APPENDIX V. PROJECT IMPLEMENTATION AND O & M

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Table A.5.1-1 Zoning and Canal Length for O & M

No. of zone	Command area	Main and lateral		Sub-lateral		Total Length	Remarks
		Name	Length	Name	Length		
	ha	Main	3.70 Km	1L-3L	0.93 Km	Km	
No. 1	217	1L	2.75	1R-3L	2.80		
	136	2L	0.50	1L-1L-3L	1.50		
				2R-3L	1.50		
	1,689	3L	10.60	2L-3L	2.60		
Sub-total	2,042		17.55		9.33	26.88	
No. 2	1,103	Main	11.00				
	350	5L	1.90				
Sub-total	1,453		12.90			12.90	
No. 3	2,241	4L	13.00	1L-4L	4.00		
				2L-4L	2.50		
				1R-4L	2.30		
				1L-1R-4l	1.30		
Sub-total	2,241		13.00		10.10	23.10	
No. 4	1,715	6L	12.00	1L-6L	3.70		
				1R-1L-6L	1.80		
				2L-6L	1.50		
				3L-6L	2.00		
				4L-6L	1.60		
Sub-total	1,715		12.00		10.60	22.60	
No. 5	1,368	6L	3.00	1R-6L	2.70		
				2R-6L	2.50		
Sub-total	1,368		3.00		5.20	8.20	
No. 6	296	Main	5.00				
	304	7L	2.40				
	456	8L	2.30				
	470	9L	3.70				
Sub-total	1,526		13.40		-	13.40	

No. of zone	Command area	Main and Lateral		sub-lateral		Total	Remarks
		Name	Length	Name	Length	Length	
No. 7	107 ha	Main	3.00 Km	1L-10L	4.40 Km	Km	
	1,545	10L	6.50	1L-1L-10L	1.80		
Sub-total	1,652		9.50		6.20	15.70	
No. 8	1.248	Main	12.70	1L-11L	1.60		
	773	11L	8.35				
	142	12L	2.20				
Sub-total	2,163		23.25		1.60	24.85	
Total	14,160		104.60		43.03	147.63	

Table A.5.1-2 Preliminary Estimate of Pump Operation Charge (Electricity)

(A) Wet season

A-1. Equiped capacity of electric motor

560 KW x 7 units = 3,920 KW
(2.50 cms. x 7 units = 17.50 cms. ---- peak time)

A-2. Shaft power of electric motor

3,920 KW ÷ 1.15 ≒ 3,409 KW

A-3. Input power of electric motor

3,409 KW ÷ 0.93 ≒ 3,666 KW

A-4. Pump operation charges

3,666 KW x 1.19 ฿/KWH x 1,306 H. ≒ ฿ 5,697,000

(B) Dry season

B-1. Equiped capacity of electric motor

560 KW x 2 units = 1,120 KW

$$\frac{9.48 \text{ mm/day} \times 10^4}{86{,}400 \times 10^3 \times 0.6} \times 2{,}800 \text{ ha.} \fallingdotseq 5.12 \text{ cms.} \fallingdotseq 2.5 \text{ cms.} \times 2 \text{ units)}$$

B-2. Shaft power of electric motor

1,120 KW ÷ 1.15 ≒ 974 KW

B-3. Input power of electric motor

974 KW ÷ 0.93 ≒ 1,047 KW

B-4. Pump operation charges

1,047 KW x 1.19 ฿/KWH x 2,142 H. ≒ ฿ 2,669,000

Total amount = ฿ 5,697,000 + 2,669,000 = ฿ 8,366,000

Table A.5.1-3 Preliminary Estimate of operation Hours of Pumping Plant

Wet Season					Dry Season				
Month	Decade	Water req. to be pumped up	Proportion %	Operation hours	Month	Decade	Water req. to be pumped up	Proportion %	Operation hours
		mm/decade					mm/decade		
Jun.	1	-	-	-	Jan.	1	82.5	79	190
	2	18.1	18	43		2	82.5	79	190
	3	43.4	43	103		3	104.3	100	240
Jul.	1	75.5	75	180	Feb.	1	35.0	34	82
	2	100.7	100	240		2	58.1	56	134
	3	40.8	40	106		3	77.0	74	178
Aug.	1	3.4	3	7	Mar.	1	89.4	86	206
	2	25.3	25	60		2	89.4	86	206
	3	0.0	0	0		3	98.3	94	226
Sep.	1	0.0	0	0	Apr.	1	87.0	83	199
	2	47.0	47	113		2	72.2	69	166
	3	0.0	0	0		3	43.5	42	101
Oct.	1	57.7	57	137	May	1	10.7	10	24
	2	33.7	33	79		2	-	-	-
	3	0.0	0	0		3	-	-	-
Nov.	1	32.3	32	77					
	2	37.1	37	89					
	3	22.1	22	53					
Dec.	1	8.3	8	19					
	2	-	-	-					
	3	-	-	-					
Total		(for 7 units)		1,306	Total		(for 2 units)		2,142

Note ---- Cropping intensity both of HYV. and LV. in wet season are assumed about 50 percent respectively.

Cropping intensity in dry season is assumed about 20 percent of total beneficial area.

Fig. A.5.1-1 Manning Schedule of Consulting Services for the Project

	FY1982				FY1983				FY1984				FY1985				FY1986				FY1987				FY1988			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Foreign																												
Team Leader						6.0				6.0				6.0				6.0								6.0		
Design Engineer							12.0					9.0				6.0				6.0								
a. Canal Engineer						6.0				5.0																		
b. Structure Engineer										1.5																		
Mechanical Engineer										1.5																		
Electrical Engineer						1.0																						
Geologist							3.0																					
Specification Writer										1.0			1.0															
Equipment Engineer								2.0									3.0											
Agronomist								2.0						1.5													1.5	
Agro-economist										6.0				6.0				6.0				6.0				6.0		
Const. Superviser																												
Sub-total						29.0				28.0				20.5				20.0				9.0				13.5		
2. Local																												
Canal Design Engineer								16.0						8.0				8.0				13.0						
Architect							3.0																					
Agronomist								5.0		5.0			5.0		6.0			5.0			5.0		6.0			5.0		
Const. Superviser										6.0				6.0				6.0				6.0				6.0		
Sub-total						15.0				16.0				23.0				17.0				25.0				14.0		
TOTAL						44.0				44.0				43.5				37.0				34.0				27.5		

APPENDIX VI. PROJECT JUSTIFICATION

APPENDIX VI. PROJECT JUSTIFICATION

6.1. Economic Prices

6.2. Economic Cost of Labor

6.3. Economic Benefit and Cost

6.4. Sensitivity Analysis

6.5. Farm Budget Analysis

Appendix 6.1. Economic Prices

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Table A.6.1-1. Price Structure of Paddy (1981 Constant Price)

	1981		1990	
	Financial	Economic	Financial	Economic
Export price, 5% broken (US$/ton)[1/]	511	511	600	600
F.O.B. Bangkok (฿/ton)[2/]	10,730	10,730	13,800	13,800
Grade differential (85%)	9,170	9,170	11,730	11,730
Rice Premium	1,000	-	1,400	-
Export duty	520	-	730	-
Municipal tax	15	-	20	-
Exporter's margin	465	320[3/]	510	350[3/]
Wholesaler's margin	320	220[3/]	350	240[3/]
Transport and Handling	210	160[4/]	230	170[4/]
Ex-mill price of rice	6,640	8,470	8,490	10,970
Ex-mill price of paddy[5/]	4,380	5,590	5,600	7,240
Milling tax	90	-	100	-
Miller's margin	350	250[6/]	390	280[6/]
Input price of paddy at mill	3,940	5,340	5,110	6,960
Middleman's margin	220	150[3/]	240	160[3/]
Farm gate price of paddy	3,720	5,190	4,870	6,800

Note: 1/ Based on Price Projection for Major Primary Commodities, IBRD, Ja. 1980

2/ Exchange Rate : US$1.00=฿21 for 1981 and US$1.00 = ฿23 for 1990

3/ Conversion factor : 0.69

4/ Conversion factor : 0.76

5/ Milling Recovery : 66%

6/ Conversion factor : 0.72

Table A.6.1-2 Price Structure of Maize (1981 Constant Prices)

	1981		1990	
	Financial	Economic	Financial	Economic
Export price, F.O.B. Bangkok				
(US$/ton)[1/]	175	175	213	213
(฿/ton)[2/]	4,025	4,025	4,900	4,900
Export duty	250	-	280	-
Exporter's margin	200	140[3/]	220	150[3/]
Transport and handling	100	80[4/]	110	85[4/]
Cost of shelling	300	240[5/]	330	265[5/]
Shelling factory's margin	200	140[6/]	220	160[6/]
Tax	50	-	60	-
Transport to factory	100	80[4/]	110	85[4/]
Input price of maize at factory	2,925	3,345	3,570	4,155
Middleman's margin	205	140[3/]	230	160[3/]
Farm gate price of maize	2,620	3,205	3,340	3,995

Note: 1/ Based on Price Prospects for Major Primary Commodities, IBRD, Jan. 1980

2/ Exchange Rate : US$1.00 = ฿23

3/ Conversion factor : 0.69

4/ Conversion factor : 0.76

5/ Conversion factor : 0.80

6/ Conversion factor : 0.72

Table A.6.1-3 Price Structure of Groundnuts (1981 Constant Price)

	1981		1990	
	Financial	Economic	Financial	Economic
Export price, F.O.B., (US$/ton)[1/]	676	676	711	711
Bangkok (฿/ton)[2/]	15,550	15,550	16,350	16,350
Export duty	500	-	550	-
Exporter's margin	400	280[3/]	440	300[3/]
Transport and handling	200	150[4/]	220	170[4/]
Price without shell	14,450	15,120	15,140	15,880
Price with shell	9,390	9,830	9,840	10,320
Cost of shelling	500	400[5/]	550	440[5/]
Shelling factory's margin	400	290[6/]	440	320[6/]
Tax	200	-	220	-
Transport to factory	100	80[4/]	110	90[4/]
Input price of groundnuts at factory	8,190	9,060	8,520	9,470
Middleman's margin	500	350[3/]	550	380[3/]
Farm gate price				
- dried	7,690	8,710	7,970	9,090
- fresh	3,845	4,355	3,985	4,545

Note: 1/ Based on Price Prospects for Major Primary Commodities, IBRD, Jan 1980

2/ Exchange Rate : US$1.00 = ฿ 23

3/ Conversion factor : 0.69

4/ Conversion factor : 0.76

5/ Conversion factor : 0.80

6/ Conversion factor : 0.72

6.2. Economic Cost of Labor

6.2. Economic Cost of Labor

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6.2. Economic Cost of Farm Labor

Generally, market wage rates do not fully reflect the situation between real demand and supply of farm labor in the project area because of imperfections in the labor market as well as the influence of a statutory minimum wage rate, currently fixed at ฿35 per day. For these reasons, observed market wage rates ranging from ฿10 to ฿60 per day, are likely to be higher than the economic cost of labor, which is measured as the marginal product of labor at border prices.

By applying the techniques developed by the World Bank, it is postulated that the economic (marginal opportunity) cost of farm labor can be approximated by a S-shaped curve. The monthly economic cost of labor can be read directly from the curve at the corresponding level of labor demand.

The following summarizes the relation between wage rates and labor utilization rate, in taking consideration of future increase in wage rates implying a real wage rate increase of 2.5 percent per annum.

Labor Utilization Rate	Wage Rate (฿ per man-day)	
	present (1981)	Future (1990)
0 %	10	13
50 %	20	25
100 %	35	44
150 %	45	56

By applying a logistic curve for this relation, the following formulas are worked out.

Present Case

$$Y = 1/(0.0166 + 0.0835 \times 0.9816^{X})$$

Future Case

$$Y = 1/(0.0127 + 0.0644 \times 0.9826^{X})$$

where;

Y: Wage Rate (฿ per man-day)

X: Labor Utilization Rate as percent

Figure A.6.2-1 shows the S-curve for the economic cost of labor at present as well as in future.

As for labor supply in the project area, 183,000 man-days are monthly workable at present, assuming two workers per farm can engage in agricultural works, with the total number of agricultural household of 3,660 in the project area. Considering a growth rate of two percent per annum in the agricultural population, future monthly labor supply can be estimated at 217,600 man-days within the project area.

Table A.6.2-1 shows the estimated monthly economic cost of farm labor, and the weighted average cost of farm labor can be summarized as follows;

	Financial (฿/man-day)	Economic (฿/man-day)
Present	35.0	21.0
Future		
Without Project	44.0	24.0
With Project	44.0	30.0

Table A.6.2-1 Economic Cost of Farm Labor

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Weighted Average
Present													
Labor Supply	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0	-
Labor Demand	10.3	15.3	6.0	4.9	30.4	19.3	167.2	328.9	84.5	20.8	99.4	363.9	-
Utiliz. Ratio (%)	5.6	8.4	3.3	2.7	16.6	10.5	91.4	179.7	46.2	11.4	54.3	198.9	52.4
Labor Cost (฿/m.d)	10.9	11.4	10.5	10.4	12.8	11.7	31.4	51.1	19.2	11.9	21.2	53.5	20.8
Future Without													
Labor Supply	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	-
Labor Demand	10.8	16.0	6.3	5.2	31.9	20.7	177.4	346.6	96.0	23.7	132.0	334.6	-
Utiliz. Ratio (%)	5.0	7.4	2.9	2.4	14.7	9.5	81.5	159.3	44.1	10.9	60.7	153.8	46.0
Labor Cost (฿/m.d)	13.9	14.4	13.5	13.4	16.0	14.9	35.6	60.1	23.6	15.2	28.7	58.7	24.1
Future With													
Labor Supply	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	217.6	-
Labor Demand	49.6	74.8	28.6	14.6	105.5	27.8	227.8	438.2	125.2	39.0	255.2	275.2	-
Utiliz. Ratio (%)	22.8	34.4	13.1	6.7	48.5	12.8	104.7	201.4	57.5	17.9	117.3	126.5	63.6
Labor Cost (฿/m.d)	17.9	20.9	15.7	14.3	24.9	15.6	43.6	68.6	27.6	16.7	47.8	50.8	29.6

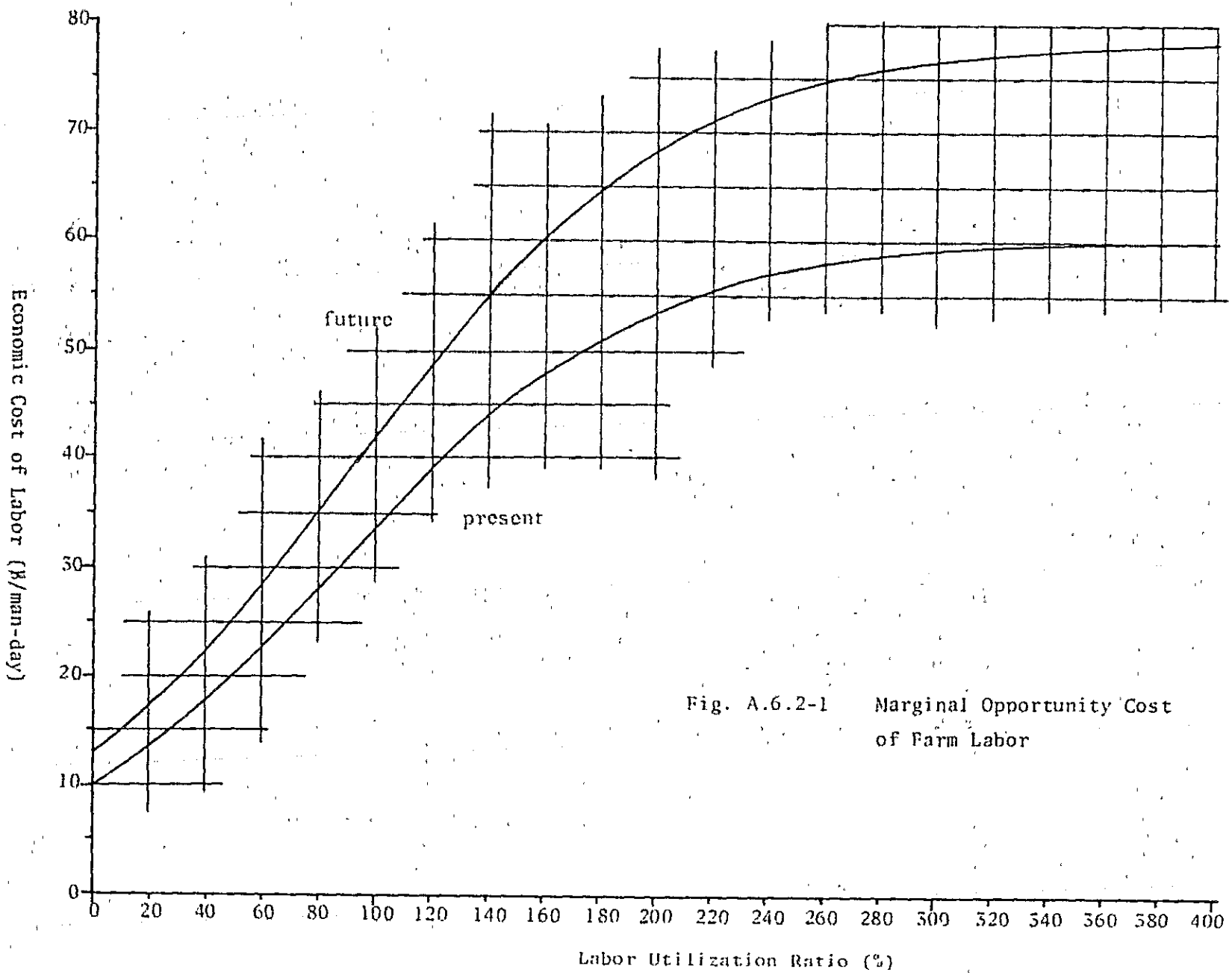

Fig. A.6.2-1 Marginal Opportunity Cost of Farm Labor

6.3. Economic Benefit and Cost

6.3. Economic Benefit and Cost

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Table A.6.3-1 Crop Production Cost (Economic)

Season: Wet

Crop: Paddy (L.V.-T.P.) (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	5.8	70	406	55	319
Fertilizers						
Ammophos	kg	6.6	74	488	147	970
Ammonium Sulfate	kg	4.4	73	321	79	348
Potassium Chloride	kg	8.3	-	-	-	-
Sub-total	-	-	-	809	-	1,318
Agr. Chemicals						
Padan Mipcin	kg	17.6	3	53	30	528
Saturn	kg	15.4	-	-	15	231
Asodrin	kg	193.6	-	-	-	-
Sub-total	-	-	-	53	-	759
Labor	man-day	24/30 1/	87.2	2,093	99.5	2,985
Agr. Machineries						
Two Wheel Tractor	hour	47.6	28.3	1,347	37.4	1,780
Harrowing	hour	159.1	-	-	-	-
Ridging	hour	165.8	-	-	-	
Fertilizing	hour	6.7	-	-	4.2	28
Duster	hour	5.7	-	-	9.6	55
Trailer	hour	60.8	-	-	6.0	365
Thresher	hour	47.0	3.3	155	9.0	423
Sub-total	-	-	-	1,502	-	2,651
Draft Animal	day	54.5	4.9	267	-	-
Pump						
Wet	ha	371.0	-	-	-	-
Dry	ha	612.0	-	-	-	-
Sub-total	-	-	-	-	-	-
Miscellaneous	L.S.	-	-	154	-	241
Total	-	-	-	5,284	-	8,273

Note: 1/ Without/With

Table A.6.3-2 Crop Production Cost (Economic)

Season: Wet

Crop: Paddy (H.Y.V. - T.P.) (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	7.2	60	432	50	360
Fertilizers						
Ammophos	kg	6.6	90	594	137	904
Ammonium Sulfate	kg	4.4	90	396	123	541
Potassium Chloride	kg	8.3	-	-	-	-
Sub-total	-	-	-	990	-	1,445
Agr. Chemicals						
Padan Mipcin	kg	17.6	3	53	30	528
Saturn	kg	15.4	-	-	15	231
Asodrin	kg	193.6	-	-	-	-
Sub-total	-	-	-	53	-	759
Labor	man-day	24/30 1/	88.7	2,129	99.4	2,982
Agr. Machineries						
Two Wheel Tractor	hour	47.6	24.3	1,157	37.4	1,780
Harrowing	hour	159.1	-	-	-	-
Ridging	hour	165.8	-	-	-	-
Fertilizing	hour	6.7	-	-	4.2	28
Duster	hour	5.7	-	-	9.6	55
Trailer	hour	60.8	-	-	6.0	365
Thresher	hour	47.0	3.4	160	9.0	423
Sub-total	-	-	-	1,317	-	2,651
Draft Animal	day	54.5	4.7	256	-	-
Pump						
Wet	ha	371.0	1	371	-	-
Dry	ha	612.0	-	-	-	-
Sub-total	-	-	-	371	-	-
Miscellaneous	L.S.	-	-	166	-	246
Total	-	-	-	5,714 (5,332)	-	8,443

Note: 1/ Without/With

Table A.6.3-3 Crop Production Cost (Economic)

Season: Wet

Crop: Paddy (Broadcasting) (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	5.8	90	522	-	-
Fertilizers						
Ammophos	kg	6.6	70	462	-	-
Ammonium Sulfate	kg	4.4	70	308	-	-
Potassium Chloride	kg	8.3	-	-	-	-
Sub-total	-	-	-	770	-	-
Agr. Chemicals						
Padan Mipcin	kg	17.6	0.1	2	-	-
Saturn	kg	15.4	-	-	-	-
Asodrin	kg	193.6	-	-	-	-
Sub-total	-	-	-	2	-	-
Labor	man-day	24/30 1/	39.7	953	-	-
Agr. Machineries						
Two Wheel Tractor	hour	47.6	20.2	962	-	-
Harrowing	hour	159.1	-	-	-	-
Ridging	hour	165.8	-	-	-	-
Fertilizing	hour	6.7	-	-	-	-
Duster	hour	5.7	-	-	-	-
Trailer	hour	60.8	-	-	-	-
Thresher	hour	47.0	3.3	155	-	-
Sub-total	-	-	-	1,117	-	-
Draft Animal	day	54.5	22.5	1,226	-	-
Pump						
Wet	ha	371.0	-	-	-	-
Dry	ha	612.0	-	-	-	-
Sub-total	-	-	-	-	-	-
Miscellaneous	L.S.	-	-	138	-	-
Total	-	-	-	4,728	-	-

Note: 1/ Without/With

Table A.6.3-4 Crop Production Cost (Economic)

Season: Wet

Crop: Maize (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	7.2	18	130	10	72
Fertilizers						
Ammophos	kg	6.6	4	26	200	1,320
Ammonium Sulfate	kg	4.4	-	-	-	-
Potassium Chloride	kg	8.3	-	-	-	-
Sub-total	-	-	-	26	-	1,320
Agr. Chemicals						
Padan Mipcin	kg	17.6	-	-	-	-
Saturn	kg	15.4	-	-	-	-
Asodrin	kg	193.6	6	1,162	8	1,549
Sub-total	-	-	-	1,162	-	1,549
Labor	man-day	24/30 1/	64.0	1,536	41.4	1,242
Agr. Machineries						
Two Wheel Tractor	hour	47.6	-	-	-	-
Harrowing	hour	159.1	5.7	907	3.6	573
Ridging	hour	165.8	-	-	2.0	332
Fertilizing	hour	6.7	-	-	2.1	14
Duster	hour	5.7	-	-	2.1	12
Trailer	hour	60.8	-	-	6.0	365
Thresher	hour	47.0	-	-	-	-
Sub-total	-	-	-	907	-	1,296
Draft Animal	day	54.5	7.5	409	-	-
Pump						
Wet	ha	371.0	-	-	-	-
Dry	ha	612.0	-	-	-	-
Sub-total	-	-	-	-	-	-
Miscellaneous	L.S.	-	-	125	-	164
Total	-	-	-	4,295	-	5,643

Note: 1/ Without/With

Table A.6.3-5 Crop Production Cost (Economic)

Season: Wet

Crop: Groundnuts (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	14.4	120	1,728	110	1,584
Fertilizers						
Ammophos	kg	6.6	4	26	-	-
Ammonium Sulfate	kg	4.4	-	-	-	-
Potassium Chloride	kg	8.3	-	-	125	1,038
Sub-total	-	-	-	26	-	1,038
Agr. Chemicals						
Padan Mipcin	kg	17.6	-	-	-	-
Saturn	kg	15.4	-	-	-	-
Asodrin	kg	193.6	-	-	6	1,162
Sub-total	-	-	-	-	-	1,162
Labor	man-day	24/30 1/	141.3	3,391	102.8	3,084
Agr. Machineries						
Two Wheel Tractor	hour	47.6	-	-	-	-
Harrowing	hour	159.1	2.2	350	3.6	573
Ridging	hour	165.8	-	-	2.0	332
Fertilizing	hour	6.7	-	-	2.1	14
Duster	hour	5.7	-	-	2.1	12
Trailer	hour	60.8	-	-	6.0	365
Thresher	hour	47.0	-	-	-	-
Sub-total	-	-	-	350	-	1,296
Draft Animal	day	54.5	14.6	796	-	-
Pump						
Wet	ha	371.0	-	-	-	-
Dry	ha	612.0	-	-	-	-
Sub-total	-	-	-	-	-	-
Miscellaneous	L.S.	-	-	189	-	245
Total	-	-	-	6,480	-	8,409

Note: 1/ Without/With

Table A.6.3-6 Crop Production Cost (Economic)

Season: Dry

Crop: Paddy (H.Y.V. - T.P.) (Unit: per ha)

Item	Unit	Price (฿)	Without Project Quantity	Without Project Cost	With Project Quantity	With Project Cost
Seed	kg	7.2	60	432	50	360
Fertilizers						
Ammophos	kg	6.6	110	726	148	977
Ammonium Sulfate	kg	4.4	110	484	135	594
Potassium Chloride	kg	8.3	-	-	-	-
Sub-total	-	-	-	1,210	-	1,571
Agr. Chemicals						
Padan Mipcin	kg	17.6	3	53	30	528
Saturn	kg	15.4	-	-	15	231
Asodrin	kg	193.6	-	-	-	-
Sub-total	-	-	-	53	-	759
Labor	man-day	24/30 1/	88.6	2,126	99.3	2,979
Agr. Machineries						
Two Wheel Tractor	hour	47.6	24.3	1,157	37.4	1,780
Harrowing	hour	159.1	-	-	-	-
Ridging	hour	165.8	-	-	-	-
Fertilizing	hour	6.7	-	-	4.2	28
Duster	hour	5.7	-	-	9.6	55
Trailer	hour	60.8	-	-	6.0	365
Thresher	hour	47.0	3.4	160	9.0	423
Sub-total	-	-	-	1,317	-	2,651
Draft Animal	day	54.5	4.7	256	-	-
Pump						
Wet	ha	371.0	-	-	-	-
Dry	ha	612.0	1	612	-	-
Sub-total	-	-	-	612	-	-
Miscellaneous	L.S.	-	-	180	-	250
Total	-	-	-	6,186	-	8,570

Note: 1/ Without/With

Table A.6.3-7 Incremental Net Production Value (Economic at 1981 Constant prices)

	Wet Season						Dry Season	
	Paddy							
Without Project	L.V.	H.Y.V. (Rainfed)	H.Y.V. (Irrigated)	Broadcast	Maize	Groundnuts	Paddy	Total (฿1,000)
Yield (ton/ha)	2.0	2.6	2.8	1.7	2.1	2.0	3.5	-
Unit Price (฿/ton)	6,800	6,800	6,800	6,800	3,995	4,545	6,800	-
G.P.V. (฿/ha)	13,600	17,680	19,040	11,560	8,390	9,090	23,800	-
P.C. (฿/ha)	5,284	5,332	5,714	4,728	4,295	6,480	6,186	-
N.P.V. (฿/ha)	8,316	12,348	13,326	6,832	4,095	2,610	17,514	-
Cropped Area (ha)	8,550	1,660	2,000	940	410	50	680	-
Total N.P.V.(฿1,000)	71,102	20,498	26,652	6,422	1,679	131	11,910	138,394
With Project								
Yield (ton/ha)	3.3	-	4.0	-	2.7	2.6	4.2	-
Unit Price (฿/ton)	6,800	-	6,800	-	3,995	4,545	6,800	-
G.P.V. (฿/ha)	22,440	-	27,200	-	10,787	11,817	28,560	-
P.C. (฿/ha)	8,273	-	8,443	-	5,643	8,409	8,570	-
N.P.V. (฿/ha)	14,167	-	18,757	-	5,144	3,408	19,990	-
Cropped Area (ha)	6,840	-	6,840	-	430	50	2,800	-
Total N.P.V.(฿1,000)	96,902	-	128,298	-	2,212	170	55,972	283,554
Incremental N.P.V.	25,800	-20,498	101,646	-6,422	533	39	44,062	145,160

Table A.6.3-8 Economic Initial Cost

(Unit: ฿ 1,000)

Description	FY1982		FY1983		FY1984		FY1985		FY1986		FY1987		FY1988		TOTAL		
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	Total
1. Survey Design	-	1,850	-	2,220	-	2,220	-	740	-	444	-	370	-	296	-	8,140	8,140
2. Civil Works																	
2.1 Pumping Station	-	-	-	-	6,856	9,725	3,826	5,428	-	-	-	-	-	-	10,682	15,153	25,835
2.2 Irrigation Canal	-	-	-	-	14,058	15,367	18,842	20,596	29,087	31,792	23,629	25,828	15,249	16,668	100,865	110,251	211,116
2.3 Irri. Structures	-	-	-	-	1,801	5,360	2,438	7,248	3,734	11,104	3,034	9,021	1,958	5,822	12,965	38,555	51,520
2.4 Drainage Canal	-	-	-	-	-	-	2,351	786	11,760	3,929	7,056	2,357	5,317	1,776	26,484	8,848	35,332
2.5 Drai. Structures	-	-	-	-	-	-	134	397	673	1,985	403	1,191	134	397	1,344	3,970	5,314
2.6 Demonstration Farm	-	-	-	-	-	-	1,211	1,990	-	-	-	-	-	-	1,211	1,990	3,201
2.7 Transmission Line	-	-	-	-	-	-	-	2,679	-	-	-	-	-	-	-	2,679	2,679
Sub-total	-	-	-	-	22,715	30,452	28,802	39,124	45,254	48,810	34,122	38,397	22,658	24,663	153,551	181,446	334,997
3. Procurement																	
3.1 Pump Plants	-	-	-	-	52,465	-	-	3,700	-	-	-	-	-	-	52,465	3,700	56,165
3.2 Gates	-	-	-	-	-	-	-	-	-	-	1,020	-	-	207	1,020	207	1,227
3.3 Project Equipment	-	-	-	-	2,900	74	-	-	-	-	-	-	-	-	2,900	74	2,974
3.4 O.M. Equipment	-	-	-	-	-	-	-	-	-	-	-	-	8,100	666	8,100	666	8,766
Sub-total	-	-	-	-	55,365	74	-	3,700	-	-	1,020	-	8,100	873	64,485	4,647	69,132
4. Land Aquisition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Project Facilities	-	740	-	2,960	-	-	-	-	-	-	-	-	-	-	-	3,700	3,700
6. Supporting Services	-	-	-	260	-	260	-	260	-	260	-	260	-	260	-	1,560	1,560
7. Administration	-	259	-	544	-	11,109	-	7,263	-	9,477	-	7,417	-	5,685	-	41,754	41,754
8. Consulting Services	-	-	7,000	1,027	7,000	1,027	6,960	1,612	5,000	1,106	2,400	1,659	3,400	948	31,760	7,379	39,139
Total (1 - 8)	-	2,849	7,000	7,011	85,080	45,142	35,762	52,699	50,254	60,097	37,542	48,103	34,158	32,725	249,796	248,626	498,422
9. Physical Contingency	-	285	700	701	8,508	4,514	3,576	5,270	5,025	6,010	3,754	4,810	3,416	3,273	24,979	24,863	49,842
Total (1 - 9)	-	3,134	7,700	7,712	93,588	49,656	39,338	57,969	55,279	66,107	41,296	52,913	37,574	35,998	274,775	273,489	548,264
10. Price Escalation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total (1 - 10)	-	3,134	7,700	7,712	93,588	49,656	39,338	57,969	55,279	66,107	41,296	52,913	37,574	35,998	274,775	273,489	548,264

6.4. Sensitivity Analysis

6.4. Sensitivity Analysis

List of Tables

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Table A.6.4-1 Sensitivity Analysis-Case-1 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST: INITIAL COST	PROJECT COST: REPLACE. COST	PROJECT COST: O & M COST	PROJECT COST: TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3447	-	-	3447	-	-3447
2	16953	-	-	16953	-	-16953
3	157568	-	-	157568	-	-157568
4	107038	-	6614	113652	10262	-103390
5	133525	-	8302	141827	21005	-120822
6	103630	-	10579	114209	38241	-75968
7	80929	-	11562	92491	61647	-30844
8	-	-	11562	11562	89573	78011
9	-	-	11562	11562	115105	103543
10	-	-	11562	11562	133424	121862
11	-	-	11562	11562	142943	131381
12	-	-	11562	11562	145160	133598
13	-	-	11562	11562	145160	133598
14	-	-	11562	11562	145160	133598
15	-	-	11562	11562	145160	133598
16	-	-	11562	11562	145160	133598
17	-	8100	11562	19662	145160	125498
18	-	-	11562	11562	145160	133598
19	-	-	11562	11562	145160	133598
20	-	-	11562	11562	145160	133598
21	-	-	11562	11562	145160	133598
22	-	-	11562	11562	145160	133598
23	-	-	11562	11562	145160	133598
24	-	15000	11562	26562	145160	118598
25	-	-	11562	11562	145160	133598
26	-	-	11562	11562	145160	133598
27	-	8100	11562	19662	145160	125498
28	-	-	11562	11562	145160	133598
29	-	-	11562	11562	145160	133598
30	-	-	11562	11562	145160	133598
31	-	-	11562	11562	145160	133598
32	-	-	11562	11562	145160	133598
33	-	-	11562	11562	145160	133598
34	-	-	11562	11562	145160	133598
35	-	-	11562	11562	145160	133598
36	-	-	11562	11562	145160	133598
37	-	8100	11562	19662	145160	125498
38	-	-	11562	11562	145160	133598
39	-	-	11562	11562	145160	133598
40	-	-	11562	11562	145160	133598
41	-	-	11562	11562	145160	133598
42	-	-	11562	11562	145160	133598
43	-	-	11562	11562	145160	133598
44	-	15000	11562	26562	145160	118598
45	-	-	11562	11562	145160	133598
46	-	-	11562	11562	145160	133598
47	-	8100	11562	19662	145160	125498
48	-	-	11562	11562	145160	133598
49	-	-	11562	11562	145160	133598
50	-	-	11562	11562	145160	133598

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	10262.	6760.	6522.	6294.	6076.	5867.	5668.	5476.	5293.	5117.	4949.
5	21005.	12465.	11919.	11401.	10909.	10443.	10001.	9581.	9182.	8802.	8441.
6	38241.	20445.	19374.	18368.	17422.	16533.	15696.	14908.	14166.	13466.	12807.
7	61647.	29693.	27886.	26204.	24637.	23175.	21813.	20541.	19353.	18242.	17205.
8	89573.	38868.	36177.	33694.	31401.	29282.	27322.	25509.	23830.	22274.	20832.
9	115105.	44998.	41508.	38317.	35396.	32720.	30267.	28017.	25951.	24053.	22308.
10	133424.	46990.	42959.	39305.	35990.	32980.	30245.	27757.	25493.	23430.	21549.
11	142943.	45354.	41093.	37265.	33823.	30725.	27934.	25417.	23145.	21093.	19238.
12	145160.	41493.	37259.	33490.	30129.	27132.	24454.	22061.	19919.	18001.	16281.
13	145160.	37381.	33267.	29637.	26429.	23593.	21081.	18855.	16880.	15126.	13567.
14	145160.	33677.	29703.	26227.	23184.	20515.	18173.	16116.	14305.	12711.	11306.
15	145160.	30339.	26520.	23210.	20337.	17839.	15667.	13774.	12123.	10682.	9422.
16	145160.	27333.	23679.	20540.	17839.	15513.	13506.	11773.	10274.	8976.	7851.
17	145160.	24624.	21142.	18177.	15648.	13489.	11643.	10062.	8707.	7543.	6543.
18	145160.	22184.	18877.	16086.	13727.	11730.	10037.	8600.	7379.	6339.	5452.
19	145160.	19985.	16854.	14235.	12041.	10200.	8653.	7351.	6253.	5327.	4544.
20	145160.	18005.	15048.	12598.	10562.	8869.	7459.	6283.	5299.	4476.	3786.
21	145160.	16221.	13436.	11148.	9265.	7713.	6430.	5370.	4491.	3762.	3155.
22	145160.	14613.	11996.	9866.	8127.	6707.	5543.	4589.	3806.	3161.	2629.
23	145160.	13165.	10711.	8731.	7129.	5832.	4779.	3923.	3225.	2656.	2191.
24	145160.	11860.	9563.	7726.	6254.	5071.	4120.	3353.	2733.	2232.	1826.
25	145160.	10685.	8539.	6837.	5486.	4410.	3551.	2866.	2316.	1876.	1522.
26	145160.	9626.	7624.	6051.	4812.	3834.	3062.	2449.	1963.	1576.	1268.
27	145160.	8672.	6807.	5355.	4221.	3334.	2639.	2093.	1664.	1325.	1057.
28	145160.	7813.	6078.	4739.	3703.	2899.	2275.	1789.	1410.	1113.	881.
29	145160.	7039.	5427.	4194.	3248.	2521.	1961.	1529.	1195.	935.	734.
30	145160.	6341.	4845.	3711.	2849.	2192.	1691.	1307.	1012.	786.	612.
31	145160.	5713.	4326.	3284.	2499.	1906.	1458.	1117.	858.	661.	510.
32	145160.	5147.	3863.	2906.	2192.	1658.	1257.	955.	727.	555.	425.
33	145160.	4637.	3449.	2572.	1923.	1442.	1083.	816.	616.	466.	354.
34	145160.	4177.	3079.	2276.	1687.	1254.	934.	697.	522.	392.	295.
35	145160.	3763.	2749.	2014.	1480.	1090.	805.	596.	443.	329.	246.
36	145160.	3390.	2455.	1783.	1298.	948.	694.	510.	375.	277.	205.
37	145160.	3054.	2192.	1577.	1139.	824.	598.	435.	318.	233.	171.
38	145160.	2752.	1957.	1396.	999.	717.	516.	372.	269.	195.	142.
39	145160.	2479.	1747.	1235.	876.	623.	445.	318.	228.	164.	119.
40	145160.	2233.	1560.	1093.	769.	542.	383.	272.	193.	138.	99.
41	145160.	2012.	1393.	967.	674.	471.	330.	232.	164.	116.	82.
42	145160.	1813.	1244.	856.	591.	410.	285.	199.	139.	97.	69.
43	145160.	1633.	1110.	758.	519.	356.	246.	170.	118.	82.	57.
44	145160.	1471.	991.	671.	455.	310.	212.	145.	100.	69.	48.
45	145160.	1325.	885.	593.	399.	269.	182.	124.	85.	58.	40.
46	145160.	1194.	790.	525.	350.	234.	157.	106.	72.	49.	33.
47	145160.	1076.	706.	465.	307.	204.	136.	91.	61.	41.	28.
48	145160.	969.	630.	411.	269.	177.	117.	77.	51.	34.	23.
49	145160.	873.	563.	364.	236.	154.	101.	66.	44.	29.	19.
50	145160.	787.	502.	322.	207.	134.	87.	57.	37.	24.	16.
TOTAL	6273440.	657123.	571002.	499472.	439513.	388840.	345693.	308702.	276785.	249091.	224932.

(3)

*** PRESENT WORTH OF COST ***

(UNIT: THOUSAND BAHT)

YEAR	C. STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	3447.	3105.	3078.	3050.	3024.	2997.	2972.	2946.	2921.	2897.	2873.
2	16953.	13759.	13515.	13277.	13045.	12819.	12599.	12384.	12175.	11972.	11773.
3	157568.	115213.	112154.	109203.	106354.	103604.	100947.	98381.	95901.	93503.	91185.
4	113652.	74866.	72228.	69705.	67291.	64981.	62769.	60651.	58621.	56675.	54809.
5	141827.	84168.	80477.	76978.	73661.	70513.	67526.	64689.	61994.	59433.	56997.
6	114209.	61061.	57862.	54857.	52032.	49376.	46876.	44523.	42307.	40218.	38248.
7	92491.	44549.	41838.	39314.	36963.	34771.	32726.	30818.	29035.	27370.	25813.
8	11562.	5017.	4670.	4349.	4053.	3780.	3527.	3293.	3076.	2875.	2689.
9	11562.	4520.	4169.	3849.	3555.	3287.	3040.	2814.	2607.	2416.	2241.
10	11562.	4072.	3723.	3406.	3119.	2858.	2621.	2405.	2209.	2030.	1867.
11	11562.	3668.	3324.	3014.	2736.	2485.	2259.	2056.	1872.	1706.	1556.
12	11562.	3305.	2968.	2667.	2400.	2161.	1948.	1757.	1587.	1434.	1297.
13	11562.	2977.	2650.	2361.	2105.	1879.	1679.	1502.	1345.	1205.	1081.
14	11562.	2682.	2366.	2089.	1847.	1634.	1448.	1284.	1139.	1012.	901.
15	11562.	2417.	2112.	1849.	1620.	1421.	1248.	1097.	966.	851.	750.
16	11562.	2177.	1886.	1636.	1421.	1236.	1076.	938.	818.	715.	625.
17	19662.	3335.	2864.	2462.	2120.	1827.	1577.	1363.	1179.	1022.	886.
18	11562.	1767.	1504.	1281.	1093.	934.	799.	685.	588.	505.	434.
19	11562.	1592.	1342.	1134.	959.	812.	689.	585.	498.	424.	362.
20	11562.	1434.	1199.	1003.	841.	706.	594.	500.	422.	357.	302.
21	11562.	1292.	1070.	888.	738.	614.	512.	428.	358.	300.	251.
22	11562.	1164.	956.	786.	647.	534.	442.	366.	303.	252.	209.
23	11562.	1049.	853.	695.	568.	465.	381.	312.	257.	212.	175.
24	26562.	2170.	1750.	1414.	1144.	928.	754.	613.	500.	408.	334.
25	11562.	851.	680.	545.	437.	351.	283.	228.	184.	149.	121.
26	11562.	767.	607.	482.	383.	305.	244.	195.	156.	126.	101.
27	19662.	1175.	922.	725.	572.	452.	357.	284.	225.	179.	143.
28	11562.	622.	484.	377.	295.	231.	181.	143.	112.	89.	70.
29	11562.	561.	432.	334.	259.	201.	156.	122.	95.	75.	58.
30	11562.	505.	386.	296.	227.	175.	135.	104.	81.	63.	49.
31	11562.	455.	345.	262.	199.	152.	116.	89.	68.	53.	41.
32	11562.	410.	308.	231.	175.	132.	100.	76.	58.	44.	34.
33	11562.	369.	275.	205.	153.	115.	86.	65.	49.	37.	28.
34	11562.	333.	245.	181.	134.	100.	74.	56.	42.	31.	23.
35	11562.	300.	219.	160.	118.	87.	64.	47.	35.	26.	20.
36	11562.	270.	196.	142.	103.	75.	55.	41.	30.	22.	16.
37	19662.	414.	297.	214.	154.	112.	81.	59.	43.	32.	23.
38	11562.	219.	156.	111.	80.	57.	41.	30.	21.	16.	11.
39	11562.	197.	139.	98.	70.	50.	35.	25.	18.	13.	9.
40	11562.	178.	124.	87.	61.	43.	31.	22.	15.	11.	8.
41	11562.	160.	111.	77.	54.	38.	26.	19.	13.	9.	7.
42	11562.	144.	99.	68.	47.	33.	23.	16.	11.	8.	5.
43	11562.	130.	88.	60.	41.	28.	20.	14.	9.	7.	5.
44	26562.	269.	181.	123.	83.	57.	39.	27.	18.	13.	9.
45	11562.	106.	71.	47.	32.	21.	15.	10.	7.	5.	3.
46	11562.	95.	63.	42.	28.	19.	13.	8.	6.	4.	3.
47	19662.	146.	96.	63.	42.	28.	18.	12.	8.	6.	4.
48	11562.	77.	50.	33.	21.	14.	9.	6.	4.	3.	2.
49	11562.	70.	45.	29.	19.	12.	8.	5.	3.	2.	2.
50	11562.	63.	40.	26.	17.	11.	7.	5.	3.	2.	1.
TOTAL	1199713.	450243.	427212.	406285.	387138.	369518.	353224.	338095.	323994.	310811.	298453.

(4)

***** CALCULATION OF INTERNAL RATE OF RETURN *****

(UNIT: THOUSAND BAHT)

DISCOUNT RATE	+++++ PRESENT WORTH +++++ BENEFIT	COST	B/C RATIO
11.00 %	657123.	450243.	1.46
12.00 %	571002.	427212.	1.34
13.00 %	499472.	406285.	1.23
14.00 %	439513.	387138.	1.14
15.00 %	388840.	369518.	1.05
16.00 %	345693.	353224.	0.98
17.00 %	308702.	338095.	0.91
18.00 %	276785.	323994.	0.85
19.00 %	249091.	310811.	0.80
20.00 %	224932.	298453.	0.75

INTERNAL RATE OF RETURN ---------- 15.7 %

Fig.A.6.4-1 Sensitivity Analysis Case-1

*** PLOT OF PW OF BENEFIT AND COST ***

Y AXIS : PRESENT WORTH VALUE

X AXIS : DISCOUNT RATE (%)

I.R.R. (*) ----- 15.7 %

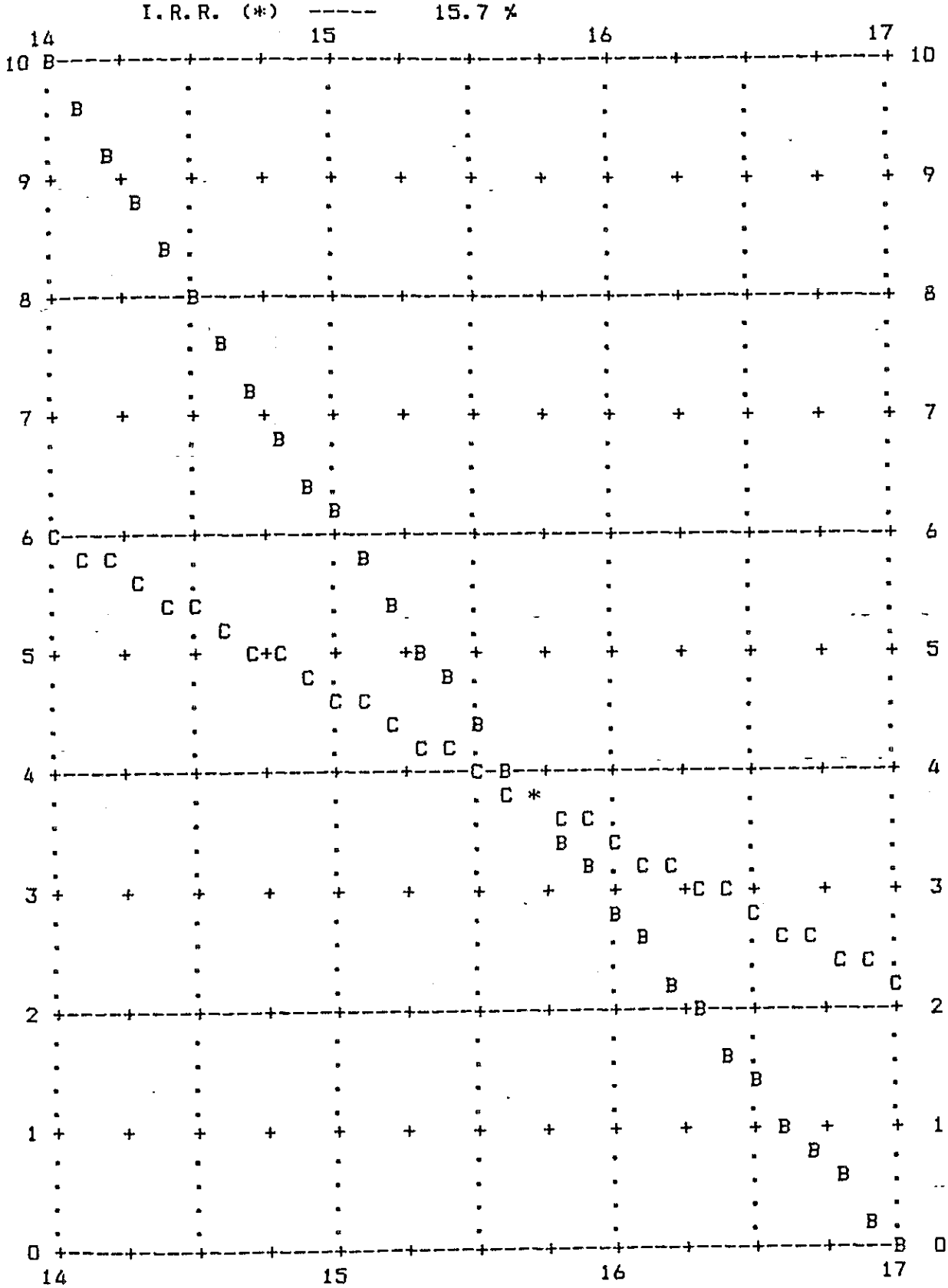

Table A.6.4-2 Sensitivity Analysis-Case-2 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST INITIAL COST	REPLACE. COST	O & M COST	TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3761	-	-	3761	-	-3761
2	18494	-	-	18494	-	-18494
3	171893	-	-	171893	-	-171893
4	116768	-	6614	123382	10262	-113120
5	145663	-	8302	153965	21005	-132960
6	113051	-	10579	123630	38241	-85389
7	88286	-	11562	99848	61647	-38201
8	-	-	11562	11562	89573	78011
9	-	-	11562	11562	115105	103543
10	-	-	11562	11562	133424	121862
11	-	-	11562	11562	142943	131381
12	-	-	11562	11562	145160	133598
13	-	-	11562	11562	145160	133598
14	-	-	11562	11562	145160	133598
15	-	-	11562	11562	145160	133598
16	-	-	11562	11562	145160	133598
17	-	8100	11562	19662	145160	125498
18	-	-	11562	11562	145160	133598
19	-	-	11562	11562	145160	133598
20	-	-	11562	11562	145160	133598
21	-	-	11562	11562	145160	133598
22	-	-	11562	11562	145160	133598
23	-	-	11562	11562	145160	133598
24	-	15000	11562	26562	145160	118598
25	-	-	11562	11562	145160	133598
26	-	-	11562	11562	145160	133598
27	-	8100	11562	19662	145160	125498
28	-	-	11562	11562	145160	133598
29	-	-	11562	11562	145160	133598
30	-	-	11562	11562	145160	133598
31	-	-	11562	11562	145160	133598
32	-	-	11562	11562	145160	133598
33	-	-	11562	11562	145160	133598
34	-	-	11562	11562	145160	133598
35	-	-	11562	11562	145160	133598
36	-	-	11562	11562	145160	133598
37	-	8100	11562	19662	145160	125498
38	-	-	11562	11562	145160	133598
39	-	-	11562	11562	145160	133598
40	-	-	11562	11562	145160	133598
41	-	-	11562	11562	145160	133598
42	-	-	11562	11562	145160	133598
43	-	-	11562	11562	145160	133598
44	-	15000	11562	26562	145160	118598
45	-	-	11562	11562	145160	133598
46	-	-	11562	11562	145160	133598
47	-	8100	11562	19662	145160	125498
48	-	-	11562	11562	145160	133598
49	-	-	11562	11562	145160	133598
50	-	-	11562	11562	145160	133598

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	10262.	6760.	6522.	6294.	6076.	5867.	5668.	5476.	5293.	5117.	4949.
5	21005.	12465.	11919.	11401.	10909.	10443.	10001.	9581.	9182.	8802.	8441.
6	38241.	20445.	19374.	18368.	17422.	16533.	15696.	14908.	14166.	13466.	12807.
7	61647.	29693.	27886.	26204.	24637.	23175.	21813.	20541.	19353.	18242.	17205.
8	89573.	38868.	36177.	33694.	31401.	29282.	27322.	25509.	23830.	22274.	20832.
9	115105.	44998.	41508.	38317.	35396.	32720.	30267.	28017.	25951.	24053.	22308.
10	133424.	46990.	42959.	39305.	35990.	32980.	30245.	27757.	25493.	23430.	21549.
11	142943.	45354.	41093.	37265.	33823.	30725.	27934.	25417.	23145.	21093.	19238.
12	145160.	41493.	37259.	33490.	30129.	27132.	24454.	22061.	19919.	18001.	16281.
13	145160.	37381.	33267.	29637.	26429.	23593.	21081.	18855.	16880.	15126.	13567.
14	145160.	33677.	29703.	26227.	23184.	20515.	18173.	16116.	14305.	12711.	11306.
15	145160.	30339.	26520.	23210.	20337.	17839.	15667.	13774.	12123.	10682.	9422.
16	145160.	27333.	23679.	20540.	17839.	15513.	13506.	11773.	10274.	8976.	7851.
17	145160.	24624.	21142.	18177.	15648.	13489.	11643.	10062.	8707.	7543.	6543.
18	145160.	22184.	18877.	16086.	13727.	11730.	10037.	8600.	7379.	6339.	5452.
19	145160.	19985.	16854.	14235.	12041.	10200.	8653.	7351.	6253.	5327.	4544.
20	145160.	18005.	15048.	12598.	10562.	8869.	7459.	6283.	5299.	4476.	3786.
21	145160.	16221.	13436.	11148.	9265.	7713.	6430.	5370.	4491.	3762.	3155.
22	145160.	14613.	11996.	9866.	8127.	6707.	5543.	4589.	3806.	3161.	2629.
23	145160.	13165.	10711.	8731.	7129.	5832.	4779.	3923.	3225.	2656.	2191.
24	145160.	11860.	9563.	7726.	6254.	5071.	4120.	3353.	2733.	2232.	1826.
25	145160.	10685.	8539.	6837.	5486.	4410.	3551.	2866.	2316.	1876.	1522.
26	145160.	9626.	7624.	6051.	4812.	3834.	3062.	2449.	1963.	1576.	1268.
27	145160.	8672.	6807.	5355.	4221.	3334.	2639.	2093.	1664.	1325.	1057.
28	145160.	7813.	6078.	4739.	3703.	2899.	2275.	1789.	1410.	1113.	881.
29	145160.	7039.	5427.	4194.	3248.	2521.	1961.	1529.	1195.	935.	734.
30	145160.	6341.	4845.	3711.	2849.	2192.	1691.	1307.	1012.	786.	612.
31	145160.	5713.	4326.	3284.	2499.	1906.	1458.	1117.	858.	661.	510.
32	145160.	5147.	3863.	2906.	2192.	1658.	1257.	955.	727.	555.	425.
33	145160.	4637.	3449.	2572.	1923.	1442.	1083.	816.	616.	466.	354.
34	145160.	4177.	3079.	2276.	1687.	1254.	934.	697.	522.	392.	295.
35	145160.	3763.	2749.	2014.	1480.	1090.	805.	596.	443.	329.	246.
36	145160.	3390.	2455.	1783.	1298.	948.	694.	510.	375.	277.	205.
37	145160.	3054.	2192.	1577.	1139.	824.	598.	435.	318.	233.	171.
38	145160.	2752.	1957.	1396.	999.	717.	516.	372.	269.	195.	142.
39	145160.	2479.	1747.	1235.	876.	623.	445.	318.	228.	164.	119.
40	145160.	2233.	1560.	1093.	769.	542.	383.	272.	193.	138.	99.
41	145160.	2012.	1393.	967.	674.	471.	330.	232.	164.	116.	82.
42	145160.	1813.	1244.	856.	591.	410.	285.	199.	139.	97.	69.
43	145160.	1633.	1110.	758.	519.	356.	246.	170.	118.	82.	57.
44	145160.	1471.	991.	671.	455.	310.	212.	145.	100.	69.	48.
45	145160.	1325.	885.	593.	399.	269.	182.	124.	85.	58.	40.
46	145160.	1194.	790.	525.	350.	234.	157.	106.	72.	49.	33.
47	145160.	1076.	706.	465.	307.	204.	136.	91.	61.	41.	28.
48	145160.	969.	630.	411.	269.	177.	117.	77.	51.	34.	23.
49	145160.	873.	563.	364.	236.	154.	101.	66.	44.	29.	19.
50	145160.	787.	502.	322.	207.	134.	87.	57.	37.	24.	16.
TOTAL	6273440.	657123.	571002.	499472.	439513.	388840.	345693.	308702.	276785.	249091.	224932.

(3)

*** PRESENT WORTH OF COST ***

(UNIT: THOUSAND BAHT)

YEAR	C.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	3761.	3388.	3358.	3328.	3299.	3270.	3242.	3215.	3187.	3161.	3134.
2	18494.	15010.	14743.	14484.	14231.	13984.	13744.	13510.	13282.	13060.	12843.
3	171893.	125687.	122350.	119131.	116023.	113023.	110125.	107325.	104620.	102004.	99475.
4	123382.	81276.	78412.	75673.	73052.	70544.	68143.	65843.	63639.	61527.	59501.
5	153965.	91371.	87364.	83566.	79965.	76548.	73305.	70225.	67300.	64519.	61875.
6	123630.	66098.	62635.	59382.	56324.	53449.	50743.	48196.	45797.	43535.	41403.
7	99848.	48093.	45166.	42442.	39903.	37537.	35329.	33269.	31345.	29547.	27866.
8	11562.	5017.	4670.	4349.	4053.	3780.	3527.	3293.	3076.	2875.	2689.
9	11562.	4520.	4169.	3849.	3555.	3287.	3040.	2814.	2607.	2416.	2241.
10	11562.	4072.	3723.	3406.	3119.	2858.	2621.	2405.	2209.	2030.	1867.
11	11562.	3668.	3324.	3014.	2736.	2485.	2259.	2056.	1872.	1706.	1556.
12	11562.	3305.	2968.	2667.	2400.	2161.	1948.	1757.	1587.	1434.	1297.
13	11562.	2977.	2650.	2361.	2105.	1879.	1679.	1502.	1345.	1205.	1081.
14	11562.	2682.	2366.	2089.	1847.	1634.	1448.	1284.	1139.	1012.	901.
15	11562.	2417.	2112.	1849.	1620.	1421.	1248.	1097.	966.	851.	750.
16	11562.	2177.	1886.	1636.	1421.	1236.	1076.	938.	818.	715.	625.
17	19662.	3335.	2864.	2462.	2120.	1827.	1577.	1363.	1179.	1022.	886.
18	11562.	1767.	1504.	1281.	1093.	934.	799.	685.	588.	505.	434.
19	11562.	1592.	1342.	1134.	959.	812.	689.	585.	498.	424.	362.
20	11562.	1434.	1199.	1003.	841.	706.	594.	500.	422.	357.	302.
21	11562.	1292.	1070.	888.	738.	614.	512.	428.	358.	300.	251.
22	11562.	1164.	956.	786.	647.	534.	442.	366.	303.	252.	209.
23	11562.	1049.	853.	695.	568.	465.	381.	312.	257.	212.	175.
24	26562.	2170.	1750.	1414.	1144.	928.	754.	613.	500.	408.	334.
25	11562.	851.	680.	545.	437.	351.	283.	228.	184.	149.	121.
26	11562.	767.	607.	482.	383.	305.	244.	195.	156.	126.	101.
27	19662.	1175.	922.	725.	572.	452.	357.	284.	225.	179.	143.
28	11562.	622.	484.	377.	295.	231.	181.	143.	112.	89.	70.
29	11562.	561.	432.	334.	259.	201.	156.	122.	95.	75.	58.
30	11562.	505.	386.	296.	227.	175.	135.	104.	81.	63.	49.
31	11562.	455.	345.	262.	199.	152.	116.	89.	68.	53.	41.
32	11562.	410.	308.	231.	175.	132.	100.	76.	58.	44.	34.
33	11562.	369.	275.	205.	153.	115.	86.	65.	49.	37.	28.
34	11562.	333.	245.	181.	134.	100.	74.	56.	42.	31.	23.
35	11562.	300.	219.	160.	118.	87.	64.	47.	35.	26.	20.
36	11562.	270.	196.	142.	103.	75.	55.	41.	30.	22.	16.
37	19662.	414.	297.	214.	154.	112.	81.	59.	43.	32.	23.
38	11562.	219.	156.	111.	80.	57.	41.	30.	21.	16.	11.
39	11562.	197.	139.	98.	70.	50.	35.	25.	18.	13.	9.
40	11562.	178.	124.	87.	61.	43.	31.	22.	15.	11.	8.
41	11562.	160.	111.	77.	54.	38.	26.	19.	13.	9.	7.
42	11562.	144.	99.	68.	47.	33.	23.	16.	11.	8.	5.
43	11562.	130.	88.	60.	41.	28.	20.	14.	9.	7.	5.
44	26562.	269.	181.	123.	83.	57.	39.	27.	18.	13.	9.
45	11562.	106.	71.	47.	32.	21.	15.	10.	7.	5.	3.
46	11562.	95.	63.	42.	28.	19.	13.	8.	6.	4.	3.
47	19662.	146.	96.	63.	42.	28.	18.	12.	8.	6.	4.
48	11562.	77.	50.	33.	21.	14.	9.	6.	4.	3.	2.
49	11562.	70.	45.	29.	19.	12.	8.	5.	3.	2.	2.
50	11562.	63.	40.	26.	17.	11.	7.	5.	3.	2.	1.
TOTAL	1254539.	484445.	460089.	437906.	417565.	398812.	381440.	365286.	350209.	336096.	322853.

(4)

***** CALCULATION OF INTERNAL RATE OF RETURN *****

(UNIT: THOUSAND BAHT)

DISCOUNT RATE	+++++ PRESENT WORTH +++++ BENEFIT	COST	B/C RATIO
11.00 %	657123.	484445.	1.36
12.00 %	571002.	460089.	1.24
13.00 %	499472.	437906.	1.14
14.00 %	439513.	417565.	1.05
15.00 %	388840.	398812.	0.97
16.00 %	345693.	381440.	0.91
17.00 %	308702.	365286.	0.85
18.00 %	276785.	350209.	0.79
19.00 %	249091.	336096.	0.74
20.00 %	224932.	322853.	0.70

INTERNAL RATE OF RETURN ---------- 14.7 %

Fig.A.6.4-2 Sensitivity Analysis-Case-2

*** PLOT OF PW OF BENEFIT AND COST ***

Y AXIS : PRESENT WORTH VALUE

X AXIS : DISCOUNT RATE (%)

I.R.R. (*) ----- 14.7 %

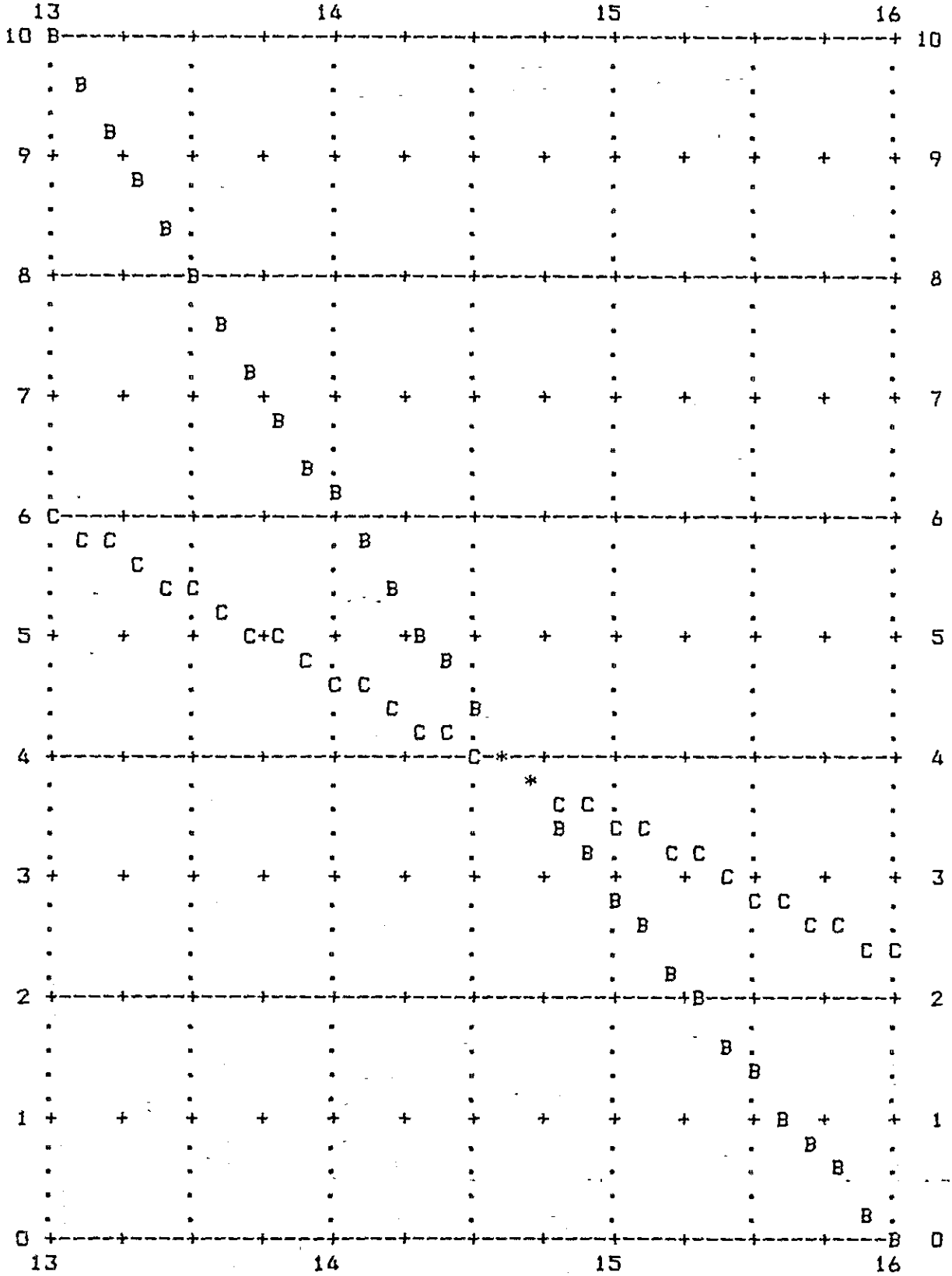

Table A.6.4-3 Sensitivity Analysis-Case-3 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST INITIAL COST	REPLACE. COST	O & M COST	TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3134	-	-	3134	-	-3134
2	13973	-	-	13973	-	-13973
3	59437	-	-	59437	-	-59437
4	74976	-	-	74976	-	-74976
5	161416	-	5581	166997	7891	-159106
6	87796	-	7453	95249	17549	-77700
7	62290	-	9284	71574	31286	-40288
8	43928	-	10646	54574	50724	-3850
9	41317	-	11562	52879	74771	21892
10	-	-	11562	11562	100447	88885
11	-	-	11562	11562	121789	110227
12	-	-	11562	11562	136045	124483
13	-	-	11562	11562	143144	131582
14	-	-	11562	11562	145160	133598
15	-	-	11562	11562	145160	133598
16	-	-	11562	11562	145160	133598
17	-	-	11562	11562	145160	133598
18	-	-	11562	11562	145160	133598
19	-	8100	11562	19662	145160	125498
20	-	-	11562	11562	145160	133598
21	-	-	11562	11562	145160	133598
22	-	-	11562	11562	145160	133598
23	-	-	11562	11562	145160	133598
24	-	-	11562	11562	145160	133598
25	-	-	11562	11562	145160	133598
26	-	15000	11562	26562	145160	118598
27	-	-	11562	11562	145160	133598
28	-	-	11562	11562	145160	133598
29	-	8100	11562	19662	145160	125498
30	-	-	11562	11562	145160	133598
31	-	-	11562	11562	145160	133598
32	-	-	11562	11562	145160	133598
33	-	-	11562	11562	145160	133598
34	-	-	11562	11562	145160	133598
35	-	-	11562	11562	145160	133598
36	-	-	11562	11562	145160	133598
37	-	-	11562	11562	145160	133598
38	-	-	11562	11562	145160	133598
39	-	8100	11562	19662	145160	125498
40	-	-	11562	11562	145160	133598
41	-	-	11562	11562	145160	133598
42	-	-	11562	11562	145160	133598
43	-	-	11562	11562	145160	133598
44	-	-	11562	11562	145160	133598
45	-	-	11562	11562	145160	133598
46	-	15000	11562	26562	145160	118598
47	-	-	11562	11562	145160	133598
48	-	-	11562	11562	145160	133598
49	-	-	11562	11562	145160	133598
50	-	-	11562	11562	145160	133598

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	7891.	4683.	4478.	4283.	4098.	3923.	3757.	3599.	3449.	3307.	3171.
6	17549.	9382.	8891.	8429.	7995.	7587.	7203.	6841.	6501.	6180.	5877.
7	31286.	15069.	14152.	13299.	12503.	11762.	11070.	10424.	9821.	9258.	8731.
8	50724.	22011.	20487.	19080.	17782.	16582.	15472.	14445.	13495.	12614.	11797.
9	74771.	29230.	26963.	24890.	22993.	21255.	19661.	18200.	16858.	15625.	14491.
10	100447.	35376.	32341.	29591.	27095.	24829.	22770.	20897.	19192.	17639.	16223.
11	121789.	38642.	35011.	31750.	28818.	26178.	23800.	21655.	19720.	17972.	16391.
12	136045.	38887.	34919.	31387.	28238.	25428.	22919.	20676.	18668.	16870.	15258.
13	143144.	36862.	32805.	29225.	26062.	23265.	20788.	18593.	16646.	14916.	13379.
14	145160.	33677.	29703.	26227.	23184.	20515.	18173.	16116.	14305.	12711.	11306.
15	145160.	30339.	26520.	23210.	20337.	17839.	15667.	13774.	12123.	10682.	9422.
16	145160.	27333.	23679.	20540.	17839.	15513.	13506.	11773.	10274.	8976.	7851.
17	145160.	24624.	21142.	18177.	15648.	13489.	11643.	10062.	8707.	7543.	6543.
18	145160.	22184.	18877.	16086.	13727.	11730.	10037.	8600.	7379.	6339.	5452.
19	145160.	19985.	16854.	14235.	12041.	10200.	8653.	7351.	6253.	5327.	4544.
20	145160.	18005.	15048.	12598.	10562.	8869.	7459.	6283.	5299.	4476.	3786.
21	145160.	16221.	13436.	11148.	9265.	7713.	6430.	5370.	4491.	3762.	3155.
22	145160.	14613.	11996.	9866.	8127.	6707.	5543.	4589.	3806.	3161.	2629.
23	145160.	13165.	10711.	8731.	7129.	5832.	4779.	3923.	3225.	2656.	2191.
24	145160.	11860.	9563.	7726.	6254.	5071.	4120.	3353.	2733.	2232.	1826.
25	145160.	10685.	8539.	6837.	5486.	4410.	3551.	2866.	2316.	1876.	1522.
26	145160.	9626.	7624.	6051.	4812.	3834.	3062.	2449.	1963.	1576.	1268.
27	145160.	8672.	6807.	5355.	4221.	3334.	2639.	2093.	1664.	1325.	1057.
28	145160.	7813.	6078.	4739.	3703.	2899.	2275.	1789.	1410.	1113.	881.
29	145160.	7039.	5427.	4194.	3248.	2521.	1961.	1529.	1195.	935.	734.
30	145160.	6341.	4845.	3711.	2849.	2192.	1691.	1307.	1012.	786.	612.
31	145160.	5713.	4326.	3284.	2499.	1906.	1458.	1117.	858.	661.	510.
32	145160.	5147.	3863.	2906.	2192.	1658.	1257.	955.	727.	555.	425.
33	145160.	4637.	3449.	2572.	1923.	1442.	1083.	816.	616.	466.	354.
34	145160.	4177.	3079.	2276.	1687.	1254.	934.	697.	522.	392.	295.
35	145160.	3763.	2749.	2014.	1480.	1090.	805.	596.	443.	329.	246.
36	145160.	3390.	2455.	1783.	1298.	948.	694.	510.	375.	277.	205.
37	145160.	3054.	2192.	1577.	1139.	824.	598.	435.	318.	233.	171.
38	145160.	2752.	1957.	1396.	999.	717.	516.	372.	269.	195.	142.
39	145160.	2479.	1747.	1235.	876.	623.	445.	318.	228.	164.	119.
40	145160.	2233.	1560.	1093.	769.	542.	383.	272.	193.	138.	99.
41	145160.	2012.	1393.	967.	674.	471.	330.	232.	164.	116.	82.
42	145160.	1813.	1244.	856.	591.	410.	285.	199.	139.	97.	69.
43	145160.	1633.	1110.	758.	519.	356.	246.	170.	118.	82.	57.
44	145160.	1471.	991.	671.	455.	310.	212.	145.	100.	69.	48.
45	145160.	1325.	885.	593.	399.	269.	182.	124.	85.	58.	40.
46	145160.	1194.	790.	525.	350.	234.	157.	106.	72.	49.	33.
47	145160.	1076.	706.	465.	307.	204.	136.	91.	61.	41.	28.
48	145160.	969.	630.	411.	269.	177.	117.	77.	51.	34.	23.
49	145160.	873.	563.	364.	236.	154.	101.	66.	44.	29.	19.
50	145160.	787.	502.	322.	207.	134.	87.	57.	37.	24.	16.
TOTAL	6054566.	562818.	483086.	417432.	362884.	317199.	278652.	245912.	217924.	193865.	173074.

(3)

*** PRESENT WORTH OF COST ***

(UNIT: THOUSAND BAHT)

YEAR	C.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	3134.	2823.	2798.	2773.	2749.	2725.	2702.	2679.	2656.	2634.	2612.
2	13973.	11341.	11139.	10943.	10752.	10566.	10384.	10207.	10035.	9867.	9703.
3	59437.	43460.	42306.	41193.	40118.	39081.	38079.	37111.	36175.	35271.	34396.
4	74976.	49389.	47649.	45984.	44392.	42868.	41409.	40011.	38672.	37388.	36157.
5	166997.	99105.	94759.	90640.	86733.	83027.	79510.	76169.	72996.	69980.	67112.
6	95249.	50924.	48256.	45750.	43394.	41179.	39094.	37132.	35283.	33541.	31899.
7	71574.	34474.	32376.	30423.	28604.	26907.	25325.	23848.	22469.	21180.	19975.
8	54574.	23681.	22042.	20529.	19131.	17840.	16646.	15542.	14519.	13571.	12692.
9	52879.	20672.	19069.	17603.	16261.	15032.	13905.	12871.	11922.	11050.	10248.
10	11562.	4072.	3723.	3406.	3119.	2858.	2621.	2405.	2209.	2030.	1867.
11	11562.	3668.	3324.	3014.	2736.	2485.	2259.	2056.	1872.	1706.	1556.
12	11562.	3305.	2968.	2667.	2400.	2161.	1948.	1757.	1587.	1434.	1297.
13	11562.	2977.	2650.	2361.	2105.	1879.	1679.	1502.	1345.	1205.	1081.
14	11562.	2682.	2366.	2089.	1847.	1634.	1448.	1284.	1139.	1012.	901.
15	11562.	2417.	2112.	1849.	1620.	1421.	1248.	1097.	966.	851.	750.
16	11562.	2177.	1886.	1636.	1421.	1236.	1076.	938.	818.	715.	625.
17	11562.	1961.	1684.	1448.	1246.	1074.	927.	801.	693.	601.	521.
18	11562.	1767.	1504.	1281.	1093.	934.	799.	685.	588.	505.	434.
19	19662.	2707.	2283.	1928.	1631.	1382.	1172.	996.	847.	722.	615.
20	11562.	1434.	1199.	1003.	841.	706.	594.	500.	422.	357.	302.
21	11562.	1292.	1070.	888.	738.	614.	512.	428.	358.	300.	251.
22	11562.	1164.	956.	786.	647.	534.	442.	366.	303.	252.	209.
23	11562.	1049.	853.	695.	568.	465.	381.	312.	257.	212.	175.
24	11562.	945.	762.	615.	498.	404.	328.	267.	218.	178.	145.
25	11562.	851.	680.	545.	437.	351.	283.	228.	184.	149.	121.
26	26562.	1761.	1395.	1107.	881.	702.	560.	448.	359.	288.	232.
27	11562.	691.	542.	427.	336.	266.	210.	167.	133.	106.	84.
28	11562.	622.	484.	377.	295.	231.	181.	143.	112.	89.	70.
29	19662.	953.	735.	568.	440.	342.	266.	207.	162.	127.	99.
30	11562.	505.	386.	296.	227.	175.	135.	104.	81.	63.	49.
31	11562.	455.	345.	262.	199.	152.	116.	89.	68.	53.	41.
32	11562.	410.	308.	231.	175.	132.	100.	76.	58.	44.	34.
33	11562.	369.	275.	205.	153.	115.	86.	65.	49.	37.	28.
34	11562.	333.	245.	181.	134.	100.	74.	56.	42.	31.	23.
35	11562.	300.	219.	160.	118.	87.	64.	47.	35.	26.	20.
36	11562.	270.	196.	142.	103.	75.	55.	41.	30.	22.	16.
37	11562.	243.	175.	126.	91.	66.	48.	35.	25.	19.	14.
38	11562.	219.	156.	111.	80.	57.	41.	30.	21.	16.	11.
39	19662.	336.	237.	167.	119.	84.	60.	43.	31.	22.	16.
40	11562.	178.	124.	87.	61.	43.	31.	22.	15.	11.	8.
41	11562.	160.	111.	77.	54.	38.	26.	19.	13.	9.	7.
42	11562.	144.	99.	68.	47.	33.	23.	16.	11.	8.	5.
43	11562.	130.	88.	60.	41.	28.	20.	14.	9.	7.	5.
44	11562.	117.	79.	53.	36.	25.	17.	12.	8.	5.	4.
45	11562.	106.	71.	47.	32.	21.	15.	10.	7.	5.	3.
46	26562.	218.	145.	96.	64.	43.	29.	19.	13.	9.	6.
47	11562.	86.	56.	37.	24.	16.	11.	7.	5.	3.	2.
48	11562.	77.	50.	33.	21.	14.	9.	6.	4.	3.	2.
49	11562.	70.	45.	29.	19.	12.	8.	5.	3.	2.	2.
50	11562.	63.	40.	26.	17.	11.	7.	5.	3.	2.	1.
TOTAL	1121135.	379153.	357014.	337023.	318847.	302228.	286960.	272874.	259830.	247714.	236428.

(4)

***** CALCULATION OF INTERNAL RATE OF RETURN *****

(UNIT: THOUSAND BAHT)

DISCOUNT RATE	+++++ PRESENT WORTH +++++ BENEFIT	COST	B/C RATIO
11.00 %	562818.	379153.	1.48
12.00 %	483086.	357014.	1.35
13.00 %	417432.	337023.	1.24
14.00 %	362884.	318847.	1.14
15.00 %	317199.	302228.	1.05
16.00 %	278652.	286960.	0.97
17.00 %	245912.	272874.	0.90
18.00 %	217924.	259830.	0.84
19.00 %	193865.	247714.	0.78
20.00 %	173074.	236428.	0.73

INTERNAL RATE OF RETURN ---------- 15.6 %

Fig.A.6.4-3 Sensitivity Analysis Case-3

*** PLOT OF PW OF BENEFIT AND COST ***

Y AXIS : PRESENT WORTH VALUE

X AXIS : DISCOUNT RATE (%)

I.R.R. (*) ----- 15.6 %

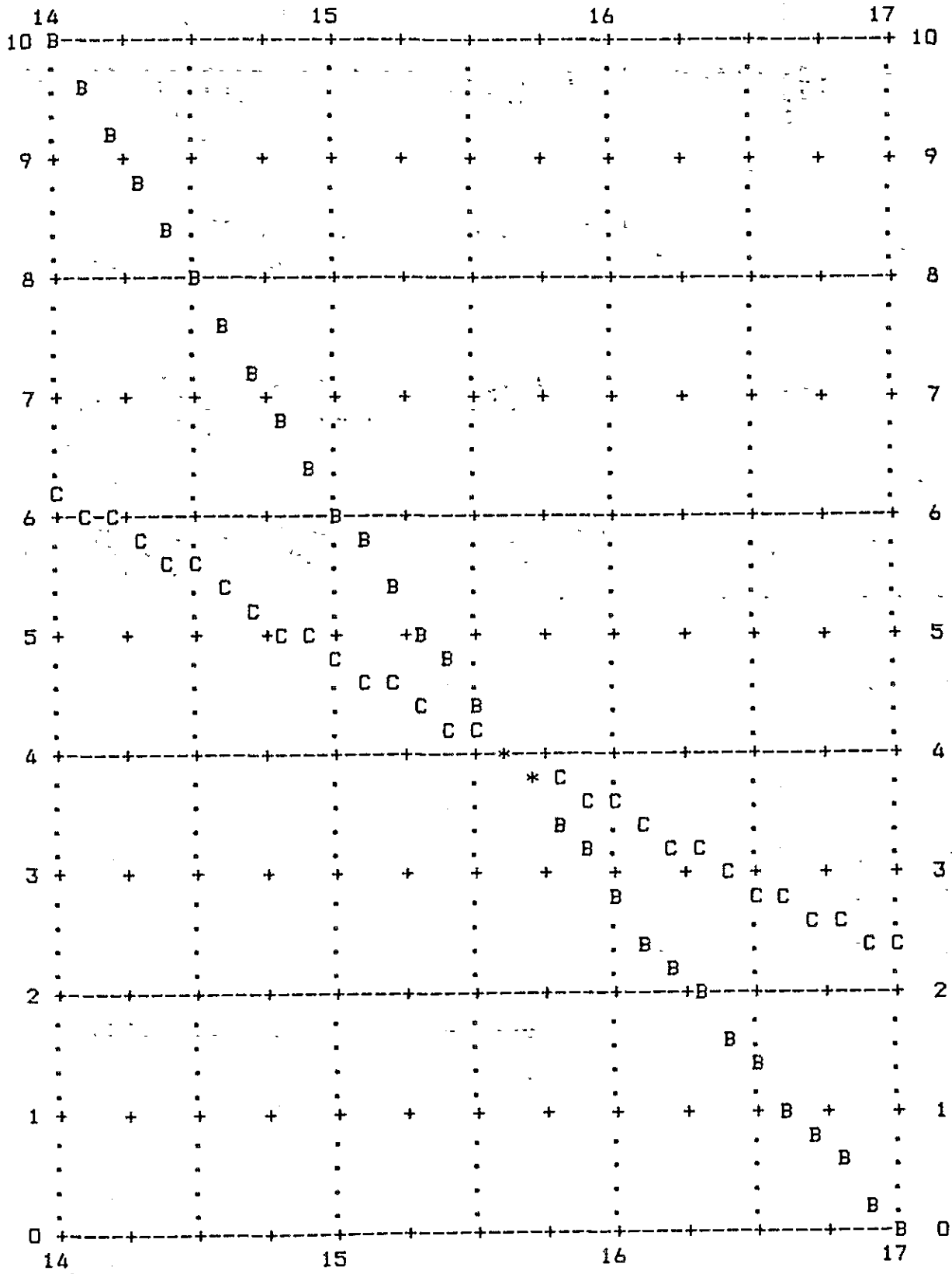

Table A.6.4-4 Sensitivity Analysis-Case-4 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST INITIAL COST	REPLACE. COST	O & M COST	TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3134	-	-	3134	-	-3134
2	15412	-	-	15412	-	-15412
3	143244	-	-	143244	-	-143244
4	97307	-	6614	103921	7836	-96085
5	121386	-	8302	129688	15465	-114223
6	94209	-	10579	104788	27402	-77386
7	73572	-	11562	85134	43836	-41298
8	-	-	11562	11562	63684	52122
9	-	-	11562	11562	81838	70276
10	-	-	11562	11562	94863	83301
11	-	-	11562	11562	101632	90070
12	-	-	11562	11562	103209	91647
13	-	-	11562	11562	103209	91647
14	-	-	11562	11562	103209	91647
15	-	-	11562	11562	103209	91647
16	-	-	11562	11562	103209	91647
17	-	8100	11562	19662	103209	83547
18	-	-	11562	11562	103209	91647
19	-	-	11562	11562	103209	91647
20	-	-	11562	11562	103209	91647
21	-	-	11562	11562	103209	91647
22	-	-	11562	11562	103209	91647
23	-	-	11562	11562	103209	91647
24	-	15000	11562	26562	103209	76647
25	-	-	11562	11562	103209	91647
26	-	-	11562	11562	103209	91647
27	-	8100	11562	19662	103209	83547
28	-	-	11562	11562	103209	91647
29	-	-	11562	11562	103209	91647
30	-	-	11562	11562	103209	91647
31	-	-	11562	11562	103209	91647
32	-	-	11562	11562	103209	91647
33	-	-	11562	11562	103209	91647
34	-	-	11562	11562	103209	91647
35	-	-	11562	11562	103209	91647
36	-	-	11562	11562	103209	91647
37	-	8100	11562	19662	103209	83547
38	-	-	11562	11562	103209	91647
39	-	-	11562	11562	103209	91647
40	-	-	11562	11562	103209	91647
41	-	-	11562	11562	103209	91647
42	-	-	11562	11562	103209	91647
43	-	-	11562	11562	103209	91647
44	-	15000	11562	26562	103209	76647
45	-	-	11562	11562	103209	91647
46	-	-	11562	11562	103209	91647
47	-	8100	11562	19662	103209	83547
48	-	-	11562	11562	103209	91647
49	-	-	11562	11562	103209	91647
50	-	-	11562	11562	103209	91647

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	7836.	5162.	4980.	4806.	4640.	4480.	4328.	4182.	4042.	3908.	3779.
5	15465.	9178.	8775.	8394.	8032.	7689.	7363.	7054.	6760.	6481.	6215.
6	27402.	14650.	13883.	13162.	12484.	11847.	11247.	10682.	10151.	9649.	9177.
7	43836.	21114.	19829.	18633.	17519.	16480.	15510.	14606.	13761.	12972.	12234.
8	63684.	27634.	25721.	23956.	22325.	20818.	19425.	18136.	16942.	15836.	14811.
9	81838.	31993.	29512.	27243.	25166.	23264.	21520.	19920.	18451.	17101.	15861.
10	94863.	33409.	30543.	27946.	25589.	23449.	21504.	19735.	18125.	16658.	15321.
11	101632.	32246.	29217.	26495.	24048.	21845.	19861.	18071.	16456.	14997.	13678.
12	103209.	29501.	26491.	23811.	21422.	19291.	17387.	15685.	14162.	12798.	11576.
13	103209.	26578.	23653.	21072.	18791.	16774.	14989.	13406.	12002.	10755.	9646.
14	103209.	23944.	21119.	18648.	16484.	14586.	12921.	11458.	10171.	9038.	8039.
15	103209.	21571.	18856.	16502.	14459.	12684.	11139.	9793.	8620.	7595.	6699.
16	103209.	19434.	16836.	14604.	12684.	11029.	9603.	8370.	7305.	6382.	5582.
17	103209.	17508.	15032.	12924.	11126.	9591.	8278.	7154.	6191.	5363.	4652.
18	103209.	15773.	13421.	11437.	9760.	8340.	7136.	6115.	5246.	4507.	3877.
19	103209.	14210.	11983.	10121.	8561.	7252.	6152.	5226.	4446.	3787.	3231.
20	103209.	12801.	10699.	8957.	7510.	6306.	5303.	4467.	3768.	3183.	2692.
21	103209.	11533.	9553.	7926.	6587.	5484.	4572.	3818.	3193.	2674.	2243.
22	103209.	10390.	8529.	7015.	5779.	4768.	3941.	3263.	2706.	2247.	1870.
23	103209.	9360.	7616.	6208.	5069.	4146.	3398.	2789.	2293.	1889.	1558.
24	103209.	8433.	6800.	5493.	4446.	3606.	2929.	2384.	1943.	1587.	1298.
25	103209.	7597.	6071.	4861.	3900.	3135.	2525.	2037.	1647.	1334.	1082.
26	103209.	6844.	5421.	4302.	3421.	2726.	2177.	1741.	1396.	1121.	902.
27	103209.	6166.	4840.	3807.	3001.	2371.	1877.	1488.	1183.	942.	751.
28	103209.	5555.	4321.	3369.	2633.	2061.	1618.	1272.	1002.	791.	626.
29	103209.	5004.	3858.	2982.	2309.	1793.	1395.	1087.	849.	665.	522.
30	103209.	4509.	3445.	2639.	2026.	1559.	1202.	929.	720.	559.	435.
31	103209.	4062.	3076.	2335.	1777.	1355.	1036.	794.	610.	470.	362.
32	103209.	3659.	2746.	2066.	1559.	1179.	893.	679.	517.	395.	302.
33	103209.	3297.	2452.	1829.	1367.	1025.	770.	580.	438.	332.	252.
34	103209.	2970.	2189.	1618.	1199.	891.	664.	496.	371.	279.	210.
35	103209.	2676.	1955.	1432.	1052.	775.	572.	424.	315.	234.	175.
36	103209.	2410.	1745.	1267.	923.	674.	493.	362.	267.	197.	146.
37	103209.	2172.	1558.	1122.	810.	586.	425.	310.	226.	165.	121.
38	103209.	1956.	1391.	993.	710.	510.	367.	265.	192.	139.	101.
39	103209.	1762.	1242.	878.	623.	443.	316.	226.	162.	117.	84.
40	103209.	1588.	1109.	777.	546.	385.	273.	193.	138.	98.	70.
41	103209.	1430.	990.	688.	479.	335.	235.	165.	117.	82.	59.
42	103209.	1289.	884.	609.	420.	291.	203.	141.	99.	69.	49.
43	103209.	1161.	789.	539.	369.	253.	175.	121.	84.	58.	41.
44	103209.	1046.	705.	477.	324.	220.	151.	103.	71.	49.	34.
45	103209.	942.	629.	422.	284.	192.	130.	88.	60.	41.	28.
46	103209.	849.	562.	373.	249.	167.	112.	75.	51.	35.	24.
47	103209.	765.	502.	330.	218.	145.	96.	64.	43.	29.	20.
48	103209.	689.	448.	292.	192.	126.	83.	55.	37.	24.	16.
49	103209.	621.	400.	259.	168.	110.	72.	47.	31.	21.	14.
50	103209.	559.	357.	229.	147.	95.	62.	40.	26.	17.	11.
TOTAL	4461707.	467999.	406734.	355846.	313186.	277130.	246426.	220100.	197384.	177670.	160471.

(3)

*** PRESENT WORTH OF COST ***

(UNIT: THOUSAND BAHT)

YEAR	C.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	3134.	2823.	2798.	2773.	2749.	2725.	2702.	2679.	2656.	2634.	2612.
2	15412.	12509.	12286.	12070.	11859.	11654.	11454.	11259.	11069.	10883.	10703.
3	143244.	104739.	101958.	99276.	96686.	94185.	91770.	89438.	87183.	85003.	82896.
4	103921.	68456.	66044.	63737.	61530.	59417.	57395.	55458.	53601.	51822.	50116.
5	129688.	76964.	73589.	70390.	67356.	64478.	61746.	59152.	56688.	54346.	52119.
6	104788.	56024.	53089.	50332.	47740.	45303.	43009.	40851.	38817.	36900.	35093.
7	85134.	41006.	38510.	36187.	34023.	32005.	30123.	28366.	26726.	25193.	23759.
8	11562.	5017.	4670.	4349.	4053.	3780.	3527.	3293.	3076.	2875.	2689.
9	11562.	4520.	4169.	3849.	3555.	3287.	3040.	2814.	2607.	2416.	2241.
10	11562.	4072.	3723.	3406.	3119.	2858.	2621.	2405.	2209.	2030.	1867.
11	11562.	3668.	3324.	3014.	2736.	2485.	2259.	2056.	1872.	1706.	1556.
12	11562.	3305.	2968.	2667.	2400.	2161.	1948.	1757.	1587.	1434.	1297.
13	11562.	2977.	2650.	2361.	2105.	1879.	1679.	1502.	1345.	1205.	1081.
14	11562.	2682.	2366.	2089.	1847.	1634.	1448.	1284.	1139.	1012.	901.
15	11562.	2417.	2112.	1849.	1620.	1421.	1248.	1097.	966.	851.	750.
16	11562.	2177.	1886.	1636.	1421.	1236.	1076.	938.	818.	715.	625.
17	19662.	3335.	2864.	2462.	2120.	1827.	1577.	1363.	1179.	1022.	886.
18	11562.	1767.	1504.	1281.	1093.	934.	799.	685.	588.	505.	434.
19	11562.	1592.	1342.	1134.	959.	812.	689.	585.	498.	424.	362.
20	11562.	1434.	1199.	1003.	841.	706.	594.	500.	422.	357.	302.
21	11562.	1292.	1070.	888.	738.	614.	512.	428.	358.	300.	251.
22	11562.	1164.	956.	786.	647.	534.	442.	366.	303.	252.	209.
23	11562.	1049.	853.	695.	568.	465.	381.	312.	257.	212.	175.
24	26562.	2170.	1750.	1414.	1144.	928.	754.	613.	500.	408.	334.
25	11562.	851.	680.	545.	437.	351.	283.	228.	184.	149.	121.
26	11562.	767.	607.	482.	383.	305.	244.	195.	156.	126.	101.
27	19662.	1175.	922.	725.	572.	452.	357.	284.	225.	179.	143.
28	11562.	622.	484.	377.	295.	231.	181.	143.	112.	89.	70.
29	11562.	561.	432.	334.	259.	201.	156.	122.	95.	75.	58.
30	11562.	505.	386.	296.	227.	175.	135.	104.	81.	63.	49.
31	11562.	455.	345.	262.	199.	152.	116.	89.	68.	53.	41.
32	11562.	410.	308.	231.	175.	132.	100.	76.	58.	44.	34.
33	11562.	369.	275.	205.	153.	115.	86.	65.	49.	37.	28.
34	11562.	333.	245.	181.	134.	100.	74.	56.	42.	31.	23.
35	11562.	300.	219.	160.	118.	87.	64.	47.	35.	26.	20.
36	11562.	270.	196.	142.	103.	75.	55.	41.	30.	22.	16.
37	19662.	414.	297.	214.	154.	112.	81.	59.	43.	32.	23.
38	11562.	219.	156.	111.	80.	57.	41.	30.	21.	16.	11.
39	11562.	197.	139.	98.	70.	50.	35.	25.	18.	13.	9.
40	11562.	178.	124.	87.	61.	43.	31.	22.	15.	11.	8.
41	11562.	160.	111.	77.	54.	38.	26.	19.	13.	9.	7.
42	11562.	144.	99.	68.	47.	33.	23.	16.	11.	8.	5.
43	11562.	130.	88.	60.	41.	28.	20.	14.	9.	7.	5.
44	26562.	269.	181.	123.	83.	57.	39.	27.	18.	13.	9.
45	11562.	106.	71.	47.	32.	21.	15.	10.	7.	5.	3.
46	11562.	95.	63.	42.	28.	19.	13.	8.	6.	4.	3.
47	19662.	146.	96.	63.	42.	28.	18.	12.	8.	6.	4.
48	11562.	77.	50.	33.	21.	14.	9.	6.	4.	3.	2.
49	11562.	70.	45.	29.	19.	12.	8.	5.	3.	2.	2.
50	11562.	63.	40.	26.	17.	11.	7.	5.	3.	2.	1.
TOTAL	1144887.	416043.	394335.	374665.	356711.	340224.	325008.	310904.	297779.	285525.	274053.

(4)

***** CALCULATION OF INTERNAL RATE OF RETURN *****

(UNIT: THOUSAND BAHT)

DISCOUNT RATE	+++++ PRESENT WORTH BENEFIT	+++++ COST	B/C RATIO
11.00 %	467999.	416043.	1.12
12.00 %	406734.	394335.	1.03
13.00 %	355846.	374665.	0.95
14.00 %	313186.	356711.	0.88
15.00 %	277130.	340224.	0.81
16.00 %	246426.	325008.	0.76
17.00 %	220100.	310904.	0.71
18.00 %	197384.	297779.	0.66
19.00 %	177670.	285525.	0.62
20.00 %	160471.	274053.	0.59

INTERNAL RATE OF RETURN ---------- 12.4 %

Fig.A.6.4-4 Sensitivity Analysis Case-4

*** PLOT OF PW OF BENEFIT AND COST ***

Y AXIS : PRESENT WORTH VALUE

X AXIS : DISCOUNT RATE (%)

I.R.R. (*) ----- 12.4 %

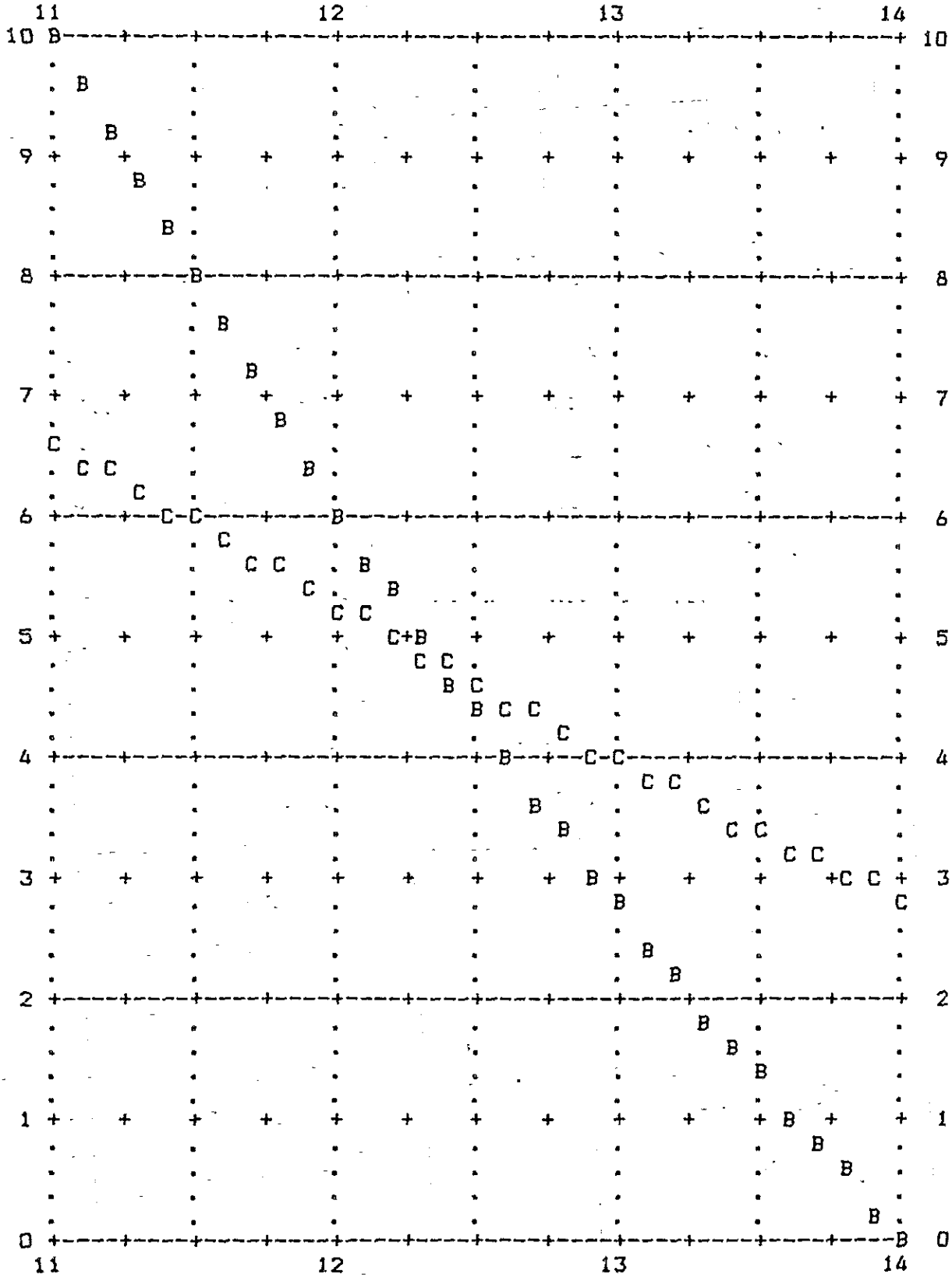

Table A.6.4-5 Sensitivity Analysis-Case-5 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST INITIAL COST	REPLACE. COST	O & M COST	TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3134	-	-	3134	-	-3134
2	15412	-	-	15412	-	-15412
3	143244	-	-	143244	-	-143244
4	97307	-	6614	103921	9236	-94685
5	121386	-	8302	129688	18905	-110783
6	94209	-	10579	104788	34417	-70371
7	73572	-	11562	85134	55482	-29652
8	-	-	11562	11562	80616	69054
9	-	-	11562	11562	103595	92033
10	-	-	11562	11562	120082	108520
11	-	-	11562	11562	128649	117087
12	-	-	11562	11562	130644	119082
13	-	-	11562	11562	130644	119082
14	-	-	11562	11562	130644	119082
15	-	-	11562	11562	130644	119082
16	-	-	11562	11562	130644	119082
17	-	8100	11562	19662	130644	110982
18	-	-	11562	11562	130644	119082
19	-	-	11562	11562	130644	119082
20	-	-	11562	11562	130644	119082
21	-	-	11562	11562	130644	119082
22	-	-	11562	11562	130644	119082
23	-	-	11562	11562	130644	119082
24	-	15000	11562	26562	130644	104082
25	-	-	11562	11562	130644	119082
26	-	-	11562	11562	130644	119082
27	-	8100	11562	19662	130644	110982
28	-	-	11562	11562	130644	119082
29	-	-	11562	11562	130644	119082
30	-	-	11562	11562	130644	119082
31	-	-	11562	11562	130644	119082
32	-	-	11562	11562	130644	119082
33	-	-	11562	11562	130644	119082
34	-	-	11562	11562	130644	119082
35	-	-	11562	11562	130644	119082
36	-	-	11562	11562	130644	119082
37	-	8100	11562	19662	130644	110982
38	-	-	11562	11562	130644	119082
39	-	-	11562	11562	130644	119082
40	-	-	11562	11562	130644	119082
41	-	-	11562	11562	130644	119082
42	-	-	11562	11562	130644	119082
43	-	-	11562	11562	130644	119082
44	-	15000	11562	26562	130644	104082
45	-	-	11562	11562	130644	119082
46	-	-	11562	11562	130644	119082
47	-	8100	11562	19662	130644	110982
48	-	-	11562	11562	130644	119082
49	-	-	11562	11562	130644	119082
50	-	-	11562	11562	130644	119082

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	9236.	6084.	5870.	5665.	5468.	5281.	5101.	4929.	4764.	4606.	4454.
5	18905.	11219.	10727.	10261.	9819.	9399.	9001.	8623.	8264.	7922.	7598.
6	34417.	18401.	17437.	16531.	15680.	14879.	14126.	13417.	12749.	12120.	11526.
7	55482.	24723.	25097.	23583.	22173.	20858.	19631.	18486.	17417.	16418.	15484.
8	80616.	34982.	32559.	30325.	28261.	26354.	24590.	22958.	21447.	20047.	18749.
9	103595.	40498.	37357.	34485.	31856.	29448.	27241.	25216.	23356.	21648.	20077.
10	120082.	42291.	38663.	35375.	32392.	29683.	27221.	24982.	22944.	21087.	19394.
11	128649.	40818.	36984.	33539.	30441.	27652.	25140.	22875.	20831.	18984.	17315.
12	130644.	37344.	33533.	30141.	27117.	24418.	22009.	19855.	17927.	16200.	14653.
13	130644.	33643.	29940.	26673.	23786.	21233.	18973.	16970.	15192.	13614.	12211.
14	130644.	30309.	26732.	23605.	20865.	18464.	16356.	14504.	12875.	11440.	10175.
15	130644.	27305.	23868.	20889.	18303.	16056.	14100.	12397.	10911.	9614.	8480.
16	130644.	24599.	21311.	18486.	16055.	13961.	12155.	10595.	9247.	8079.	7066.
17	130644.	22162.	19028.	16359.	14084.	12140.	10479.	9056.	7836.	6789.	5889.
18	130644.	19965.	16989.	14477.	12354.	10557.	9033.	7740.	6641.	5705.	4907.
19	130644.	17987.	15169.	12812.	10837.	9180.	7787.	6616.	5628.	4794.	4089.
20	130644.	16204.	13543.	11338.	9506.	7982.	6713.	5654.	4769.	4029.	3408.
21	130644.	14599.	12092.	10033.	8339.	6941.	5787.	4833.	4042.	3385.	2840.
22	130644.	13152.	10797.	8879.	7315.	6036.	4989.	4131.	3425.	2845.	2366.
23	130644.	11849.	9640.	7858.	6416.	5249.	4301.	3530.	2903.	2391.	1972.
24	130644.	10674.	8607.	6954.	5628.	4564.	3708.	3017.	2460.	2009.	1643.
25	130644.	9617.	7685.	6154.	4937.	3969.	3196.	2579.	2085.	1688.	1369.
26	130644.	8664.	6862.	5446.	4331.	3451.	2755.	2204.	1767.	1419.	1141.
27	130644.	7805.	6126.	4819.	3799.	3001.	2375.	1884.	1497.	1192.	951.
28	130644.	7032.	5470.	4265.	3332.	2609.	2048.	1610.	1269.	1002.	793.
29	130644.	6335.	4884.	3774.	2923.	2269.	1765.	1376.	1075.	842.	660.
30	130644.	5707.	4361.	3340.	2564.	1973.	1522.	1176.	911.	707.	550.
31	130644.	5141.	3893.	2956.	2249.	1716.	1312.	1005.	772.	594.	459.
32	130644.	4632.	3476.	2616.	1973.	1492.	1131.	859.	654.	500.	382.
33	130644.	4173.	3104.	2315.	1731.	1297.	975.	734.	555.	420.	319.
34	130644.	3759.	2771.	2048.	1518.	1128.	840.	628.	470.	353.	265.
35	130644.	3387.	2474.	1813.	1332.	981.	725.	537.	398.	296.	221.
36	130644.	3051.	2209.	1604.	1168.	853.	625.	459.	338.	249.	184.
37	130644.	2749.	1973.	1420.	1025.	742.	538.	392.	286.	209.	154.
38	130644.	2476.	1761.	1256.	899.	645.	464.	335.	242.	176.	128.
39	130644.	2231.	1572.	1112.	789.	561.	400.	286.	205.	148.	107.
40	130644.	2010.	1404.	984.	692.	488.	345.	245.	174.	124.	89.
41	130644.	1811.	1254.	871.	607.	424.	297.	209.	148.	104.	74.
42	130644.	1631.	1119.	771.	532.	369.	256.	179.	125.	88.	62.
43	130644.	1470.	999.	682.	467.	321.	221.	153.	106.	74.	51.
44	130644.	1324.	892.	603.	410.	279.	191.	131.	90.	62.	43.
45	130644.	1193.	797.	534.	359.	242.	164.	112.	76.	52.	36.
46	130644.	1075.	711.	473.	315.	211.	142.	95.	64.	44.	30.
47	130644.	968.	635.	418.	276.	183.	122.	82.	55.	37.	25.
48	130644.	872.	567.	370.	242.	159.	105.	70.	46.	31.	21.
49	130644.	786.	506.	328.	213.	139.	91.	60.	39.	26.	17.
50	130644.	708.	452.	290.	187.	121.	78.	51.	33.	22.	14.
TOTAL	5646098.	591411.	513902.	449526.	395562.	349957.	311124.	277833.	249107.	224182.	202439.

(3)

*** PRESENT WORTH OF COST ***

(UNIT: THOUSAND BAHT)

YEAR	C.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	3134.	2823.	2798.	2773.	2749.	2725.	2702.	2679.	2656.	2634.	2612.
2	15412.	12509.	12286.	12070.	11859.	11654.	11454.	11259.	11069.	10883.	10703.
3	143244.	104739.	101958.	99276.	96686.	94185.	91770.	89438.	87183.	85003.	82896.
4	103921.	68456.	66044.	63737.	61530.	59417.	57395.	55458.	53601.	51822.	50116.
5	129688.	76964.	73589.	70390.	67356.	64478.	61746.	59152.	56688.	54346.	52119.
6	104788.	56024.	53089.	50332.	47740.	45303.	43009.	40851.	38817.	36900.	35093.
7	85134.	41006.	38510.	36187.	34023.	32005.	30123.	28366.	26726.	25193.	23759.
8	11562.	5017.	4670.	4349.	4053.	3780.	3527.	3293.	3076.	2875.	2689.
9	11562.	4520.	4169.	3849.	3555.	3287.	3040.	2814.	2607.	2416.	2241.
10	11562.	4072.	3723.	3406.	3119.	2858.	2621.	2405.	2209.	2030.	1867.
11	11562.	3668.	3324.	3014.	2736.	2485.	2259.	2056.	1872.	1706.	1556.
12	11562.	3305.	2968.	2667.	2400.	2161.	1948.	1757.	1587.	1434.	1297.
13	11562.	2977.	2650.	2361.	2105.	1879.	1679.	1502.	1345.	1205.	1081.
14	11562.	2682.	2366.	2089.	1847.	1634.	1448.	1284.	1139.	1012.	901.
15	11562.	2417.	2112.	1849.	1620.	1421.	1248.	1097.	966.	851.	750.
16	11562.	2177.	1886.	1636.	1421.	1236.	1076.	938.	818.	715.	625.
17	19662.	3335.	2864.	2462.	2120.	1827.	1577.	1363.	1179.	1022.	886.
18	11562.	1767.	1504.	1281.	1093.	934.	799.	685.	588.	505.	434.
19	11562.	1592.	1342.	1134.	959.	812.	689.	585.	498.	424.	362.
20	11562.	1434.	1199.	1003.	841.	706.	594.	500.	422.	357.	302.
21	11562.	1292.	1070.	888.	738.	614.	512.	428.	358.	300.	251.
22	11562.	1164.	956.	786.	647.	534.	442.	366.	303.	252.	209.
23	11562.	1049.	853.	695.	568.	465.	381.	312.	257.	212.	175.
24	26562.	2170.	1750.	1414.	1144.	928.	754.	613.	500.	408.	334.
25	11562.	851.	680.	545.	437.	351.	283.	228.	184.	149.	121.
26	11562.	767.	607.	482.	383.	305.	244.	195.	156.	126.	101.
27	19662.	1175.	922.	725.	572.	452.	357.	284.	225.	179.	143.
28	11562.	622.	484.	377.	295.	231.	181.	143.	112.	89.	70.
29	11562.	561.	432.	334.	259.	201.	156.	122.	95.	75.	58.
30	11562.	505.	386.	296.	227.	175.	135.	104.	81.	63.	49.
31	11562.	455.	345.	262.	199.	152.	116.	89.	68.	53.	41.
32	11562.	410.	308.	231.	175.	132.	100.	76.	58.	44.	34.
33	11562.	369.	275.	205.	153.	115.	86.	65.	49.	37.	28.
34	11562.	333.	245.	181.	134.	100.	74.	56.	42.	31.	23.
35	11562.	300.	219.	160.	118.	87.	64.	47.	35.	26.	20.
36	11562.	270.	196.	142.	103.	75.	55.	41.	30.	22.	16.
37	19662.	414.	297.	214.	154.	112.	81.	59.	43.	32.	23.
38	11562.	219.	156.	111.	80.	57.	41.	30.	21.	16.	11.
39	11562.	197.	139.	98.	70.	50.	35.	25.	18.	13.	9.
40	11562.	178.	124.	87.	61.	43.	31.	22.	15.	11.	8.
41	11562.	160.	111.	77.	54.	38.	26.	19.	13.	9.	7.
42	11562.	144.	99.	68.	47.	33.	23.	16.	11.	8.	5.
43	11562.	130.	88.	60.	41.	28.	20.	14.	9.	7.	5.
44	26562.	269.	181.	123.	83.	57.	39.	27.	18.	13.	9.
45	11562.	106.	71.	47.	32.	21.	15.	10.	7.	5.	3.
46	11562.	95.	63.	42.	28.	19.	13.	8.	6.	4.	3.
47	19662.	146.	96.	63.	42.	28.	18.	12.	8.	6.	4.
48	11562.	77.	50.	33.	21.	14.	9.	6.	4.	3.	2.
49	11562.	70.	45.	29.	19.	12.	8.	5.	3.	2.	2.
50	11562.	63.	40.	26.	17.	11.	7.	5.	3.	2.	1.
TOTAL	1144887.	416043.	394335.	374665.	356711.	340224.	325008.	310904.	297779.	285525.	274053.

(4)

***** CALCULATION OF INTERNAL RATE OF RETURN *****

(UNIT: THOUSAND BAHT)

DISCOUNT RATE	+++++ PRESENT WORTH +++++ BENEFIT	COST	B/C RATIO
11.00 %	591411.	416043.	1.42
12.00 %	513902.	394335.	1.30
13.00 %	449526.	374665.	1.20
14.00 %	395562.	356711.	1.11
15.00 %	349957.	340224.	1.03
16.00 %	311124.	325008.	0.96
17.00 %	277833.	310904.	0.89
18.00 %	249107.	297779.	0.84
19.00 %	224182.	285525.	0.79
20.00 %	202439.	274053.	0.74

INTERNAL RATE OF RETURN ---------- 15.4 %

Fig.A.6.4-5 Sensitivity Analysis Case-5

*** PLOT OF PW OF BENEFIT AND COST ***

Y AXIS : PRESENT WORTH VALUE

X AXIS : DISCOUNT RATE (%)

I.R.R. (*) ----- 15.4 %

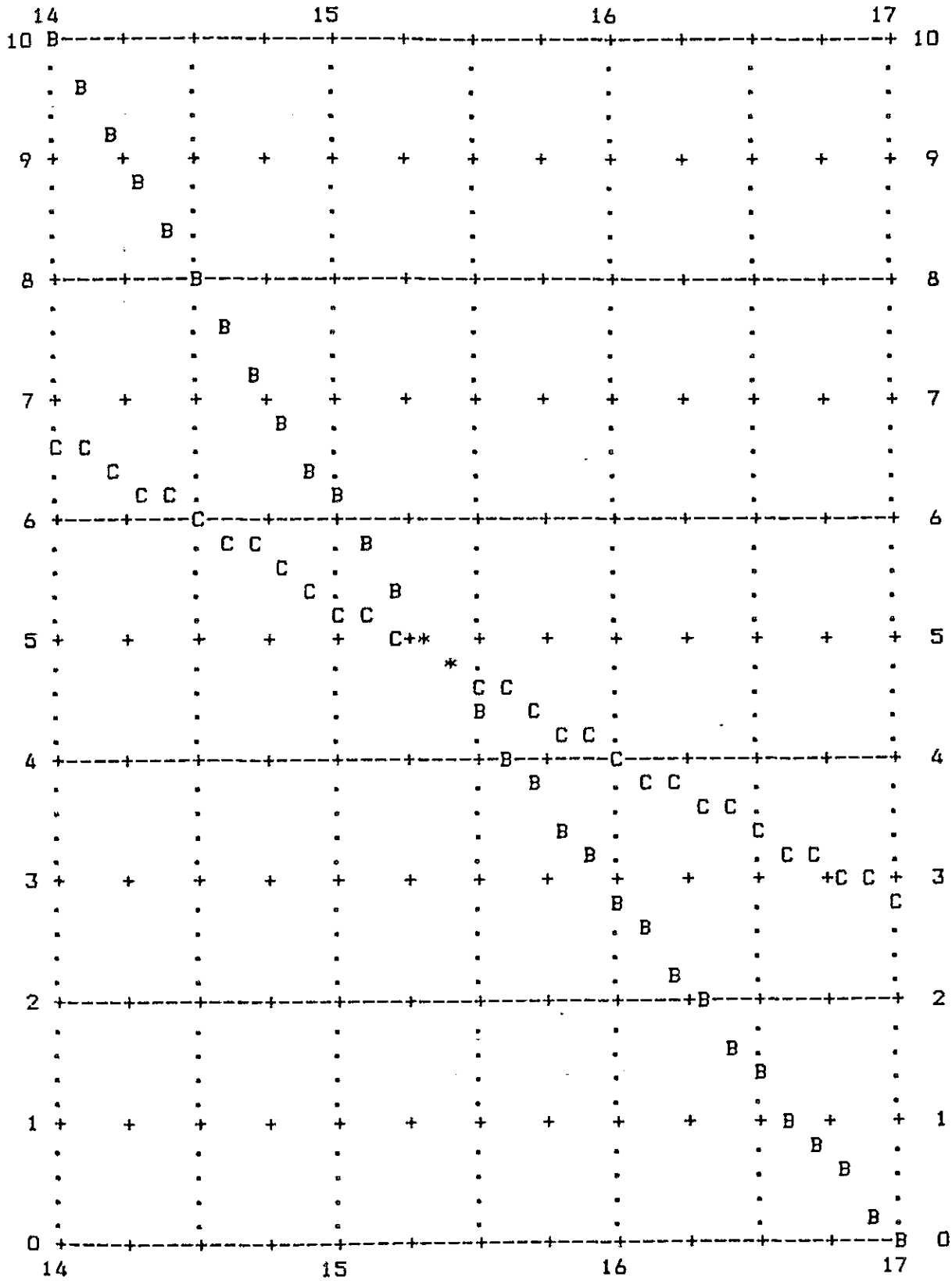

Table A.6.4-6 Sensitivity Analysis-Case-6 (1)

***** STREAMS OF PROJECT COST AND BENEFIT *****

(UNIT: THOUSAND BAHT)

PROJECT YEAR	PROJECT COST INITIAL COST	PROJECT COST REPLACE. COST	PROJECT COST O & M COST	PROJECT COST TOTAL	PROJECT BENEFIT	NET BENEFIT
1	3134	-	-	3134	-	-3134
2	15412	-	-	15412	-	-15412
3	143244	-	-	143244	-	-143244
4	97307	-	6614	103921	8210	-95711
5	121386	-	8302	129688	16804	-112884
6	94209	-	10579	104788	30593	-74195
7	73572	-	11562	85134	49318	-35816
8	-	-	11562	11562	71658	60096
9	-	-	11562	11562	92084	80522
10	-	-	11562	11562	106739	95177
11	-	-	11562	11562	114354	102792
12	-	-	11562	11562	116128	104566
13	-	-	11562	11562	116128	104566
14	-	-	11562	11562	116128	104566
15	-	-	11562	11562	116128	104566
16	-	-	11562	11562	116128	104566
17	-	8100	11562	19662	116128	96466
18	-	-	11562	11562	116128	104566
19	-	-	11562	11562	116128	104566
20	-	-	11562	11562	116128	104566
21	-	-	11562	11562	116128	104566
22	-	-	11562	11562	116128	104566
23	-	-	11562	11562	116128	104566
24	-	15000	11562	26562	116128	89566
25	-	-	11562	11562	116128	104566
26	-	-	11562	11562	116128	104566
27	-	8100	11562	19662	116128	96466
28	-	-	11562	11562	116128	104566
29	-	-	11562	11562	116128	104566
30	-	-	11562	11562	116128	104566
31	-	-	11562	11562	116128	104566
32	-	-	11562	11562	116128	104566
33	-	-	11562	11562	116128	104566
34	-	-	11562	11562	116128	104566
35	-	-	11562	11562	116128	104566
36	-	-	11562	11562	116128	104566
37	-	8100	11562	19662	116128	96466
38	-	-	11562	11562	116128	104566
39	-	-	11562	11562	116128	104566
40	-	-	11562	11562	116128	104566
41	-	-	11562	11562	116128	104566
42	-	-	11562	11562	116128	104566
43	-	-	11562	11562	116128	104566
44	-	15000	11562	26562	116128	89566
45	-	-	11562	11562	116128	104566
46	-	-	11562	11562	116128	104566
47	-	8100	11562	19662	116128	96466
48	-	-	11562	11562	116128	104566
49	-	-	11562	11562	116128	104566
50	-	-	11562	11562	116128	104566

(2)

*** PRESENT WORTH OF BENEFIT ***

(UNIT: THOUSAND BAHT)

YEAR	B.STREAM	11.00 %	12.00 %	13.00 %	14.00 %	15.00 %	16.00 %	17.00 %	18.00 %	19.00 %	20.00 %
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	8210.	5408.	5218.	5035.	4861.	4694.	4534.	4381.	4235.	4094.	3959.
5	16804.	9972.	9535.	9121.	8727.	8355.	8001.	7665.	7345.	7042.	6753.
6	30593.	16356.	15499.	14694.	13938.	13226.	12557.	11926.	11333.	10773.	10246.
7	49318.	23754.	22309.	20963.	19709.	18541.	17450.	16433.	15482.	14594.	13764.
8	71658.	31094.	28941.	26955.	25120.	23425.	21858.	20407.	19064.	17819.	16665.
9	92084.	35998.	33206.	30654.	28317.	26176.	24214.	22414.	20761.	19243.	17847.
10	106739.	37592.	34367.	31444.	28792.	26384.	24196.	22206.	20394.	18744.	17239.
11	114354.	36283.	32874.	29812.	27058.	24580.	22347.	20333.	18516.	16875.	15391.
12	116128.	33194.	29807.	26792.	24104.	21705.	19563.	17649.	15935.	14400.	13025.
13	116128.	29905.	26614.	23709.	21144.	18874.	16865.	15084.	13504.	12101.	10854.
14	116128.	26941.	23762.	20982.	18547.	16412.	14539.	12893.	11444.	10169.	9045.
15	116128.	24271.	21216.	18568.	16269.	14272.	12533.	11019.	9699.	8545.	7537.
16	116128.	21866.	18943.	16432.	14271.	12410.	10805.	9418.	8219.	7181.	6281.
17	116128.	19699.	16913.	14541.	12519.	10791.	9314.	8050.	6965.	6035.	5234.
18	116128.	17747.	15101.	12869.	10981.	9384.	8030.	6880.	5903.	5071.	4362.
19	116128.	15988.	13483.	11388.	9633.	8160.	6922.	5880.	5002.	4261.	3635.
20	116128.	14404.	12039.	10078.	8450.	7096.	5967.	5026.	4239.	3581.	3029.
21	116128.	12976.	10749.	8919.	7412.	6170.	5144.	4296.	3593.	3009.	2524.
22	116128.	11691.	9597.	7893.	6502.	5365.	4435.	3672.	3045.	2529.	2104.
23	116128.	10532.	8569.	6985.	5703.	4665.	3823.	3138.	2580.	2125.	1753.
24	116128.	9488.	7651.	6181.	5003.	4057.	3296.	2682.	2187.	1786.	1461.
25	116128.	8548.	6831.	5470.	4389.	3528.	2841.	2292.	1853.	1501.	1217.
26	116128.	7701.	6099.	4841.	3850.	3068.	2449.	1959.	1570.	1261.	1014.
27	116128.	6938.	5446.	4284.	3377.	2667.	2111.	1675.	1331.	1060.	845.
28	116128.	6250.	4862.	3791.	2962.	2320.	1820.	1431.	1128.	890.	704.
29	116128.	5631.	4341.	3355.	2598.	2017.	1569.	1223.	956.	748.	587.
30	116128.	5073.	3876.	2969.	2279.	1754.	1353.	1046.	810.	629.	489.
31	116128.	4570.	3461.	2627.	1999.	1525.	1166.	894.	686.	528.	408.
32	116128.	4117.	3090.	2325.	1754.	1326.	1005.	764.	582.	444.	340.
33	116128.	3709.	2759.	2058.	1538.	1153.	867.	653.	493.	373.	283.
34	116128.	3342.	2463.	1821.	1350.	1003.	747.	558.	418.	314.	236.
35	116128.	3010.	2199.	1611.	1184.	872.	644.	477.	354.	264.	197.
36	116128.	2712.	1964.	1426.	1038.	758.	555.	408.	300.	221.	164.
37	116128.	2443.	1753.	1262.	911.	659.	479.	348.	254.	186.	137.
38	116128.	2201.	1566.	1117.	799.	573.	413.	298.	215.	156.	114.
39	116128.	1983.	1398.	988.	701.	499.	356.	255.	183.	131.	95.
40	116128.	1787.	1248.	875.	615.	434.	307.	218.	155.	110.	79.
41	116128.	1610.	1114.	774.	539.	377.	264.	186.	131.	93.	66.
42	116128.	1450.	995.	685.	473.	328.	228.	159.	111.	78.	55.
43	116128.	1306.	888.	606.	415.	285.	196.	136.	94.	66.	46.
44	116128.	1177.	793.	536.	364.	248.	169.	116.	80.	55.	38.
45	116128.	1060.	708.	475.	319.	216.	146.	99.	68.	46.	32.
46	116128.	955.	632.	420.	280.	187.	126.	85.	57.	39.	26.
47	116128.	861.	565.	372.	246.	163.	108.	72.	49.	33.	22.
48	116128.	775.	504.	329.	216.	142.	94.	62.	41.	27.	18.
49	116128.	698.	450.	291.	189.	123.	81.	53.	35.	23.	15.
50	116128.	629.	402.	258.	166.	107.	70.	45.	30.	19.	13.
TOTAL	5018752.	525698.	456801.	399578.	351610.	311072.	276554.	246962.	221428.	199272.	179946.