	1,295	83	1,378	452
11. IX. Western Mindanao	1,696	605	929	39	968	728
12. X. Northern Mindanao	1,891	698	1,237	61	1,298	593
13. XI. Southern Mindanao	2,358	928	1,497	91	1,588	770
14. XII. Central Mindanao	1,477	566	910	27	957	540
B. Percent of Employment (Total of 15 years old and over = 100)						
1. Whole Country		29.2	58.9	4.0	62.9	37.1
2. Nat'l. Capital Region		0.6	46.7	9.6	56.3	43.7
3. I. Ilocos		31.7	57.5	1.9	59.4	40.6
4. II. Cagayan Valley		45.2	66.8	3.2	70.0	30.0
5. III. Central Luzon		19.2	52.2	3.7	55.9	44.1
6. IV. Southern Tagalog		22.9	55.2	4.0	59.2	40.8
7. V. Bicol		38.6	66.0	2.6	68.6	31.4
8. VI. Western Visayas		36.9	61.8	3.3	65.1	34.9
9. VII. Central Visayas		34.9	65.2	2.0	67.2	32.8
10. VIII. Eastern Visayas		48.5	70.8	4.5	75.3	24.7
11. IX. Western Mindanao		35.7	54.8	2.3	57.1	42.9
12. X. Northern Mindanao		36.9	65.4	3.2	68.6	31.4
13. XI. Southern Mindanao		39.4	63.5	3.9	67.4	32.6
14. XII. Central Mindanao		38.3	61.7	1.8	63.5	36.5

Source: "Household Survey 1984/85" NCSO, NEDA  
(Average of third and fourth quarter in 1984 and first and second quarter in 1985)

TABLE J-50. EMPLOYMENT STATUS IN ISABELA, 1980

I t e m s	(unit: persons)					
	Worker Over 15 Years	(%)	Professional/ Technical Workers	Administrative Managerial Workers	Clerical and Related Workers	Sales Workers
Grand total in Isabela	235,193	100.0	13,259	923	5,735	9,763
1. Agriculture, Fishery and Forestry	167,049	71.0	582	68	171	20
(Agricultural crop)	(160,760)	(68.4)	(92)	(12)	(96)	(11)
2. Mining and Quarrying	645	0.3	25	-	38	5
3. Manufacturing	8,363	3.6	119	173	261	150
Food, beverage, tobacco	2,305		70	85	79	103
Textile and leather	2,223		5	9	-	5
Wood furniture	2,876		20	58	150	5
Chemicals and paper	144		14	11	26	4
Metallic	527		10	5	-	4
Machinery and equipment	237		10	5	6	9
Others	53		-	-	-	66
4. Electricity, Gas and Water	653	0.3	67	-	124	5
5. Construction	7,194	3.1	313	30	224	8
6. Wholesale, retail trade	9,951	4.2	107	20	207	9,054
7. Transportation, storage	7,935	3.4	44	63	985	10
8. Financing and Business services	2,256	1.0	436	101	1,141	337
9. Community, Social services	29,428	12.5	11,487	463	2,626	126
10. Not defined	1,723	0.6	81	5	160	90

Source: Socio-economic Profile of Isabela, Ilagan Provincial Capitol, 1984

TABLE J-51. QUALITY OF DRINKING WATER IN MRIIS AREA

Municipalities	Number of Samples		Population Served	Existance of Disease Germ	
	Deep Well	Shallow Well		Negative (-)	Positive (+)
1. Isabera Province					
1. Gamu	41	7	2,033	4	44
2. Naguilian	12	36	3,324	12	36
3. Burgos	-	48	270	2	46
4. Reina Mercedes	4	41	1,149	0	45
2. Quirino Province					
1. Diffun	5	31	1,866	5	31
2. Saguday	-	36	439	21	15
<u>Total</u> (Total Sample=100)	<u>62</u>	<u>199</u>	<u>9,081</u>	<u>44</u> (17%)	<u>217</u> (83%)

Source: "Surveillance and Monitoring of Water Quality Program 1984".

Cagayan Regional Hospital.

TABLE J-52. ROAD CATEGORY BY PROVINCE IN REGION II

(unit: 1000 Km)

PROVINCES	National		Provincial		Municipal		Barangay		Total	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	(%)
REGION II	2,234	100	1,885	100	913	100	7,305	100	12,337	100
Batanes	65	3.0	65	3.4	30	3.3	156	2.1	316	2.6
Cagayan	551	24.6	569	30.2	190	20.8	2,130	29.2	3,440	27.9
Ifugao	254	11.4	51	1.6	61	6.7	337	4.6	683	5.5
Isabela	391	17.5 (10%)	580	30.8 (15%)	355	38.9 (9%)	2,493	34.1 (66%)	3,819	30.9 (100%)
Kalinga-Apayao	395	17.7	174	9.2	147	16.1	800	11.0	1,516	12.3
Nueva Vizcaya	319	14.3	346	18.4	64	7.0	1,196	16.4	1,925	15.6
Quirino	259	11.5	120	6.4	66	7.1	193	2.6	638	5.2

Source: NEDA, Region II Office

TABLE J-53. NUMBER OF SOCIAL INFRASTRUCTURES

Municipality	Education				Medical			Communication		
	Primary & Elementary School	Secondary School	College	Vocational School	University	Hospital	Bed	Telegraph Station	Telephone Station	Radio Station
<b>I. ISABELA Province</b>										
1. Alicia	6	5	1	1	-	5	15	-	-	-
2. Angadanan	38	3	-	1	-	-	-	-	-	-
3. Aurora	18	2	-	-	-	1	10	-	-	-
4. Burgos	12	2	-	-	-	-	-	-	-	-
5. Cabatuan	19	1	-	-	-	2	10	-	-	-
6. Cauayan	48	3	2	-	-	5	90	2	3	2
7. Cordon	19	4	-	1	-	1	25	-	-	-
8. Echague	48	7	1	-	1	1	25	1	1	-
9. Gamu	15	2	-	-	-	-	-	-	-	-
10. Luma	8	1	-	-	-	-	-	-	-	-
11. Neguilian	20	1	-	-	-	-	-	-	-	-
12. Quirino	14	1	-	-	-	1	10	-	-	-
15. Ramon	16	2	-	-	-	1	25	-	-	-
14. Reina Mercedes	11	1	-	-	-	-	-	-	-	-
15. Roxas	27	4	1	1	1	2	60	2	-	-
16. San Isidro	15	1	-	-	-	-	-	-	-	-
17. San Manuel	10	1	-	-	-	-	-	-	-	-
18. San Mateo	21	3	1	1	-	-	90	1	-	-
19. Santiago	49	2	2	5	-	5	170	2	3	3
Sub-total	410	46	8	10	2	22	528	8	7	5
<b>II. QUIRINO Province</b>										
20. Cabaroguis	18	5	1	1	-	2	N.A.	N.A.	N.A.	-
21. Diffun	33	2	1	-	-	-	-	N.A.	N.A.	-
22. Saguday	7	1	-	-	-	-	-	N.A.	N.A.	-
Sub-total	58	8	2	1	-	2	N.A.	-	-	-
<b>III. IFUGAO Province</b>										
23. Potia	N.A.	2	1	-	-	-	-	N.A.	N.A.	-
Total	468	56	11	11	2	24	528	8	7	5

TABLE J-54. CHARACTERISTICS OF RICE RECOMMENDABLE VARIETIES

Variety	Growth Period (Transplanted)		Potential Yield (ton/ha)
	Wet Season (day)	Dry Season (day)	
1. Very early maturing			
- IR 58	100	105	N.A.
2. Early maturing			
- IR 56	108	114	5.2
- IR 60	108	114	5.2
- IR 62	109	106	N.A.
- IR 64	110	115	4.1
- IR 28150-84-3-3-2*	120	125	5.2

Note: \* under approval for recommended variety as IR 66.

Source: BPI

TABLE J-55. ESTIMATED PADDY PRODUCTION, WITH THE IMPROVEMENT PROJECT

Item	Unit	Total		District I		District II		District III		District IV		
		Total	P	G	P	G	P	G	P	G	P	
1. Wet Season												
(1) Planted Area	1000 ha	97.4	89.1	8.3	24.0	-	24.5	-	18.2	6.6	22.4	1.7
- IR & Dual		55.9	53.7	2.2	12.0	-	17.1	-	11.6	2.0	13.0	0.2
- 2R		25.5	22.6	2.9	6.0	-	6.1	-	3.9	2.3	6.6	0.6
- 5R & Others		16.0	12.8	3.2	6.0	-	1.3	-	2.7	2.3	2.8	0.9
(2) Production	1000 ton	381.8	351.3	30.5	92.4	-	98.7	-	72.0	24.5	88.2	6.0
- IR & Dual (4.2 ton/ha)		234.7	225.5	9.2	50.4	-	71.8	-	48.7	8.4	54.6	0.8
- 2R (3.7 ton/ha)		94.3	83.6	10.7	22.2	-	22.6	-	14.4	8.5	24.4	2.2
- 5R & Others (3.5 ton/ha)		52.8	42.2	10.6	19.8	-	4.3	-	8.9	7.6	9.2	3.0
2. Dry Season												
(1) Planted Area	1000 ha	87.6	80.1	7.5	21.6	-	22.1	-	16.3	6.0	20.1	1.5
- IR & Dual		50.3	48.3	2.0	10.8	-	15.4	-	10.4	1.8	11.7	0.2
- 2R		22.9	20.3	2.6	5.4	-	5.5	-	3.5	2.1	5.9	0.5
- 5R & Others		14.4	11.5	2.9	5.4	-	1.2	-	2.4	2.1	2.5	0.8
(2) Production	1000 ton	570.1	540.4	29.7	89.6	-	95.5	-	69.7	23.8	85.6	5.9
- IR & Dual (4.5 ton/ha)		226.5	217.6	8.9	48.6	-	69.3	-	47.0	8.1	52.7	0.8
- 2R (4.0 ton/ha)		91.9	81.4	10.5	21.6	-	22.0	-	14.0	8.3	23.8	2.2
- 5R & Others (3.6 ton/ha)		51.7	41.4	10.3	19.4	-	4.2	-	8.7	7.4	9.1	2.9
3. Total Production	1000 ton	751.9	691.7	60.2	182.0	-	194.2	-	141.7	47.6	173.8	11.9
		(4.1 ton/ha)										

Note: G ... Gravity, P ... Pump

TABLE J-56. FORECASTED RICE DEMAND IN 2000

<u>Item</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>Ratio</u> <u>(2000/1985)</u> <u>(%)</u>
1. Population (thousand) <u>1/</u>					
- Whole country	54,400	60,200	65,400	69,900	
- Region IV	14,000	15,800	17,600	19,100	
- Region II	2,510	2,780	3,040	3,270	
2. Demand (thousand ton) <u>2/</u>					
- Whole country	5,740	5,900	6,500	7,000	131
- Region IV	1,410	1,600	1,800	2,000	142
- Region II	315	350	370	400	130

Note: 1/ Forecasted by NEDA.

2/ Estimated demand of milled rice, including the converted amount into milled rice for the seeds, industrial materials and wastage.



TABLE J-57. PADDY YIELD IN THE MRIIS UPSTREAM AREA

WM Division	Total		First Crop (Dry)			Second Crop (Wet)			
	Planted Area (ha)	Production (ton)	Yield (ton/ha)	Planted Area (ha)	Production (ton)	Yield (ton/ha)	Planted Area (ha)	Production (ton)	Yield (ton/ha)
I-1	1,565	7,195	4.6	722	3,706	4.8	793	3,489	4.4
2	1,297	5,931	4.6	616	2,526	4.1	681	3,405	5.0
3	1,489	7,222	4.9	746	3,750	5.0	743	3,492	4.7
4	1,455	5,969	4.1	743	3,121	4.2	712	2,848	4.0
5	1,809	7,598	4.2	906	3,986	4.4	903	3,612	4.0
6	1,674	7,616	4.5	856	4,013	4.8	858	3,603	4.3
7	1,585	7,450	4.7	798	3,751	4.7	787	3,699	4.7
10	1,403	5,825	4.1	710	3,053	4.3	693	2,772	4.0
Total	12,277	54,806	4.5	6,127	27,886	4.6	6,150	26,920	4.4

Source: MRIIS, District I Office, NIA

TABLE J-58. AGRO-SERVICE FACILITIES IN EACH 1A (300 HA)

Kind of Facilities	Unit Performance	Crop Season	Performance	Daily			No. of Unit	Production (tons) (%)	Remarks
				Operation Hour	Working Day	Production (tons) (%)			
Dry Pavement 300 sq.m	6 ton/day	Wet	6	-	17	6	600 ( 50)	Notes:	
Grain Dryer	0.5 ton/day	Dry	6	-	34	6	1,200 (100)	(1) Assumed palay production 4 t/ha x 300 ha = 1,200 tons/one crop.	
Power Tiller	30 hr./ha	Wet	1/30	8	45	25	300 (100)	(2) One 1A of 300 ha comprises of three Barangays in average.	
Power Thresher	1.5 ton/hr.	Dry	1.5	7	40	3	1,200 (100)	(3) Jeepney for transportation will be used for direct farm output transportation by 50%, and less 50% will be used for miscellaneous works.	
Warehouse 300 sq.m	600 ton	Wet	600	-	-	1	600 ( 50)		
Jeepney	2 ton	Dry	15 t/d	5	60	2	1,800 (150)		
Others		Others		5	120	2	-		

TABLE J-59. OPERATION COST OF AGRO-SERVICE FACILITIES IN EACH 1A (300 HA)

Kind of Facilities	No. of Unit (1)	Cost of Facilities (1,000 Pesos)		Operation Hour Annual (5)	Hourly Operation Cost (Pesos)			Total (4-9) (10)	Operation Cost by Other Unit (Pesos) daily Per ton ha/crop (11) (12) (13)			
		Rate (2)	Amount (3)		Amortization (6)	Repair & Maintenance (7)	Fuel & Oil (8)		Operator 1/ (9)	by Other Unit (Pesos) daily Per ton ha/crop (11) (12) (13)		
Dry Pavement	6	30	180	10 years	40 days	-	-	-	-	6	18	
Grain Dryer	3	16	48	3,000	300	5.3	7.2	18.4	-	309	62	62
Power Tiller	25	30	750	5,000	720	6.0	15	7.8	-	230	216	864
Power Thresher	3	50	150	5,000	560	10.0	25	15.2	-	337	32	126
Warehouse	1	210	210	10 years	-	5.8	-	-	4.5	-	12	48
Jeepney	2	150	300	8,000	1,200	18.8	45	17.0	9.8	453	30	120
<u>Sub-total</u>			<u>1,638</u>									<u>1,238</u>
Miscellaneous 2/ Management			162									32
Fee 3/												130
<u>Total Cost</u>			<u>1,800</u>									<u>1,400</u>

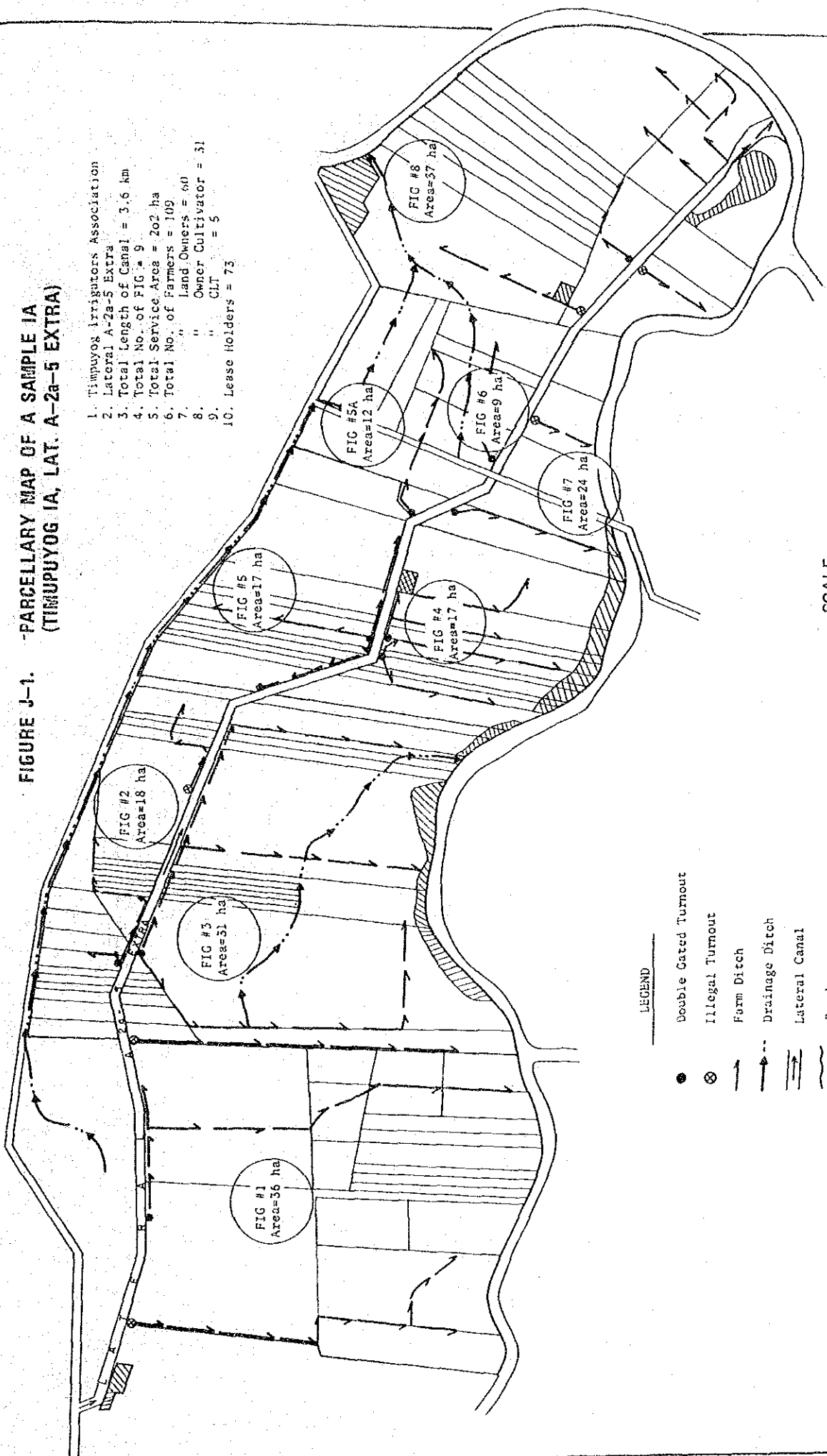
Notes: 1/: Monthly wage used for the account is, 900 pesos for vehicle driver, and 600 pesos for warehouse watchman.

2/: Included registration fee, insurance of vehicles, and warehouse.

3/: The amount of management fee is equivalent to less than one cavan for one crop, which could be used for administration budget of Association.

**FIGURE J-1. PARCELLARY MAP OF A SAMPLE IA (TIMUPUYOG IA, LAT. A-2a-5 EXTRA)**

1. Timupuyog Irrigators Association
2. Lateral A-2a-5 Extra
3. Total Length of Canal = 3.6 Km
4. Total No. of FIG.'s = 9
5. Total Service Area = 202 ha
6. Total No. of Farmers = 109
7. " " Land Owners = 60
8. " " Owner Cultivator = 51
9. " " CLT = 5
10. Lease Holders = 73



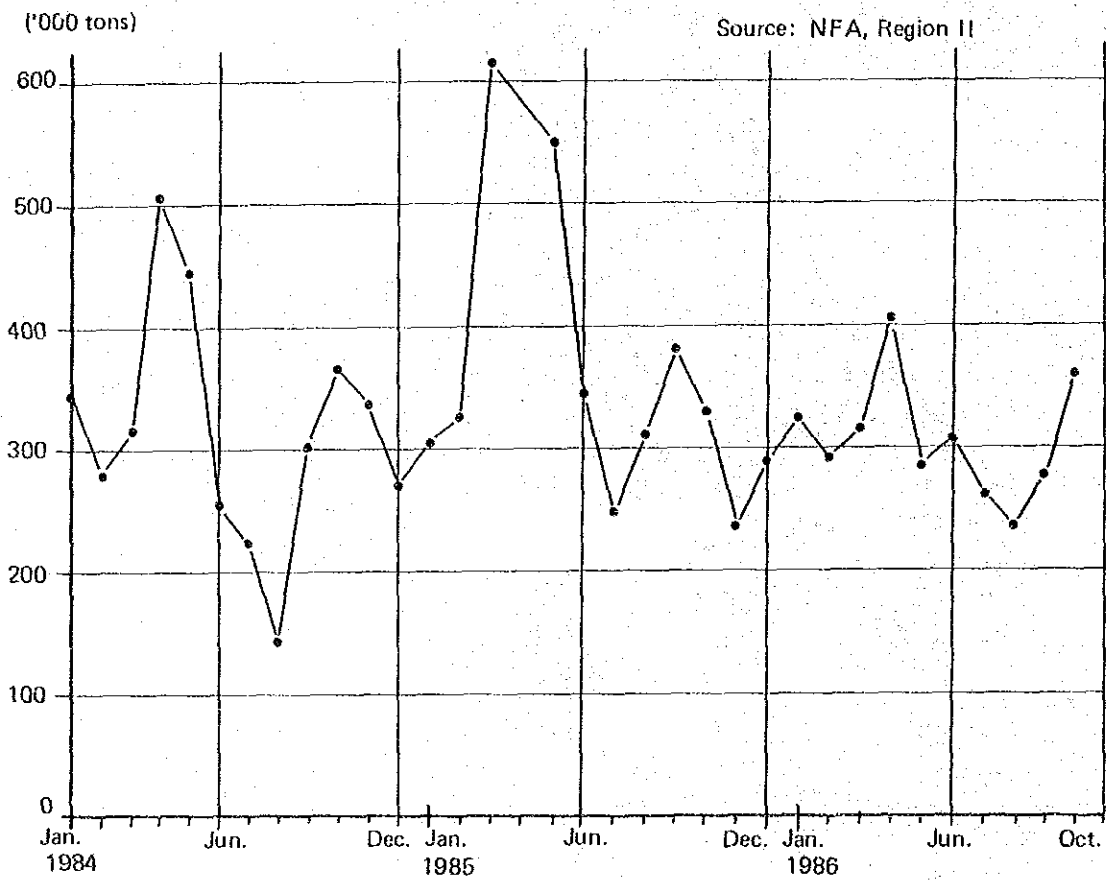
**LEGEND**

- Double Gated Turnout
- ⊗ Illegal Turnout
- ↑ Farm Ditch
- ↑ Drainage Ditch
- || Lateral Canal
- ~ Creek

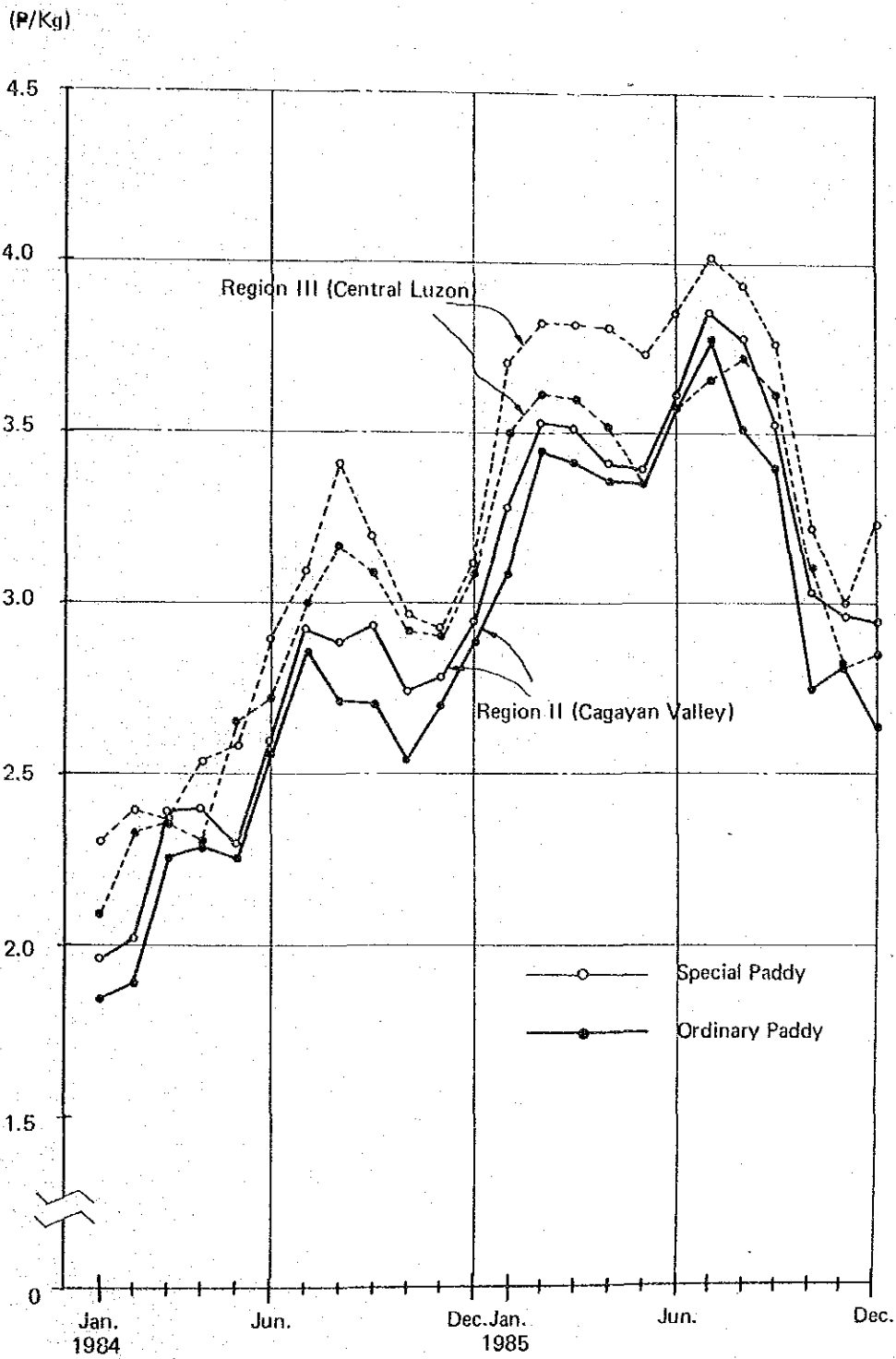
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**SCALE**

FIGURE J-2. COMMERCIAL OUTFLOW OF PADDY FROM ISABELA PROVINCE

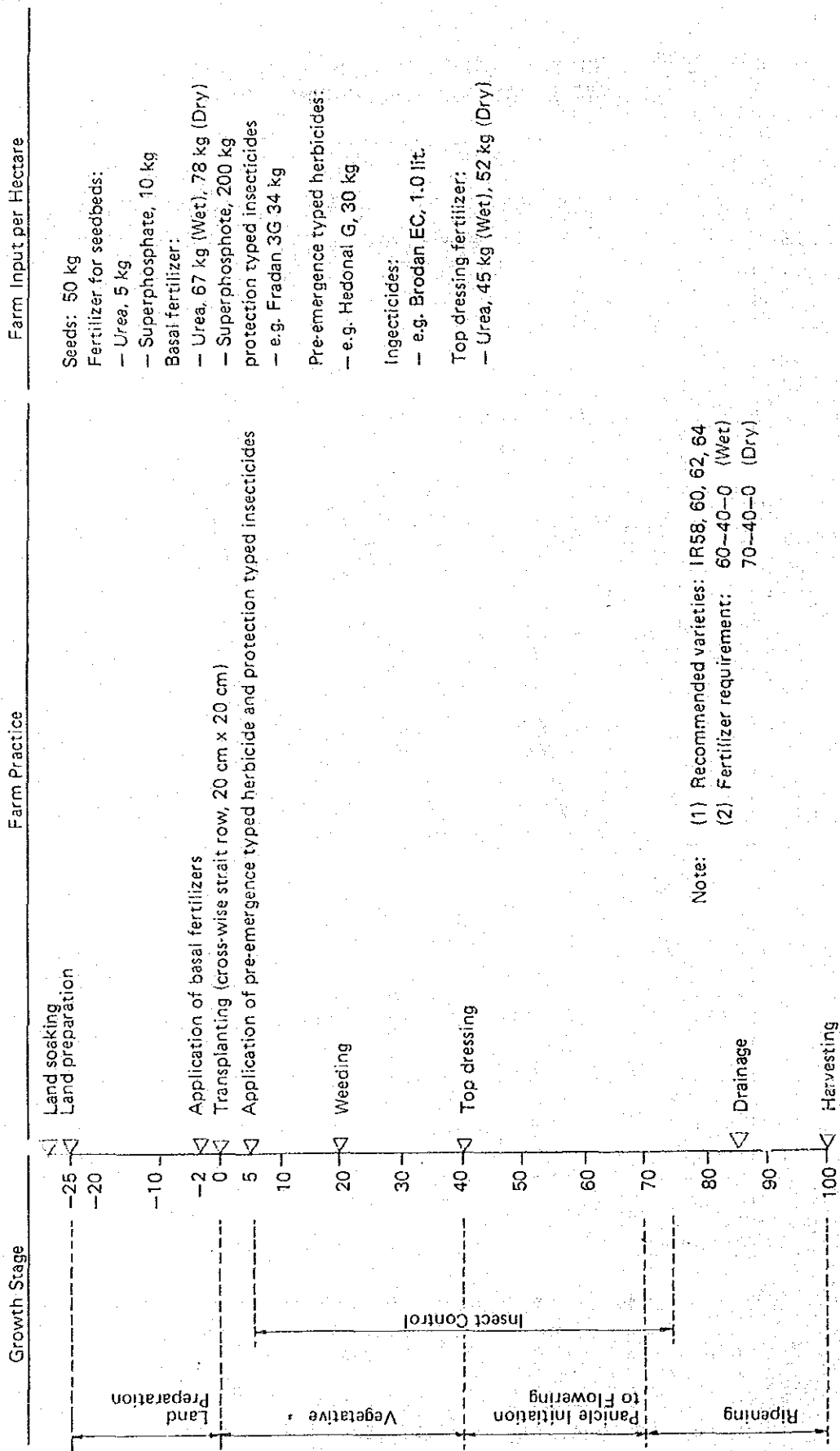


**FIGURE J-3. MONTHLY TREND OF FARM-GATE PRICE OF PADDY IN THE LARGE PADDY PRODUCING REGION**



Source: Bureau of Agricultural Economics, Ministry of Agriculture

FIGURE J-4. FARM PRACTICES AND INPUT REQUIREMENT, PADDY TRANSPLANTED



Note: (1) Recommended varieties: IR58, 60, 62, 64  
 (2) Fertilizer requirement: 60-40-0 (Wet)  
 70-40-0 (Dry)

**ANNEX K**  
**PROJECT EVALUATION**





K. PROJECT EVALUATION

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## 1. PADDY PRICE

Paddy price is estimated at 3.0 ₱/kg based on the farm and rice mill survey in the MRIIS area conducted by the survey team and IBRDs' price date (Aug. 1986).

	<u>Unit</u>	<u>1986</u>	<u>2000</u>
- Rice Price of IBRDs' for cast (5% broken rice)	US\$/ton	209	233
- Farm-gate Price of Paddy in the MRIIS Area (Outside to IA Federation)	₱/kg	2.7	3.0
- Farm-gate Price of Paddy in the MRIIS Area (Inside the IA Federation)	₱/kg	2.7	3.5

Note: \* ... 18% plus

Paddy quality will be go up for the using of post harvesting facilities in the IA Federation. It is possible to out 18% of storm damaged paddy by using the paddy drying facilities in the IA Federation.

## 2. PADDY PRODUCTION COST

Table K-1 shows the paddy production cost by work items and yield class. For processing the paddy production cost, the result of the farm survey in the MRIIS area conducted by the study team was mainly used and the IDD's farm survey result was referred.

Table K-6 shows the farm income in case of outside and inside the IA Federation.

### 3. BENEFICIAL AREA

Trend of irrigable and planted area without and with the Project are shown in the Table K-7 and 8. The irrigable area and planted area by year are estimated based on the Feasibility Report on MAGAT River in 1973 and MRIIS office data.

### 4. NET PRODUCTION VALUE

#### Production Value Without and With the MRIIS

- i) Trend of net production without project (Table K-8, 9)
- ii) Trend of net production with project (Table K-11, 12)  
- Area not yet under construction -

#### Production Value Without and With Improvement Project

- i) Paddy yield projection (Table K-13)
- ii) Estimate of Paddy production without improvement project (Table K-14)
- iii) Estimate of paddy production with improvement project (Table K-15)
- iv) Net production value without and with improvement project (Table K-17 - 20)

### 5. BENEFIT

- i) Financial benefit (Table K-21)
- ii) Economic benefit (Table K-22)

### 6. PROJECT COST

- (1) Present Value of MRIIS Project

The present value of the MRIIS project cost is estimated based on the annual disbursement and the present worth factor for local

and foreign currency and evaluated to be 6,804 million pesos at 1986. The detail estimation is shown in Table K-23.

In the evaluation of present value, 50 percent of dam construction cost is allocated for the irrigation purpose. The remained 50 percent of the cost is allocated for the hydro-electric power, because the benefit brought from irrigation and power is mostly same as about 1,000 million pesos per annum, respectively.

(2) Cost of MRIIS Rehabilitation

To keep the present production level ₱183 million of the MRIIS rehabilitation cost will be needed in immediately. The detail cost of the MRIIS rehabilitation is estimated in Table D-24.

(3) Cost of MRIIS Improvement Project

Financial and economic cost of MRIIS improvement project including the present value of MRIIS project are summarized in Table K-28.

(4) O & M Cost

O & M Cost without and with improvement project are estimated in Table K-25 to 27.

7. BENEFIT AND COST COMPARISON

The financial and economic evaluation are made taking into account the annual disbursement for project cost and benefit steam since 1974. The financial and economic index is estimated in Table K-29 to 32.

Sensitivity test have been made to test the sensitivity of rate to other parameters than those considered probable in the initial



calculation. The parameters employed are reduction in benefits, increase in Project cost, and combination of these parameters.  
(Table K-33 - 38)

List of IRR

	<u>Without Improve- ment Project</u>		<u>With Improve- ment Project</u>	
	<u>Financial</u>	<u>Economic</u>	<u>Financial</u>	<u>Economic</u>
Proto-type (Sensitivity Test)	5.1	9.4	9.9	13.6
(1) Increase in Project Cost (10% up)	-	-	9.8	13.5
(2) Reduction in Benefits (Without IA Federation)	-	-	7.7	12.0
(3) Combination of (1) & (2)	-	-	7.7	12.0

8. STATEMENT OF PROFIT AND LOSS FOR THE MRIIS

The Statement of Project and Loss for MRIIS has been prepared, and in detailing, the relevant calculation was made for two cases of "without" and "with" improvement project in taking the project benefit as profit while the capital cost and O/M cost as loss.

The project income and expenditure as profit and loss in the Statement can be shown in current prices, whereas the benefit and cost for the financial internal rate of return can be in constant prices. Accordingly, the benefit and cost estimated in constant prices for calculating profit and loss for MRIIS Project shall be converted into those in current prices in the following conditions.

Project Income (Profit)

Most of the Income of MRIIS has accrued from paddy production, and the magnitude of paddy production benefit will be more affected by selling price of paddy than by price of input materials applied to production. And, the financial benefit indicated in constant price for the paddy price before 1986 has been converted into current price with the farm gate price in Cagayan Valley and that after 1986 forecasted prices up to the year of 2000 by World Bank.  
(ref. to Table K-39)

### Project Cost (Loss)

Capital Cost ... The capital costs invested between 1974 and 1986 were estimated based on the actual result of expenditures by NIA. The local currency portion of the above shall be deemed as the direct expenditure of the Philippine Government, while the foreign currency portion was assumed to be loaned in the conditions of 10-years grace period and 30-years repayment term in any case, although loaned in different conditions in each case by World Bank, ADB and other international financing organizations. (ref. to Table K-40...K-42)

Furthermore, the local currency portion of the capital cost for five years between 1988 and 1992 is estimated with 10 percent price escalation included in the amount of the direct investment by the Government, while the foreign currency portion was deemed as the same level of the loan amount up to 1986 in excluding the price escalation.

O/M Cost ... The O/M cost was estimated on the annual basis before 1986 and after 1987 in taking annual average price escalation in the Country by 10 percent into consideration. (ref. to Table K-43)

The estimation of the Profit and Loss for MRIIS with the income (profit) and expenditure (loss) converted into current prices has resulted into that the project management would be turned to black from red in balance in 1983, the ninth year from commencement of the construction works in 1974, and even in both cases of "without" and "with" improvement project, the Project management as a whole would be turned into black in 1988, the 14th year from commencement in blotting out all the accumulated losses. It shows the significant meaningfulness of the MRIIS Project that the accumulated losses could be blotted away at the 14th year of the Project which falls within one third of 50 years as the life span of the Project.

The accumulated red figures could be resolved in the same year for the both cases of "without" and "with" improvement project. The case study of "without" and "with" improvement project on the long-term balance of income (profit) and expenditure (loss) for 48 years from 1974 when the works commenced to 2021 when the loan repayment is over will find that the MRIIS Project as a whole will be more profitable in case of "with" improvement works than in the case of "without". In other words, the MRIIS Project, when implemented with the improvement works, will result in 1.5 time larger expenditure, 2.7 times larger income and 3.5 times larger net profit than those when implemented without improvement works. (ref. to Table K-44 & 45)

(unit: million Pessos)

Project	The Sum of Income	The Sum of Expenditure			Total	The Sum of Profit and Loss
		Capital Cost	O & M Cost			
		Foreign Currency	Local Currency			
- Without Improvement Project	27,300	2,500	1,600	6,600	10,700	16,600
- With Improvement Project	73,900 (270)	3,700 (147)	2,100 (135)	9,700 (146)	15,500 (145)	58,400 (351)

Note: The figures in the parenthesis are the percentage of with Improvement Project to without Improvement Project.

TABLE K-1. PADDY PRODUCTION COST BY WORK ITEMS PER HECTARE  
- Average of Dry and Wet Season Paddy -

Items	Labor Requirement (Hired/Family) (man-days)	Hired Labor	Inputs Materials	Machinery and Animals	Fee and Others	Total Cost
<b>A. 2.0 tons/ha of Production</b>						
1. Land Preparation	1.5/16.4	40	-	770	-	810
2. Pulling of Seedling	2.3/3.2	60	310	-	-	370
3. Transplanting	7.8/10.5	200	-	-	-	200
4. Care of Crops						
- Water Management	-/1.7	-	-	-	440	440
- Fertilizing	-/1.6	-	880	-	-	880
- Spraying	-/6.7	-	480	-	-	480
5. Harvesting	13.5/17.0	340	-	-	-	340
6. Threshing	2.9/4.0	70	-	430	-	500
7. Hauling	-/2.6	-	-	-	-	-
8. Drying	-/2.3	-	-	-	-	-
9. Others	-/-	-	-	-	-	-
<b>Total</b>	<b>28/66</b>	<b>710</b>	<b>1,670</b>	<b>1,200</b>	<b>840</b>	<b>4,420</b>
(Cost of family labor)*1		(830)				(5,250)
<b>B. 3.0 tons/ha of Production</b>						
1. Land Preparation	2.0/15.9	50	-	900	-	950
2. Pulling of Seedling	3.2/2.3	80	320	-	-	400
3. Transplanting	10.9/7.4	270	-	-	-	270
4. Care of Crops						
- Water Management	-/1.7	-	-	-	440	440
- Fertilizing	-/1.6	-	920	-	-	920
- Spraying	0.7/6.0	20	520	-	-	540
5. Harvesting	18.6/11.9	470	-	-	-	470
6. Threshing	4.1/2.8	100	-	600	-	700
7. Hauling	0.5/2.1	10	-	-	-	10
8. Drying	-/2.3	-	-	-	-	-
9. Others	-/-	-	-	-	470	470
<b>Total</b>	<b>40/54</b>	<b>1,000</b>	<b>1,760</b>	<b>1,500</b>	<b>910</b>	<b>5,170</b>
(Cost of family labor)		(680)				(5,850)
<b>C. 4.0 tons/ha of Production</b>						
1. Land Preparation	2.7/15.2	70	-	920	-	990
2. Pulling of Seedling	4.5/1.0	110	340	-	-	450
3. Transplanting	15.0/3.3	380	-	-	-	380
4. Care of Crops						
- Water Management	-/1.7	-	-	-	440	440
- Fertilizing	-/1.6	-	980	-	-	980
- Spraying	1.0/5.7	20	570	-	-	590
5. Harvesting	26.0/4.5	650	-	-	-	650
6. Threshing	5.7/1.2	140	-	780	-	920
7. Hauling	0.8/1.8	20	-	-	-	20
8. Drying	0.3/2.0	10	-	-	-	10
9. Others	-/-	-	-	-	540	540
<b>Total</b>	<b>56/38</b>	<b>1,400</b>	<b>1,890</b>	<b>1,700</b>	<b>980</b>	<b>5,970</b>
(Cost of family labor)		(480)				(6,450)
<b>D. 5.0 ton/ha of Production</b>						
1. Land Preparation	4.7/10.5	110	-	950	-	1,060
2. Pulling of Seedling	5.4/0.1	140	360	-	-	500
3. Transplanting	18.3/-	460	-	-	-	460
4. Care of Crops						
- Water Management	-/1.7	-	-	-	440	440
- Fertilizing	-/1.6	-	1,100	-	-	1,100
- Spraying	2.2/4.5	60	610	-	-	670
5. Harvesting	28.0/2.5	700	-	-	-	700
6. Threshing	5.4/1.5	130	-	950	-	1,080
7. Hauling	2.0/2.0	50	-	-	-	50
8. Drying	2.0/1.6	50	-	-	-	50
9. Others	-/-	-	-	-	610	610
<b>Total</b>	<b>68/26</b>	<b>1,700</b>	<b>2,070</b>	<b>1,900</b>	<b>1,050</b>	<b>6,720</b>
(Cost of family labor)		(330)				(7,050)

Source: Farm Economic Survey in the Project Area, 1986

Note: \*1--- 12.5P/man-day of opportunity cost of farm labor is applied.

TABLE K-2. CROP BUDGETS PER HECTARE AT PRESENT

Items	(unit: ₹/ha)			
	2.0 tons/ha	3.0 tons/ha	4.0 tons/ha	5.0 tons/ha
<b>A. Financial</b>				
1. Gross Production Value *1	6,000	9,000	12,000	15,000
2. Production Cost *2	3,520 (4,240 <sup>*4</sup> )	3,990 (4,580 <sup>*4</sup> )	4,480 (4,890 <sup>*4</sup> )	4,930 (5,200 <sup>*4</sup> )
- Pre-harvesting *3	500 ( 610 <sup>*4</sup> )	710 ( 800 <sup>*4</sup> )	950 (1,010 <sup>*4</sup> )	1,180 (1,240 <sup>*4</sup> )
- Post-harvesting				
- Others				
° Loan interest	300	350	400	450
° Depreciation cost & others	100	120	140	160
<u>Total</u>	4,420 (5,250 <sup>*4</sup> )	5,170 (5,850 <sup>*4</sup> )	5,970 (6,440 <sup>*4</sup> )	6,720 (7,050 <sup>*4</sup> )
3. Farm Income	1,580	3,830	6,030	8,280
4. Net Production Value	750	3,150	5,560	7,950
<b>B. Economic</b>				
1. Gross Production Value *1	6,000	9,000	12,000	15,000
2. Production Cost *2	2,760	2,980	3,180	3,380
- Pre-harvesting *3	400	520	660	810
- Post-harvesting				
- Others				
° Loan interest	-	-	-	-
° Depreciation cost & others	70	80	90	100
<u>Total</u>	3,230	3,580	3,930	4,290
3. Net Production Value	3,770	5,420	8,070	10,710

Note: \*1 ... 3.0 ₹/kg of paddy price is applied.  
 \*2 ... Cost of land preparation up to harvesting are included.  
 \*3 ... Cost of Threshing up to farm-gate are included.  
 \*4 ... Included family labor.  
 \*5 ... 0.65 of conversion factor is applied to convert economic value.

TABLE K-3. CROP PRODUCTION COST PER HECTARE WITH IMPROVEMENT PROJECT  
BY WORK ITEMS (4.1 tons/ha)

Items	Labor Requirement (hired/family)		Labor		Inputs Material	Machinery and Animals (\$/ha)	Free and Others	Total Cost	
	Hired (man-days/ha)	*1 (Family)	*2 (Family)	Excluded Family Labor				Included Family Labor	
<b>A. Area Outside the IA Federation</b>									
1. Land Preparation	2.9/14.7	70	(180)	-	-	920	-	990	1,170
2. Pulling of Seedling	4.6/0.9	120	(10)	340	-	-	-	460	470
3. Transplanting	15.3/3.0	380	(40)	-	-	-	-	380	420
4. Care of Crops									
- Water Management	-/1.7	-	(20)	-	-	-	440	440	460
- Fertilizing	-/1.6	-	(20)	990	-	-	-	990	1,010
- Spraying	1.1/5.7	30	(70)	580	-	-	-	610	680
5. Harvesting	26.2/4.4	660	(60)	-	-	-	-	660	720
6. Threshing	5.6/1.2	140	(20)	-	800	-	-	940	960
7. Hauling	0.9/1.8	20	(20)	-	-	-	-	20	40
8. Drying	0.4/2.0	10	(30)	-	-	-	-	10	40
9. Others	-/-	-	-	-	-	-	550	550	550
<b>Total</b>	<b>57/37</b>	<b>1,430</b>	<b>(470)</b>	<b>1,910</b>	<b>1,720</b>	<b>990</b>	<b>6,050</b>	<b>6,520</b>	<b>6,520</b>
<b>B. Area Inside the IA Federation</b>									
1. Land Preparation	2.9/7.0	70	(90)	-	-	955	-	1,025	1,115
2. Pulling of Seedling	4.6/0.9	120	(10)	340	-	-	-	460	470
3. Transplanting	15.3/3.0	380	(40)	-	-	-	-	380	420
4. Care of Crops									
- Water Management	-/1.7	-	(20)	-	-	-	440	440	460
- Fertilizing	-/1.6	-	(20)	990	-	-	-	990	1,010
- Spraying	1.1/5.7	30	(70)	580	-	-	-	610	680
5. Harvesting	26.2/4.4	660	(60)	-	-	-	-	660	720
6. Threshing	5.6/1.2	140	(20)	-	139	-	-	279	299
7. Hauling	0.9/1.8	20	(20)	-	-	-	-	20	40
8. Drying	0.4/2.0	10	(30)	-	-	88	-	98	128
9. Others	-/-	-	-	-	-	218	320	538	538
<b>Total</b>	<b>57/30</b>	<b>1,430</b>	<b>(380)</b>	<b>1,910</b>	<b>1,400</b>	<b>760</b>	<b>5,500</b>	<b>5,880</b>	<b>5,880</b>

Note: \*1 ... 25 \$/man-day of hired labor cost is applied \*2 ... 50% of hired labor wage rate is applied to family labor

Basic Data: Farm Economic Survey in the MRIIS Area, 1986

TABLE K-4. OPERATION COST OF AGRO-SERVICE FACILITIES

(unit: ₱/ha)

<u>Kind of Facilities</u>	<u>Basic Cost</u>	<u>Miscel- laneous</u>	<u>Management Free</u>	<u>Total</u>
1. Power Tiller	864	-	91	955
2. Power Thresher	126	-	13	139
3. Dry Pavement	18	-	2	20
4. Grain Dryer	62	-	6	68
5. Warehouse	48	10	5	63
6. Jeepney	120	22	13	155
<u>Total</u>	<u>1,238</u>	<u>32</u>	<u>130</u>	<u>1,400</u>

TABLE K-5. CROP BUDGETS PER HECTARE WITH IMPROVEMENT  
PROJECT (4.1 tons/ha)

(unit: ₱/ha)

Items	<u>Financial</u>	<u>Economic</u> <sup>*6</sup>
A. Area Outside the IA Federation		
1. Gross Production Value <sup>*1</sup>	12,300	12,300
2. Production Cost		
- Pre-harvesting <sup>*2</sup>	4,530 (4,930 <sup>*4</sup> )	3,200
- Post-harvesting <sup>*3</sup>	970 (1,040 <sup>*4</sup> )	680
- Others		
° Loan interest	410	-
° Depreciation cost & others	140	90
Total	6,050 (6,520 <sup>*4</sup> )	3,970
3. Farm Income	6,250	-
4. Net Production Value	5,780	8,330
B. Area Inside the IA Federation		
1. Gross Production Value <sup>*5</sup>	14,400	14,400
2. Production Cost		
- Pre-harvesting <sup>*2</sup>	4,565 (4,875 <sup>*4</sup> )	3,170
- Post-harvesting <sup>*3</sup>	615 ( 685 <sup>*4</sup> )	450
- Others		
° Loan interest	180	-
° Depreciation cost & others	140	90
Total	5,500 (5,880 <sup>*4</sup> )	3,710
3. Farm Income	8,900	-
4. Net Production Value	8,520	10,690

Note: \*1 ... 3.0 ₱/kg of paddy price is applied.  
\*2 ... Cost of land preparation up to harvesting are included.  
\*3 ... Cost of Threshing up to farm-gate are included.  
\*4 ... Included family labor.  
\*5 ... 3.5 ₱/kg of paddy price is applied.  
\*6 ... 0.65 of conversion factor is applied to convert economic value



TABLE K-6. FARM BUDGETS BY DISTRICTS (1.8 ha Farm)

Items	Districts			
	I	II	III	IV
1. Without Improvement Project				
a) Paddy Field (tons/ha)	3.4	3.8	3.3	3.3
b) Production (tons)	11.6	13.0	11.3	11.3
c) Gross Income ('000P)	34.8	39.0	33.9	33.9
d) Production Cost ('000P)	18.7	19.9	18.5	18.5
e) Farm Income ('000P)				
° Owner Farmer	16.1	19.1	15.4	15.4
° Tenant Farmer	11.1	14.1	10.4	10.4
2. With Improvement Project				
- Outside the IA Federation				
a) Paddy Field (tons/ha)	4.0	4.4	4.1	4.0
b) Production (tons)	13.7	15.0	14.0	13.7
c) Gross Income ('000P)	41.1	45.0	42.0	41.1
d) Production Cost ('000P)	20.5	21.4	20.6	20.5
e) Farm Income ('000P)				
° Owner Farmer	20.6	23.6	21.4	20.6
° Tenant Farmer	15.6	18.6	16.4	15.6
- Inside the IA Federation				
a) Paddy Field (tons/ha)	4.0	4.4	4.1	4.0
b) Production (tons)	13.7	15.0	14.0	13.7
c) Gross Income ('000P)	48.0	52.5	49.0	48.0
d) Production Cost ('000P)	18.2	20.0	18.6	18.2
e) Farm Income ('000P)				
° Owner Farmer	29.8	32.5	30.4	29.8
° Tenant Farmer	24.8	27.5	25.4	24.8

TABLE K-7. ESTIMATE OF IRRIGABLE AREA WITH AND WITHOUT IMPROVEMENT PROJECT

(unit: '000 ha)

Year	Area not yet under construction				Area where is in-progress	Total	
	Irrigated Area	Rainfed Area	Development Area	Sub-total			
1. MRIIS Existing Project							
1974	50.0	40.0	7.4	97.4	-	97.4	
75	24.0	40.0	7.4	71.4	26.0	----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----	
76	19.0	40.0	7.4	66.4	31.0		
77	14.0	40.0	7.4	61.4	36.0		
78	5.0	40.0	7.4	52.4	45.0		
79	5.0	40.0	7.4	59.4	38.0		
80	5.0	40.0	7.4	54.4	43.0		(same)
81	5.0	40.0	7.4	59.4	38.0		
82	-	40.0	7.4	54.4	43.0		
83	-	36.4	6.0	54.4	43.0		
84	-	31.9	5.5	37.4	60.0		
85	-	26.8	5.0	31.8	65.6		
86	-	23.6	4.7	28.3	69.1		97.4
2. Without Improvement Project							
1987	-	21.7	4.7	26.4	71.0	97.4	
88	-	19.9	4.7	24.6	72.8	----- ----- ----- ----- -----	
89	-	18.0	4.7	22.7	74.7		(same)
90	-	16.2	4.7	20.9	76.5		
91	-	14.8	4.7	19.5	77.9		97.4
3. With Improvement Project							
1987	-	21.7	4.7	26.4	71.0	97.4	
88	-	18.8	3.5	22.3	75.1	----- ----- ----- ----- -----	
89	-	15.4	2.5	17.9	79.5		(same)
90	-	10.4	1.5	11.9	85.5		
91	-	5.4	-	5.9	91.5		
92	-	-	-	-	97.4		97.4

TABLE K-8. ESTIMATE OF PADDY PLANTED AREA WITH AND WITHOUT IMPROVEMENT PROJECT

- Area not yet under construction -

(unit: '000 ha)

Year	Irrigated Area			Rainfed Area			Total
	Dry Season	Wet Season	Sub-total	Dry Season	Wet Season	Sub-total	
1. MRIIS Existing Project							
1974	24.0	50.0	74.0	4.0	40.0	44.0	118.0
75	11.5	24.0	35.5	4.0	40.0	44.0	79.5
76	9.1	19.0	28.1	4.0	40.0	44.0	72.1
77	6.7	14.0	20.7	4.0	40.0	44.0	64.7
78	2.4	5.0	7.4	4.0	40.0	44.0	51.4
79	5.8	12.0	17.8	4.0	40.0	44.0	61.8
80	3.4	7.0	10.4	4.0	40.0	44.0	54.4
81	5.8	12.0	17.8	4.0	40.0	44.0	61.8
82	3.4	7.0	10.4	4.0	40.0	44.0	54.4
83	5.8	12.0	19.8	3.6	36.4	40.0	57.8
84	-	-	-	3.2	31.9	35.1	35.1
85	-	-	-	2.7	26.8	29.5	29.5
86	-	-	-	2.4	23.6	26.0	26.0
2. Without Improvement Project							
1987	-	-	-	2.2	21.7	23.9	23.9
88	-	-	-	2.0	19.9	21.9	21.9
89	-	-	-	1.8	18.0	19.8	19.8
90	-	-	-	1.6	16.2	17.8	17.8
91~	-	-	-	1.5	14.8	16.3	16.3
3. With Improvement Project							
1987	-	-	-	2.2	21.7	23.9	23.9
88	-	-	-	1.9	18.8	20.7	20.7
89	-	-	-	1.5	15.4	16.9	16.9
90	-	-	-	1.0	10.4	11.4	11.4
91	-	-	-	0.5	5.4	5.9	5.9
92~	-	-	-	-	-	-	-

TABLE K-9. PADDY PRODUCTION WITHOUT PROJECT

Year	Irrigated Area			Rainfed Area			Total
	Dry Season	Wet Season	Sub-total	Dry Season	Wet Season	Sub-total	
1. Paddy Area Planted <sup>*1</sup> ('000 ha)							
1974	24.0	50.0	74.0	4.0	40.0	44.0	118.0
2. Paddy Yield <sup>*2</sup> (ton/ha)							
1974	2.2	2.1		1.4	1.4		
1991-	2.6	2.5		1.5	1.5		
3. Paddy Production ('000 ton)							
1974	52.8	105.0	157.8	5.6	56.5	61.6	219.4
1986	59.6	119.1	178.7	5.9	58.8	64.7	243.4
1991-	62.4	125.0	187.4	6.0	60.0	66.0	253.4
4. Gross Production Value (million ₱)							
1974	158.4	315.0	475.4	16.8	168.0	184.0	658.2
1991-	187.2	375.0	562.2	18.0	180.0	198.0	760.2
5. Net Production Value (million ₱)							
- Financial							
1974	27	47	74	1	7	8	82
1991-	49	90	139	2	18	20	159
- Economic							
1974	78	145	223	5	47	52	275
1991-	103	199	302	6	58	64	366

Source: \*1 ... "Magat River Project Feasibility Report" June, 1973.

\*2 ... "Magat River Project Stage II", Staff Appraisal Report IBRD, November, 1978

Note : \*3 ... 3.0 ₱/kg of paddy price was applied.

TABLE K-10. NET PRODUCTION VALUE WITHOUT PROJECT

(unit: million ₱)

Year	Irrigated Area			Rainfed Area			Total
	Dry Season	Wet Season	Sub-total	Dry Season	Wet Season	Sub-total	
1. Financial							
1974	27	47	74	1	7	8	82
75	28	50	78	1	8	9	87
76	30	52	82	1	8	9	91
77	31	55	86	1	9	10	96
78	32	57	89	1	10	11	100
79	33	60	93	1	10	11	104
80	35	62	97	1	11	12	109
81	36	65	101	1	12	13	114
82	37	67	104	1	12	13	117
83	39	70	109	2	13	15	124
84	40	72	112	2	13	15	127
85	41	75	116	2	14	16	132
86	43	77	120	2	15	17	137
87	44	80	124	2	15	17	141
88	45	82	127	2	16	18	145
89	46	85	131	2	17	19	150
90	48	87	135	2	17	19	154
90	49	90	139	2	18	20	159
2. Economic							
1974	78	145	223	5	47	52	275
75	79	148	227	5	48	53	280
76	81	151	232	5	48	53	285
77	82	155	237	5	49	54	291
78	84	158	242	5	50	55	297
79	85	161	246	5	50	55	301
80	87	164	251	5	51	56	307
81	88	167	255	5	52	57	312
82	90	170	260	5	52	57	317
83	91	174	265	6	53	59	324
84	93	177	270	6	53	59	329
85	94	180	274	6	54	70	334
86	96	183	279	6	55	61	340
87	97	186	283	6	55	61	344
88	99	189	288	6	56	62	350
89	100	193	293	6	57	63	356
90	102	196	298	6	57	63	361
91	103	199	302	6	58	64	366

TABLE K-11. NET PRODUCTION VALUE WITH AND WITHOUT IMPROVEMENT PROJECT (Financial)

- Area not yet under construction -

(unit: million ₱)

Year	Irrigated Area			Rainfed Area			Total
	Dry Season	Wet Season	Sub-total	Dry Season	Wet Season	Sub-total	
1. MRIIS Existing Project							
1974	27	47	74	1	7	8	82
1975	13	24	37	1	8	9	46
1976	11	20	31	1	8	9	40
1977	9	15	24	1	9	10	34
1978	3	6	9	1	10	11	20
1979	8	14	22	1	10	11	33
1980	5	9	14	1	11	12	26
1981	9	16	25	1	12	13	38
1982	5	9	11	1	12	13	24
1983	9	17	26	2	12	14	30
1984	-	-	-	2	10	12	12
1985	-	-	-	1	9	10	10
1986	-	-	-	1	9	10	10
2. Without Improvement Project							
1987	-	-	-	1	8	9	9
1988	-	-	-	1	8	9	9
1989	-	-	-	1	8	9	9
1990	-	-	-	1	7	8	8
1991-	-	-	-	1	7	8	8
3. With Improvement Project							
1987	-	-	-	1	8	9	9
1988	-	-	-	1	8	9	9
1989	-	-	-	1	7	8	8
1990	-	-	-	1	4	5	5
1991	-	-	-	1	2	3	3
1992-	-	-	-	-	-	-	-

TABLE K-12. NET PRODUCTION VALUE WITH AND WITHOUT IMPROVEMENT PROJECT (Economic)

- Area not yet under construction -

(unit: million ₱)

Year	Irrigated Area			Rainfed Area			Total
	Dry Season	Wet Season	Sub-total	Dry Season	Wet Season	Sub-total	
1. MRIIS Existing Project							
1974	78	145	223	5	47	52	275
1975	38	71	109	5	48	53	162
1976	31	57	88	5	48	53	141
1977	23	43	66	5	49	54	120
1978	8	16	24	5	50	55	79
1979	21	39	60	5	50	55	115
1980	12	23	35	5	51	56	91
1981	21	40	61	5	52	57	118
1982	13	24	37	5	52	52	89
1983	22	42	64	5	48	48	112
1984	-	-	-	5	42	42	42
1985	-	-	-	4	36	36	36
1986	-	-	-	4	32	32	32
1. Without Improvement Project							
1987	-	-	-	3	30	30	30
1988	-	-	-	3	28	28	28
1989	-	-	-	3	26	26	26
1990	-	-	-	2	23	23	23
1991-	-	-	-	2	21	21	21
3. With Improvement Project							
1987	-	-	-	3	30	30	30
1988	-	-	-	2	26	26	26
1989	-	-	-	2	22	22	22
1990	-	-	-	2	15	15	15
1991	-	-	-	1	8	8	8
1992	-	-	-	-	-	-	-

TABLE K-13. PADDY YIELD PROJECTION

(unit: tons/ha)

<u>Description</u>		<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
A. Without Improvement Project								
1. District I	Dry	3.3	3.4	3.5	3.5	3.6	3.7	3.7
	Wet	2.8	2.9	3.0	3.0	3.1	3.2	3.2
2. District II	Dry	3.6	3.7	3.8	3.9	4.0	4.0	4.0
	Wet	3.3	3.4	3.4	3.5	3.5	3.6	3.6
3. District III								
- Gravity Service	Dry	3.3	3.4	3.4	3.5	3.5	3.6	3.6
	Wet	2.4	2.5	2.7	2.8	3.0	3.1	3.1
- Pump Up Service	Dry	3.3	3.3	3.3	3.4	3.4	3.5	3.5
	Wet	2.5	2.5	2.5	2.5	2.5	2.6	2.6
4. District IV								
- Gravity Service	Dry	3.3	3.4	3.4	3.5	3.5	3.6	3.6
	Wet	2.6	2.7	2.8	2.8	2.9	3.0	3.0
- Pump Up Service	Dry	3.0	3.1	3.2	3.2	3.3	3.4	3.4
	Wet	2.3	2.3	2.4	2.4	2.5	2.5	2.5
B. With Improvement Project								
1. District I	Dry	3.3	3.4	3.5	3.7	3.9	4.0	4.2
	Wet	2.8	2.9	3.1	3.3	3.5	3.7	3.9
2. District II	Dry	3.6	3.7	3.8	4.0	4.2	4.3	4.5
	Wet	3.3	3.4	3.6	3.8	3.9	4.1	4.3
3. District III								
- Gravity Service	Dry	3.3	3.4	3.4	3.6	3.9	4.1	4.3
	Wet	2.4	2.5	2.8	3.1	3.4	3.7	4.0
- Pump Up Service	Dry	3.3	3.3	3.3	3.4	3.7	3.9	4.0
	Wet	2.5	2.5	2.5	2.5	3.0	3.3	3.7
4. District IV								
- Gravity Service	Dry	3.3	3.4	3.4	3.6	3.9	4.0	4.2
	Wet	2.6	2.7	3.0	3.2	3.5	3.7	4.0
- Pump Up Service	Dry	3.0	3.1	3.2	3.2	3.6	3.7	3.8
	Wet	2.3	2.3	2.4	2.4	2.9	3.2	3.5



TABLE K-14. PADDY PLANTED AREA AND PRODUCTION  
WITHOUT IMPROVEMENT PROJECT

- Area where is in-progress MRIIS -

Description		1986	1987	1988	1989	1990	1991	1992
<b>A. Planted Area ('000 ha)</b>								
1. District I	Dry	15.0	15.5	15.9	16.4	16.8	17.3	17.3
	Wet	15.9	16.8	17.7	18.6	19.5	20.4	20.4
2. District II	Dry	20.4	20.4	20.4	20.4	20.4	20.4	20.4
	Wet	20.3	20.8	21.2	21.7	22.1	22.1	22.1
3. District III								
-Gravity	Dry	14.3	14.3	14.3	14.3	14.3	14.3	14.3
Service	Wet	15.0	15.1	15.2	15.3	15.4	15.5	15.5
-Pump Up	Dry	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Service	Wet	2.8	2.8	2.8	2.8	2.8	2.8	2.8
4. District IV								
-Gravity	Dry	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Service	Wet	14.8	15.2	15.6	16.0	16.4	16.8	16.8
-Pump Up	Dry	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Service	Wet	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total								
-Gravity	Dry	64.3	64.8	65.2	65.7	66.1	66.6	66.6
Service	Wet	66.0	67.9	69.7	71.6	73.4	74.8	74.8
-Pump Up	Dry	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Service	Wet	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Total Area	Dry	66.9	67.4	67.8	68.3	68.7	69.2	69.2
	Wet	69.1	71.0	72.8	74.7	76.5	77.9	77.9
	Total	136.0	138.4	140.6	143.0	145.2	147.1	147.1
<b>B. Production ('000 tons)</b>								
1. District I	Dry	49.6	52.5	55.4	58.2	61.1	64.0	64.0
	Wet	44.7	48.8	52.9	57.1	61.2	65.3	65.3
2. District II	Dry	74.1	76.0	77.9	79.7	81.6	81.6	81.6
	Wet	66.1	69.5	72.9	76.2	79.6	79.6	79.6
3. District III								
-Gravity	Dry	46.7	47.7	48.6	49.6	50.5	51.5	51.5
Service	Wet	35.7	38.2	40.7	43.1	45.6	48.1	48.1
-Pump Up	Dry	7.8	7.9	8.0	8.2	8.3	8.4	8.4
Service	Wet	6.9	7.0	7.1	7.1	7.2	7.3	7.3
4. District IV								
-Gravity	Dry	47.7	48.7	49.7	50.6	51.6	52.6	52.6
Service	Wet	38.8	41.1	43.4	45.8	48.1	50.4	50.4
-Pump Up	Dry	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Service	Wet	0.7	0.7	0.7	0.8	0.8	0.8	0.8
Total								
-Gravity	Dry	218.1	224.9	231.6	238.1	244.8	249.7	249.7
Service	Wet	185.3	197.6	209.9	222.2	234.5	243.4	243.4
-Pump Up	Dry	8.4	8.5	8.6	8.9	9.0	9.1	9.1
Service	Wet	7.6	7.7	7.8	7.9	8.0	8.1	8.1
Total Area	Dry	226.5	233.4	240.2	247.0	253.8	258.8	258.8
	Wet	192.9	205.3	217.7	230.1	242.5	251.5	251.5
	Total	419.4	438.7	457.9	477.1	496.3	510.3	510.3

TABLE K-15. PADDY PLANTED AREA AND PRODUCTION  
WITH IMPROVEMENT PROJECT

- Area where is in-progress -

Description		1986	1987	1988	1989	1990	1991	1992
<b>A. Planted Area ('000 ha)</b>								
1. District I								
	Dry	15.0	15.5	15.9	17.3	18.8	20.2	21.6
	Wet	15.9	16.8	18.2	19.7	21.1	22.6	24.0
2. District II								
	Dry	20.4	20.4	20.4	20.8	21.3	21.7	22.1
	Wet	20.3	20.8	21.5	22.3	23.0	23.8	24.5
3. District III								
	-Gravity							
	Dry	14.3	14.3	14.3	14.8	15.4	15.9	16.4
	Wet	15.0	15.1	15.7	16.3	17.0	17.6	18.2
	-Pump Up							
	Dry	2.4	2.4	2.4	2.4	3.6	4.7	5.9
	Wet	2.8	2.8	2.8	2.8	4.1	5.3	6.6
4. District IV								
	-Gravity							
	Dry	14.6	14.6	14.6	16.0	17.4	18.8	20.2
	Wet	14.8	15.2	16.6	18.1	19.5	21.0	22.4
	-Pump Up							
	Dry	0.2	0.2	0.2	0.2	0.6	1.1	1.5
	Wet	0.3	0.3	0.3	0.3	0.8	1.2	1.7
Total								
	-Gravity							
	Dry	64.3	64.8	65.2	68.9	72.9	76.6	80.3
	Wet	66.0	67.9	72.0	76.4	80.6	85.0	89.1
	-Pump Up							
	Dry	2.6	2.6	2.6	2.6	4.2	5.8	7.4
	Wet	3.1	3.1	3.1	3.1	4.9	6.5	8.3
Total Area								
	Dry	66.9	67.4	67.8	71.5	77.1	82.4	87.7
	Wet	69.1	71.0	75.1	79.5	85.5	91.5	97.4
	Total	136.0	138.4	142.9	151.0	162.6	173.9	185.1
<b>B. Production ('000 tons)</b>								
1. District I								
	Dry	49.6	52.5	55.4	64.0	73.3	80.8	90.7
	Wet	44.7	48.8	57.5	66.2	75.0	83.7	92.4
2. District II								
	Dry	74.1	76.0	77.9	83.2	89.5	93.3	99.5
	Wet	66.1	69.5	76.6	83.8	90.9	98.1	105.2
3. District III								
	-Gravity							
	Dry	46.7	47.7	48.6	53.3	60.1	65.2	70.5
	Wet	35.7	38.2	45.0	51.8	58.5	65.3	72.1
	-Pump Up							
	Dry	7.8	7.9	8.0	8.2	13.3	18.3	23.6
	Wet	6.9	7.0	7.1	7.1	12.9	18.8	24.6
4. District IV								
	-Gravity							
	Dry	47.7	48.7	49.7	57.6	67.9	75.2	84.8
	Wet	38.8	41.1	50.6	60.1	69.7	79.2	88.7
	-Pump Up							
	Dry	0.6	0.6	0.6	0.7	2.2	4.1	5.7
	Wet	0.7	0.7	0.7	0.8	2.5	4.2	5.9
Total								
	-Gravity							
	Dry	218.1	224.9	231.6	258.1	290.8	314.5	345.5
	Wet	185.3	197.6	229.7	261.9	294.1	326.3	358.4
	-Pump Up							
	Dry	8.4	8.5	8.6	8.9	15.5	22.4	29.3
	Wet	7.6	7.7	7.8	7.9	15.4	23.0	30.5
Total Area								
	Dry	226.5	233.4	240.2	267.0	306.3	336.9	374.8
	Wet	192.9	205.3	237.5	269.8	309.5	349.3	388.9
	Total	419.4	438.7	477.7	536.8	605.8	686.2	763.7

TABLE K-16. PADDY PLANTED AREA AND PRODUCTION WITH PROJECT

- Area where is in-progress -

Year	Planted Area ('000 ha)			Production ('000 tons)		
	Dry	Wet	Total	Dry	Wet	Total
	Season	Season		Season	Season	
1975	16.1	25.8	41.9	42.0	48.3	90.3
76	5.3	30.8	36.1	14.7	75.5	90.2
77	15.4	35.4	50.8	57.3	98.2	155.5
78	25.3	44.7	70.0	89.7	120.1	209.8
79	34.1	37.7	71.8	121.3	129.4	250.7
80	38.6	42.4	81.0	121.3	112.0	233.3
81	31.5	37.6	69.1	110.4	94.1	204.5
82	44.0	42.8	86.8	149.8	123.9	273.7
83	42.4	38.0	80.4	160.1	98.3	258.4
84	49.5	55.8	105.3	173.9	182.2	356.1
85	65.6	65.0	130.6	231.6	188.7	420.3

TABLE K-17. NET PRODUCTION VALUE WITH PROJECT

- Area where is in-progress -

(unit: million ₱)

Year	Gross Production Value			Net Production Value	
	Dry	Wet	Total	Financial	Economic
	Season	Season		Financial	Economic
1975	126.0	144.9	270.9	100	165
76	44.1	226.5	270.6	100	165
77	171.9	294.6	466.5	173	285
78	269.1	360.3	629.4	233	384
79	363.9	388.2	752.1	278	459
80	363.9	336.0	699.9	259	427
81	331.2	282.3	613.5	227	374
82	449.4	371.7	821.1	304	501
83	480.3	294.9	775.2	287	473
84	521.7	546.6	1,068.3	395	652
85	694.8	566.1	1,260.9	467	769

TABLE K-18. NET PRODUCTION VALUE WITHOUT IMPROVEMENT PROJECT

- Area where is in-progress -

Year	Paddy Planted Area '000 ha	Production '000 tons	Gross Production Value	Net Production Value	
				Financial million ₱	Economic
1986	136.0	419.4	1,258	453	767
1987	138.4	438.7	1,316	487	816
1988	140.6	457.9	1,374	522	852
1989	143.0	477.1	1,431	544	887
1990	145.2	496.3	1,489	596	938
1991	147.1	510.3	1,531	628	980
1992-	147.1	510.3	1,531	628	980

TABLE K-19. NET PRODUCTION VALUE WITH IMPROVEMENT PROJECT AND WITHOUT IA FEDERATION PROJECT (CASE STUDY)

- Area where is in-progress -

Year	Paddy Planted Area '000 ha	Production '000 tons	Gross Production Value	Net Production Value	
				Financial million ₱	Economic
1986	136.0	419.4	1,258	453	767
1987	138.4	438.7	1,316	487	816
1988	142.9	477.7	1,433	545	888
1989	151.0	536.8	1,610	676	1,030
1990	162.6	605.8	1,817	781	1,181
1991	173.9	686.2	2,059	927	1,380
1992-	185.1	763.7	2,291	1,070	1,542

TABLE K-20. NET PRODUCTION VALUE WITH IMPROVEMENT PROJECT

- Area is in-progress -

Year	Area outside the IA Federation				Area in the IA Federation				Total of	
	Paddy Planted Area '000 ha	Production '000 tons	Gross Production million ₪	Net Production million ₪	Paddy Planted Area '000 ha	Production '000 tons	Gross Production million ₪	Net Production million ₪	Finan- cial	Eco- nomic
1986	136.0	419.4	1,258	453	-	-	-	-	453	767
1987	138.4	438.7	1,316	487	-	-	-	-	487	816
1988	142.9	477.7	1,433	545	-	-	-	-	545	888
1989	125.0	429.8	1,289	541	26.0	107.0	374	221	762	1,102
1990	110.6	391.8	1,175	505	52.0	214.0	748	443	948	1,319
1991	95.9	365.2	1,096	493	78.0	321.0	1,123	665	1,158	1,568
1992	81.1	335.7	1,007	470	104.0	428.0	1,497	886	1,356	1,789
1993	56.1	228.7	686	320	129.0	535.0	1,871	1,107	1,427	1,850
1994	44.1	183.7	551	257	141.0	580.0	2,031	1,202	1,459	1,878
1995	33.1	137.7	413	193	152.0	626.0	2,192	1,297	1,490	1,904
1996	22.1	91.7	275	128	163.0	672.0	2,352	1,392	1,520	1,930
1997	11.1	45.7	137	64	174.0	718.0	2,513	1,487	1,551	1,956
1998	-	-	-	-	185.1	763.7	2,673	1,582	1,582	1,983

TABLE K-21. PADDY PRODUCTION BENEFIT (FINANCIAL)

(unit: million ₱)

Year	Net Production Without Project	Net Production With Project			Benefit
		Area not yet under construction	Area where is in-progress	Total	
1. MRIIS Existing Project					
1974	82	82	-	82	0
1975	87	46	100	146	59
1976	91	40	100	140	49
1977	96	34	173	207	111
1978	100	20	233	253	153
1979	104	33	278	311	207
1980	109	26	259	285	176
1981	114	38	227	265	151
1982	117	24	304	328	211
1983	124	30	287	317	193
1984	127	12	395	407	280
1985	132	10	467	477	345
1986	137	10	453	463	326
2. Without Improvement Project					
1987	141	9	487	496	355
1988	145	9	522	531	386
1989	150	9	544	553	403
1990	154	8	596	604	450
1991	159	8	628	636	477
1992-	159	8	628	636	477
3. With Improvement Project					
1987	141	9	487	496	355
1988	145	9	545	554	409
1989	150	8	762	770	620
1990	154	5	948	953	799
1991	159	5	1,158	1,163	1,004
1992	159	-	1,356	1,356	1,197
1993	159	-	1,427	1,427	1,268
1994	159	-	1,459	1,459	1,300
1995	159	-	1,490	1,490	1,331
1996	159	-	1,520	1,520	1,361
1997	159	-	1,551	1,551	1,392
1998-	159	-	1,582	1,582	1,423

TABLE K-22. PADDY PRODUCTION BENEFIT (ECONOMIC)\*

(unit: million ₱)

Year	Net Production Without Project	Net Production With Project			Benefit
		Area not yet under construction	Area where is in-progress	Total	
1. MRIIS Existing Project					
1974	275	275	--	275	0
1975	280	162	165	327	47
1976	285	141	165	306	21
1977	291	120	285	405	114
1978	297	79	384	463	166
1979	301	115	459	574	273
1980	307	91	427	518	211
1981	312	118	374	492	180
1982	317	89	501	590	273
1983	324	112	473	585	261
1984	329	42	652	694	365
1985	334	36	769	805	471
1986	340	32	767	799	459
2. Without Improvement Project					
1987	344	30	816	846	502
1988	350	28	852	880	530
1989	356	26	887	913	557
1990	361	23	938	961	600
1991	366	21	980	1,001	635
1992-	366	21	980	1,001	635
3. With Improvement Project					
1987	344	30	816	846	502
1988	350	26	888	914	564
1989	356	22	1,102	1,124	768
1990	361	15	1,319	1,334	973
1991	366	8	1,568	1,576	1,210
1992	366	--	1,789	1,789	1,423
1993	366	--	1,850	1,850	1,484
1994	366	--	1,878	1,878	1,512
1995	366	--	1,904	1,904	1,538
1996	366	--	1,930	1,930	1,564
1997	366	--	1,956	1,956	1,590
1998-	366	--	1,983	1,983	1,617

Note: \* ... 0.6 of conversion factor is applied to convert economic value of production cost.

TABLE K-23. ANNUAL DISBURSEMENT OF MRIIS PROJECT COST

Year	Canal and Others								Dam *1			Grand Total	
	Local Currency				Foreign Currency				Sub-Total	Local Currency	Foreign Currency		Sub-Total
	Ia	Ib	II	Total	Ia	Ib	III	Total					
1. Actual Expenses *3 (unit: L.C. --- P x 10 <sup>6</sup> , F.C. --- US\$ x 10 <sup>6</sup> )													
1974	15.0	-	-	15.0	2.1	-	-	2.1	-	-	-	-	
75	30.0	10.5	-	40.5	4.1	-	-	4.1	-	-	-	-	
76	15.0	34.1	-	49.1	2.0	0.6	-	2.6	-	-	-	-	
77	-	50.7	-	50.7	-	5.4	-	5.4	7.6	-	-	-	
78	-	54.9	-	54.9	-	8.1	-	8.1	87.6	-	-	-	
79	-	53.9	42.0	95.9	-	5.1	1.1	6.2	132.0	21.1	-	-	
80	-	40.4	14.8	55.2	-	6.2	5.3	11.5	287.8	14.7	-	-	
81	-	34.3	57.8	92.1	-	6.7	2.9	9.6	196.6	21.7	-	-	
82	-	31.8	35.5	67.3	-	7.3	9.6	16.9	153.9	9.5	-	-	
83	-	35.7	34.9	70.6	-	2.6	4.5	7.1	24.5	3.5	-	-	
84	-	-	29.5	29.5	-	-	7.2	7.2	16.0	2.1	-	-	
85	-	-	24.2	24.2	-	-	3.1	3.1	5.0	0.9	-	-	
86	-	-	17.4	17.4	-	-	2.4	2.4	1.8	0.7	-	-	
Total	60.0	346.3	256.1	662.4	8.2	42.0	36.1	86.3	912.8	74.2	-	-	
2. Present Value *2 (unit: P x 10 <sup>6</sup> )													
1974	50	-	-	50	82	-	-	82	132	-	-	-	132
75	93	33	-	126	146	-	-	146	272	-	-	-	272
76	42	97	-	139	68	20	-	88	227	-	-	-	227
77	-	132	-	132	-	170	-	170	302	20	-	20	322
78	-	133	-	133	-	191	-	191	324	212	-	212	536
79	-	113	88	201	-	135	29	164	365	276	562	838	1,203
80	-	73	27	100	-	137	117	254	354	524	326	850	1,204
81	-	55	93	148	-	148	64	212	360	316	476	792	1,152
82	-	46	52	98	-	162	213	375	473	225	211	436	909
83	-	48	46	94	-	59	102	161	255	33	80	113	368
84	-	-	36	36	-	-	168	168	204	20	49	69	273
85	-	-	27	27	-	-	72	72	99	5	20	25	124
86	-	-	17	17	-	-	49	49	66	2	14	16	82
Total	185	730	386	1,301	296	1,022	814	2,132	3,433	1,633	1,738	3,371	6,804

Note : \*1--- Dam cost allocated fertilization is 50% of total dam cost.

\*2--- Following present worth factors are applied to convert to present value in 1986. And, present value of US\$ are converted to pesos with rate of P20.5 per US\$.

	1974	75	76	77	78	79	80	81	82	83	84	85	86
Local Currency	3.36	3.11	2.84	2.60	2.42	2.09	1.82	1.61	1.46	1.33	1.21	1.10	1.00
Foreign Currency	1.91	1.72	1.65	1.54	1.15	1.30	1.08	1.07	1.08	1.12	1.14	1.13	1.00

Source: \*3--- "Summary of Actual Expenditures" MRMP, NIA



TABLE K-24. COST OF MRTIS REHABILITATION

(unit: million ₱)

<u>Description</u>	<u>Cost</u>
<u>I. Improvement of Mechanical Facilities</u>	
1. Rehabilitation of Siffu Diversion Gate	16.2
2. Improvement of Weir	17.7
<u>Total</u>	<u>33.9</u>
<u>II. Procurement of Equipment</u>	
1. Procurement of Construction Equipment	51.0
2. Procurement of O & M Equipment	32.2
<u>Total</u>	<u>83.2</u>
<u>III. Rehabilitation Works of Canal System</u>	
1. Civil Work	
- Repair of Scoured Canal	29.0
- Desilting	4.0
- Structure Repair	5.9
<u>Sub-total</u>	<u>38.9</u>
2. Repair C/H Gates	
- Gate to be repaired	0.3
- Gate to be replaced	0.2
<u>Sub-total</u>	<u>0.5</u>
3. Repair of Turn-Out Gates	
- To be repaired	0.5
- To be replaced or installed	2.5
<u>Sub-total</u>	<u>3.0</u>
<u>Total</u>	<u>42.4</u>
<u>TOTAL</u>	<u>159.5</u>
<u>IV. Physical Contingencies</u>	<u>23.5</u>
<u>GRAND TOTAL</u>	<u>183.0</u>

TABLE K-25. O & M COST AND POWER INCOME WITH AND WITHOUT IMPROVEMENT PROJECT

(unit: '000 ₱)

Description	With Improvement Project	Without Improvement Project *1
1. O & M Cost		
- Salary and Wage	28,300	22,600
- Administration and General Expenditure (30%)	8,500	6,800
- Depreciation and Repair Cost	8,500	6,800
- Fuel and Oil	860	700
- Maintenance of Facilities	15,200	12,200
- Power Cost for Pump	20,410	7,400 *2
- Contingency	8,230	6,600
Sub-total	<u>90,000</u>	<u>63,100</u>
2. Power Income by Baligatan Electric Plant	18,600	18,600
<u>Total</u>	<u>71,400</u>	<u>44,500</u>

Note: \*1--- Cost for 77,900 ha of total irrigated area (77,900ha/97,400ha).

\*2--- Cost for 5,700 ha of pump up area (5,700ha/15,700ha).

TABLE K-26. PROJECTION OF REPLACEMENT AND O & M COST  
WITHOUT IMPROVEMENT PROJECT

(unit: million ₱)

Year	Replacement Cost				Total	Cost of Rehabilitation	O & M Cost	Total
	Computer System (10)*	Gate (30)*	Pump (20)*	Equipment (10)*				
1 1974								
12 1985								
13 86	----- Termination of construction -----						42	42
14 87	-	-	-	-	-	-	42	42
15 88	-	-	-	-	-	36	45	81
16 89	-	-	-	-	-	37	45	82
17 90	-	-	-	-	-	37	45	82
18 91	-	-	-	-	-	37	45	82
19 92	-	-	-	-	-	36	45	81
20 93	-	-	-	-	-	-	45	45
21 94	-	-	-	-	-	-	45	45
22 95	2	-	-	40	42	-	45	87
23 96	-	-	-	-	-	-	45	45
24 97	-	-	-	-	-	-	45	45
25 98	-	-	-	-	-	-	45	45
26 99	-	-	-	-	-	-	45	45
27 2000	-	-	-	-	-	-	45	45
28 1	-	-	-	-	-	-	45	45
29 2	-	-	-	-	-	-	45	45
30 3	-	-	-	-	-	-	45	45
31 4	-	-	-	-	-	-	45	45
32 5	2	-	100	40	142	-	45	187
33 6	-	-	-	-	-	-	45	45
34 7	-	-	-	-	-	-	45	45
35 8	-	-	-	-	-	-	45	45
36 9	-	-	-	-	-	-	45	45
37 10	-	-	-	-	-	-	45	45
38 11	-	-	-	-	-	-	45	45
39 12	-	-	-	-	-	-	45	45
40 13	-	-	-	-	-	-	45	45
41 14	-	-	-	-	-	-	45	45
42 15	2	40	-	40	82	-	45	127
43 16	-	-	-	-	-	-	45	45
44 17	-	-	-	-	-	-	45	45
45 18	-	-	-	-	-	-	45	45
46 19	-	-	-	-	-	-	45	45
47 20	-	-	-	-	-	-	45	45
48 21	-	-	-	-	-	-	45	45
49 22	-	-	-	-	-	-	45	45
50 23	-	-	-	-	-	-	45	45

Note: \* ... Figures in the parenthesis are the useful life of each facilities.

TABLE K-27. PROJECTION OF REPLACEMENT AND O & M COST WITH IMPROVEMENT PROJECT

(unit: million ₱)

Year	Replacement Cost					O & M <sup>*2</sup> Cost	Total
	Water Management(10)*1 System	Gate (30)*1	Pump (20)*1	O & M Equipment (10)*1	Total		
14 1987	-	-	-	-	-	42	42
15 88	-	-	-	-	-	52	52
16 89	-	-	-	-	-	57	57
17 90	-	-	-	-	-	62	62
18 91	-	-	-	-	-	66	66
19 92	----- Termination of construction. -----					71	71
20 93	-	-	-	-	-	71	71
21 94	-	-	-	-	-	71	71
22 95	-	-	-	-	-	71	71
23 96	-	-	-	-	-	71	71
24 97	-	-	-	-	-	71	71
25 98	-	-	-	-	-	71	71
26 99	-	-	-	-	-	71	71
27 2000	-	-	-	-	-	71	71
28 1	20	-	-	50	70	71	141
29 2	-	-	-	-	-	71	71
30 3	-	-	-	-	-	71	71
31 4	-	-	-	-	-	71	71
32 5	-	-	-	-	-	71	71
33 6	-	-	-	-	-	71	71
34 7	-	-	-	-	-	71	71
35 8	-	-	-	-	-	71	71
36 9	-	-	-	-	-	71	71
37 10	-	-	-	-	-	71	71
38 11	20	-	100	50	170	71	241
39 12	-	-	-	-	-	71	71
40 13	-	-	-	-	-	71	71
41 14	-	-	-	-	-	71	71
42 15	-	-	-	-	-	71	71
43 16	-	-	-	-	-	71	71
44 17	-	-	-	-	-	71	71
45 18	-	-	-	-	-	71	71
46 19	-	-	-	-	-	71	71
47 20	-	-	-	-	-	71	71
48 21	20	50	-	50	120	71	191
49 22	-	-	-	-	-	71	71
50 23	-	-	-	-	-	71	71

Note: \*1---Figures in the parenthesis are the useful life of each facilities.

\*2---Power income by Baligatan electric plant is minus.

TABLE K-28. FINANCIAL AND ECONOMIC PROJECT COST

(unit: million ₪)

Year	Without Improvement Project				With Improvement Project			
	Financial		Economic		Financial		Economic	
	Capital	O & M	Capital	O & M	Capital	O & M	Capital	O & M
1974	132	-	106	-	132	-	106	-
75	272	8	218	6	272	8	218	6
76	227	7	182	6	227	7	182	6
77	322	11	258	9	322	11	258	9
78	536	11	429	9	536	11	429	9
79	1,203	11	962	9	1,203	11	962	9
80	1,204	11	963	9	1,204	11	963	9
81	1,152	10	922	8	1,152	10	922	8
82	909	9	727	7	909	9	727	7
83	368	8	294	6	368	8	294	6
84	273	8	218	6	273	8	218	6
85	124	7	99	6	124	7	99	6
86	82	42	66	34	82	42	66	34
87	-	42	-	34	-	42	-	34
88	-	81	-	65	158	52	126	42
89	-	82	-	66	353	57	282	46
90	-	82	-	66	235	62	188	50
91	-	82	-	66	183	66	146	53
92	-	81	-	65	131	71	105	57
93	-	45	-	36	-	71	-	57
94	-	45	-	36	-	71	-	57
95	-	87	-	70	-	71	-	57
2001	-	45	-	36	-	141	-	113
2005	-	187	-	150	-	71	-	57
2011	-	45	-	36	-	241	-	193
2015	-	127	-	102	-	71	-	57
2021	-	45	-	36	-	191	-	153
Total	6,804	-	5,444	-	7,864	-	6,291	-

Note: 0.80 percent of conversion factor is applied to convert economic value.

TABLE K-29. PROJECT COST AND BENEFITS WITHOUT IMPROVEMENT PROJECT - FINANCIAL -  
( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	132.0	0.0	132.0	0.0	-132.0	132.00	0.0	132.00	0.0	132.00	0.0
2 1975	272.0	8.0	280.0	59.0	-221.0	240.05	50.58	231.41	48.76	223.21	47.03
3 1976	322.0	7.0	329.0	49.0	-185.0	185.76	38.90	175.81	58.81	166.56	34.83
4 1977	323.0	11.0	333.0	111.0	-222.0	244.77	81.59	227.44	75.81	211.63	70.54
5 1978	536.0	11.0	547.0	153.0	-394.0	372.28	104.13	339.65	95.00	310.38	86.82
6 1979	1203.0	11.0	1214.0	207.0	-1007.0	765.03	130.45	685.27	116.85	615.05	104.87
7 1980	1204.0	11.0	1215.0	178.0	-1037.0	708.94	102.69	623.49	90.32	549.62	79.61
8 1981	1152.0	10.0	1162.0	151.0	-1011.0	627.80	81.58	542.09	70.44	489.51	60.99
9 1982	909.0	9.0	918.0	211.0	-707.0	459.25	103.55	389.32	89.49	331.04	76.09
10 1983	368.0	8.0	376.0	193.0	-183.0	174.16	89.40	144.97	74.41	121.06	62.14
11 1984	273.0	8.0	281.0	280.0	-1.0	120.52	120.09	98.49	98.14	80.78	80.49
12 1985	124.0	7.0	131.0	345.0	214.0	52.02	137.01	41.74	109.93	33.62	38.55
13 1986	82.0	42.0	124.0	326.0	202.0	45.59	119.87	35.92	94.45	28.42	74.71
14 1987	0.0	42.0	42.0	313.0	313.0	14.30	120.86	11.06	93.48	8.59	72.64
15 1988	0.0	81.0	81.0	306.0	306.0	25.53	121.68	19.39	92.41	14.80	70.52
16 1989	0.0	82.0	82.0	403.0	321.0	23.94	117.65	17.85	87.71	13.58	65.74
17 1990	0.0	82.0	82.0	450.0	368.0	22.16	121.62	16.22	89.03	11.94	65.52
18 1991	0.0	82.0	82.0	477.0	395.0	20.52	119.37	14.75	85.79	10.66	62.03
19 1992	0.0	81.0	81.0	477.0	386.0	18.77	110.53	13.24	77.99	9.40	58.39
20 1993	0.0	45.0	45.0	477.0	432.0	9.65	102.54	6.69	70.90	4.67	49.45
21 1994	0.0	45.0	45.0	477.0	432.0	8.94	94.76	6.08	64.46	4.17	44.15
22 1995	0.0	87.0	87.0	477.0	390.0	16.00	87.74	10.69	58.60	7.19	39.42
23 1996	0.0	45.0	45.0	477.0	432.0	7.66	81.24	5.03	53.27	3.52	35.20
24 1997	0.0	45.0	45.0	477.0	432.0	7.10	75.22	4.57	48.43	2.96	31.43
25 1998	0.0	45.0	45.0	477.0	432.0	6.57	69.65	4.15	44.03	2.65	28.06
26 1999	0.0	45.0	45.0	477.0	432.0	6.08	64.49	3.78	40.02	2.36	25.05
27 2000	0.0	45.0	45.0	477.0	432.0	5.63	59.72	3.43	36.59	2.11	22.37
28 2001	0.0	45.0	45.0	477.0	432.0	5.22	55.29	3.12	33.08	1.88	19.97
29 2002	0.0	45.0	45.0	477.0	432.0	4.83	51.20	2.84	30.07	1.63	17.83
30 2003	0.0	45.0	45.0	477.0	432.0	4.47	47.40	2.58	27.34	1.50	15.92
31 2004	0.0	45.0	45.0	477.0	432.0	4.14	43.89	2.34	24.85	1.34	14.22
32 2005	0.0	187.0	187.0	477.0	290.0	5.93	40.64	8.86	22.59	4.98	12.69
33 2006	0.0	45.0	45.0	477.0	432.0	5.55	37.63	1.94	20.54	1.07	11.33
34 2007	0.0	45.0	45.0	477.0	432.0	5.29	34.84	1.76	18.67	0.95	10.12
35 2008	0.0	45.0	45.0	477.0	432.0	5.04	32.26	1.60	16.97	0.85	9.03
36 2009	0.0	45.0	45.0	477.0	432.0	4.82	29.87	1.46	15.43	0.76	8.07
37 2010	0.0	45.0	45.0	477.0	432.0	4.61	27.66	1.32	14.03	0.68	7.20
38 2011	0.0	45.0	45.0	477.0	432.0	4.42	25.61	1.20	12.75	0.61	6.43
39 2012	0.0	45.0	45.0	477.0	432.0	4.24	23.71	1.09	11.59	0.54	5.74
40 2013	0.0	45.0	45.0	477.0	432.0	4.07	21.96	0.99	10.54	0.48	5.13
41 2014	0.0	45.0	45.0	477.0	432.0	3.92	20.33	0.90	9.58	0.43	4.58
42 2015	0.0	127.0	127.0	477.0	350.0	5.01	18.82	2.32	4.09	1.09	4.09
43 2016	0.0	45.0	45.0	477.0	432.0	4.84	17.43	0.75	7.92	0.34	3.65
44 2017	0.0	45.0	45.0	477.0	432.0	4.68	16.14	0.68	7.20	0.31	3.26
45 2018	0.0	45.0	45.0	477.0	432.0	4.54	14.94	0.62	6.54	0.27	2.91
46 2019	0.0	45.0	45.0	477.0	432.0	4.41	13.84	0.56	5.95	0.25	2.60
47 2020	0.0	45.0	45.0	477.0	432.0	4.29	12.81	0.51	5.41	0.22	2.32
48 2021	0.0	45.0	45.0	477.0	432.0	4.18	11.86	0.46	4.92	0.20	2.07
49 2022	0.0	45.0	45.0	477.0	432.0	4.04	11.04	0.42	4.47	0.17	1.85
50 2023	0.0	45.0	45.0	477.0	432.0	3.96	10.17	0.38	4.06	0.16	1.65
TOTAL	680.0	2254.0	9038.0	19596.0	10538.0	4394.78	3128.01	3843.24	2266.03	3391.65	1706.36

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 0.71 ( 8% ) = 5.1 %  
INTERNAL RATE OF RETURN (IRR) = 0.59 ( 10% ) = 0.50 ( 12% )

TABLE K-30. PROJECT COST AND BENEFITS WITHOUT IMPROVEMENT PROJECT - ECONOMIC -  
( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	106.0	0.0	106.0	0.0	-106.0	106.00	0.0	106.00	0.0	106.00	0.0
2 1975	218.0	6.0	224.0	47.0	-177.0	192.04	40.29	185.12	38.84	178.57	37.47
3 1976	182.0	6.0	188.0	21.0	-167.0	149.24	16.67	141.23	15.78	133.81	14.95
4 1977	258.0	9.0	267.0	114.0	-153.0	196.25	83.79	182.37	77.86	169.68	72.45
5 1978	429.0	9.0	438.0	166.0	-272.0	298.10	112.98	271.96	103.07	248.53	94.19
6 1979	962.0	9.0	971.0	273.0	-698.0	611.90	172.04	548.11	154.10	491.94	138.51
7 1980	922.0	9.0	931.0	211.0	-720.0	627.15	123.12	498.79	108.28	439.68	95.45
8 1981	922.0	9.0	931.0	180.0	-750.0	502.45	97.25	433.85	83.97	375.61	72.70
9 1982	727.0	7.0	734.0	273.0	-461.0	367.18	136.57	311.29	113.78	264.69	98.45
10 1983	294.0	6.0	300.0	261.0	-39.0	138.96	120.89	115.66	100.63	96.59	84.04
11 1984	218.0	6.0	224.0	365.0	141.0	96.07	156.54	78.51	127.93	64.39	104.93
12 1985	99.0	6.0	105.0	471.0	366.0	41.70	187.04	33.46	150.08	64.39	120.69
13 1986	66.0	34.0	100.0	459.0	359.0	36.77	168.77	28.97	132.96	22.92	105.19
14 1987	0.0	34.0	34.0	502.0	468.0	11.58	170.91	8.95	132.19	6.96	102.72
15 1988	0.0	65.0	65.0	530.0	465.0	20.49	167.08	15.56	126.88	11.88	96.83
16 1989	0.0	66.0	66.0	557.0	491.0	19.26	162.58	14.36	124.22	10.77	90.66
17 1990	0.0	66.0	66.0	600.0	534.0	17.84	162.16	13.06	118.71	9.61	87.39
18 1991	0.0	66.0	66.0	635.0	569.0	16.52	158.91	11.87	114.21	8.28	82.52
19 1992	0.0	65.0	65.0	635.0	570.0	15.06	147.14	10.63	103.85	7.55	73.73
20 1993	0.0	36.0	36.0	635.0	599.0	7.72	136.24	5.35	94.39	3.23	65.83
21 1994	0.0	36.0	36.0	635.0	599.0	7.15	126.15	4.86	85.81	3.23	65.83
22 1995	0.0	70.0	70.0	635.0	565.0	12.88	116.80	8.60	78.01	5.78	52.48
23 1996	0.0	36.0	36.0	635.0	599.0	6.13	108.15	4.02	70.92	2.66	46.86
24 1997	0.0	36.0	36.0	635.0	599.0	5.68	100.14	3.65	64.17	2.37	41.84
25 1998	0.0	36.0	36.0	635.0	599.0	5.26	92.72	3.32	58.61	2.12	37.35
26 1999	0.0	36.0	36.0	635.0	599.0	4.87	85.85	3.02	53.26	1.89	33.35
27 2000	0.0	36.0	36.0	635.0	599.0	4.51	79.49	2.75	48.44	1.69	29.78
28 2001	0.0	36.0	36.0	635.0	599.0	4.17	73.61	2.50	44.03	1.51	26.59
29 2002	0.0	36.0	36.0	635.0	599.0	3.86	68.15	2.27	40.03	1.35	23.74
30 2003	0.0	36.0	36.0	635.0	599.0	3.58	63.11	2.06	36.39	1.20	21.20
31 2004	0.0	36.0	36.0	635.0	599.0	3.31	58.45	1.88	33.08	1.07	18.92
32 2005	0.0	150.0	150.0	635.0	485.0	12.78	54.10	7.10	30.08	3.99	16.90
33 2006	0.0	36.0	36.0	635.0	599.0	2.84	50.10	1.55	27.34	0.86	13.09
34 2007	0.0	36.0	36.0	635.0	599.0	2.63	46.38	1.41	24.86	0.76	13.47
35 2008	0.0	36.0	36.0	635.0	599.0	2.43	42.95	1.28	22.60	0.68	12.03
36 2009	0.0	36.0	36.0	635.0	599.0	2.25	39.77	1.16	20.54	0.61	10.74
37 2010	0.0	36.0	36.0	635.0	599.0	2.09	36.82	1.06	18.98	0.54	9.59
38 2011	0.0	36.0	36.0	635.0	599.0	1.93	34.09	0.96	16.98	0.49	8.56
39 2012	0.0	36.0	36.0	635.0	599.0	1.79	31.57	0.87	15.43	0.43	7.64
40 2013	0.0	36.0	36.0	635.0	599.0	1.66	29.23	0.80	14.03	0.39	6.82
41 2014	0.0	36.0	36.0	635.0	599.0	1.53	27.07	0.72	12.76	0.35	6.09
42 2015	0.0	102.0	102.0	635.0	533.0	4.03	25.06	1.86	11.60	0.87	5.44
43 2016	0.0	36.0	36.0	635.0	599.0	1.32	23.20	0.60	10.54	0.38	4.86
44 2017	0.0	36.0	36.0	635.0	599.0	1.22	21.49	0.54	9.58	0.35	4.34
45 2018	0.0	36.0	36.0	635.0	599.0	1.13	19.89	0.49	8.71	0.32	3.87
46 2019	0.0	36.0	36.0	635.0	599.0	1.04	18.42	0.45	7.92	0.29	3.46
47 2020	0.0	36.0	36.0	635.0	599.0	0.97	17.06	0.41	7.20	0.26	3.09
48 2021	0.0	36.0	36.0	635.0	599.0	0.90	15.79	0.37	6.55	0.23	2.76
49 2022	0.0	36.0	36.0	635.0	599.0	0.83	14.62	0.34	5.95	0.19	2.46
50 2023	0.0	36.0	36.0	635.0	599.0	0.77	13.54	0.31	5.41	0.16	2.20
TOTAL	5442.0	1807.0	7251.0	25985.0	18734.0	3517.81	4034.76	3076.36	2910.53	2714.93	2169.21

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.15 (8%), 0.95 (10%), 0.80 (12%)  
INTERNAL RATE OF RETURN (IRR) = 9.4 %

TABLE K-31. PROJECT COST AND BENEFITS WITH IMPROVEMENT PROJECT -- FINANCIAL --

( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	132.0	0.0	132.0	0.0	-132.0	132.00	0.0	132.00	0.0	132.00	0.0
2 1975	272.0	8.0	280.0	59.0	-221.0	240.05	50.58	231.41	48.76	223.21	47.03
3 1976	227.0	7.0	234.0	49.0	-185.0	185.76	38.90	175.81	36.81	166.56	34.88
4 1977	322.0	11.0	333.0	111.0	-222.0	244.77	81.59	227.44	74.63	211.63	70.52
5 1978	536.0	11.0	547.0	153.0	-394.0	372.28	104.13	339.65	95.00	310.38	86.82
6 1979	1203.0	11.0	1214.0	207.0	-1007.0	765.03	130.45	683.27	116.85	615.05	104.87
7 1980	1204.0	11.0	1215.0	176.0	-1039.0	708.94	102.69	623.49	90.52	549.61	79.61
8 1981	1152.0	10.0	1162.0	151.0	-1011.0	627.80	81.58	542.09	70.44	469.51	60.99
9 1982	909.0	9.0	918.0	211.0	-707.0	459.23	105.55	369.32	89.49	331.04	76.09
10 1983	368.0	8.0	376.0	193.0	-183.0	174.16	89.10	144.97	74.41	121.06	62.14
11 1984	280.0	8.0	288.0	180.0	-108.0	120.09	98.49	98.14	98.14	80.78	80.49
12 1985	273.0	7.0	280.0	345.0	214.0	52.02	137.01	41.74	109.93	33.62	88.55
13 1986	124.0	42.0	124.0	326.0	202.0	45.59	119.87	35.92	94.43	28.42	74.71
14 1987	82.0	42.0	82.0	355.0	313.0	14.30	120.86	11.06	93.48	8.59	72.64
15 1988	158.0	52.0	210.0	409.0	199.0	66.20	128.93	50.27	97.91	38.37	74.72
16 1989	353.0	57.0	410.0	620.0	210.0	119.68	180.97	89.23	134.93	66.88	101.14
17 1990	235.0	62.0	297.0	799.0	502.0	80.27	215.95	58.76	158.08	43.26	116.37
18 1991	183.0	66.0	249.0	1004.0	755.0	62.31	251.25	44.79	180.58	32.58	130.56
19 1992	131.0	71.0	202.0	1197.0	995.0	66.81	277.36	33.03	195.72	23.45	138.98
20 1993	0.0	71.0	71.0	1268.0	1197.0	15.23	272.05	10.55	188.48	7.56	131.45
21 1994	0.0	71.0	71.0	1300.0	1229.0	14.10	258.26	9.59	175.67	6.57	120.35
22 1995	0.0	71.0	71.0	1331.0	1260.0	13.06	244.83	8.72	163.51	5.87	110.00
23 1996	0.0	71.0	71.0	1361.0	1290.0	12.09	231.80	7.93	152.00	5.24	100.45
24 1997	0.0	71.0	71.0	1392.0	1321.0	11.20	219.52	7.21	141.33	4.68	91.71
25 1998	0.0	71.0	71.0	1423.0	1352.0	10.37	207.79	6.55	131.54	4.18	83.71
26 1999	0.0	71.0	71.0	1453.0	1382.0	9.60	192.40	5.96	119.40	3.73	74.74
27 2000	0.0	71.0	71.0	1483.0	1412.0	8.89	178.14	5.42	108.55	3.33	66.73
28 2001	0.0	141.0	141.0	1423.0	1282.0	16.34	164.95	9.78	98.68	5.90	59.58
29 2002	0.0	71.0	71.0	1453.0	1352.0	7.62	152.73	4.48	89.71	2.65	53.20
30 2003	0.0	71.0	71.0	1483.0	1382.0	7.06	141.42	4.07	81.55	2.37	47.50
31 2004	0.0	71.0	71.0	1423.0	1352.0	6.53	130.94	3.70	74.14	2.12	42.41
32 2005	0.0	71.0	71.0	1453.0	1382.0	6.05	121.24	3.36	67.40	1.89	37.86
33 2006	0.0	71.0	71.0	1483.0	1412.0	5.60	112.26	3.06	61.27	1.69	33.61
34 2007	0.0	71.0	71.0	1423.0	1352.0	5.19	103.95	2.78	55.70	1.51	30.19
35 2008	0.0	71.0	71.0	1453.0	1382.0	4.80	96.25	2.53	50.64	1.34	26.95
36 2009	0.0	71.0	71.0	1483.0	1412.0	4.45	89.12	2.30	46.03	1.20	24.06
37 2010	0.0	71.0	71.0	1423.0	1352.0	4.12	82.52	2.09	41.85	1.07	21.49
38 2011	0.0	241.0	241.0	1453.0	1382.0	12.94	76.40	6.44	38.04	3.25	19.18
39 2012	0.0	71.0	71.0	1483.0	1412.0	3.83	70.74	1.73	34.59	0.85	17.13
40 2013	0.0	71.0	71.0	1423.0	1352.0	3.57	65.50	1.57	31.44	0.76	15.29
41 2014	0.0	71.0	71.0	1453.0	1382.0	3.33	60.65	1.43	28.38	0.68	13.65
42 2015	0.0	71.0	71.0	1483.0	1412.0	2.80	56.16	1.30	25.99	0.61	12.19
43 2016	0.0	71.0	71.0	1423.0	1352.0	2.59	52.00	1.18	23.62	0.54	10.89
44 2017	0.0	71.0	71.0	1453.0	1382.0	2.40	48.15	1.07	21.48	0.48	9.72
45 2018	0.0	71.0	71.0	1483.0	1412.0	2.22	44.58	0.97	19.52	0.43	8.68
46 2019	0.0	71.0	71.0	1423.0	1352.0	2.06	41.28	0.89	17.75	0.39	7.75
47 2020	0.0	71.0	71.0	1453.0	1382.0	1.91	38.22	0.81	16.13	0.35	6.92
48 2021	0.0	191.0	191.0	1423.0	1352.0	1.75	35.39	1.97	14.67	0.83	6.18
49 2022	0.0	71.0	71.0	1453.0	1382.0	1.63	32.77	1.63	13.53	0.78	5.51
50 2023	0.0	71.0	71.0	1423.0	1352.0	1.51	30.34	1.51	12.12	0.72	4.92
TOTAL	7864.0	3034.0	10918.0	50395.0	39377.0	4724.67	5939.50	4075.41	4005.62	3558.00	2795.29

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.27 (8%) = 9.19 %  
INTERNAL RATE OF RETURN (IRR) = 0.79 (10%) = 7.9 %



TABLE K-32. PROJECT COST AND BENEFITS WITH IMPROVEMENT PROJECT -ECONOMIC -  
( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	O & M	CAPITAL				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	0.0	106.0	106.0	0.0	-106.0	106.00	0.0	106.00	0.0	106.00	0.0
2 1975	6.0	218.0	224.0	47.0	-177.0	192.04	40.29	185.12	38.84	178.57	34.47
3 1976	6.0	182.0	188.0	21.0	-167.0	149.24	16.67	141.25	15.78	133.81	14.95
4 1977	9.0	258.0	267.0	114.0	-153.0	196.25	83.79	182.37	77.86	169.68	72.45
5 1978	9.0	429.0	438.0	166.0	-272.0	298.10	112.98	271.96	103.07	248.55	94.19
6 1979	9.0	962.0	971.0	273.0	-698.0	611.90	172.04	548.11	154.10	491.94	138.31
7 1980	9.0	963.0	972.0	211.0	-761.0	567.15	123.12	498.79	108.38	439.68	95.45
8 1981	9.0	922.0	930.0	180.0	-750.0	502.45	97.25	433.85	83.97	375.61	72.70
9 1982	7.0	727.0	734.0	273.0	-461.0	567.18	136.57	321.29	113.78	264.69	98.45
10 1983	6.0	294.0	300.0	261.0	-39.0	138.96	120.89	115.66	100.63	96.59	84.04
11 1984	6.0	218.0	224.0	365.0	141.0	96.07	156.54	78.51	127.93	64.39	104.93
12 1985	6.0	99.0	105.0	471.0	366.0	41.70	187.04	33.46	150.08	26.93	120.89
13 1986	6.0	66.0	100.0	459.0	359.0	36.77	188.77	28.97	132.96	22.92	105.19
14 1987	0.0	0.0	34.0	502.0	468.0	11.58	170.91	8.95	132.19	6.96	102.72
15 1988	42.0	126.0	168.0	564.0	396.0	52.96	177.80	40.22	153.02	30.69	120.94
16 1989	46.0	282.0	328.0	768.0	440.0	55.74	224.17	71.38	167.14	53.50	125.28
17 1990	50.0	188.0	238.0	973.0	735.0	64.32	282.97	47.09	192.51	34.66	141.71
18 1991	53.0	146.0	199.0	1011.0	811.0	49.80	302.80	35.79	217.63	25.88	157.33
19 1992	57.0	105.0	162.0	1423.0	1261.0	37.54	329.73	26.49	232.68	18.21	165.22
20 1993	0.0	0.0	57.0	1484.0	1427.0	12.23	338.39	8.17	220.59	3.91	153.84
21 1994	0.0	0.0	57.0	1512.0	1455.0	11.32	300.37	7.70	204.32	5.28	139.93
22 1995	0.0	0.0	57.0	1538.0	1481.0	10.48	283.90	7.00	158.94	4.71	127.11
23 1996	0.0	0.0	57.0	1564.0	1507.0	9.71	266.38	6.37	174.67	4.21	125.41
24 1997	0.0	0.0	57.0	1590.0	1533.0	8.99	250.75	5.79	161.43	3.76	104.75
25 1998	0.0	0.0	57.0	1617.0	1560.0	8.32	236.11	5.26	149.25	3.35	95.12
26 1999	0.0	0.0	57.0	1617.0	1560.0	7.71	218.62	4.78	135.68	2.99	84.93
27 2000	0.0	0.0	57.0	1617.0	1560.0	7.14	203.43	4.35	123.34	2.67	75.83
28 2001	113.0	0.0	113.0	1617.0	1504.0	13.10	187.44	7.84	112.13	4.73	67.70
29 2002	57.0	0.0	57.0	1617.0	1560.0	6.12	173.55	3.59	101.94	2.13	60.45
30 2003	57.0	0.0	57.0	1617.0	1560.0	5.66	160.70	3.27	92.67	1.90	53.97
31 2004	57.0	0.0	57.0	1617.0	1560.0	5.25	148.79	2.97	84.35	1.70	48.19
32 2005	57.0	0.0	57.0	1617.0	1560.0	4.86	137.77	2.70	76.59	1.52	43.03
33 2006	57.0	0.0	57.0	1617.0	1560.0	4.50	127.57	2.45	69.62	1.35	38.42
34 2007	57.0	0.0	57.0	1617.0	1560.0	4.16	118.12	2.23	63.30	1.21	34.30
35 2008	57.0	0.0	57.0	1617.0	1560.0	3.86	109.37	2.03	57.54	1.08	30.63
36 2009	57.0	0.0	57.0	1617.0	1560.0	3.57	101.27	1.84	52.31	0.96	27.34
37 2010	57.0	0.0	57.0	1617.0	1560.0	3.31	93.76	1.68	47.55	0.86	24.41
38 2011	193.0	0.0	193.0	1617.0	1424.0	10.36	80.82	1.56	43.23	2.60	21.80
39 2012	57.0	0.0	57.0	1617.0	1560.0	2.83	80.39	1.39	39.30	0.69	19.46
40 2013	57.0	0.0	57.0	1617.0	1560.0	2.62	74.43	1.26	35.73	0.61	17.38
41 2014	57.0	0.0	57.0	1617.0	1560.0	2.43	68.92	1.14	32.48	0.55	15.32
42 2015	57.0	0.0	57.0	1617.0	1560.0	2.25	63.82	1.04	29.53	0.49	13.85
43 2016	57.0	0.0	57.0	1617.0	1560.0	2.08	59.09	0.95	26.84	0.44	12.37
44 2017	57.0	0.0	57.0	1617.0	1560.0	1.93	54.71	0.86	24.40	0.39	11.04
45 2018	57.0	0.0	57.0	1617.0	1560.0	1.79	50.66	0.78	22.18	0.35	9.86
46 2019	57.0	0.0	57.0	1617.0	1560.0	1.65	46.91	0.71	20.17	0.31	8.80
47 2020	57.0	0.0	57.0	1617.0	1560.0	1.53	43.43	0.65	18.33	0.28	7.86
48 2021	153.0	0.0	153.0	1617.0	1464.0	3.81	40.21	1.58	16.67	0.66	7.02
49 2022	57.0	0.0	57.0	1617.0	1560.0	1.31	37.24	0.53	15.15	0.22	6.27
50 2023	57.0	0.0	57.0	1617.0	1560.0	1.22	34.48	0.49	13.78	0.20	5.60
TOTAL	6291.0	2452.0	8743.0	58011.0	49268.0	3781.85	7059.74	3362.12	4740.37	2847.99	3316.54

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.87 ( 8%), 1.45 (10%), 1.16 (12%)  
INTERNAL RATE OF RETURN (IRR) = 13.6%

TABLE K-33. PROJECT COST AND BENEFITS, SENSITIVITY TEST (1) - FINANCIAL -

( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	132.0	0.0	132.0	0.0	-132.0	132.00	0.0	132.00	0.0	132.00	0.0
2 1975	272.0	8.0	280.0	59.0	-221.0	260.05	50.58	231.41	48.76	225.21	47.03
3 1976	227.0	7.0	234.0	49.0	-185.0	185.76	38.90	175.81	36.81	166.56	34.88
4 1977	322.0	11.0	333.0	111.0	-221.0	244.77	81.59	227.44	75.81	211.63	70.52
5 1978	536.0	11.0	547.0	153.0	-394.0	372.28	104.13	339.65	95.00	310.38	86.52
6 1979	1203.0	11.0	1214.0	207.0	-1007.0	765.03	130.45	685.27	116.85	610.05	104.07
7 1980	1206.0	11.0	1215.0	176.0	-1039.0	708.94	102.69	623.49	90.32	548.61	79.61
8 1981	1152.0	10.0	1162.0	151.0	-1011.0	627.80	81.58	542.09	70.44	489.51	60.99
9 1982	909.0	9.0	918.0	211.0	-707.0	459.23	105.55	389.52	89.49	311.04	76.09
10 1983	368.0	8.0	376.0	193.0	-183.0	174.16	89.40	144.97	74.41	111.06	62.14
11 1984	273.0	8.0	281.0	280.0	-1.0	120.52	120.09	98.49	98.14	80.78	80.49
12 1985	124.0	7.0	131.0	345.0	214.0	52.02	137.01	41.74	109.93	33.62	68.55
13 1986	82.0	42.0	124.0	326.0	202.0	45.59	119.87	35.92	94.43	28.42	74.71
14 1987	0.0	42.0	42.0	355.0	313.0	14.30	120.86	11.06	93.68	8.59	72.64
15 1988	174.0	52.0	226.0	409.0	183.0	71.25	128.93	54.10	97.91	41.29	74.72
16 1989	388.0	57.0	445.0	620.0	175.0	129.99	180.97	96.85	134.93	72.59	101.11
17 1990	259.0	62.0	321.0	799.0	478.0	86.76	215.95	63.51	158.08	46.75	116.37
18 1991	201.0	66.0	267.0	1197.0	737.0	66.82	251.25	48.02	180.58	34.72	150.56
19 1992	141.0	71.0	212.0	1397.0	985.0	49.12	277.36	34.66	193.72	21.61	170.95
20 1993	0.0	71.0	71.0	1268.0	1197.0	15.23	272.05	10.35	186.48	7.36	179.15
21 1994	0.0	71.0	71.0	1300.0	1229.0	14.00	258.26	9.59	173.67	6.57	177.10
22 1995	0.0	71.0	71.0	1331.0	1280.0	13.06	244.83	8.72	163.51	5.87	170.00
23 1996	0.0	71.0	71.0	1361.0	1290.0	12.09	231.80	7.93	152.00	5.24	167.76
24 1997	0.0	71.0	71.0	1392.0	1321.0	11.20	219.52	7.21	141.33	4.66	163.67
25 1998	0.0	71.0	71.0	1423.0	1352.0	10.37	207.79	6.35	130.54	4.13	159.66
26 1999	0.0	71.0	71.0	1423.0	1352.0	9.60	192.40	5.96	119.40	3.75	155.65
27 2000	0.0	71.0	71.0	1423.0	1352.0	8.89	176.14	5.42	108.55	3.33	151.22
28 2001	0.0	141.0	141.0	1423.0	1282.0	16.54	164.95	9.78	98.68	5.90	145.78
29 2002	0.0	71.0	71.0	1423.0	1352.0	7.62	152.73	4.48	89.71	2.65	141.06
30 2003	0.0	71.0	71.0	1423.0	1352.0	7.06	141.42	4.07	81.55	2.37	137.18
31 2004	0.0	71.0	71.0	1423.0	1352.0	6.53	130.94	3.70	74.14	2.12	132.02
32 2005	0.0	71.0	71.0	1423.0	1352.0	6.05	121.24	3.36	67.40	1.89	127.53
33 2006	0.0	71.0	71.0	1423.0	1352.0	5.60	112.26	3.04	61.27	1.69	122.84
34 2007	0.0	71.0	71.0	1423.0	1352.0	5.19	103.95	2.78	55.70	1.51	118.35
35 2008	0.0	71.0	71.0	1423.0	1352.0	4.80	96.25	2.53	50.64	1.34	113.80
36 2009	0.0	71.0	71.0	1423.0	1352.0	4.45	89.12	2.30	46.03	1.20	109.60
37 2010	0.0	71.0	71.0	1423.0	1352.0	4.12	82.52	2.09	41.85	1.07	105.53
38 2011	0.0	241.0	241.0	1423.0	1182.0	12.94	76.40	6.64	38.04	3.25	101.49
39 2012	0.0	71.0	71.0	1423.0	1352.0	3.53	70.74	1.73	34.59	0.85	97.24
40 2013	0.0	71.0	71.0	1423.0	1352.0	3.27	65.50	1.57	31.44	0.76	93.48
41 2014	0.0	71.0	71.0	1423.0	1352.0	3.03	60.65	1.43	28.58	0.68	89.80
42 2015	0.0	71.0	71.0	1423.0	1352.0	2.80	56.16	1.30	25.99	0.61	86.19
43 2016	0.0	71.0	71.0	1423.0	1352.0	2.59	52.00	1.18	23.62	0.54	82.64
44 2017	0.0	71.0	71.0	1423.0	1352.0	2.40	48.15	1.07	21.48	0.48	79.16
45 2018	0.0	71.0	71.0	1423.0	1352.0	2.22	44.58	0.97	19.52	0.43	75.73
46 2019	0.0	71.0	71.0	1423.0	1352.0	2.06	41.28	0.89	17.75	0.39	72.34
47 2020	0.0	71.0	71.0	1423.0	1352.0	1.91	38.22	0.81	16.13	0.35	69.00
48 2021	0.0	191.0	191.0	1423.0	1232.0	4.75	35.39	1.97	14.67	0.63	65.66
49 2022	0.0	71.0	71.0	1423.0	1352.0	1.63	32.77	0.67	13.23	0.28	62.54
50 2023	0.0	71.0	71.0	1423.0	1352.0	1.51	30.34	0.60	12.42	0.25	59.12
TOTAL	7967.0	3054.0	11021.0	50895.0	39274.0	4753.24	5989.50	4096.48	4005.82	3573.63	2795.29

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.26 ( 8% ) 0.98 ( 10% ) 0.78 ( 12% )  
INTERNAL RATE OF RETURN (IRR) = 9.8 %

TABLE K-34. PROJECT COST AND BENEFITS, SENSITIVITY TEST (1) - ECONOMIC -

( UNIT : MILLION PESOS )

YEAR	PROJECT COST		RETURN	BENEFITS		TOTAL	8 %		10 %		12 %	
	CAPITAL	O & M		(BENEFITS)	(COST)		(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)
1 1974	106.0	0.0	-106.0	0.0	106.0	106.00	0.0	106.00	0.0	106.00	0.0	106.00
2 1975	218.0	6.0	-177.0	47.0	224.0	192.04	40.29	185.12	38.84	178.57	37.47	178.57
3 1976	182.0	6.0	-167.0	21.0	188.0	149.24	16.67	141.35	15.78	133.81	14.95	133.81
4 1977	258.0	9.0	-253.0	14.0	267.0	296.25	83.79	182.37	77.86	169.88	72.45	169.88
5 1978	429.0	9.0	-429.0	166.0	438.0	298.10	112.98	271.96	103.07	248.33	94.19	248.33
6 1979	962.0	9.0	-962.0	273.0	971.0	611.90	172.04	548.11	154.10	491.94	138.31	491.94
7 1980	963.0	9.0	-972.0	211.0	972.0	567.15	123.12	498.79	108.28	439.68	95.45	439.68
8 1981	922.0	8.0	-930.0	180.0	930.0	502.45	97.25	433.85	83.97	375.61	72.70	375.61
9 1982	727.0	7.0	-734.0	273.0	734.0	567.18	136.57	311.29	115.78	264.69	98.45	264.69
10 1983	294.0	6.0	-300.0	261.0	300.0	158.96	120.89	115.66	100.63	96.59	84.04	96.59
11 1984	218.0	6.0	-224.0	365.0	224.0	96.07	141.0	78.51	127.93	64.39	104.93	64.39
12 1985	99.0	6.0	-105.0	471.0	105.0	41.70	187.04	33.46	150.08	26.95	120.89	26.95
13 1986	66.0	34.0	-100.0	459.0	100.0	36.77	168.77	28.97	132.96	22.92	105.19	22.92
14 1987	0.0	34.0	-34.0	502.0	34.0	11.58	170.91	8.93	132.19	6.96	102.72	6.96
15 1988	139.0	42.0	-181.0	564.0	181.0	57.06	177.80	43.33	135.02	33.07	103.04	33.07
16 1989	310.0	46.0	-356.0	788.0	356.0	103.91	224.17	77.48	167.14	58.07	125.28	58.07
17 1990	207.0	50.0	-257.0	973.0	257.0	69.46	262.97	50.93	192.51	37.43	121.71	37.43
18 1991	161.0	53.0	-214.0	1210.0	214.0	53.55	302.80	38.49	217.63	27.83	137.35	27.83
19 1992	116.0	57.0	-173.0	1423.0	173.0	40.09	339.73	28.29	232.68	20.09	165.22	20.09
20 1993	0.0	57.0	-57.0	1484.0	57.0	12.23	333.39	8.47	226.59	5.91	153.84	5.91
21 1994	0.0	57.0	-57.0	1538.0	57.0	10.48	300.37	7.00	204.32	5.28	139.65	5.28
22 1995	0.0	57.0	-57.0	1584.0	57.0	9.71	266.33	6.37	188.94	4.71	127.11	4.71
23 1996	0.0	57.0	-57.0	1590.0	57.0	8.32	230.75	5.79	161.43	3.76	104.75	3.76
24 1997	0.0	57.0	-57.0	1617.0	57.0	7.71	216.11	5.26	149.25	3.35	95.12	3.35
25 1998	0.0	57.0	-57.0	1660.0	57.0	7.14	213.62	4.78	135.68	2.99	81.93	2.99
26 1999	0.0	57.0	-57.0	1617.0	57.0	6.50	202.43	4.35	123.34	2.67	75.83	2.67
27 2000	0.0	57.0	-57.0	1617.0	57.0	5.84	187.44	3.84	112.13	2.45	67.70	2.45
28 2001	0.0	57.0	-57.0	1617.0	57.0	5.12	173.55	3.39	101.92	2.23	60.45	2.23
29 2002	0.0	57.0	-57.0	1617.0	57.0	4.46	160.70	3.27	92.67	1.90	55.97	1.90
30 2003	0.0	57.0	-57.0	1617.0	57.0	3.85	148.79	2.97	84.25	1.70	48.19	1.70
31 2004	0.0	57.0	-57.0	1617.0	57.0	3.25	137.57	2.70	76.59	1.52	43.03	1.52
32 2005	0.0	57.0	-57.0	1617.0	57.0	2.66	127.77	2.45	69.62	1.35	38.42	1.35
33 2006	0.0	57.0	-57.0	1617.0	57.0	2.08	118.12	2.23	63.50	1.21	34.30	1.21
34 2007	0.0	57.0	-57.0	1617.0	57.0	1.51	109.37	2.03	57.54	1.08	30.63	1.08
35 2008	0.0	57.0	-57.0	1617.0	57.0	0.94	101.27	1.84	52.31	0.96	27.34	0.96
36 2009	0.0	57.0	-57.0	1617.0	57.0	0.37	93.76	1.68	47.55	0.86	24.41	0.86
37 2010	0.0	57.0	-57.0	1617.0	57.0	0.31	86.82	1.56	43.23	0.86	21.80	0.86
38 2011	0.0	57.0	-57.0	1617.0	57.0	0.25	80.39	1.44	39.30	0.69	19.46	0.69
39 2012	0.0	57.0	-57.0	1617.0	57.0	0.20	74.43	1.32	35.73	0.61	17.38	0.61
40 2013	0.0	57.0	-57.0	1617.0	57.0	0.15	68.92	1.24	32.48	0.55	15.52	0.55
41 2014	0.0	57.0	-57.0	1617.0	57.0	0.11	63.82	1.14	29.53	0.49	13.85	0.49
42 2015	0.0	57.0	-57.0	1617.0	57.0	0.08	59.09	0.95	26.84	0.44	12.37	0.44
43 2016	0.0	57.0	-57.0	1617.0	57.0	0.06	54.71	0.86	24.40	0.39	11.04	0.39
44 2017	0.0	57.0	-57.0	1617.0	57.0	0.05	50.66	0.78	22.18	0.35	9.86	0.35
45 2018	0.0	57.0	-57.0	1617.0	57.0	0.04	46.91	0.71	20.17	0.31	8.80	0.31
46 2019	0.0	57.0	-57.0	1617.0	57.0	0.03	43.43	0.65	18.33	0.28	7.86	0.28
47 2020	0.0	57.0	-57.0	1617.0	57.0	0.02	40.21	0.58	16.67	0.25	7.02	0.25
48 2021	0.0	153.0	-153.0	1617.0	153.0	1.31	37.24	0.53	15.15	0.22	6.27	0.22
49 2022	0.0	57.0	-57.0	1617.0	57.0	0.01	34.48	0.49	13.78	0.20	5.60	0.20
50 2023	0.0	57.0	-57.0	1617.0	57.0	0.00	31.78	0.45	12.58	0.18	5.00	0.18
TOTAL	6377.0	2452.0	-8829.0	58011.0	8829.0	3805.55	7039.74	3879.58	4740.37	2860.93	3316.54	2860.93

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.86 (8%), 1.45 (10%), 1.16 (12%)  
INTERNAL RATE OF RETURN (IRR) = 13.5%

TABLE K-35. PROJECT COST AND BENEFITS, SENSITIVITY TEST (2) - FINANCIAL -

( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	132.0	0.0	132.0	0.0	-132.0	132.00	0.0	132.00	0.0	132.00	0.0
2 1975	272.0	8.0	280.0	59.0	-221.0	240.05	50.58	231.41	48.76	223.21	47.03
3 1976	227.0	7.0	234.0	49.0	-185.0	185.76	38.90	175.81	36.81	166.56	34.88
4 1977	322.0	11.0	333.0	111.0	-222.0	242.77	111.59	227.14	75.81	211.63	70.51
5 1978	536.0	11.0	547.0	193.0	-354.0	372.28	339.65	339.65	93.00	310.58	86.82
6 1979	1203.0	11.0	1214.0	207.0	-1007.0	765.03	130.45	685.27	116.85	615.05	104.87
7 1980	1204.0	11.0	1215.0	176.0	-1039.0	708.94	102.69	632.49	90.32	548.61	79.81
8 1981	1152.0	10.0	1162.0	151.0	-1011.0	627.80	81.58	542.09	70.44	469.31	60.99
9 1982	909.0	9.0	918.0	211.0	-707.0	459.23	105.55	389.32	89.49	331.04	76.09
10 1983	368.0	8.0	376.0	135.0	-183.0	174.16	89.40	144.97	74.41	121.06	63.14
11 1984	273.0	8.0	281.0	281.0	-1.0	120.52	120.09	98.49	98.14	60.78	85.49
12 1985	124.0	7.0	131.0	345.0	214.0	52.02	157.01	41.74	109.53	33.62	88.52
13 1986	82.0	42.0	124.0	326.0	202.0	45.59	119.87	35.92	94.43	28.42	74.71
14 1987	0.0	0.0	42.0	335.0	313.0	14.30	120.86	11.06	93.48	8.59	72.64
15 1988	158.0	52.0	210.0	409.0	199.0	66.20	128.93	50.27	97.91	38.57	74.72
16 1989	353.0	57.0	410.0	524.0	124.0	119.68	155.87	89.23	116.22	66.86	87.11
17 1990	235.0	62.0	297.0	632.0	335.0	80.27	170.81	58.76	125.04	43.26	82.03
18 1991	183.0	68.0	249.0	773.0	524.0	62.31	193.44	44.79	139.03	52.58	100.52
19 1992	131.0	71.0	202.0	911.0	709.0	46.81	211.09	33.03	148.96	23.45	103.77
20 1993	0.0	71.0	71.0	911.0	840.0	15.23	195.46	10.55	135.42	7.36	84.44
21 1994	0.0	71.0	71.0	911.0	840.0	14.10	180.98	9.59	123.11	6.57	84.32
22 1995	0.0	71.0	71.0	911.0	840.0	13.06	167.57	8.72	111.81	5.87	75.39
23 1996	0.0	71.0	71.0	911.0	840.0	12.09	155.16	7.93	104.74	5.24	67.22
24 1997	0.0	71.0	71.0	911.0	840.0	11.20	143.67	7.21	92.49	4.68	60.02
25 1998	0.0	71.0	71.0	911.0	840.0	10.37	133.02	6.55	84.08	4.10	52.59
26 1999	0.0	71.0	71.0	911.0	840.0	9.60	123.17	5.96	76.44	3.73	47.83
27 2000	0.0	71.0	71.0	911.0	840.0	8.89	114.05	5.42	69.49	3.33	42.72
28 2001	0.0	141.0	141.0	911.0	770.0	16.34	105.60	9.78	65.47	3.90	35.11
29 2002	0.0	71.0	71.0	911.0	840.0	7.62	97.78	4.48	52.43	2.65	34.08
30 2003	0.0	71.0	71.0	911.0	840.0	7.06	90.53	4.07	52.21	2.37	30.41
31 2004	0.0	71.0	71.0	911.0	840.0	6.53	83.83	3.70	47.46	2.12	27.15
32 2005	0.0	71.0	71.0	911.0	840.0	6.05	77.62	3.36	43.15	1.89	24.24
33 2006	0.0	71.0	71.0	911.0	840.0	5.60	71.87	3.06	39.23	1.69	21.64
34 2007	0.0	71.0	71.0	911.0	840.0	5.19	66.55	2.78	35.66	1.51	19.32
35 2008	0.0	71.0	71.0	911.0	840.0	4.80	61.62	2.53	32.42	1.34	17.25
36 2009	0.0	71.0	71.0	911.0	840.0	4.45	57.05	2.30	29.47	1.20	15.41
37 2010	0.0	71.0	71.0	911.0	840.0	4.12	52.83	2.09	26.79	1.07	13.75
38 2011	0.0	241.0	241.0	911.0	670.0	12.94	48.91	6.44	24.36	3.25	12.28
39 2012	0.0	71.0	71.0	911.0	840.0	3.35	45.29	1.73	22.14	0.85	10.97
40 2013	0.0	71.0	71.0	911.0	840.0	3.27	41.94	1.57	20.13	0.76	9.79
41 2014	0.0	71.0	71.0	911.0	840.0	3.03	38.83	1.43	18.30	0.68	8.74
42 2015	0.0	71.0	71.0	911.0	840.0	2.80	35.95	1.30	16.64	0.61	7.80
43 2016	0.0	71.0	71.0	911.0	840.0	2.59	32.29	1.18	15.12	0.54	6.97
44 2017	0.0	71.0	71.0	911.0	840.0	2.40	30.82	1.07	13.75	0.48	6.22
45 2018	0.0	71.0	71.0	911.0	840.0	2.22	28.54	0.97	12.50	0.43	5.56
46 2019	0.0	71.0	71.0	911.0	840.0	2.06	26.43	0.89	11.36	0.39	4.93
47 2020	0.0	71.0	71.0	911.0	840.0	1.91	24.47	0.81	10.33	0.35	4.43
48 2021	0.0	191.0	191.0	911.0	720.0	1.75	22.66	1.97	9.53	0.33	3.95
49 2022	0.0	71.0	71.0	911.0	840.0	1.63	20.98	0.67	8.54	0.28	3.53
50 2023	0.0	71.0	71.0	911.0	840.0	1.51	19.42	0.60	7.76	0.25	3.15
TOTAL	7864.0	3054.0	10918.0	34116.0	23198.0	4724.67	4538.72	4075.41	3433.02	3556.00	2854.73

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 0.96 (8%), 0.77 (10%), 0.63 (12%)  
INTERNAL RATE OF RETURN (IRR) = 7.7 %

TABLE K-36. PROJECT COST AND BENEFITS, SENSITIVITY TEST (2) - ECONOMIC -

( UNIT : MILLION PESOS )

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	5 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	106.0	0.0	106.0	0.0	-105.0	106.00	0.0	106.00	0.0	106.00	0.0
2 1975	218.0	6.0	224.0	47.0	-177.0	192.04	40.29	185.12	38.84	178.57	37.47
3 1976	188.0	6.0	194.0	21.0	-167.0	149.24	16.67	141.25	15.72	135.83	14.93
4 1977	258.0	9.0	267.0	114.0	-153.0	196.125	83.79	182.137	77.86	169.68	72.45
5 1978	429.0	9.0	438.0	160.0	-278.0	298.10	112.98	271.86	103.07	248.133	94.19
6 1979	962.0	9.0	971.0	273.0	-698.0	611.90	172.04	548.11	154.10	491.94	138.31
7 1980	963.0	9.0	972.0	211.0	-761.0	567.15	123.12	498.79	108.28	439.68	95.45
8 1981	922.0	8.0	930.0	180.0	-750.0	502.13	97.25	433.85	83.97	375.61	72.70
9 1982	727.0	7.0	734.0	273.0	-461.0	567.18	136.57	311.29	115.78	264.69	98.43
10 1983	294.0	6.0	300.0	261.0	-39.0	138.96	120.89	115.66	100.63	96.59	81.04
11 1984	218.0	6.0	224.0	363.0	141.0	98.07	136.54	78.51	127.93	64.39	104.93
12 1985	99.0	6.0	105.0	471.0	366.0	41.70	187.04	33.46	150.08	26.95	120.89
13 1986	66.0	34.0	100.0	459.0	359.0	56.77	168.77	28.97	132.96	22.92	105.19
14 1987	0.0	34.0	34.0	503.0	468.0	11.58	170.91	8.93	132.19	6.96	102.72
15 1988	126.0	42.0	168.0	564.0	396.0	52.96	177.80	40.22	135.02	30.69	103.04
16 1989	282.0	46.0	328.0	696.0	368.0	95.74	223.16	71.38	151.47	53.50	113.53
17 1990	188.0	50.0	238.0	835.0	597.0	64.32	223.66	47.09	151.61	34.66	121.61
18 1991	146.0	53.0	199.0	1022.0	823.0	49.60	253.76	33.79	183.82	25.88	132.90
19 1992	105.0	57.0	162.0	1176.0	1014.0	37.54	222.50	26.49	182.29	18.81	136.54
20 1993	0.0	57.0	57.0	1176.0	1119.0	12.23	222.31	8.47	174.81	3.91	122.91
21 1994	0.0	57.0	57.0	1176.0	1119.0	11.32	223.62	7.70	158.92	5.28	108.85
22 1995	0.0	57.0	57.0	1176.0	1119.0	10.68	216.32	7.00	144.47	4.71	97.49
23 1996	0.0	57.0	57.0	1176.0	1119.0	9.71	200.29	6.37	133.34	4.21	86.78
24 1997	0.0	57.0	57.0	1176.0	1119.0	8.99	185.46	5.79	119.40	3.76	77.48
25 1998	0.0	57.0	57.0	1176.0	1119.0	8.32	171.72	5.26	108.54	3.35	69.18
26 1999	0.0	57.0	57.0	1176.0	1119.0	7.71	159.00	4.78	98.68	2.99	61.77
27 2000	0.0	57.0	57.0	1176.0	1119.0	7.14	147.22	4.33	89.70	2.67	55.15
28 2001	0.0	113.0	113.0	1176.0	1063.0	13.10	136.32	7.84	81.55	4.73	49.24
29 2002	0.0	57.0	57.0	1176.0	1119.0	6.12	126.22	3.59	74.14	2.33	43.66
30 2003	0.0	57.0	57.0	1176.0	1119.0	5.66	116.87	3.27	61.40	1.90	39.23
31 2004	0.0	57.0	57.0	1176.0	1119.0	5.25	108.21	2.97	61.27	1.70	35.05
32 2005	0.0	57.0	57.0	1176.0	1119.0	4.86	100.20	2.70	55.70	1.52	31.29
33 2006	0.0	57.0	57.0	1176.0	1119.0	4.50	92.78	2.45	50.64	1.35	27.94
34 2007	0.0	57.0	57.0	1176.0	1119.0	4.16	85.90	2.23	46.03	1.24	24.95
35 2008	0.0	57.0	57.0	1176.0	1119.0	3.86	79.54	2.03	41.85	1.08	22.27
36 2009	0.0	57.0	57.0	1176.0	1119.0	3.57	73.65	1.84	38.04	0.96	19.89
37 2010	0.0	57.0	57.0	1176.0	1119.0	3.31	68.19	1.68	34.59	0.86	17.76
38 2011	0.0	193.0	193.0	1176.0	983.0	10.36	63.14	3.16	31.44	2.60	15.85
39 2012	0.0	57.0	57.0	1176.0	1119.0	2.83	58.46	1.39	28.58	0.69	14.16
40 2013	0.0	57.0	57.0	1176.0	1119.0	2.62	54.13	1.26	25.98	0.61	12.64
41 2014	0.0	57.0	57.0	1176.0	1119.0	2.43	50.12	1.14	23.62	0.55	11.28
42 2015	0.0	57.0	57.0	1176.0	1119.0	2.25	46.41	1.04	21.47	0.49	10.08
43 2016	0.0	57.0	57.0	1176.0	1119.0	2.08	42.97	0.95	19.52	0.44	9.00
44 2017	0.0	57.0	57.0	1176.0	1119.0	1.93	39.79	0.86	17.75	0.39	8.05
45 2018	0.0	57.0	57.0	1176.0	1119.0	1.79	36.84	0.78	16.13	0.35	7.17
46 2019	0.0	57.0	57.0	1176.0	1119.0	1.65	34.11	0.71	14.67	0.31	6.40
47 2020	0.0	57.0	57.0	1176.0	1119.0	1.53	31.59	0.65	13.33	0.28	5.72
48 2021	0.0	153.0	153.0	1176.0	1033.0	3.81	29.25	1.58	12.12	0.66	5.10
49 2022	0.0	57.0	57.0	1176.0	1119.0	1.31	27.08	0.53	11.02	0.22	4.56
50 2023	0.0	57.0	57.0	1176.0	1119.0	1.22	25.07	0.49	10.02	0.20	4.07
TOTAL	6291.0	2452.0	8743.0	44092.0	35369.0	3781.85	5814.56	3362.12	3992.00	2847.99	2853.31

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 1.54 (8%), 1.22 (10%), 1.00 (12%)  
 INTERNAL RATE OF RETURN (IRR) = 12.0 %

TABLE K-37. PROJECT COST AND BENEFITS, SENSITIVITY TEST OF COMBINATION OF (1) & (2) - FINANCIAL -

YEAR	PROJECT COST		RETURN	BENEFITS	TOTAL	WORTH VALUE BY DISCOUNT RATE			( UNIT : MILLION PESOS )		
	CAPITAL	O & M				(BENEFITS)	(COST)	10 %	(BENEFITS)	(COST)	12 %
1 1974	132.0	0.0	-132.0	0.0	132.0	132.00	0.0	132.00	0.0	132.00	0.0
2 1975	272.0	8.0	-280.0	59.0	280.0	240.05	50.58	231.41	48.76	231.41	47.03
3 1976	227.0	7.0	-234.0	49.0	234.0	185.76	36.90	175.81	36.81	166.56	34.88
4 1977	322.0	11.0	-333.0	111.0	333.0	244.77	81.59	227.44	75.81	211.63	70.54
5 1978	536.0	11.0	-547.0	153.0	547.0	372.28	104.13	339.65	95.00	310.38	86.82
6 1979	1203.0	11.0	-1214.0	207.0	1214.0	765.03	130.45	685.27	116.85	615.05	104.87
7 1980	1204.0	11.0	-1215.0	176.0	1215.0	708.94	102.69	623.49	90.32	549.61	79.61
8 1981	1152.0	10.0	-1162.0	151.0	1162.0	627.80	81.58	542.09	70.44	469.31	60.99
9 1982	909.0	9.0	-918.0	211.0	918.0	459.23	103.55	389.32	89.49	331.04	76.09
10 1983	368.0	8.0	-376.0	193.0	376.0	174.16	89.40	144.97	74.41	121.06	62.14
11 1984	273.0	8.0	-281.0	280.0	280.0	120.52	120.09	98.49	98.14	90.78	80.49
12 1985	124.0	7.0	-131.0	345.0	345.0	52.02	157.01	41.74	109.93	33.62	88.55
13 1986	82.0	42.0	-124.0	326.0	326.0	45.59	119.87	35.92	84.43	28.42	74.71
14 1987	0.0	42.0	-42.0	355.0	355.0	14.50	120.86	11.06	93.48	8.59	72.64
15 1988	174.0	52.0	-226.0	409.0	409.0	71.25	128.93	54.10	97.91	41.29	74.72
16 1989	388.0	57.0	-445.0	534.0	534.0	129.89	185.87	96.85	116.22	72.59	87.11
17 1990	259.0	62.0	-321.0	632.0	632.0	86.76	170.81	63.51	123.04	46.75	92.05
18 1991	201.0	66.0	-267.0	773.0	773.0	66.82	193.24	48.02	128.96	54.72	100.52
19 1992	141.0	71.0	-212.0	911.0	911.0	49.12	211.09	34.66	148.02	24.61	103.77
20 1993	0.0	71.0	-71.0	911.0	911.0	15.23	195.46	10.55	135.42	7.36	94.44
21 1994	0.0	71.0	-71.0	911.0	911.0	14.10	180.98	9.59	123.11	6.57	84.32
22 1995	0.0	71.0	-71.0	911.0	911.0	13.06	167.57	8.72	111.91	5.87	75.29
23 1996	0.0	71.0	-71.0	911.0	911.0	12.09	155.16	7.93	101.74	5.24	67.22
24 1997	0.0	71.0	-71.0	911.0	911.0	11.20	143.67	7.21	92.49	4.68	60.02
25 1998	0.0	71.0	-71.0	911.0	911.0	10.37	133.02	6.55	84.03	4.15	53.59
26 1999	0.0	71.0	-71.0	911.0	911.0	9.60	125.17	5.96	76.44	3.73	47.95
27 2000	0.0	71.0	-71.0	911.0	911.0	8.89	114.05	5.42	69.49	3.33	42.72
28 2001	0.0	141.0	-141.0	911.0	911.0	16.34	105.60	9.78	63.17	3.90	38.14
29 2002	0.0	71.0	-71.0	911.0	911.0	7.62	97.78	4.48	52.43	2.65	34.06
30 2003	0.0	71.0	-71.0	911.0	911.0	7.06	90.53	4.07	52.21	2.37	30.41
31 2004	0.0	71.0	-71.0	911.0	911.0	6.53	83.83	3.70	47.48	2.12	27.15
32 2005	0.0	71.0	-71.0	911.0	911.0	6.05	77.62	3.36	43.15	1.89	24.24
33 2006	0.0	71.0	-71.0	911.0	911.0	5.60	71.87	3.06	39.23	1.69	21.64
34 2007	0.0	71.0	-71.0	911.0	911.0	5.19	66.55	2.78	35.66	1.51	19.52
35 2008	0.0	71.0	-71.0	911.0	911.0	4.80	61.62	2.53	32.42	1.34	17.25
36 2009	0.0	71.0	-71.0	911.0	911.0	4.45	57.05	2.30	29.47	1.20	15.41
37 2010	0.0	71.0	-71.0	911.0	911.0	4.12	52.83	2.09	26.79	1.07	13.75
38 2011	0.0	241.0	-241.0	911.0	911.0	12.94	48.91	6.44	24.36	3.25	12.28
39 2012	0.0	71.0	-71.0	911.0	911.0	3.53	45.29	1.73	22.14	0.85	10.97
40 2013	0.0	71.0	-71.0	911.0	911.0	3.27	41.94	1.57	20.33	0.76	9.79
41 2014	0.0	71.0	-71.0	911.0	911.0	3.03	38.83	1.43	18.30	0.68	8.74
42 2015	0.0	71.0	-71.0	911.0	911.0	2.80	35.95	1.30	16.64	0.61	7.80
43 2016	0.0	71.0	-71.0	911.0	911.0	2.59	33.29	1.18	15.12	0.54	6.97
44 2017	0.0	71.0	-71.0	911.0	911.0	2.40	30.82	1.07	13.75	0.48	6.22
45 2018	0.0	71.0	-71.0	911.0	911.0	2.22	28.54	0.97	12.50	0.43	5.56
46 2019	0.0	71.0	-71.0	911.0	911.0	2.06	26.43	0.89	11.36	0.39	4.96
47 2020	0.0	71.0	-71.0	911.0	911.0	1.91	24.47	0.81	10.33	0.35	4.43
48 2021	0.0	191.0	-191.0	911.0	911.0	1.75	22.66	0.77	9.39	0.33	3.95
49 2022	0.0	71.0	-71.0	911.0	911.0	1.65	20.98	0.67	8.54	0.28	3.53
50 2023	0.0	71.0	-71.0	911.0	911.0	1.51	19.42	0.60	7.76	0.25	3.15
TOTAL	7967.0	3054.0	-11021.0	34116.0	45387.2	47533.24	4538.72	4096.48	3133.02	3573.63	2254.73

BENEFIT COST RATIO BY DISCOUNT RATE (B/C) = 0.95 (8%), 0.76 (10%), 0.63 (12%)  
INTERNAL RATE OF RETURN (IRR) = 7.7 %

TABLE K-38. PROJECT COST AND BENEFITS, SENSITIVITY TEST OF COMBINATION OF (1) & (2) - ECONOMIC -

YEAR	PROJECT COST		TOTAL	BENEFITS	RETURN	8 %		10 %		12 %	
	CAPITAL	O & M				(COST)	(BENEFITS)	(COST)	(BENEFITS)	(COST)	(BENEFITS)
1 1974	106.0	0.0	106.0	0.0	-106.0	106.00	106.00	106.00	0.0	106.00	0.0
2 1975	218.0	6.0	224.0	47.0	-177.0	192.29	40.29	185.12	38.84	176.57	37.47
3 1976	182.0	6.0	188.0	21.0	-167.0	149.24	16.67	141.25	15.78	133.81	14.95
4 1977	258.0	9.0	267.0	114.0	-153.0	196.25	83.79	182.57	77.86	169.68	72.45
5 1978	429.0	9.0	438.0	166.0	-272.0	298.10	112.98	271.96	103.07	248.53	94.19
6 1979	962.0	9.0	971.0	273.0	-698.0	611.90	172.04	548.11	154.10	491.94	138.31
7 1980	963.0	9.0	972.0	211.0	-761.0	567.15	123.12	492.79	108.28	439.68	93.45
8 1981	922.0	8.0	930.0	180.0	-750.0	502.45	97.25	433.85	83.97	375.61	72.70
9 1982	927.0	7.0	934.0	273.0	-661.0	357.18	111.29	311.29	115.78	264.69	96.45
10 1983	294.0	6.0	300.0	261.0	-39.0	138.96	130.89	115.66	100.65	96.19	84.04
11 1984	218.0	6.0	224.0	365.0	147.0	96.07	178.51	78.51	64.39	104.93	64.39
12 1985	99.0	6.0	105.0	471.0	366.0	41.70	187.04	33.46	150.08	26.95	120.89
13 1986	66.0	6.0	72.0	459.0	389.0	36.77	188.77	28.97	138.96	22.52	105.19
14 1987	0.0	34.0	34.0	502.0	468.0	11.58	170.91	8.95	132.19	6.94	102.72
15 1988	139.0	42.0	181.0	564.0	393.0	57.06	177.80	43.33	133.02	33.07	103.04
16 1989	310.0	46.0	356.0	696.0	340.0	103.91	203.16	77.48	151.47	58.07	113.55
17 1990	207.0	50.0	257.0	1032.0	578.0	69.46	225.68	50.85	183.82	37.43	132.90
18 1991	161.0	53.0	214.0	1022.0	808.0	53.55	255.76	38.49	221.61	27.61	132.90
19 1992	116.0	57.0	173.0	1176.0	1003.0	40.09	222.50	28.29	192.29	20.89	136.54
20 1993	0.0	57.0	57.0	1176.0	1119.0	12.23	223.62	8.47	174.81	5.91	121.91
21 1994	0.0	57.0	57.0	1176.0	1119.0	10.48	226.32	7.00	144.47	4.71	97.19
22 1995	0.0	57.0	57.0	1176.0	1119.0	9.71	200.29	6.37	131.34	4.21	86.78
23 1996	0.0	57.0	57.0	1176.0	1119.0	8.99	185.46	5.79	119.40	3.76	77.48
24 1997	0.0	57.0	57.0	1176.0	1119.0	8.32	171.72	5.26	108.54	3.35	69.13
25 1998	0.0	57.0	57.0	1176.0	1119.0	7.71	147.22	4.35	89.70	2.67	55.15
26 1999	0.0	57.0	57.0	1176.0	1119.0	7.14	130.32	3.84	81.55	2.47	49.22
27 2000	0.0	57.0	57.0	1176.0	1119.0	6.62	126.22	3.59	74.14	2.35	43.96
28 2001	0.0	113.0	113.0	1176.0	1063.0	13.10	156.32	7.84	81.55	4.75	49.22
29 2002	0.0	57.0	57.0	1176.0	1119.0	6.12	126.22	3.59	74.14	2.35	43.96
30 2003	0.0	57.0	57.0	1176.0	1119.0	5.66	116.87	3.27	67.40	2.19	39.25
31 2004	0.0	57.0	57.0	1176.0	1119.0	5.25	108.21	2.97	61.27	1.70	35.05
32 2005	0.0	57.0	57.0	1176.0	1119.0	4.86	100.20	2.70	55.70	1.52	31.29
33 2006	0.0	57.0	57.0	1176.0	1119.0	4.50	92.78	2.45	50.64	1.35	27.94
34 2007	0.0	57.0	57.0	1176.0	1119.0	4.16	85.90	2.23	46.03	1.21	24.95
35 2008	0.0	57.0	57.0	1176.0	1119.0	3.86	79.54	2.03	41.85	1.08	22.27
36 2009	0.0	57.0	57.0	1176.0	1119.0	3.57	73.65	1.84	38.04	0.96	19.69
37 2010	0.0	57.0	57.0	1176.0	1119.0	3.31	68.19	1.68	34.59	0.86	17.76
38 2011	0.0	193.0	193.0	1176.0	983.0	10.36	65.14	5.16	31.44	2.60	15.65
39 2012	0.0	57.0	57.0	1176.0	1119.0	2.83	58.46	1.39	28.58	0.69	14.16
40 2013	0.0	57.0	57.0	1176.0	1119.0	2.62	54.13	1.26	25.98	0.61	12.64
41 2014	0.0	57.0	57.0	1176.0	1119.0	2.43	50.12	1.14	23.62	0.55	11.28
42 2015	0.0	57.0	57.0	1176.0	1119.0	2.25	46.41	1.04	21.47	0.49	10.08
43 2016	0.0	57.0	57.0	1176.0	1119.0	2.08	42.97	0.95	19.52	0.44	9.00
44 2017	0.0	57.0	57.0	1176.0	1119.0	1.93	39.79	0.86	17.75	0.39	8.03
45 2018	0.0	57.0	57.0	1176.0	1119.0	1.79	36.84	0.78	16.13	0.35	7.17
46 2019	0.0	57.0	57.0	1176.0	1119.0	1.65	34.11	0.71	14.67	0.31	6.40
47 2020	0.0	57.0	57.0	1176.0	1119.0	1.53	31.59	0.65	13.33	0.28	5.72
48 2021	0.0	153.0	153.0	1176.0	1023.0	3.81	29.25	1.58	12.12	0.66	5.10
49 2022	0.0	57.0	57.0	1176.0	1119.0	1.51	27.08	0.55	11.02	0.22	4.56
50 2023	0.0	57.0	57.0	1176.0	1119.0	1.22	25.07	0.49	10.02	0.20	4.07
TOTAL	6377.0	2452.0	8829.0	44092.0	35263.0	3805.55	5816.56	3379.58	3992.00	2860.93	2853.31

BENEFIT COST RATIO BY DISCOUNT RATE (9/C) = 1.53 (8%), 1.22 (10%), 1.00 (12%)  
INTERNAL RATE OF RETURN (IRR) = 12.0 %

TABLE K-39. ACTUAL BENEFIT ESTIMATE

(unit: million pesos)

Year	Price* Index	Without Improvement Project		With Improvement Project	
		Constant Price	Current Price	Constant Price	Current Price
1974	-	0	0	0	0
1975	0.07	59	4	59	4
1976	0.13	49	7	49	7
1977	0.23	111	26	111	26
1978	0.30	153	46	153	46
1979	0.40	207	83	207	83
1980	0.50	176	88	176	88
1981	0.57	151	86	151	86
1982	0.67	211	141	211	141
1983	0.73	193	142	193	142
1984	0.83	280	233	280	233
1985	0.90	345	310	345	310
1986	1.00	326	326	326	326
1987	1.05	355	373	355	373
1988	1.16	386	448	409	474
1989	1.27	403	512	620	787
1990	1.34	450	603	799	1,071
1991	1.37	477	653	1,004	1,375
1992	1.39	477	663	1,197	1,664
1993	1.42	477	682	1,268	1,801
1994	1.44	477	687	1,300	1,872
1995	1.46	477	696	1,331	1,943
1996	1.50	477	716	1,361	2,042
1997	1.54	477	735	1,392	2,144
1998	1.59	477	758	1,423	2,263
1999	1.63	477	778	1,423	2,319
2000-	1.67	477	797	1,423	2,376

Note: \* ... Because of the source of the MRIIS benefit is paddy production, the rice price index is applied to convert current price of the benefit.

Source of rice price index;

before 1986 ... "Farm-gate price of paddy in Cagayan Valley",  
Bureau of Agri. Economics, MAF.

1987 - 2000 ... "Rice price projection", IBRD.



TABLE K-40. TOTAL OF THE MRIIS PROJECT COST WITH IMPROVEMENT PROJECT

- Current Price -

Year	Local Currency			Foreign Currency			Total Exchange Rate (₱/US\$) (million Pesos)
	Canal and Others	Dam (million Pesos)	Total	Canal and Others	Dam (million US\$)	US\$	
1. Existing Project *1							
1974	15.0	-	15.0	2.1	-	2.1	7.25
1975	40.5	-	40.5	4.1	-	4.1	7.25
1976	49.1	-	49.1	2.6	-	2.6	7.44
1977	50.7	7.6	58.3	5.4	-	5.4	7.40
1978	54.9	87.6	142.5	8.1	-	8.1	7.37
1979	95.9	132.0	227.9	6.2	21.1	27.3	7.38
1980	55.2	287.8	343.0	11.5	14.7	26.2	7.51
1981	92.1	196.6	288.7	9.6	21.7	31.3	7.87
1982	67.3	153.9	221.2	16.9	9.5	26.4	8.37
1983	70.6	24.5	95.1	7.1	3.5	10.6	14.00
1984	29.5	16.0	45.5	7.2	2.1	9.3	18.00
1985	24.2	5.0	29.2	3.1	0.9	4.0	20.00
1986	17.4	1.8	19.2	2.4	0.7	3.1	20.50
<u>Sub-total</u>	<u>662.4</u>	<u>912.8</u>	<u>1,575.2</u>	<u>86.3</u>	<u>74.2</u>	<u>160.5</u>	<u>1,488.9</u>
2. Project Cost With Improvement Project *2							
1987			0				0
1988			82.8				92.6
1989			105.9				277.3
1990			123.7				154.4
1991			117.4				114.0
1992			119.4				66.9
<u>Sub-total</u>			<u>549.2</u>				<u>705.2</u>
<u>Total</u>			<u>2,124.4</u>				<u>2,194.1</u>

Source: \*1 ... "Summary of Actual Expenditures" MRMP, NIA. \*2 ... estimated by the team.

TABLE K-41. PROJECTION OF LOAN REPAYMENT  
MRIIS, WITHOUT IMPROVEMENT PROJECT  
( UNIT : MILLION PESOS )

YEAR	LOAN BY YEAR (1)	REMAINDER		REPAYMENT		
		PRINCIPAL (2)	PRINCIPAL (3)	INTEREST (4)	TOTAL (5)	
1974	1	15.20	15.20	0.00	0.27	0.27
1975	2	29.70	44.90	0.00	1.05	1.05
1976	3	19.30	64.20	0.00	1.91	1.91
1977	4	40.00	104.20	0.00	2.95	2.95
1978	5	59.70	163.90	0.00	4.69	4.69
1979	6	201.50	365.40	0.00	9.26	9.26
1980	7	196.80	562.20	0.00	16.23	16.23
1981	8	246.30	808.50	0.00	23.99	23.99
1982	9	221.00	1029.50	0.00	32.16	32.16
1983	10	148.40	1177.90	0.00	38.63	38.63
1984	11	167.40	1344.54	0.76	44.15	44.91
1985	12	80.00	1422.29	2.24	48.44	50.68
1986	13	63.60	1482.68	3.21	50.87	54.08
1987	14	0.00	1477.47	5.21	51.85	57.06
1988	15	0.00	1469.28	8.19	51.64	59.83
1989	16	0.00	1451.01	18.27	51.26	69.53
1990	17	0.00	1422.90	28.11	50.54	78.65
1991	18	0.00	1382.47	40.42	49.45	89.87
1992	19	0.00	1331.00	51.47	47.94	99.41
1993	20	0.00	1272.10	58.89	46.07	104.96
1994	21	0.00	1204.84	67.26	43.94	111.20
1995	22	0.00	1133.57	71.26	41.55	112.81
1996	23	0.00	1059.13	74.44	39.02	113.47
1997	24	0.00	984.68	74.44	36.42	110.86
1998	25	0.00	910.24	74.44	33.81	108.26
1999	26	0.00	835.79	74.44	31.21	105.65
2000	27	0.00	761.35	74.44	28.60	103.05
2001	28	0.00	686.90	74.44	26.00	100.44
2002	29	0.00	612.46	74.44	23.39	97.84
2003	30	0.00	538.01	74.44	20.78	95.23
2004	31	0.00	464.33	73.68	18.19	91.87
2005	32	0.00	392.13	72.20	15.62	87.82
2006	33	0.00	320.89	71.23	13.10	84.34
2007	34	0.00	251.66	69.23	10.63	79.86
2008	35	0.00	185.41	66.25	8.23	74.48
2009	36	0.00	129.23	56.17	6.00	62.17
2010	37	0.00	82.90	46.33	4.12	50.45
2011	38	0.00	48.88	34.02	2.60	36.62
2012	39	0.00	25.91	22.97	1.51	24.48
2013	40	0.00	10.36	15.55	0.77	16.32
2014	41	0.00	3.18	7.18	0.30	7.48
2015	42	0.00	0.00	3.18	0.08	3.26
2016	43	0.00	0.00	0.00	0.00	0.00
2017	44	0.00	0.00	0.00	0.00	0.00
2018	45	0.00	0.00	0.00	0.00	0.00
2019	46	0.00	0.00	0.00	0.00	0.00
2020	47	0.00	0.00	0.00	0.00	0.00
2021	48	0.00	0.00	0.00	0.00	0.00
2022	49	0.00	0.00	0.00	0.00	0.00
2023	50	0.00	0.00	0.00	0.00	0.00
TOTAL		1488.90		1488.90	1029.20	2518.09

(GRACE PERIOD) (REPAYMENT TERM) (INTEREST)  
10 YEARS 30 YEARS 3.5 %

TABLE K-42. PROJECTION OF LOAN REPAYMENT  
MRIIS , WITH IMPROVEMENT PROJECT  
( UNIT : MILLION PESOS )

YEAR	LOAN BY YEAR	REMAINDER		REPAYMENT		
		PRINCIPAL	PRINCIPAL	INTEREST	TOTAL	
	(1)	(2)	(3)	(4)	(5)	
1974	1	15.20	15.20	0.00	0.27	0.27
1975	2	29.70	44.90	0.00	1.05	1.05
1976	3	19.30	64.20	0.00	1.91	1.91
1977	4	40.00	104.20	0.00	2.95	2.95
1978	5	59.70	163.90	0.00	4.69	4.69
1979	6	201.50	365.40	0.00	9.26	9.26
1980	7	196.80	562.20	0.00	16.23	16.23
1981	8	246.30	808.50	0.00	23.99	23.99
1982	9	221.00	1029.50	0.00	32.16	32.16
1983	10	148.40	1177.90	0.00	38.63	38.63
1984	11	167.40	1344.54	0.76	44.15	44.91
1985	12	80.00	1422.29	2.24	48.44	50.68
1986	13	63.60	1482.68	3.21	50.87	54.08
1987	14	0.00	1477.47	5.21	51.85	57.06
1988	15	92.60	1561.88	8.19	53.26	61.46
1989	16	277.30	1820.91	18.27	59.36	77.63
1990	17	154.40	1947.20	28.11	66.19	94.30
1991	18	114.00	2020.77	40.42	69.79	110.22
1992	19	66.90	2036.20	51.47	71.45	122.92
1993	20	0.00	1977.30	58.89	70.75	129.65
1994	21	0.00	1910.04	67.26	68.62	135.88
1995	22	0.00	1838.77	71.26	66.23	137.49
1996	23	0.00	1764.33	74.44	63.71	138.15
1997	24	0.00	1689.88	74.44	61.10	135.54
1998	25	0.00	1610.81	79.07	58.45	137.53
1999	26	0.00	1517.87	92.94	55.57	148.50
2000	27	0.00	1417.21	100.66	52.24	152.90
2001	28	0.00	1310.85	106.36	48.67	155.03
2002	29	0.00	1201.14	109.70	44.92	154.62
2003	30	0.00	1091.44	109.70	41.08	150.78
2004	31	0.00	982.49	108.94	37.25	146.19
2005	32	0.00	875.03	107.46	33.45	140.91
2006	33	0.00	768.54	106.49	29.69	136.19
2007	34	0.00	664.04	104.49	25.98	130.48
2008	35	0.00	562.53	101.51	22.35	123.86
2009	36	0.00	471.10	91.43	18.89	110.32
2010	37	0.00	389.50	81.59	15.77	97.37
2011	38	0.00	320.22	69.28	13.03	82.31
2012	39	0.00	261.99	58.23	10.70	68.93
2013	40	0.00	211.18	50.81	8.73	59.54
2014	41	0.00	168.74	42.44	7.02	49.46
2015	42	0.00	130.30	38.44	5.57	44.01
2016	43	0.00	95.04	35.26	4.25	39.51
2017	44	0.00	59.78	35.26	3.02	38.28
2018	45	0.00	29.15	30.63	1.82	32.45
2019	46	0.00	12.39	16.76	0.87	17.64
2020	47	0.00	3.34	9.04	0.35	9.40
2021	48	0.00	0.00	3.34	0.09	3.43
2022	49	0.00	0.00	0.00	0.00	0.00
2023	50	0.00	0.00	0.00	0.00	0.00
TOTAL		2194.10		2194.10	1516.66	3710.75

(GRACE PERIOD) (REPAYMENT TERM) (INTEREST)  
10 YEARS 30 YEARS 3.5 %

TABLE K-43. ACTUAL O &amp; M COST ESTIMATE

(unit: million pesos)

Year	Price Index*	Without Improvement Project		With Improvement Project	
		Constant Price	Current Price	Constant Price	Current Price
1974	0.33	-	-	-	-
1975	0.37	8	3	8	3
1976	0.41	7	3	7	3
1977	0.44	11	5	11	5
1978	0.49	11	5	11	5
1979	0.54	11	6	11	6
1980	0.59	11	6	11	6
1981	0.65	10	7	10	7
1982	0.72	9	6	9	6
1983	0.79	8	6	8	6
1984	0.87	8	7	8	7
1985	0.95	7	7	7	7
1986	1.05	42	44	42	44
1987	1.16	42	49	42	49
1988	1.27	81	103	52	66
1989	1.40	82	115	57	80
1990	1.54	82	126	62	95
1991	1.69	82	139	66	112
1992	1.86	81	151	71	132
1993	2.05	45	92	71	146
1994	2.25	45	101	71	160
1995	2.48	87	216	71	176
1996	2.72	45	122	71	193
1997	3.00	45	135	71	213
1998	3.29	45	148	71	233
1999	3.62	45	163	71	257
2000-	3.99	45	180	71	283

Note: \* ... It was considered that the annual average of price increase until 2000 is ten percent in Philippines.

TABLE STATEMENT OF INCOME AND EXPENDITURE  
WITHOUT IMPROVEMENT PROJECT  
-- Current Price --

(unit: million pesos)

Year	Income *1	Expenditure			Total	Profit and Loss	The sum of Profit and Loss
		Project Cost		O&M			
		F.C. *2	L.C. *3	Cost			
1 1974	0	0	15	0	15	-15	-15
2 1975	4	1	41	3	45	-41	-56
3 1976	7	2	49	3	54	-47	-103
4 1977	26	3	58	5	66	-40	-143
5 1978	46	5	143	5	153	-107	-250
6 1979	83	9	228	6	243	-160	-410
7 1980	88	16	343	6	365	-277	-687
8 1981	86	24	289	7	320	-234	-921
9 1982	141	32	221	6	259	-118	-1039
10 1983	142	39	95	6	140	2	-1037
11 1984	233	45	45	7	97	136	-901
12 1985	310	51	29	7	87	223	-678
13 1986	326	54	19	44	117	209	-469
14 1987	373	57	0	49	106	267	-202
15 1988	448	60	0	103	163	285	83
16 1989	512	70	0	115	185	327	410
17 1990	603	79	0	126	205	398	808
18 1991	653	90	0	139	229	424	1,232
19 1992	663	99	0	151	250	413	1,645
20 1993	682	105	0	92	197	485	2,130
21 1994	687	111	0	101	212	475	2,605
22 1995	696	113	0	216	329	367	2,972
23 1996	716	113	0	122	235	481	3,453
24 1997	735	111	0	135	246	489	3,942
25 1998	758	108	0	148	256	502	4,444
26 1999	778	106	0	163	269	509	4,953
27 2000	797	103	0	180	283	514	5,467
28 2001	797	100	0	180	280	517	5,984
29 2002	797	98	0	180	278	519	6,503
30 2003	797	95	0	180	275	522	7,025
31 2004	797	92	0	180	272	525	7,550
32 2005	797	88	0	746	834	-37	7,513
33 2006	797	84	0	180	264	533	8,046
34 2007	797	80	0	180	260	537	8,583
35 2008	797	74	0	180	254	543	9,126
36 2009	797	62	0	180	242	555	9,681
37 2010	797	50	0	180	230	567	10,248
38 2011	797	37	0	180	217	580	10,828
39 2012	797	24	0	180	204	593	11,421
40 2013	797	16	0	180	196	601	12,022
41 2014	797	7	0	180	187	610	12,632
42 2015	797	3	0	507	510	287	12,919
43 2016	797	0	0	180	180	617	13,536
44 2017	797	0	0	180	180	617	14,158
45 2018	797	0	0	180	180	617	14,770
46 2019	797	0	0	180	180	617	15,387
47 2020	797	0	0	180	180	617	16,004
48 2021	797	0	0	180	180	617	16,621
<b>Total</b>	<b>27,330</b>	<b>2,516</b>	<b>1,575</b>	<b>6,618</b>	<b>10,709</b>	<b>16,621</b>	<b>-</b>

Note: \*1 ... Benefit without improvement project was considered as the MRIIS income.  
\*2 ... It was supposed that the total of foreign currency among the capital investment was covered by foreign loan.  
(Loaning condition: - grace period ..... 10 years  
- repayment year ... 30 years  
- interest ..... 3.5 percent/year  
\*3 ... Total of local currency among capital investment.

TABLE  
STATEMENT OF INCOME AND EXPENDITURE  
WITH IMPROVEMENT PROJECT  
- Current Price -

(unit: million pesos)

Year	Income*1	Expenditure				Profit and Loss	The sum of Profit and Loss
		Project Cost		O&M			
		F.C.*2	L.C.*3	Cost	Total		
1 1974	0	0	15	0	15	-15	-15
2 1975	4	1	41	3	45	-41	-56
3 1976	7	2	49	3	54	-47	-103
4 1977	26	3	58	5	66	-40	-143
5 1978	46	5	143	5	153	-107	-250
6 1979	83	9	228	6	243	-160	-410
7 1980	88	16	343	6	365	-277	-687
8 1981	86	24	289	7	320	-234	-921
9 1982	141	32	221	6	259	-118	-1039
10 1983	142	39	95	6	140	2	-1037
11 1984	233	45	45	7	97	136	-901
12 1985	310	51	29	7	87	223	-678
13 1986	326	54	19	44	117	209	-469
14 1987	373	57	0	49	106	267	-202
15 1988	474	61	83	66	210	264	62
16 1989	787	78	106	80	264	523	585
17 1990	1,071	94	124	95	313	758	1,343
18 1991	1,375	110	117	112	339	1,036	2,379
19 1992	1,664	123	119	132	374	1,290	3,669
20 1993	1,801	130	0	146	276	1,525	5,194
21 1994	1,872	136	0	160	296	1,576	6,770
22 1995	1,943	137	0	176	313	1,630	8,400
23 1996	2,042	138	0	193	331	1,711	10,111
24 1997	2,144	136	0	213	349	1,795	11,906
25 1998	2,263	138	0	233	371	1,892	13,798
26 1999	2,319	149	0	257	406	1,913	15,711
27 2000	2,376	153	0	283	436	1,940	17,651
28 2001	2,376	155	0	563	718	1,658	19,309
29 2002	2,376	155	0	283	438	1,938	21,247
30 2003	2,376	151	0	283	434	1,942	23,189
31 2004	2,376	146	0	283	429	1,947	25,136
32 2005	2,376	141	0	283	424	1,952	27,088
33 2006	2,376	136	0	283	419	1,957	29,045
34 2007	2,376	130	0	283	413	1,963	31,008
35 2008	2,376	124	0	283	407	1,969	32,977
36 2009	2,376	110	0	283	393	1,983	34,960
37 2010	2,376	97	0	283	380	1,996	36,956
38 2011	2,376	82	0	962	1,044	1,332	38,288
39 2012	2,376	69	0	283	352	2,024	40,312
40 2013	2,376	60	0	283	343	2,033	42,345
41 2014	2,376	49	0	283	332	2,044	44,389
42 2015	2,376	44	0	283	327	2,049	46,438
43 2016	2,376	40	0	283	323	2,053	48,491
44 2017	2,376	38	0	283	321	2,055	50,546
45 2018	2,376	32	0	283	315	2,061	52,607
46 2019	2,376	18	0	283	301	2,075	54,682
47 2020	2,376	9	0	283	292	2,084	56,766
48 2021	2,376	3	0	762	765	1,611	58,377
<b>Total</b>	<b>73,892</b>	<b>3,710</b>	<b>2,124</b>	<b>9,681</b>	<b>15,515</b>	<b>58,377</b>	<b>-</b>

Note: \*1 ... Benefit with improvement project was considered as the MRIIS income.

\*2 ... It was supposed that the total of foreign currency among the capital investment was covered by foreign loan.

(Loaning condition: - grace period ..... 10 years  
- repayment year ... 30 years  
- interest ..... 3.5 percent/year

\*3 ... Total of local currency among capital investment.

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