

**TABLES**

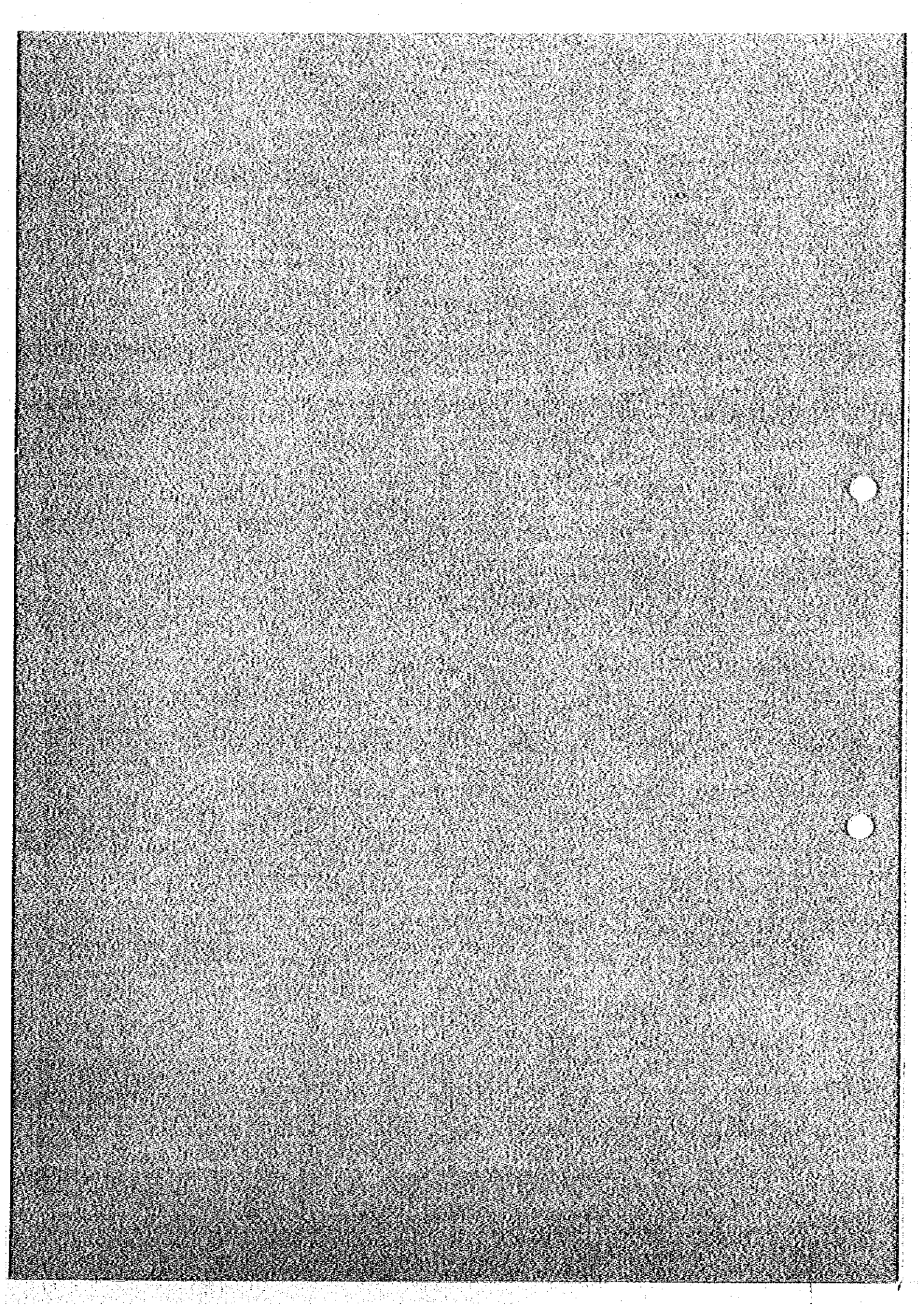




Table 1 ECONOMIC TARGETS OF FIFTH NATIONAL PLAN

Description	Unit	Fourth Plan (1977-1981)	Fifth Plan (1982-1986)
<b>Trade deficit</b>			
Average annual value	฿10 <sup>6</sup>	45,300	78,400
Trade deficit/GDP	%	7.6	5.9
<b>Current account deficit</b>			
Average annual value	฿10 <sup>6</sup>	37,400	53,000
Current account deficit/GDP	%	6.3	4.1
<b>Export of goods</b>			
Growth in value	%/yr	21.9	22.3
Growth in volume	%/yr	10.5	11.3
<b>Import of goods</b>			
Growth in value	%/yr	26.3	18.1
Growth in volume	%/yr	10.9	7.2
<b>Economic growth</b>			
GDP	%/yr	7.3	6.6
Agriculture	%/yr	3.5	4.5
Manufacturing	%/yr	9.3	7.6
Mining	%/yr	12.6	16.4
Population growth	%/yr	2.1	1.5

Data Source: NESDB

Table 2 INFRASTRUCTURE DEVELOPMENT PLAN

Infrastructure	Facilities	Construction Period
Ports	Sattahip: rehabilitation	1983 - 1984
	Sattahip: two new berths	1983 - 1986
	Sattahip: four new berths	1984 - 1990
	Laem Chabang: breakwater, etc.	1987 - 1988
	Laem Chabang: four new berths	1988 - 1992
	Sattahip or Laem Chabang: four new berths	1993 - 1997
Railway	Chachoengsao - Sattahip	1981 - 1983
	Sattahip - Map Ta Phut	1983 - 1985
	North East link	1983 - 1985
	Laem Chabang spur	1989 - 1991
Road <sup>/1</sup>	Sattahip - Rayong: upgrading	1985 - 1986
	Rayong bypass: extension	1985 - 1986
	Pattaya - Sattahip: upgrading	1985 - 1986
	Pattaya spur road: development	1985 - 1986
	Map Ta Phut - Route 319: upgrading	1986 - 1987
	Chon Buri - Pattaya: improvement	1986 - 1987
	Chon Buri bypass: upgrading	1986 - 1988
	Route 314: upgrading	1987 - 1990
	Chon Buri - Pattaya: upgrading	1989 - 1990
	Route 315: improvement	1990 - 1991
	Laem Chabang urban road	1990 - 1991
	Pattaya - Sattahip: improvement	1991 - 1995
	Siracha - Laem Chabang bypass	1991 - 1998
Water Supply <sup>/2</sup>	Dok Krai dam: extension	1982 - 1984
	Dok Krai - Map Ta Phut pipeline	1982 - 1984
	Nong Pla Lai dam	1983 - 1986
	Map Ta Phut - Sattahip pipeline	1983 - 1986
	Treatment works	1983 - 1984
	Map Ta Phut - Sattahip - Ban Phe pipeline	1985 - 1988
	Dok Krai - Laem Chabang - Map Prachan pipeline	1989 - 1991
	Thap Ma dam and pipeline	1992 - 1994
Electricity	Substation 3 at Rayong	1983
	Line from Substation 2 at Rayong	1983
	Substation at Laem Chabang	1991
	Ao Phai - Laem Chabang line	1991
Telephones	Map Ta Phut exchange	1985
	Laem Chabang exchange	1985
Telex	Map Ta Phut/Rayong/Sattahip exchange	1985

/1: Initial programme

/2: Phase I

Data Source: ESS

Table 3 PROJECTED POPULATION AND DOMESTIC WATER DEMAND

Year	Description	Unit	1	2	3	4	5	6	7	8	9	10	Total	
1986	Population	103	310.4	154.6	14.8	112.9	82.1	18.3	113.5	17.8	25.7	188.0	1,038.1	
	Urban	103	35.8	148.2	0	59.1	64.0	14.1	21.5	15.1	13.3	48.2	419.3	
	Rural	103	274.6	6.4	13.8	53.8	18.1	4.2	92.0	2.7	12.4	139.8	618.8	
	Water Demand	106m <sup>3</sup> /yr	3.2	12.5	0.1	5.1	4.4	0.4	1.6	0.7	0.7	0.9	4.2	33.1
	Urban	106m <sup>3</sup> /yr	1.4	12.4	0	4.8	4.3	0.4	1.0	0.7	0.7	0.8	3.3	29.1
	Rural	106m <sup>3</sup> /yr	1.8	0.1	0.1	0.3	0.1	0	0.6	0	0	0.1	0.9	4.0
1991	Population	103	324.5	169.5	16.1	140.0	107.0	19.4	123.2	18.6	32.0	209.0	1,159.3	
	Urban	103	37.0	163.1	0	81.4	87.0	14.8	24.4	15.9	19.4	57.5	500.5	
	Rural	103	287.5	6.4	16.1	58.6	20.0	4.6	98.8	2.7	12.6	151.5	658.8	
	Water Demand	106m <sup>3</sup> /yr	5.1	12.8	0.2	7.1	8.0	0.8	2.9	0.9	0.9	1.6	6.0	45.4
	Urban	106m <sup>3</sup> /yr	2.0	12.7	0	6.4	7.8	0.8	1.9	0.9	0.9	1.5	4.3	38.3
	Rural	106m <sup>3</sup> /yr	3.1	0.1	0.2	0.7	0.2	0	1.0	0	0	0.1	1.7	7.1
1996	Population	103	327.7	191.3	16.4	173.7	130.9	20.2	125.2	19.1	38.9	228.2	1,271.6	
	Urban	103	38.2	184.9	0	114.0	110.8	15.4	25.3	16.5	26.3	71.7	603.1	
	Rural	103	289.5	6.4	16.4	59.7	20.1	4.8	99.9	2.6	12.6	156.5	668.5	
	Water Demand	106m <sup>3</sup> /yr	6.9	17.9	0.3	12.4	11.2	1.0	3.9	1.0	2.8	2.8	9.3	66.7
	Urban	106m <sup>3</sup> /yr	2.3	17.8	0	11.4	10.9	0.9	2.4	1.0	2.6	2.6	6.8	56.1
	Rural	106m <sup>3</sup> /yr	4.6	0.1	0.3	1.0	0.3	0.1	1.5	0	0	0.2	2.5	10.6
2001	Population	103	316.3	216.8	15.4	222.2	154.7	20.1	120.8	19.3	48.2	249.8	1,383.6	
	Urban	103	39.2	210.8	0	166.4	136.7	15.9	25.8	16.9	35.9	90.8	738.4	
	Rural	103	277.1	6.0	15.4	55.8	18.0	4.2	95.0	2.4	12.3	159.0	645.2	
	Water Demand	106m <sup>3</sup> /yr	8.3	23.4	0.3	19.8	15.5	1.1	4.9	1.1	4.2	4.2	12.9	91.5
	Urban	106m <sup>3</sup> /yr	2.5	23.3	0	18.6	15.2	1.0	2.9	1.1	4.0	4.0	9.6	78.2
	Rural	106m <sup>3</sup> /yr	5.8	0.1	0.3	1.2	0.3	0.1	2.0	0.0	0.2	0.2	3.3	13.3

Note: The water demand is indicated in terms of the source water demand.

Table 4 INDUSTRIAL WATER DEMAND

Description	(Unit: 10 <sup>6</sup> m <sup>3</sup> /yr)										
	1	2	3	4	5	6	7	8	9	10	Total
<u>1986</u>											
Projected by ESS	3.3	0	0	5.4	0	0	3.9	0	33.0	0	45.6
Existing	4.3	0	2.3	2.1	0.7	0	0	0	0	1.6	11.0
Total	7.6	0	2.3	7.5	0.7	0	3.9	0	33.0	1.6	56.6
<u>1991</u>											
Projected by ESS	6.6	0	0	13.9	0	0	3.9	0	35.8	0	60.2
Existing	4.3	0	2.3	2.1	0.7	0	0	0	0	1.6	11.0
Total	10.9	0	2.3	16.0	0.7	0	3.9	0	35.8	1.6	71.2
<u>1996</u>											
Projected by ESS	6.6	0	0	17.4	0	0	3.9	0	38.5	0	66.4
Existing	4.3	0	2.3	2.1	0.7	0	0	0	0	1.6	11.0
Total	10.9	0	2.3	19.5	0.7	0	3.9	0	38.5	1.6	77.4
<u>2001</u>											
Projected by ESS	6.6	0	0	25.7	0	0	3.9	0	41.3	0	77.5
Existing	4.3	0	2.3	2.1	0.7	0	0	0	0	1.6	11.0
Total	10.9	0	2.3	27.8	0.7	0	3.9	0	41.3	1.6	88.5

Note: Figures are indicated in terms of the source water demand.

Table 5 REPRESENTATIVE RIVER AND RIVER MAINTENANCE FLOW

Zone No.	Representative River	Balance Point	Maintenance Flow	
			m <sup>3</sup> /s	10 <sup>6</sup> m <sup>3</sup> /yr
1	Khlong Luang	Khlong Luang damsite	0.06	1.9
1-1	Ban Bung	Ban Bung dam	0.013	0.4
2	Khlong Yai Cheng	Estuary	0	0
3	Bang Phra	Bang Phra dam	0.03	1.0 <sup>/1</sup>
4	Khlong Bang Lamung	Estuary	1.01	3.2 <sup>/2</sup>
5	Map Prachan	Map Prachon dam	0.08	2.5
6	Huai Yai	Estuary	0	0
7	-	-	-	-
8	Khlong Phayun	Estuary	0	0
9	Khlong Huai Yai	Estuary	0	0
10	Rayong	Ban Khai weir	0.38	12.0
10-1	Khlong Thap Ma	Thap Ma damsite	0.33	10.5

<sup>/1</sup>: It was  $8.0 \times 10^6 \text{m}^3/\text{yr}$  in Study Report on Long-term Water Supply Plan.

<sup>/2</sup>: River maintenance flow at Nongkho dam; to be withdrawn between the dam and the estuary.

Table 6 WATER BALANCE FOR 1986 UNDER PROPOSED WATER RESOURCES DEVELOPMENT CONDITION

Zone	(Unit: MCM/yr)										TOTAL	
	1	1-1	2	3	4	5	6	7	8	9		10
<b>DEMANDS</b>												
1. Domestic Water												
Urban	1.2	0.2	12.4	0	4.8	4.3	0.4	1.0	0.7	0.8	3.3	29.1
Rural	1.8	0	0.1	0.1	0.3	0.1	0	0.6	0	0.1	0.9	4.0
Sub-total	3.0	0.2	12.5	0.1	5.1	4.4	0.4	1.6	0.7	0.9	4.2	33.1
2. Industrial Water	0	4.3	0	7.7 <sup>1/</sup>	5.4	0.7	0	3.9	0	33.0	1.6	56.6
3. Irrigation Water	0	0	0	15.4 <sup>2/</sup>	0	0	0	0	0	0	140.9	156.3
4. Maintenance Flow	1.9	0.4	0	1.0	3.2	2.5	0	0	0	0	12.0	21.0
Total	4.9	4.9	12.5	24.2	13.7	7.6	0.4	5.5	0.7	33.9	158.7	267.0
Available Local Water	1.1	0.4	0	0	0	0	0	0	0.4	0.2	0	2.1
<b>WITHDRAWAL</b>												
Available River Water	3.8	4.5	12.5	24.2	13.7	7.6	0.4	5.5	0.3	33.7	158.7	264.9
	3.5	0	0	0	8.8	0	0.4	0	0	0	38.2	50.9
<b>DEFICIT</b>												
Water Supply Capacity of Existing and Proposed Dam	0.3	4.5	12.5	24.2	4.9	7.6	0	5.5	0.3	33.7	120.5	214.0
	0	11.7	0	34.7	12.6	9.2	0	0	0	0	159.3	227.5
<b>BALANCE</b>												
	0.3	-7.2	12.5	-10.5	-7.7	-1.6	0	5.5	0.3	33.7	-38.8	-13.5

1/ Including 3.3 MCM and 2.1 MCM/yr to be diverted to Zone 1 and Zone 4, respectively

2/ To be diverted to Zone 2

Note: (1) The proposed dam is New Ban Bung, which replaces the existing Ban Bung dam.

(2) Figures with a mark (-) in line of BALANCE mean an excess in supply capacity, while figures without mean a shortage.



Table 7 WATER BALANCE FOR 1991 UNDER PROPOSED WATER RESOURCES DEVELOPMENT CONDITION

Zone	(Unit: MCM/yr)										TOTAL		
	1	1-1	2	3	4	5	6	7	8	9		10	10-1
<b>DEMANDS</b>													
1. Domestic Water													
Urban	1.7	0.3	12.7	0	6.4	7.8	0.8	1.9	0.9	1.5	4.3	0	38.3
Rural	3.1	0	0.1	0.2	0.7	0.2	0	1.0	0	0.1	1.7	0	7.1
Sub-total	4.8	0.3	12.8	0.2	7.1	8.0	0.8	2.9	0.9	1.6	6.0	0	45.4
2. Industrial Water													
	0	4.3	0	11.0 <sup>1/</sup>	13.9	0.7	0	3.9	0	35.8	1.6	0	71.2
3. Irrigation Water													
	60.1	0	0	15.4 <sup>2/</sup>	0	0	0	0	0	0	140.9	0	216.4
4. Maintenance Flow													
	1.9	0.4	0	1.0	3.2	2.5	0	0	0	0	12.0	0	21.0
Total	66.8	5.0	12.8	27.6	24.2	11.2	0.8	6.8	0.9	37.4	160.5	0	354.0
Available Local Water	1.1	0.4	0	0	0	0	0	0	0.4	0.2	0	0	2.1
<b>WITHDRAWAL</b>													
Available River Water	65.7	4.6	12.8	27.6	24.2	11.2	0.8	6.8	0.5	37.2	160.5	0	351.9
	0	0	0	0	14.0	0	0.8	0	0	0	30.9	0	45.7
<b>DEFICIT</b>													
Water Supply Capacity of Existing and Proposed Dams	65.7	4.6	12.8	27.6	10.2	11.2	0	6.8	0.5	37.2	129.6	0	306.2
	79.8	11.7	0	34.7	12.6	9.2	0	0	0	0	221.7	0	269.7
BALANCE	-14.1	-7.1	12.8	-7.1	-2.4	2.0	0	6.8	0.5	37.2	-92.1	0	-63.5

1/ Including 6.6 MCM/yr and 2.1 MCM/yr to be diverted to Zone 1 and Zone 4 respectively

2/ To be diverted to Zone 2

Note: (1) The proposed dams are New Ban Bung, Khlong Luang and Khlong Yai.

(2) Figures with a mark (-) in line of BALANCE mean an excess in supply capacity, while figures without mark mean a shortage.

Table 8 WATER BALANCE FOR 1996 UNDER PROPOSED WATER RESOURCES DEVELOPMENT CONDITION.

DEMANDS	(Unit: MCM/yr)										TOTAL			
	Zone	1	1-1	2	3	4	5	6	7	8		9	10	10-1
<b>1. Domestic Water</b>														
Urban	1.9	0.4	17.8	0	11.4	10.9	0.9	0.9	2.4	1.0	2.6	6.8	0	56.1
Rural	4.6	0	0.1	0.3	1.0	0.3	0.1	0.1	1.5	0	0.2	2.5	0	10.6
Sub-total	6.5	0.4	17.9	0.3	12.4	11.2	1.0	1.0	3.9	1.0	2.8	9.3	0	66.7
<b>2. Industrial Water</b>	0	4.3	0	11.0	17.4	0.7	0	0	3.9	0	38.5	1.6	0	77.4
<b>3. Irrigation Water</b>	60.1	0	0	15.4	0	0	0	0	0	0	0	140.9	30.6	247.0
<b>4. Maintenance Flow</b>	1.9	0.4	0	1.0	3.2	2.5	0	0	0	0	0	12.0	10.5	31.5
<b>Total</b>	68.5	5.1	17.9	27.7	33.0	14.4	1.0	1.0	7.8	1.0	41.3	163.8	41.1	422.6
Available Local Water	1.1	0.4	0	0	0	0	0	0	0	0.4	0.2	0	0	2.1
<b>WITHDRAWAL</b>														
Available River Water	67.4	4.7	17.9	27.7	33.0	14.4	1.0	1.0	7.8	0.6	41.1	163.8	41.1	420.5
<b>DEFICIT</b>	0	0	0	0	16.8	0	0.9	0	0	0	0	31.3	0	49.0
Water Supply Capacity of Existing and Proposed Dams	67.4	4.7	17.9	27.7	16.2	14.4	0.1	0.1	7.8	0.6	41.1	132.5	41.1	371.5
<b>BALANCE</b>	79.8	11.7	0	34.7	12.6	9.2	0	0	0	0	0	221.7	41.3	411.0
	-12.4	-7.0	17.9	-7.0	3.6	5.2	0.1	0.1	7.8	0.6	41.1	-89.2	-0.2	-39.5

1/ Including 6.6 MCM/yr and 2.1 MCM/yr to be diverted to Zone 1 and Zone 4 respectively

2/ To be diverted to Zone 2

Note: (1) The proposed dams are New Ban Bung, Khlong Luang, Khlong Yai and Khlong Trap Ma.

(2) Figures with a mark (-) in line of BALANCE mean an excess in supply capacity, while figures without mark mean a shortage.

Table 9 WATER BALANCE FOR 2001 UNDER PROPOSED WATER RESOURCES DEVELOPMENT CONDITION.

DEMANDS	Zone										TOTAL		
	1	1-1	2	3	4	5	6	7	8	9		10	10-1
1. Domestic Water													
Urban	2.1	0.4	23.3	0	18.5	15.2	1.0	2.9	1.1	4.0	9.7	0	78.2
Rural	5.8	0	0.1	0.3	1.2	0.3	0.1	2.0	0	0.2	3.3	0	13.3
Sub-total	7.9	0.4	23.4	0.3	19.7	15.5	1.1	4.9	1.1	4.2	13.0	0	91.5
2. Industrial Water	0	4.3	0	11.0	25.7	0.7	0	3.9	0	41.3	1.6	0	88.5
3. Irrigation Water	60.1	0	0	15.4	0	0	0	0	0	0	140.9	30.6	247.0
4. Maintenance Flow	1.9	0.4	0	1.0	3.2	2.5	0	0	0	0	12.0	10.5	31.5
Total	69.9	5.1	23.4	27.7	48.6	18.7	1.1	8.8	1.1	45.5	167.5	41.1	458.5
Available Local Water	1.1	0.4	0	0	0	0	0	0	0.4	0.2	0	0	2.1
<u>WITHDRAWAL</u>													
Available River Water	68.8	4.7	23.4	27.7	48.6	18.7	1.1	8.8	0.7	45.3	167.5	41.1	456.4
	0	0	0	0	19.6	0	1.0	0	0	0	31.8	0	52.4
<u>DEFICIT</u>													
Water Supply Capacity of Existing and Proposed Dams	68.8	4.7	23.4	27.7	29.0	18.7	0.1	8.8	0.7	45.3	135.7	41.1	404.0
	79.8	11.7	0	34.7	12.6	9.2	0	0	0	0	221.7	41.3	411.0
<u>BALANCE</u>													
	-11.0	-7.0	23.4	-7.0	16.4	9.5	0.1	8.8	0.7	45.3	-86.0	-0.2	-7.0

1/ Including 6.6 MCM/yr and 2.1 MCM/yr to be diverted to Zone 1 and Zone 4 respectively

2/ To be diverted to Zone 2

Note: (1) The proposed dams are New Ban Bung, Khlong Luang, Khlong Yai and Khlong Thap Ma.

(2) Figures with a mark (-) in line of BALANCE mean an excess in supply capacity, while figures without mark mean a shortage.

Table 10. SALIENT FEATURES OF DAMS IN OPERATION, UNDER CONSTRUCTION AND PLANNING

Description	Unit	Existing						Under construction				Under planning	
		Bang Phra	Map Prachan	Dok Krai	Ban Bung	Phluta Luang	Khlong Bang Phai	Nong Kho	Ban Bung	New	Nong	Pla Lai	
1. Purpose		D & I, A	D & I, A	D & I, A, F	D & I, A	D & I	D & I	D & I, A	D & I, A	D & I, A	A, F	A, F	
2. Year of completion		1975	1979	1975	1958	N.A	N.A						
3. Zoner		3	5	10	1-1	7	7	4	4	1-1	10	10	
4. Name of river		Huai Sukhrup	Huai Nong Pru	Khlong Dok Krai	Ban Bung	Phluta Luang	Khlong Bang Phai	Huai Nong Kho	Ban Bung	Nong Pla Lai			
5. Catchment area	km <sup>3</sup>	123	37.9	291	51.2			48.3	51.2		408		
6. Average annual inflow	10 <sup>6</sup> m <sup>3</sup>	43.9/1	13.5/1	103.8	12.2/1			17.2/1	12.2/1		126.1		
7. Reservoir													
Gross storage capacity	10 <sup>6</sup> m <sup>3</sup>	120.0	17.0	70.8	2.9			26.0	21.9		200.7		
Surcharge capacity	10 <sup>6</sup> m <sup>3</sup>	10.0	2.2	20.0	1.0			7.0	7.8		43.5		
Active storage capacity	10 <sup>6</sup> m <sup>3</sup>	104.0	14.0	46.8	0.4			18.0	12.5		144.4		
Dead storage capacity	10 <sup>6</sup> m <sup>3</sup>	6.0/2	0.8	4.0	1.5			1.0	1.6		12.8		
Flood water surface	El.m	30.6	45.7	52.6	77.1			66.5	84.3		47.0		
High water surface	El.m	30.0/3	45.0	50.6/3	76.3			65.0	82.1		45.0		
Low water surface	El.m	18.8/3	36.0	38.6/3	75.8			57.5	76.1		33.3		
Reservoir surface area at HWS	km <sup>2</sup>	15.8	2.8	8.8	1.2			4.4	3.2		20.2		
Net regulated outflow	10 <sup>6</sup> m <sup>3</sup> /yr	34.7	9.2	56.8	2.2			12.6	11.7		102.5		
8. Dam													
Type		Earth-fill	Earth-fill	Earth-fill	Earth-fill			Earth-fill	Earth-fill		Earth-fill	Earth-fill	
Height	m	24.0	17.0	24.6	8.5			17.0	21.5		31.0		
Crest elevation	El.m	31.5	47.0	54.6	78.8			68.0	86.3		49.0		
Crest length	m	1,720	2,060	1,500	1,400			2,000	2,800		4,000		
Volume	10 <sup>6</sup> m <sup>3</sup>	N.A.	N.A.	N.A.	N.A.			N.A.	1.4		3.2		
9. Spillway													
Type		Morning glory	Morning glory	Morning glory	Open Chute			Open chute	Open chute		Open chute	Open chute	
Discharge capacity	m / s	65.0	37.0	N.A.	N.A.			108	125		700		
Crest elevation of overflow section	El.m	300	45.0	50.6	76.3			65.0	82.1		38.0		
Crest length of overflow section	m	N.A	ø6.0	ø10.0	N.A.			40.0	20.0		20.0		

/1 : Estimated from Dok Krai  
 /2 : Derived from the area-storage curve prepared by RID  
 /3 : Estimated assuming sediment deposits in horizontal layer.  
 Note: N.A. : Not available  
 D & I : Domestic and industrial water supply  
 A : Irrigation  
 F : Flood control

Table 11 FEATURES OF POTENTIAL DAM SCHEMES AT SELECTED DEVELOPMENT SCALE

	Unit	Khlong Luang	Pa Daeng	Huai Bung	Huai Takhian Tia Na Klua	Khlong Na Klua	Huai Chak Nok	Huai Yai	Khlong Thap Ma	Khlong Yai
<b>Reservoir</b>										
Catchment area	km <sup>2</sup>	526.0	53.8	68.5	33.0	22.3	18.1	65.9	158.0	218.0
Average annual run-off	10 <sup>6</sup> m <sup>3</sup>	125.2	18.8	23.9	11.5	7.8	6.3	23.0	55.2	87.0
High water surface	El.m.	39.7	66.6	28.0	30.3	31.1	14.7	25.6	25.6	50.3
Low water surface	El.m.	33.8	61.7	22.3	25.0	25.0	10.0	19.9	16.2	40.6
Reservoir storage capacity										
Gross storage	10 <sup>6</sup> m <sup>3</sup>	141.0	16.6	21.2	10.2	6.9	5.6	20.4	59.9	93.6
Active storage	10 <sup>6</sup> m <sup>3</sup>	125.2	15.0	19.1	9.2	6.2	5.0	18.4	55.2	87.0
Dead storage	10 <sup>6</sup> m <sup>3</sup>	15.8	1.6	2.1	1.0	0.7	0.6	2.0	4.7	6.6
Reservoir surface area at HWS	km <sup>2</sup>	22.8	5.4	5.9	2.8	1.8	1.5	4.6	10.4	16.8
Net regulated outflow	10 <sup>6</sup> m <sup>3</sup>	80.4	11.6	16.0	7.8	5.2	4.3	15.6	41.3	62.4
<b>Dam</b>										
Type of dam		Earth-fill	Earth-fill	Earth-fill	Earth-fill	Earth-fill	Earth-fill	Earth-fill	Earth-fill	Earth-fill
Dam crest elevation	El.m.	42.7	69.6	31.0	33.3	34.1	17.7	28.6	28.6	53.3
Length of dam crest	m.	3,790.0	1,880.0	2,730.0	1,900.0	1,400.0	1,410.0	3,720.0	770.0	4,090.0
Dam height	m.	19.7	15.1	14.5	13.8	14.6	11.2	14.1	20.1	21.3
Dam volume	10 <sup>6</sup> m <sup>3</sup>	2,070.0	578.0	760.0	570.0	560.0	400.0	1,910.0	870.0	2,570.0

Table 12 SUMMARY OF CLIMATE

Climatological Features	Observation Station	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual	Data Source
<u>Air Temperature (°C)</u>															
Mean	Chon Buri	29.6	29.3	28.9	28.6	28.3	27.9	27.3	26.7	25.8	25.9	27.4	28.8	27.9	(1)
	Sattahip	29.7	29.2	28.9	28.4	28.4	27.9	27.1	26.5	26.1	26.7	27.9	28.9	27.9	(1)
	B. Nong Mapring	28.1	28.1	27.8	27.9	27.7	27.4	27.2	26.0	25.0	24.7	26.0	27.4	26.9	(2)
Mean Max.	Chon Buri	34.1	33.3	32.5	31.9	31.6	31.2	31.3	31.1	31.0	31.3	32.1	33.2	32.0	(1)
	Sattahip	34.6	33.3	32.7	32.4	32.5	32.2	31.9	32.2	32.4	33.2	33.6	34.1	32.9	(1)
	B. Nong Mapring	35.1	33.5	33.4	33.0	32.9	32.9	33.1	32.9	33.1	33.5	33.7	34.9	33.5	(2)
Mean Min.	Chon Buri	25.4	25.4	25.5	25.0	24.9	24.4	23.8	22.1	20.3	20.1	22.4	24.2	23.6	(1)
	Sattahip	26.5	26.2	26.4	25.7	25.6	25.0	24.0	22.6	21.6	22.1	24.2	25.6	24.6	(1)
	B. Nong Mapring	21.6	22.6	21.5	22.0	21.6	20.9	21.2	19.1	16.7	15.9	18.3	20.0	20.1	(2)
Extreme Max.	Chon Buri	38.0	37.8	37.1	35.5	34.7	34.4	34.8	35.2	36.1	36.2	36.6	37.0	38.0	(1)
	Sattahip	40.5	40.5	37.2	37.8	37.2	37.4	36.2	37.4	38.3	39.0	39.4	39.5	40.5	(1)
	B. Nong Mapring	40.0	40.0	39.0	43.5	39.0	40.0	38.9	40.0	38.5	38.5	39.4	39.3	43.5	(2)
Extreme Min.	Chon Buri	20.4	21.2	21.0	20.5	20.9	20.6	18.2	14.2	12.0	9.9	16.5	17.5	9.9	(1)
	Sattahip	21.0	21.5	20.9	19.0	21.5	19.0	19.5	15.0	12.8	12.3	16.8	18.7	12.3	(1)
	B. Nong Mapring	16.2	18.5	18.5	19.0	20.2	19.5	15.2	10.5	9.0	8.0	10.0	9.8	8.0	(2)
<u>Relative Humidity (%)</u>															
Mean	Chon Buri	71.0	75.0	75.0	75.0	76.0	80.0	80.0	73.0	66.0	67.0	71.0	71.0	73.0	(1)
	Sattahip	77.0	79.0	76.0	77.0	77.0	81.0	83.0	76.0	70.0	70.0	75.0	76.0	76.0	(1)
	B. Nong Mapring	92.2	94.5	94.9	94.8	94.9	95.6	94.6	90.1	88.0	92.5	92.8	93.5	93.2	(2)
Mean Max.	Chon Buri	87.6	88.8	87.6	88.5	90.0	92.3	93.0	89.5	85.1	85.0	88.2	87.8	88.6	(1)
	Sattahip	87.3	88.8	86.0	87.4	87.6	90.7	93.1	89.0	84.7	84.2	88.2	87.6	87.9	(1)
Mean Min.	Chon Buri	56.7	60.8	61.8	62.9	64.0	67.1	66.7	57.2	50.1	52.0	56.2	56.6	59.3	(1)
	Sattahip	61.1	66.6	65.5	64.2	65.9	68.3	69.1	60.7	53.0	51.2	57.0	59.9	61.9	(1)
Extreme Min.	Chon Buri	29.0	32.0	42.0	43.0	45.0	46.0	42.0	29.0	22.0	20.0	25.0	23.0	20.0	(1)
	Sattahip	33.0	43.0	43.0	47.0	48.0	45.0	38.0	28.0	21.0	25.0	17.0	29.0	17.0	(1)
<u>Evaporation (mm)</u>															
	B. Nong Mapring	111.3	102.4	93.3	95.0	90.0	77.7	91.2	96.7	101.7	99.4	93.5	112.0	1,164.2	(2)
	Bang Phra	115.9	109.7	101.0	97.3	91.8	78.3	85.1	87.5	84.7	76.2	76.9	103.1	1,110.1	(2)
	Ban Mai	121.3	111.6	107.7	106.6	103.8	90.9	98.8	96.6	107.7	109.1	107.5	125.9	1,287.5	(2)
<u>Wind Velocity (km/hr)</u>															
	Chon Buri	11.9	10.9	13.2	12.2	12.0	9.8	9.3	11.5	12.2	11.9	13.0	13.2	11.7	(1)
	Sattahip	13.3	13.3	18.2	17.4	16.9	13.7	10.7	12.6	13.2	11.1	12.6	13.7	13.9	(1)
<u>Cloud Cover (oktas)</u>															
	Chon Buri	4.7	6.1	6.5	6.7	6.9	6.7	5.8	4.5	3.6	3.9	3.8	4.0	5.2	(1)
	Sattahip	4.9	6.4	6.5	6.8	6.9	6.9	6.0	4.8	3.7	3.9	4.1	4.3	5.4	(1)
<u>Rainfall (mm)</u>															
	Rayong	62.9	210.7	120.8	122.3	112.2	203.6	203.6	63.2	8.6	17.8	47.6	53.3	1,226.6	(2)
	Ban Khai	87.8	215.3	161.3	123.9	131.4	238.7	195.9	68.2	11.5	24.6	30.1	42.2	1,330.8	(2)
	Sattahip	76.3	193.6	74.4	98.4	97.0	211.5	275.0	86.5	15.5	21.6	41.5	53.6	1,244.9	(2)
	Bang Lamung	102.6	158.8	89.6	94.5	113.6	220.1	252.7	61.5	9.3	10.4	36.9	48.7	1,198.4	(2)
	Si Racha	88.3	150.6	110.8	113.6	131.7	257.7	218.1	51.3	13.7	11.1	31.4	38.7	1,216.5	(2)
	Bang Phra	113.2	161.9	120.3	124.7	154.6	295.4	222.6	48.9	10.2	10.5	41.2	45.6	1,349.1	(2)
	Chon Buri	77.6	158.8	119.4	152.2	162.4	295.2	210.9	53.9	6.0	13.9	23.3	34.1	1,307.6	(2)
	Ban Bung	94.5	151.9	117.8	129.4	136.7	217.5	182.2	41.2	9.4	8.1	26.3	45.3	1,160.3	(2)

Data Source: (1) Climatological Data of Thailand, 25 Year Period (1951-1975), MD.

(2) RID



Table 13 MONTHLY RUN-OFF AT KHLONG YAI DAMSITE

(Unit: m<sup>3</sup>/s)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1968	0.61	2.90	6.59	2.76	1.67	3.13	11.33	3.26	4.59	0.41	0.14	0.14	3.13
1969	0.07	0.91	0.92	0.46	1.18	10.47	16.70	9.21	1.25	0.42	0.47	0.20	3.52
1970	1.26	5.16	6.73	3.40	1.54	1.61	5.77	1.23	3.53	0.73	8.53	0.62	2.67
1971	0.65	2.00	1.16	0.30	1.76	5.70	9.34	1.95	0.53	0.22	0.85	0.53	2.09
1972	5.36	0.69	1.25	0.30	0.05	7.99	13.82	8.40	2.02	0.41	0.34	0.51	3.43
1973	0.16	2.56	3.52	3.20	3.40	7.57	13.13	4.48	1.00	0.32	0.22	0.31	3.32
1974	3.03	2.71	0.68	0.38	1.10	6.11	23.32	9.10	1.57	1.03	0.77	0.47	4.18
1975	0.43	1.68	0.73	0.69	0.80	9.83	14.89	6.39	1.48	0.45	0.46	0.46	3.20
1976	0.81	2.69	0.85	0.19	1.71	15.61	8.87	9.17	1.38	0.42	0.28	0.09	3.51
1977	0.23	1.04	1.62	3.18	1.08	1.00	7.27	0.89	0.20	0.11	0.93	0.18	1.48
1978	0.41	8.42	3.32	4.59	1.92	6.39	5.81	1.04	0.22	0.22	0.05	0.01	2.69
1979	0.35	0.34	0.54	1.18	0.22	2.53	4.21	0.18	0.08	0.03	0.03	0.54	0.85
1980	0.31	0.28	2.61	1.87	2.99	1.18	9.48	3.43	0.27	0.11	0.11	0.09	1.90
1981	1.92	4.55	2.52	3.21	2.61	7.64	4.48	4.25	0.88	0.24	0.16	0.07	2.71
Average	1.11	2.57	2.36	1.84	1.57	6.20	10.60	4.50	1.35	0.37	0.38	0.30	2.76

River System : Rayong  
 Catchment Area : 218 km<sup>2</sup>

No. of Zone : 10

Note : Estimated from Ban Pak Phraek Gauge.

Table 14 SOIL GROUP, SOIL SERIES AND THEIR AREA IN THE BAN KHAI EXTENSION SCHEME AREA

Soil Group	Soil Series	Map Symbol	Surveyed Area (ha)	Surveyed Area (%)	Scheme Area (ha)	Scheme Area (%)	
Soils of Beach and Dune Sand	Rayong series (Ry)	1	2,460	6	70	0.8	
	Phattaya series (Py)	2	2,190	5	-	-	
	Ban Thon series (Bh)	3	2,260	5	810	9.0	
	Ban Thon deep phase (Bh-d)	4	560	1	370	4.1	
			7,470	17	1,250	13.9	
Soils of Recent Alluvium	Wan Phrieng, loamy var. (Wp-1)	6	300	-	270	3.0	
	Soils of Semi-recent Alluvium	Alluvial soils, poorly drained (Ac-pd)	8	7,150	17	1,620	18.0
Chonburi series (Cb)		9	290	-	140	1.6	
Klaeng series (Kl)		12	30	-	20	0.2	
Khok Khian series (Ko)		14	5,010	12	2,740	30.4	
				12,480	29	4,520	50.2
Soils of Old Alluvium	Ta Sae series (Te)	19	190	-	-	-	
	Ta Sae, mottled var. (Te-m)	20	50	-	30	0.3	
	Xho Hong & Ta Sae soils (Xh & Te)	21	360	-	10	0.1	
	Khlong Chak series (Xc)	27	170	-	-	-	
	Ranong series (Rg)	34	-	-	-	-	
	Ban Bung series (Bbg)	35	1,700	4	630	7.0	
	Sattahip series (Sh)	36	1,480	3	-	-	
	Ban Bung & Sattahip soils (Bbg & Sh)	37	1,500	4	260	2.9	
				5,450	11	930	10.3
	Soils of Transported Material and Residuum, and Others	Thung Wa series (Tg)	39	510	1	200	2.2
		Sattahip & Thung Wa soils (Sh & Tg)	40	170	-	-	-
		Khlong Nok Krathung series (Knk)	41	960	2	-	-
		Chalong, Coarse loamy var. (Chl-co)	42	1,460	3	550	6.1
Chalong, gravelly var. (Chl-g)		43	20	-	-	-	
Chalong, coarse loamy & Ch (Chl-co & Chl)		44	850	2	-	-	
Huai Pong series (Hp)		46	7,530	18	610	6.8	
Phangnga series (Pga)		48	2,270	5	10	0.1	
Huai Pong/Phangnga asso. (Hp/Pga)		49	790	2	-	-	
Phuket series (Pk)		50	290	-	-	-	
Thai Muang series (Tm)		52	70	-	-	-	
Map Bon & Thai Muang soils (Mb & Tm)		55	80	-	-	-	
Marsh		59	970	2	610	6.8	
Slope Complex (Sc)		60	620	1	50	0.6	
				16,590	36	2,030	22.6
		Total		42,290	100	9,000	100.0

Table 15 SOIL GROUP, SOIL SERIES AND THEIR AREA IN THE BAN KHUAI EXISTING SCHEME AREA

Soil Group	Soil Series	Map Symbol	Surveyed Area		Scheme Area		
			(ha)	(%)	(ha)	(%)	
Soils of Beach and Dune Sand	Rayong series (Ry)	1	2,460	6	-	-	
	Phattaya series (Py)	2	2,190	5	-	-	
	Ban Thon series (Sh)	3	2,260	5	540	10.0	
	Ban Thon deep phase (Sh-d)	4	560	1	-	-	
			7,470	17	540	10.0	
Soils of Recent Alluvium	Wan Phrieng, loamy var. (Wp-l)	6	300	-	-	-	
Soils of Semi-recent Alluvium	Alluvial soils, poorly drained (Ac-pd)	8	7,150	17	3,310	61.3	
	Chonburi series (Cb)	9	290	-	50	0.9	
	Xlaeng series (Kl)	12	30	-	-	-	
	Khok Khian series (Kx)	14	5,010	12	1,210	22.4	
				12,480	29	4,570	84.6
Soils of Old Alluvium	Ta Sae series (Te)	19	190	-	-	-	
	Ta Sae, mottled var. (Te-m)	20	50	-	-	-	
	Kho Hong & Ta Sae soils (Kh & Te)	21	360	-	-	-	
	Khlong Chak series (Kc)	27	170	-	-	-	
	Ranong series (Rg)	34	-	-	-	-	
	Ban Bung series (Bbg)	35	1,700	4	40	0.7	
	Sattahip series (Sh)	36	1,480	3	-	-	
	Ban Bung & Sattahip soils (Bbg & Sh)	37	2,500	4	100	1.9	
				5,450	11	140	2.6
	Soils of Transported Material and Residuum, and Others	Thung Wa series (Tg)	39	510	1	150	2.8
		Sattahip & Thung Wa soils (Sh & Tg)	40	170	-	-	-
		Khlong Nok Krathung series (Knk)	41	960	2	-	-
		Chalong, Coarse loamy var. (Chl-co)	42	1,460	3	-	-
Chalong, gravelly var. (Chl-g)		43	20	-	-	-	
Chalong, coarse loamy & Ch (Chl-co & Chl)		44	850	2	-	-	
Huai Pong series (Hp)		46	7,530	18	-	-	
Phangnga series (Pga)		48	2,270	5	-	-	
Huai Pong/Phangnga asso. (Hp/pgs)		49	790	2	-	-	
Phuket series (Pk)		50	290	-	-	-	
Thai Muang series (Tim)		52	70	-	-	-	
Map Bon & Thai Muang soils (Mb & Tim)		55	80	-	-	-	
Marsh		59	970	2	-	-	
Slope Complex (SC)		60	520	1	-	-	
				16,590	36	150	2.8
				42,290	100	5,400	100.0

Table 16 ECONOMIC COMPARISON OF ALTERNATIVES,  
KHLONG YAI DAM SCHEME

(Unit:  $\text{฿}10^6$ )

Alternatives	1-1	2-1	3-1	3-2	3-3
<u>Features</u>					
Dam Crest El. (m)	48.8	50.8	50.5	51.4	52.4
H.W.L. (m)	45.5	47.5	47.2	48.1	49.1
Active Storage ( $10^6 \text{ m}^3$ )	26.9	47.5	43.8	54.8	67.6
Irrigation Area (ha)	7,700	7,700	6,500	7,100	7,700
Cropping Intensity (%)	130	140	150	150	150
<u>Cost</u>					
1. Dam Works	1,708.74	1,843.38	1,822.59	1,906.74	1,990.89
2. Irrigation Facilities	478.17	478.17	382.14	425.70	478.17
3. Pipeline System	606.28	606.28	606.28	606.28	606.28
4. Engineering Service	281.54	295.00	280.44	294.52	309.75
5. Gov. Administration	82.33	85.03	79.81	83.67	87.98
Base Cost	3,157.06	3,307.86	3,171.26	3,316.90	3,473.07
6. Physical Contingency	473.56	496.18	475.69	497.54	520.96
Project Cost	3,630.62	3,804.03	3,646.94	3,814.44	3,994.03
7. O & M Cost	45.93	46.61	46.02	46.66	47.35
8. Replacement Cost	51.38	51.38	51.30	51.34	51.38
<u>(I) Annual Cost</u>	<u>394.10</u>	<u>408.95</u>	<u>395.44</u>	<u>409.81</u>	<u>425.21</u>
<u>Benefit</u>					
9. Irrigation Benefit	179.65	198.23	183.18	200.09	216.99
10. Water Supply Benefit	327.17	327.17	327.17	327.17	327.17
11. Production Foregone	31.25	34.68	34.12	35.79	37.69
<u>(II) Annual Benefit</u>	<u>475.57</u>	<u>490.72</u>	<u>476.22</u>	<u>491.46</u>	<u>506.47</u>
<u>(III) Net Benefit (B-C)</u>	<u>81.48</u>	<u>81.78</u>	<u>80.79</u>	<u>81.65</u>	<u>81.26</u>
<u>(IV) Benefit-Cost Ratio (B/C)</u>	<u>1.21</u>	<u>1.20</u>	<u>1.20</u>	<u>1.20</u>	<u>1.19</u>

Table 17 INVESTMENT COST BY COMPONENT

(Unit: \$103)

Description	First Stage			Second Stage		
	Foreign Currency Portion	Local Currency Portion	Total	Foreign Currency Portion	Local Currency Portion	Total
<b>I. Khlong Yai Dam</b>						
1. Preparatory Works	12,120	20,320	32,440			
2. Care of River	3,010	5,080	8,110			
3. Main Dam	275,950	448,020	723,970			
4. Intake	7,170	7,540	14,710			
5. Spillway	19,990	52,550	72,540			
6. Contractor's Administration Cost	11,140	18,670	29,810			
7. Contractor's Profit	20,690	34,680	55,370			
8. Tax	-	28,960	28,960			
Sub-total	350,090	615,820	965,910			
9. Compensation & Relocation	-	87,800	87,800			
10. Engineering Services	67,610	28,930	96,590			
11. Administration Cost of Executive Agency	-	19,320	19,320			
Sub-total	417,700	751,920	1,169,620			
12. Physical Contingency	62,660	112,790	175,450			
Sub-total	480,360	864,710	1,345,070			
13. Price Contingency	227,100	512,750	739,850			
Total	707,460	1,377,460	2,084,920			
<b>II. Nong Pla Lai Dam</b>						
1. Preparatory Works	14,180	25,710	39,890			
2. Diversion & Cofferdam	82,410	155,710	238,120			
3. Dam	232,230	378,390	610,620			
4. Spillway	32,420	103,260	135,630			
5. Intake	7,490	5,420	12,910			
6. Contractor's Administration Cost	12,910	23,400	36,310			
7. Contractor's Profit	23,970	43,450	67,420			
8. Tax	-	35,260	35,260			
Sub-total	405,610	770,600	1,176,210			
9. Compensation & Relocation	-	242,290	242,290			
10. Engineering Services	82,330	35,290	117,620			
11. Administration Cost of Executive Agency	-	23,520	23,520			
Sub-total	487,940	1,071,700	1,559,640			
12. Physical Contingency	73,190	160,760	233,950			
Sub-total	561,430	1,232,460	1,793,890			
13. Price Contingency	152,040	380,350	532,390			
Total	713,170	1,612,810	2,325,980			
<b>III. Raw Water Conveyance System</b>						
1. Preparatory Works	24,100	5,860	29,960	21,540	4,240	25,780
2. Civil Works	3,200	16,030	19,230	-	-	-
3. Mechanical Works	215,980	42,410	258,390	210,690	42,350	253,040
4. Electrical Works	21,870	190	22,060	4,660	50	4,710
5. Contractor's Administration Cost	9,280	2,260	11,540	8,290	1,630	9,920
6. Contractor's Profit	17,230	4,190	21,420	15,400	3,030	18,430
7. Tax	-	11,210	11,210	-	9,640	9,640
Sub-total	291,660	82,150	373,810	260,580	60,340	321,520
8. Compensation & Relocation	-	300	300	-	-	-
9. Engineering Services	20,940	8,970	29,910	18,010	7,720	25,730
10. Administration Cost of Executive Agency	-	26,660	26,660	-	12,860	12,860
Sub-total	312,600	118,080	430,680	278,590	81,520	360,110
11. Physical Contingency	46,890	17,710	64,600	41,790	12,230	54,020
Sub-total	359,490	135,790	495,280	320,380	93,750	414,130
12. Price Contingency	226,350	112,520	338,870	446,840	182,240	629,080
Total	585,840	248,310	834,150	767,220	275,990	1,043,210
<b>IV. Irrigation</b>						
1. Preparatory Works	11,800	54,200	66,000			
2. Diversion Structure	33,600	62,500	96,100			
3. Canal Construction	84,800	209,700	294,500			
4. Contractor's Administration Cost	4,560	11,420	15,980			
5. Contractor's Profit	8,460	21,220	29,680			
6. Tax	-	15,520	15,520			
Sub-total	143,220	374,560	517,780			
7. Compensation & Relocation	-	44,400	44,400			
8. Engineering Services	47,120	20,190	67,310			
9. Administration Cost of Executive Agency	24,130	27,820	51,950			
Sub-total	214,470	466,970	681,440			
10. Physical Contingency	32,170	70,050	102,220			
Sub-total	246,640	537,020	783,660			
11. Price Contingency	133,710	374,210	507,920			
Total	380,350	911,230	1,291,580			
Grand Total	2,385,820	4,149,810	6,535,630	767,220	275,990	1,043,210

Table 18 DISBURSEMENT SCHEDULE OF INVESTMENT COST

Item	1984		1985		1986		1987		1988		1989		1990		1991		1992		
	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.	F.C.	L.C.	
<b>FIRST STAGE</b>	(Unit: P102)																		
<b>TOTAL</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	
1. Compensation & Relocation	374,790	-	374,790	-	121,140	-	165,050	-	57,220	-	13,320	-	9,180	-	8,880	-	-	-	-
2. Khlong Yai Dam	965,510	350,090	615,820	-	-	-	10,500	18,480	101,530	166,270	105,020	178,590	101,530	197,060	31,510	55,420	-	-	-
3. Nong Pla Lai Dam	1,176,210	405,610	770,600	-	48,670	92,470	231,200	439,240	125,740	238,890	-	-	-	-	-	-	-	-	-
4. Water Conveyance System	373,810	291,660	82,150	-	-	-	-	-	-	-	64,160	18,070	96,250	27,110	96,250	27,110	35,000	9,860	-
5. Irrigation	517,780	143,220	374,560	-	-	-	-	21,430	19,620	52,190	39,720	90,380	41,900	102,260	32,650	84,240	9,330	24,060	-
Sub-total	3,408,500	1,190,580	2,217,920	-	121,140	48,670	257,520	241,700	536,370	246,890	470,670	208,900	239,680	315,310	160,410	166,770	44,330	33,920	-
6. Engineering Service	311,430	218,000	93,430	13,720	5,880	40,060	17,170	49,560	21,240	42,160	17,690	27,560	11,620	24,750	11,180	14,320	6,130	5,870	2,520
7. Administration of Exec. Agency	121,450	24,130	97,320	-	2,850	-	10,710	-	16,270	4,830	15,240	7,230	15,470	4,830	18,230	4,830	12,640	2,410	5,910
Sub-total	3,841,380	1,432,710	2,408,670	13,720	129,870	88,730	285,400	291,260	573,880	293,880	503,600	243,690	323,310	269,260	364,720	179,560	185,540	52,610	42,350
8. Physical Contingency	576,220	214,910	361,310	2,060	19,480	42,810	43,690	86,080	44,080	44,080	75,550	36,540	48,500	40,390	54,700	26,940	27,830	7,880	6,360
Sub-total	4,417,600	1,647,620	2,769,980	15,780	149,350	102,040	328,210	334,950	659,960	337,960	579,150	280,250	371,810	309,650	419,420	206,300	213,370	60,490	48,710
9. Price Contingency	2,119,030	739,200	1,379,830	1,260	14,940	16,980	68,920	87,000	218,450	121,840	268,790	131,530	226,990	181,720	323,610	147,400	202,430	51,470	55,700
Grand Total	6,536,630	2,386,820	4,149,810	17,040	164,290	119,020	397,130	421,950	878,410	459,800	847,940	411,780	598,800	491,370	743,030	353,900	415,800	119,600	104,410
<b>SECOND STAGE</b>																			
<b>TOTAL</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	<b>F.C.</b>	<b>L.C.</b>	
1. Water Conveyance System	321,520	260,580	60,940	-	-	57,330	13,410	85,990	20,110	85,990	20,110	31,270	7,310	-	-	-	-	-	-
Sub-total	321,520	260,580	60,940	-	-	57,330	13,410	85,990	20,110	85,990	20,110	31,270	7,310	-	-	-	-	-	-
2. Engineering Services	25,730	18,010	7,720	4,330	1,850	3,960	1,700	3,960	1,700	3,960	1,700	1,800	770	-	-	-	-	-	-
3. Administration of Exec. Agency	12,860	-	12,860	-	340	-	2,830	-	4,090	-	4,090	-	1,510	-	-	-	-	-	-
Sub-total	360,110	278,590	81,520	4,330	2,190	61,290	17,940	89,950	25,900	89,950	25,900	33,070	9,590	-	-	-	-	-	-
4. Physical Contingency	54,020	41,790	12,230	660	340	9,190	2,690	13,490	3,880	13,490	3,880	4,560	1,440	-	-	-	-	-	-
Sub-total	414,130	320,380	93,750	4,990	2,530	70,480	20,630	103,440	29,780	103,440	29,780	38,630	11,030	-	-	-	-	-	-
5. Price Contingency	629,080	446,840	182,240	4,970	3,440	81,680	32,870	137,750	55,180	157,040	63,680	65,400	27,070	-	-	-	-	-	-
Grand Total	1,043,210	767,220	275,990	9,960	5,970	152,160	53,500	241,190	84,960	260,480	93,460	103,430	38,100	-	-	-	-	-	-



Table 19 MAJOR CONSTRUCTION PLANT AND EQUIPMENT  
OF KHLONG YAI DAM

Item	Capacity	Quantity
Aggregate plant	80 tons/hr	1 set
Concrete plant	18 cft x 1	1 set
Bulldozer W/R	32 tons	7 nos.
Bulldozer	32 tons	5 nos.
- do -	21 tons	5 nos.
Back hoe	1.2 m <sup>3</sup>	6 nos.
- do -	0.7 m <sup>3</sup>	4 nos.
Power shovel	1.2 m <sup>3</sup>	5 nos.
Tractor shovel	3.2 m <sup>3</sup>	6 nos.
- do -	2.2 m <sup>3</sup>	4 nos.
- do -	1.8 m <sup>3</sup>	1 no.
Wheel loader	3.2 m <sup>3</sup>	3 nos.
- do -	1.8 m <sup>3</sup>	1 no.
Dump truck	15 tons	75 nos.
- do -	8 tons	95 nos.
Vibration roller	10 tons	5 nos.
Diesel engine generator	150 KVA	2 nos.
Agitator truck	3.2 m <sup>3</sup>	4 nos.
Motor grador	3.7 m	2 nos.
Road roller	8/10 tons	4 nos.
Hydraulic crane	25 tons	1 no.
Water tanker	8 m <sup>3</sup>	6 nos.
Asphalt spreader	30 l/min	6 nos.
Tractor and trailer	30 tons	1 no.
Spare parts	-	L.S.

Table 20 FINANCIAL AND ECONOMIC PRICE OF  
AGRICULTURAL INPUTS AND OUTPUTS

			(Unit: Baht/ton)	
Item	Financial Price	Economic Price		
Rice (paddy) - Local variety	2,900	8,360		
Rice (paddy) - Improved variety	2,800	7,940		
Groundnuts	5,500	10,440		
Vegetables	4,500	7,520		
Durian	7,200	11,990		
Rambutan	5,400	8,970		
Seed - Rice	3,600	10,030		
- Groundnuts	8,500	15,220		
- Vegetables	22/kg	36/kg		
Fertilizer - Compound (16:20:0)	6,400	10,640		
- Compound (15:15:15)	6,500	10,800		
- Compound (13:13:21)	6,400	10,640		
Agro-chemicals				
- Insecticides	78/500 gr	130/500 gr		
- Herbicides	78/2 l	130/500 gr		
- Rodenticides	2.4/kg	3/kg		
Wage - Light work	30/day	34/day		
- Heavy wage	40/day	45/day		

Note; Detail of economic price is presented in the Sectoral Report III,  
"Agriculture Development Plan."

Table 21 AGRICULTURE BENEFIT OF BAY KHAI EXTENSION AREA

Crop	Price (P/t)	Production (t/ha)	Gross Production Value (P/ha)	Production Cost (P/ha)	Net Production Value (P/ha)	Area (ha)	Benefit (P 10 <sup>3</sup> )
<u>With Project</u>							
Rice (Local)	8,360	4.0	33,440	6,930	26,510	1,420	37,644
Rice (High Yielding) /1	7,940	4.5	35,730	8,800	26,930	5,700	153,501
Rice (High Yielding) /2	7,940	5.0	39,700	9,290	30,410	850	25,849
Groundnuts	10,440	2.5	26,100	4,990	21,110	1,730	36,520
Vegetable	7,520	10.0	75,200	15,600	59,600	500	29,800
Fruit Trees	10,470	7.0	73,290	9,050	64,240	580	37,259
Total						10,780	320,573
<u>Without Project</u>							
Rice (Local)	8,360	1.8	15,048	4,480	10,570	3,770	39,849
Rice (High Yielding)	7,940	2.3	18,260	7,220	11,040	2,540	28,042
Groundnuts	10,440	1.3	13,570	2,910	10,660	20	213
Sugarcane	500	45.3	22,670	8,140	14,530	320	4,650
Cassava	1,250	16.0	20,000	3,180	16,820	1,560	26,239
Fruit Trees	10,470	5.0	52,350	5,640	46,710	500	23,355
Total						8,710	122,348

/1: Wet Season

/2: Dry Season

Table 22 DISBURSEMENT SCHEDULE OF ECONOMIC INVESTMENT COST

Item	1984		1985		1986		1987		1988		1989		1990		1991		
	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.	
<b>FIRST STAGE</b>	(Unit: P 10 <sup>3</sup> )																
	Summary																
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.	
1. Khlong Yai Dam	848,930	350,090	498,840	-	-	-	10,500	14,960	101,530	134,690	144,660	105,020	144,660	101,530	159,630	31,510	44,900
2. Nong Pla Lai Dam	1,030,640	405,610	625,030	-	48,670	75,000	231,200	356,270	125,740	193,760	-	-	-	-	-	-	-
3. Water Conveyance System (First Phase)	351,960	251,660	60,300	-	-	-	-	-	-	-	64,160	13,270	96,250	19,900	96,250	19,900	35,000
4. Irrigation	453,400	148,220	305,180	-	-	-	17,670	19,620	42,530	39,720	73,510	41,900	83,250	37,650	68,620	9,330	19,600
Sub-total	2,684,930	1,195,580	1,489,350	-	48,670	75,000	388,900	246,890	246,890	370,980	231,440	239,680	262,780	165,410	133,420	44,330	26,830
5. Engineering Services	297,450	218,000	79,450	13,720	18,300	40,060	11,400	49,560	10,560	12,440	27,560	9,870	24,750	9,520	14,320	5,220	5,870
6. Administration Cost of Exec. Agency	99,420	24,130	75,290	-	580	-	4,820	-	14,170	4,830	15,780	7,230	12,860	4,830	14,560	4,830	8,510
Sub-total	3,081,800	1,437,710	1,644,090	13,720	18,880	88,730	91,220	291,260	413,630	293,880	243,690	254,170	269,260	286,860	184,560	147,150	52,610
7. Physical Contingency	461,560	214,910	246,650	2,060	2,830	13,310	13,680	43,690	62,050	44,080	59,890	36,560	38,140	40,390	43,030	26,940	22,080
Grand Total	3,543,360	1,652,620	1,890,740	15,780	21,710	102,040	104,900	334,950	475,680	337,960	459,090	280,250	292,310	309,650	329,890	211,500	169,230

**SECOND STAGE**

Item	1992		1993		1994		1995		1996			
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.		
<b>Summary</b>												
Total	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.		
1. Water Conveyance System (Second Phase)	304,200	260,580	43,620	-	57,330	9,590	85,990	14,400	85,900	14,400	31,270	5,230
Sub-total	304,200	260,580	43,620	-	57,330	9,590	85,990	14,400	85,990	14,400	31,270	5,230
2. Engineering Service	24,570	18,010	6,560	4,330	1,580	1,440	3,960	1,440	3,960	1,440	1,800	660
3. Administration of Exec. Agency	12,170	-	12,170	-	380	-	2,600	-	3,840	-	-	1,430
Sub-total	340,940	278,590	62,350	4,330	1,960	13,710	89,950	19,680	89,950	19,680	33,070	7,320
4. Physical Contingency	51,140	41,790	9,350	660	290	2,060	13,490	2,950	13,490	2,950	4,960	1,100
Grand Total	392,060	320,380	71,700	4,990	2,250	70,480	103,440	22,630	103,440	22,630	38,030	8,420

Table 23 BENEFIT - COST STREAM

(Unit: \$10<sup>6</sup>)

No.	Year	Cost				Benefit				(B) - (C)
		Investment Cost	OM & R Cost	Replacement Cost	Total (C)	D & I Water Supply	Agriculture	Flood Control	Total (B)	
1.	1984	37.5	0.0	0.0	37.5	0.0	0.0	0.0	0.0	-37.5
2.	1985	206.9	0.0	0.0	206.9	0.0	0.0	0.0	0.0	-206.9
3.	1986	810.6	0.0	0.0	810.6	0.0	0.0	0.0	0.0	-810.6
4.	1987	797.1	0.0	0.0	797.1	0.0	-25.3	37.2	11.9	-785.2
5.	1988	572.6	5.1	0.0	577.6	190.2	-25.3	37.2	202.1	-375.5
6.	1989	639.5	5.1	0.0	644.6	195.5	-25.3	37.2	207.3	-437.3
7.	1990	380.7	7.6	0.0	388.3	200.2	21.6	57.3	279.1	-109.2
8.	1991	98.4	18.3	0.0	116.7	289.5	61.2	57.3	408.0	291.2
9.	1992	7.2	20.8	0.0	28.0	327.0	100.9	57.3	485.1	457.1
10.	1993	86.3	22.5	0.0	108.8	362.8	120.7	57.3	540.7	432.0
11.	1994	126.1	24.1	0.0	150.2	400.3	140.5	57.3	598.1	447.9
12.	1995	126.1	25.8	0.0	151.9	436.1	160.3	57.3	653.7	501.8
13.	1996	46.5	30.4	0.0	76.9	473.6	160.3	57.3	691.2	614.3
14.	1997	0.0	33.4	0.0	33.4	537.4	160.3	57.3	755.0	721.6
15.	1998	0.0	36.4	0.0	36.4	600.8	160.3	57.3	818.4	782.0
16.	1999	0.0	39.5	21.8	61.3	666.4	160.3	57.3	884.0	822.7
17.	2000	0.0	42.5	0.0	42.5	729.8	160.3	57.3	947.4	904.9
	2001	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
	2002	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
20.	2003	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
21.	2004	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
22.	2005	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
23.	2006	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
24.	2007	0.0	45.5	43.4	88.9	793.6	160.3	57.3	1,011.3	922.4
25.	2008	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
26.	2009	0.0	45.5	21.8	67.3	793.6	160.3	57.3	1,011.3	944.0
27.	2010	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
28.	2011	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
29.	2012	0.0	45.5	15.0	60.5	793.6	160.3	57.3	1,011.3	965.8
30.	2013	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
31.	2014	0.0	45.5	23.3	68.8	793.6	160.3	57.3	1,011.3	965.8
32.	2015	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	942.5
33.	2016	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
34.	2017	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
35.	2018	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
36.	2019	0.0	45.5	21.8	67.3	793.6	160.3	57.3	1,011.3	965.8
37.	2020	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	944.0
38.	2021	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
39.	2022	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
40.	2023	0.0	45.5	43.4	88.9	793.6	160.3	57.3	1,011.3	965.8
41.	2024	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	922.4
42.	2025	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
43.	2026	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
44.	2027	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
	2028	0.0	45.5	15.0	60.5	793.6	160.3	57.3	1,011.3	965.8
	2029	0.0	45.5	21.8	67.3	793.6	160.3	57.3	1,011.3	950.8
47.	2030	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	944.0
48.	2031	0.0	45.5	298.9	344.4	793.6	160.3	57.3	1,011.3	965.8
49.	2032	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	666.9
50.	2033	0.0	45.5	0.0	45.5	793.6	160.3	57.3	1,011.3	965.8
	TOTAL	3,935.5	1,813.0	526.1	6,274.6	31,599.3	6,621.4	2,632.8	40,853.5	34,578.9

Note: Production foregone of the reservoirs is subtracted from agriculture benefit.

Table 24 DISBURSEMENT SCHEDULE OF ALLOCATED INVESTMENT COST

Year	Domestic & Industrial						Irrigation		Total
	Water Supply			Foreign Currency			Local Currency		
	Foreign Currency Portion	Local Currency Portion	Sub-total	Foreign Currency Portion	Local Currency Portion	Sub-total	Foreign Currency Portion	Local Currency Portion	
<u>FIRST STAGE</u>									
1984	12,100	116,650	128,750	2,560	24,640	27,200			155,950
1985	76,430	275,920	352,250	27,520	66,920	94,440			446,690
1986	293,770	580,470	874,240	70,250	183,480	253,730			1,127,970
1987	293,710	514,790	808,500	109,710	232,560	342,270			1,150,770
1988	258,430	295,860	554,290	125,300	254,190	379,490			933,780
1989	332,540	376,540	709,080	129,550	307,330	436,880			1,145,960
1990	248,560	177,000	425,560	95,520	220,500	316,020			741,580
1991	73,100	31,150	104,250	33,020	70,140	103,160			207,410
Sub-total	1,588,640	2,368,280	3,956,920	593,430	1,359,760	1,953,190			5,910,110
<u>SECOND STAGE</u>									
1992	9,960	5,970	15,930						15,930
1993	152,160	53,500	205,660						205,660
1994	241,190	84,960	326,150						326,150
1995	260,480	93,460	353,940						353,940
1996	103,430	38,100	141,530						141,530
Sub-total	767,220	275,990	1,043,210						1,043,210
Total	2,355,860	2,644,270	5,000,130	593,430	1,359,760	1,953,190			6,953,320



Table 25 FINANCIAL CASH FLOW FOR DOMESTIC AND INDUSTRIAL DEVELOPMENT

(Unit: \$10<sup>3</sup>)

No.	Year	Loan Disbursement	Accumulated Loan	Revenue (A)	Expenditure			Total Income (B)	Government Subsidy	Total Income	Accumulated Income
					OM & R Cost (1)	OM & R Cost (2)	Repayment on Loan Interest				
1.	1984	12,100	12,100	0	0	0	423	0	423	0	
2.	1985	76,430	88,530	0	0	3,098	3,098	-423	423	0	
3.	1986	293,770	382,300	0	0	13,300	13,300	-3,098	3,098	0	
4.	1987	293,710	676,010	0	0	23,660	23,660	-13,300	13,300	0	
5.	1988	250,430	934,440	8,020	0	32,705	36,875	-23,660	23,660	0	
6.	1989	332,540	1,266,980	0,240	0	44,344	48,514	-28,855	28,855	0	
7.	1990	248,560	1,515,540	0,440	0	53,043	57,213	-40,274	40,274	0	
8.	1991	73,100	1,588,640	24,320	9,800	55,602	80,902	-48,773	48,773	0	
9.	1992	9,960	1,598,600	30,600	17,200	55,991	86,751	-56,502	56,502	0	
10.	1993	152,160	1,750,760	36,560	17,200	61,276	97,901	-56,502	56,502	0	
11.	1994	247,190	1,997,950	42,840	20,600	69,697	115,223	-61,421	61,421	0	
12.	1995	260,480	2,247,390	48,900	24,600	78,628	144,673	-72,803	72,803	0	
13.	1996	103,430	2,331,713	55,090	28,400	81,609	170,910	-95,873	95,873	0	
14.	1997	0	2,297,913	66,180	35,200	80,426	192,548	-115,830	115,830	0	
15.	1998	0	2,251,191	77,260	33,300	78,791	217,440	-126,368	126,368	0	
16.	1999	0	2,187,842	88,600	49,000	76,574	237,751	-140,180	140,180	0	
17.	2000	0	2,112,065	99,760	55,800	79,432	248,654	-149,071	149,071	0	
18.	2001	0	2,032,633	110,860	62,600	71,142	256,272	-148,894	148,894	0	
19.	2002	0	1,982,703	110,860	62,600	68,344	261,082	-145,412	145,412	0	
20.	2003	0	1,865,165	110,860	62,600	65,280	270,078	-150,222	150,222	0	
21.	2004	0	1,765,567	110,860	62,600	61,794	279,616	-159,218	159,218	0	
22.	2005	0	1,652,946	110,860	62,600	57,833	280,846	-168,756	168,756	0	
23.	2006	0	1,535,153	110,860	62,600	53,730	276,723	-169,986	169,986	0	
24.	2007	0	1,417,360	110,860	62,600	49,607	276,723	-165,863	165,863	0	
25.	2008	0	1,299,567	110,860	62,600	45,484	268,477	-205,140	205,140	0	
26.	2009	0	1,181,774	110,860	62,600	41,362	264,355	-157,617	157,617	0	
27.	2010	0	1,063,981	110,860	62,600	37,239	264,355	-153,495	153,495	0	
28.	2011	0	946,188	110,860	62,600	33,116	260,232	-149,372	149,372	0	
29.	2012	0	828,395	110,860	62,600	28,993	256,109	-145,249	145,249	0	
30.	2013	0	710,602	110,860	62,600	24,871	247,259	-141,126	141,126	0	
31.	2014	0	593,414	110,860	62,600	20,749	239,335	-136,399	136,399	0	
32.	2015	0	480,047	110,860	62,600	16,801	220,679	-128,475	128,475	0	
33.	2016	0	381,369	110,860	62,600	13,347	202,540	-109,819	109,819	0	
34.	2017	0	297,377	110,860	62,600	10,408	186,679	-91,680	91,680	0	
35.	2018	0	226,306	110,860	62,600	7,920	167,564	-75,819	75,819	0	
36.	2019	0	171,862	110,860	62,600	6,015	153,231	-56,704	56,704	0	
37.	2020	0	129,846	110,860	62,600	4,544	148,105	-42,371	42,371	0	
38.	2021	0	91,485	110,860	62,600	3,201	146,264	-37,245	37,245	0	
39.	2022	0	53,622	110,860	62,600	1,876	137,331	-26,471	26,471	0	
40.	2023	0	23,267	110,860	62,600	817	127,613	-12,475	12,475	0	
41.	2024	0	5,171	110,860	62,600	181	110,552	-5,660	5,660	0	
42.	2025	0	0	110,860	62,600	0	105,200	5,660	5,660	308	
43.	2026	0	0	110,860	62,600	0	105,200	5,660	5,660	5,968	
44.	2027	0	0	110,860	62,600	0	105,200	5,660	5,660	11,628	
45.	2028	0	0	110,860	62,600	0	105,200	5,660	5,660	17,208	
46.	2029	0	0	110,860	62,600	0	105,200	5,660	5,660	22,788	
47.	2030	0	0	110,860	62,600	0	105,200	5,660	5,660	28,368	
48.	2031	0	0	110,860	62,600	0	105,200	5,660	5,660	33,948	
49.	2032	0	0	110,860	62,600	0	105,200	5,660	5,660	39,528	
50.	2033	0	0	110,860	62,600	0	105,200	5,660	5,660	45,108	

Note: OM & R Cost (1); OM & R cost for distribution and purification. OM & R Cost (2); OM & R cost for raw water conveyance.

Table 26 FINANCIAL CASH FLOW FOR IRRIGATION DEVELOPMENT

(UNIT: \$10<sup>3</sup>)

No. Year	Loan Disbursement	Accumulated Loan	OM & R			Outflow			Project Revenue	Government Subsidy	Total (B)	Balance of Payment (B) - (A)
			Cost	Repayment of Loan	Interest	Repayment of Loan Capital	Total (A)					
1 1984	2,560	2,560	0	0	89	0	89	0	0	89	0	
2 1985	27,520	30,080	0	1,052	1,052	0	1,052	0	1,052	1,052	0	
3 1986	70,250	100,330	0	3,511	3,511	0	3,511	0	3,511	3,511	0	
4 1987	109,710	210,040	0	7,351	7,351	0	7,351	0	7,351	7,351	0	
5 1988	125,900	335,940	0	11,736	11,736	0	11,736	0	11,736	11,736	0	
6 1989	129,550	464,890	0	16,271	16,271	0	16,271	0	16,271	16,271	0	
7 1990	95,520	560,410	2,150	19,614	19,614	0	21,764	2,150	19,614	21,764	0	
8 1991	33,020	593,430	3,070	20,770	20,770	0	23,840	3,070	20,770	23,840	0	
9 1992	0	593,430	4,050	20,770	20,770	128	24,948	4,050	20,898	24,948	0	
10 1993	0	593,430	4,050	20,770	20,770	1,504	26,319	4,050	22,269	26,319	0	
11 1994	0	593,430	4,050	20,712	20,712	5,016	29,779	4,050	25,729	29,779	0	
12 1995	0	591,798	4,050	20,537	20,537	10,502	35,089	4,050	31,039	35,089	0	
13 1996	0	586,781	4,050	20,169	20,169	16,767	40,986	4,050	36,936	40,986	0	
14 1997	0	576,279	4,050	19,582	19,582	23,244	46,877	4,050	42,827	46,877	0	
15 1998	0	559,512	4,050	18,769	18,769	28,020	51,510	4,050	47,460	51,510	0	
16 1999	0	536,268	28,180	17,788	17,788	29,671	51,510	4,050	47,460	51,510	0	
17 2000	0	508,247	4,050	16,750	16,750	29,671	50,471	4,050	46,421	50,471	0	
18 2001	0	478,576	4,050	15,711	15,711	29,671	49,433	4,050	45,383	49,433	0	
19 2002	0	448,904	4,050	14,673	14,673	29,671	48,394	4,050	44,344	48,394	0	
20 2003	0	419,233	4,050	13,634	13,634	29,671	47,356	4,050	43,306	47,356	0	
21 2004	0	389,561	4,050	12,596	12,596	29,671	46,317	4,050	42,267	46,317	0	
22 2005	0	359,890	4,050	11,557	11,557	29,671	45,279	4,050	41,229	45,279	0	
23 2006	0	330,218	4,050	10,519	10,519	29,671	44,240	4,050	40,190	44,240	0	
24 2007	0	300,547	4,050	9,480	9,480	29,671	43,202	4,050	39,152	43,202	0	
25 2008	0	270,875	4,050	8,442	8,442	29,671	42,163	4,050	38,113	42,163	0	
26 2009	0	241,204	28,180	7,403	7,403	29,671	41,125	4,050	37,075	41,125	0	
27 2010	0	211,532	4,050	6,365	6,365	29,671	40,086	4,050	36,036	40,086	0	
28 2011	0	181,861	4,050	5,326	5,326	29,671	39,048	4,050	34,998	39,048	0	
29 2012	0	152,189	4,050	4,288	4,288	29,671	37,881	4,050	33,831	37,881	0	
30 2013	0	122,518	4,050	3,254	3,254	28,167	36,714	4,050	32,664	36,714	0	
31 2014	0	92,847	29,070	2,268	2,268	24,655	35,547	4,050	31,497	35,547	0	
32 2015	0	64,807	4,050	1,405	1,405	19,169	34,380	4,050	30,330	34,380	0	
33 2016	0	40,152	4,050	734	734	12,904	33,213	4,050	29,163	33,213	0	
34 2017	0	20,982	4,050	282	282	6,427	32,046	4,050	28,000	32,046	0	
35 2018	0	8,078	4,050	57	57	1,651	30,879	4,050	26,833	30,879	0	
36 2019	0	1,651	28,180	0	0	0	29,712	4,050	25,666	29,712	0	
37 2020	0	0	4,050	0	0	0	28,545	4,050	24,499	28,545	0	
38 2021	0	0	4,050	0	0	0	27,378	4,050	23,332	27,378	0	
39 2022	0	0	4,050	0	0	0	26,211	4,050	22,165	26,211	0	
40 2023	0	0	4,050	0	0	0	25,044	4,050	21,000	25,044	0	
41 2024	0	0	4,050	0	0	0	23,877	4,050	19,833	23,877	0	
42 2025	0	0	4,050	0	0	0	22,710	4,050	18,666	22,710	0	
43 2026	0	0	4,050	0	0	0	21,543	4,050	17,500	21,543	0	
44 2027	0	0	4,050	0	0	0	20,376	4,050	16,333	20,376	0	
45 2028	0	0	4,050	0	0	0	19,209	4,050	15,166	19,209	0	
46 2029	0	0	28,180	0	0	0	18,042	4,050	14,000	18,042	0	
47 2030	0	0	4,050	0	0	0	16,875	4,050	12,833	16,875	0	
48 2031	0	0	4,050	0	0	0	15,708	4,050	11,666	15,708	0	
49 2032	0	0	4,050	0	0	0	14,541	4,050	10,500	14,541	0	
50 2033	0	0	4,050	0	0	0	13,374	4,050	9,333	13,374	0	

Table 27 INVESTMENT COST OF THE REHABILITATION  
WORKS IN BAN KHAI EXISTING AREA

Item	Total (10 <sup>3</sup> ⱽ)	Foreign Currency (10 <sup>3</sup> ⱽ)	Local Currency (10 <sup>3</sup> ⱽ)
1. Direct Construction Cost			
1.1 Preparatory Works	23,400	3,100	20,300
1.2 Canal Construction			
- Main canal	79,800	16,600	63,200
- Lateral canal	37,500	12,100	25,400
- Drainage canal	6,600	2,600	4,000
1.3 Contractor's Administration Cost	5,150	1,200	3,950
1.4 Contractor's Profit	9,580	2,240	7,340
1.5 Tax	5,010	-	5,010
1.6 Land Acquisition	4,930	-	4,930
Sub-total	171,970	37,840	134,130
2. Engineering Services	21,720	15,200	6,520
3. O&M Equipment	19,690	18,230	1,460
4. Administration Cost of Executive Agency	8,350	-	8,350
Sub-total	221,730	71,270	150,460
5. Physical Contingency	33,260	10,690	22,570
Sub-total	254,990	81,960	173,030
6. Price Contingency	135,520	36,700	98,820
Grand-Total	390,510	118,660	271,850

Table 28 AGRICULTURE BENEFIT OF BAN KHAI EXISTING AREA

Crop	Price (£/t)	Production (t/ha)	Gross Production Value (£/ha)	Production Cost (£/ha)	Net Production Value (£/ha)	Area (ha)	Benefit (£ 10 <sup>3</sup> )
<u>With Project</u>							
Rice (Local)	8,360	4.0	33,440	6,930	26,510	960	25,450
Rice (High Yielding)	/1 7,940 /2 7,940	4.5 5.0	35,730 39,700	8,800 9,290	26,930 30,410	3,840 540	103,411 16,421
Groundnuts	10,440	2.5	26,100	4,990	21,110	1,080	22,799
Vegetable	7,520	10.0	75,200	15,600	59,600	300	17,880
Total						6,720	185,961
<u>Without Project</u>							
Rice (Local)	8,360	1.8	15,050	4,480	10,570	2,780	29,385
Rice (High Yielding)	/1 7,940 /2 7,940	2.3 3.6	18,260 28,580	7,220 7,620	11,040 20,960	1,860 1,900	20,534 39,824
Cassava	1,250	16.0	20,000	3,180	16,820	990	16,652
Vegetables	7,520	5.0	37,600	10,940	26,660	320	8,531
Total						7,850	114,926

/1: Wet Season

/2: Dry Season