3.4. Drainage

3.4 Drainage

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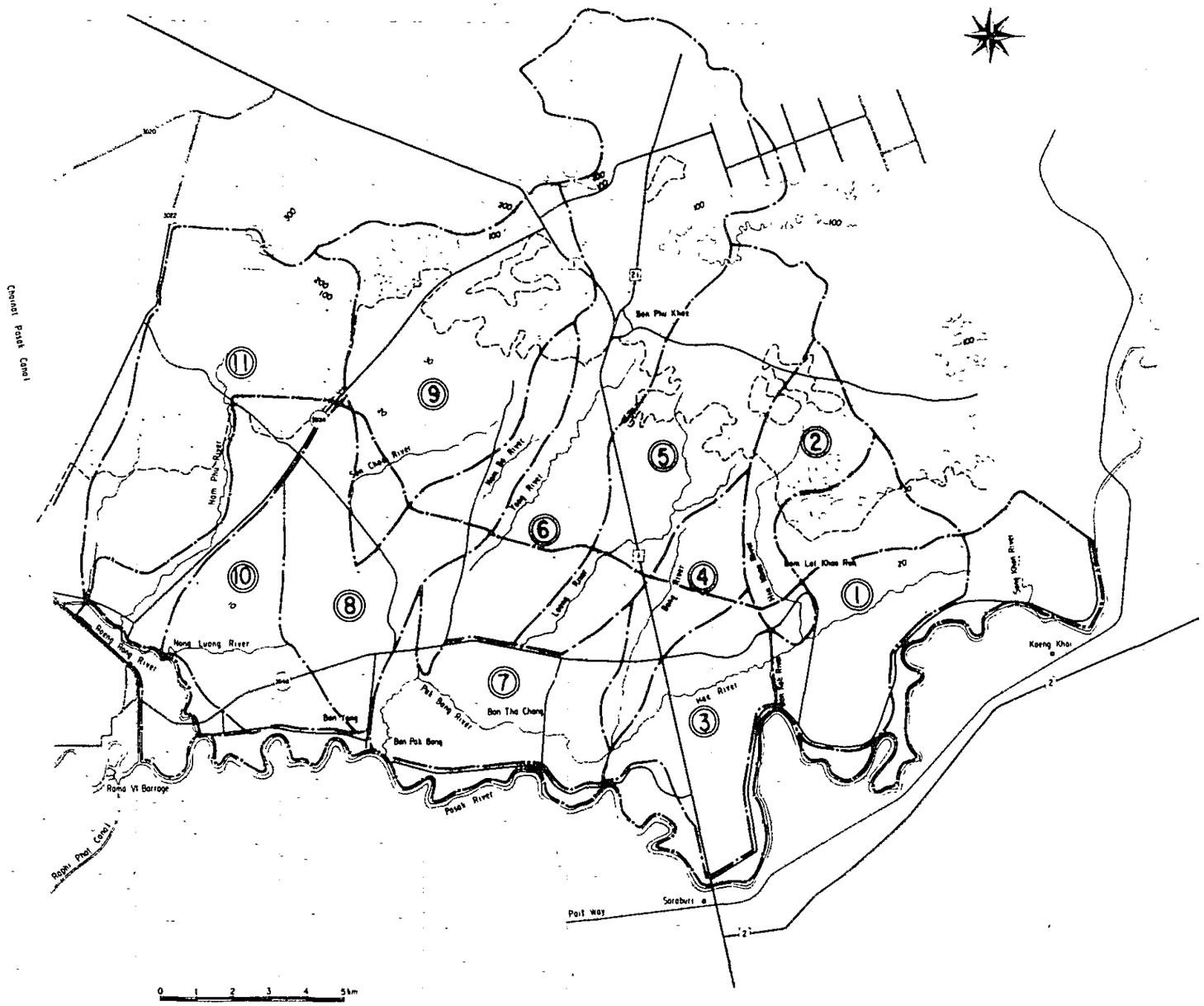
Table A.3.4-1 Drainage Area of Major Rivers

No. of Basin	River name	Drainage area (km)	Paddy (km)	Upland (km)
Pak Bang River Basin				
1.	Hae river (upstream)	26.5	22.5	4.0
2.	Hin Khao river	13.6	7.1	6.5
3.	Hae river (Middle stream)	18.3	18.3	-
4.	Bong river	11.1	11.1	-
5.	Laeng river (upstrem Wang Sai river)	32.8	18.3	14.5
6.	Yang river	58.7	20.5	38.2
7.	Pak Bang river	21.4	21.4	-
	Sub-total	182.4	119.2	63.2
(Nong Luang River)				
8.	Nam Ba river	24.9	24.9	-
9.	San Chao river	40.7	22.7	18.0
10.	Nong Luang river	16.2	16.2	-
	Sub-total	81.8	63.8	18.0

DRAINAGE BASIN MAP



NO	Drainage Area (km²)
1	26 5
2	13 6
3	18 3
4	11 1
5	32 8
6	58 7
7	21 4
8	24 9
9	40.7
10	16.2
11	51 2

LEGEND

- PADDY
- UPLAND
- NATIONAL ROAD
- RIVER
- RAIL WAY
- BOUNDARY OF DRAINAGE AREA
- PROPOSED PROJECT BOUNDARY

KINGDOM OF THAILAND
MINISTRY OF AGRICULTURE AND COOPERATIVES
ROYAL IRRIGATION DEPARTMENT

KAENG KHOI – BAN MO
PUMPING IRRIGATION PROJECT

DRAINAGE BASIN MAP

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.3.4-1

3.5. Agriculture

3.5 Agriculture

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Table A.3.5-1 Characteristics of RD Varieties

Name	Grain Type	Combination & Designation	Crossing Year	Released Year	Height (cm.)	Maturity (day)	Dormancy (day)	Characteristics	
								Advantages	Disadvantages
RD 1	Non-glutinous	LT/IR 8 (BKN S6-1-2)	1966	1969	115	130	21	- good plant type, stiff straw, wide adaptability, high responsive to fertilizer - non-sensitive to photoperiod - high yield - moderately resistant to Brown Spot and Green Leaf Hopper - clear grain and good milling quality	- susceptible to Blast, Yellow Orange Leaf Virus, Bacterial Blight, Ragged Stunt, Gall Midge and Brown Plant Hopper - not well grown in early vegetative stage - sensitive to Bacterial Blight at high nitrogen fertilizer level - rather poor eating quality
RD 2	glutinous	GP 15/T(N)1 (IR 253-4-1-2-1)	1964	1969	115	130	28	- non-sensitive to photoperiod - short height, wide adaptability - high yield - resistant to Brown Spot; moderately resistant to Green Leaf Hopper	- susceptible to Blast, Ragged Stunt, Bacterial Blight, Brown Plant Hopper and Gall Midge - fair eating quality
RD 3	non-glutinous	LT/IR 8 (BKN 12-2-2)	1966	1969	100	128	21	- non-sensitive to photoperiod - good plant type, short height, wide adaptability, high responsive to fertilizer - high yield - can be grown in poor soil fertility - covered panicle for preventing from bird damage - resistant to Green Leaf Hopper	- susceptible to Blast, Bacterial Blight, Brown Spot, Ragged Stunt and Gall Midge - rather poor eating quality
RD 4	glutinous	17-1(LT/IR 8)*W 1252// RD2 * sister line of RD 1 (BKN 6805 -22-13)	1968	1973	107	127	28	- non-sensitive to photoperiod - stiff straw, its plant type is better than MN 62 M - high yield - resistant to Gall Midge and Brown Plant Hopper - its grain is longer than MN 62 M	- very poor eating quality - susceptible to Blast, Bacterial Blight and Ragged Stunt - 20% sterility - should not be grown if there is no outbreak of Gall Midge
RD 5	non-glutinous	PN 16/Sigadis (BKN 6517-9-2-2)	1965	1973	146	140	42	- taller than RD 1, can be grown in semi-deep water - longer growth duration than RD 1 - intermediate amylose content, very good eating quality and good milling quality - resistant to Blast and moderately resistant to Bacterial Blight	- weakly sensitive to photoperiod, hence, not suitable for Dry Season - at normal fertilizer level, may produce the same yield as RD 1, but at higher level may produce less

Note: 1/ Compiled by Prabhasri Surapat, Songkran Chitrakon and Dr. Prathes Sittiyos Rice Division, Department of Agriculture (September 1981)

Name	Grain Type	Combination & Designation	Crossing Year	Released Year	Height (cm.)	Maturity (day)	Dormancy (day)	Characteristics	
								Advantages	Disadvantages
RD 6	glutinous	KDML 105'65-G_2U-68-254 (Mutant Rice Variety) KDML 105 irradiated in 1965 G_2=20 krad Gamma Ray U=Uranium 235	1965	1977	154	21 Oct.	35	- same height as NSPT - wide adaptability - resistant to Brown Spot - clear aromatic grain - good eating quality	- susceptible to Bacterial Blight and Brown Plant Hopper - sensitive to photoperiod, can be grown only in Wet Season
RD 7	non-glutinous	C_4-63/GR 88// Sigadis (SPR 6726-134-2-26)	1967	1975	108	120-130	7	- non-sensitive to photoperiod - good plant type, stiff straw, good exertion - high responsive to fertilizer - resistant to Blast and moderately resistant to Bacterial Blight - tolerant to acid sulfate soil - earlier than RD 1 for 7 days - better cooking and eating quality than RD 1	- susceptible to Yellow Orange Leaf Leaf Virus, Ragged Stunt, Brown Plant Hopper and Gall Midge - should not be grown in semi-deep water
RD 8	glutinous	NSPT/IR 262 (KKN 6721-S-7-4)	1966	1978	151	23 Oct.	21	- good plant type and tillering - a little bit shorter than NSPT - dark green leaves and erect flag leaf - more drought tolerance than NSPT - higher yield than NSPT especially in drought conditions - long slender grain, good cooking and eating quality - resistant to Brown Spot	- sensitive to photoperiod
RD 9	non-glutinous	CNT 3176/W 1256// RD 2 (BKN 6809-74-40)	1968	1975	120	115-125	35	- non-sensitive to photoperiod - good plant type, stiff straw - earlier than RD 1 - high responsive at low fertilizer level - resistant to Ragged Stunt in natural condition; moderately resistant to Brown Plant Hopper, Green Leaf Hopper and Gall Midge	- susceptible to Bacterial Blight - rather poor eating quality
RD 10	glutinous	RD 1'69 NF_1U-G6-6 (Mutant Rice Variety) RD 1 irradiated in 1969 NF_1=1.5 Krad Fast Neutrons U=Uranium 235	1969	1981	100-105	130	25	- non-sensitive to photoperiod - good plant type, short height - moderately resistant to Blast - long slender grain and good eating quality	- susceptible to Brown Spot and Ragged Stunt

Name	Grain Type	Combination & Designation	Crossing Year	Released Year	Height (cm.)	Maturity (day)	Dormancy (day)	Characteristics	
								Advantages	Disadvantages
RD 11	non-glutinous	IR 661/KDML 105 (NP 153)	1969	1977	110	135	28	- non-sensitive to photoperiod - good plant type, stiff straw - high responsive to fertilizer - moderately resistant to Brown Spot	- susceptible to Bacterial Blight, Ragged Stunt and Brown Plant Hopper - rather poor eating quality
RD 13	non-glutinous	NPY 132/PS 39 (BKN 6402-352)	1964	1978	160	26 Jan.	21	- very well exerted panicle - higher yield than NPY 132 - suitable for Nakhon Si Thammarat, Phattalung, Songkhla and Pattani in Wet Season - medium grain, good cooking and eating quality - resistant to Blast and Brown Spot	- sensitive to photoperiod
RD 15	non-glutinous	KDML 105'65 G_1U-45 (Mutant Rice Variety) KDM 105 irradiated in 1965 G_1=15 Krad Gamma Ray U=Uranium 235	1965	1978	130	10 Oct.	42-49	- higher yield than KDML 105 - better drought resistant - resistant to Brown Spot - long clear grain and good eating quality like KDML 105	- sensitive to photoperiod
RD 17	non-glutinous	IR 262/PG S6 (BKN 6986-66-2)	1969	1979	130	140	35-42	- high yield - tolerant to deep water - withstand submergence for 7 days - moderately tolerant to drought condition - moderately resistant to Bacterial Blight - good for nonirrigated area	- susceptible to Brown Plant Hopper - non-sensitive to photoperiod not recommended for Dry Season - fair cooking quality
RD 19	non-glutinous	IR 262/PG S6 (BKN 6986-147-2)	1969	1979	130	15 Nov.	28-35	- tolerant to deep water - withstand submergence for 7 days - moderately resistant to Bacterial Blight and Brown Spot - should be grown in Wet Season in Central Region - good elongation ability by fertilizer application - good kneeing ability	- susceptible to Brown Plant Hopper - sensitive to photoperiod - slightly chalky grain, suitable for parboiled rice
RD 21	non-glutinous	KDML 105/NM S-4// IR 26 (SPR 7419-86-2-5)	1974	1981	100-125	120-130	28	- non-sensitive to photoperiod - resistant to Brown Plant Hopper; resistant to Bacterial Blight and Ragged Stunt in natural condition - good grain and good eating quality	- susceptible to Yellow Orange Leaf Virus

Name	Grain Type	Combination & Designation	Crossing Year	Released Year	Height (cm.)	Maturity (day)	Dormancy (day)	Characteristics	
								Advantages	Disadvantages
RD 23	non-glutinous	RD 7/IR 32//RD 1 (SPRLR 76002-168-1-1)	1976	1981	115-120	120-130	35	- non-sensitive to photoperiod - moderately resistant to Brown Plant Hopper and Green Leaf Hopper; resistant to Bacterial Blight and Ragged Stunt in natural condition - good grain and good eating quality	- susceptible to Yellow Orange Leaf Virus
RD 25	non-glutinous	KDML 105/IR 2061// KDML 105/IR 26 (BKN 75091-CNT-B$_3$-RST-40-2-2)	1975	1981	90-100	110-120	21	- non-sensitive to photoperiod - short height - very resistant to Ragged Stunt and Brown Plant Hopper, moderately resistant to Stem Borer	- susceptible to Yellow Orange Leaf Virus - very slightly chalky grain
RD 27	non-glutinous	KTO/KTH 17 (BKN 6113-79)	1961	1981	160-170	early Nov.		- moderately resistant to Sheath Rot and Sheath Blight; resistant to Ragged Stunt in natural condition - good eating quality	- sensitive to photoperiod - susceptible to Yellow Orange Leaf Virus and Brown Plant Hopper

Notes:
RD - Rice Department
LT - Leuang Tawng (Dry Season)
GP 15 - Gam Pai 15
MN 62 M - Muey Nawng 62 M
PN 16 - Puang Nahk 16
GR 88 - Gow Ruang 88
KDML 105 - Khao Dawk Mali 105
NSPT - Niaw San Pah Tawng
PG 56 - Pin Gaew 56
NPY 132 - Nahng Prayah 132
PS 39 - Pak Sian 39
NH S-4 - Nahng Hon S-4
KTO - Khao Tah Oo
KTH 17 - Khao Tah Haeng 17

IR - rice variety from IRRI
T(N)1 - Taichung Native 1, rice variety from Taiwan
W - rice variety from India
Sigadis - rice variety from Indonesia
C_4-63 - rice variety from the Philippines
BKN - Bangkhen Rice Experiment Station
SPR - Suphanburi Rice Experiment Station
KKN - Khon Kaen Rice Experiment Station
CNT - Chainat Rice Experiment Station
LR - Lowland Rice

Table A.3-5-2 Paddy Yield by Respective Project

Name of Project	Yield (kg/ha) 1975	1976	1977	1978	1979	1980	Mean
Wet Season Paddy							
Tha Luang	2,888	2,794	3,250	2,900	3,438	2,944	3,036
Khlong Phrieo (L.V.)	2,831	2,650	2,763	3,494	2,813	3,438	2,998
Nakhon Luang	2,144	2,975	3,000	2,513	2,156	2,506	2,549
North Rangsit	2,381	2,281	1,956	2,213	3,213	2,650	2,449
Dry Season Paddy							
Khlong Phrieo (H.Y.V.)	-	-	-	-	-	4,063	4,063

Dry season paddy start in 1980

Source: O & M Division, R.I.D.

Table A.3.5-3 Water Qualities of the Rivers in Thailand

River	Place	Ca	Mg	Na	K	HCO_3	SO_4	Cl	SiO_2	PO_4	NH_4+NO_3	SS
Mekong	Chian Saen	32.1	5.9	8.4	1.7	116.9	17.1	6.9	14.4	0.00	0.06	186.2
"	Nong Khai	31.1	5.7	7.7	1.6	115.6	14.7	6.2	15.0	0.00	0.08	174.1
Chi	Khon Kaen	21.1	4.0	57.1	3.9	69.7	5.2	94.5	10.1	0.00	0.12	60.5
Mun	Surin	10.6	1.2	28.7	3.0	21.6	1.3	56.6	12.8	0.01	0.63	130.7
"	Ubon	10.9	2.3	40.0	2.8	42.4	2.0	61.6	10.8	0.00	0.16	46.6
Ping	Chiang Mai	23.1	3.8	3.9	2.7	102.1	0.7	0.5	23.6	0.00	0.14	103.1
"	Tak	23.8	3.5	5.8	1.1	105.5	0.3	1.5	20.3	0.00	0.08	120.2
Wang	Lampang	28.3	4.0	5.2	3.6	119.0	1.7	0.8	22.0	0.00	0.07	228.9
Nan	Nan	25.3	3.5	4.9	3.2	104.8	0.3	0.7	21.2	0.00	0.08	128.1
Yom	Sukhothai	31.6	6.0	7.9	2.8	140.8	3.2	0.6	21.1	0.00	0.06	296.8
Chao Phraya	Ayutthaya	22.5	3.9	8.4	3.2	99.7	1.2	7.5	18.3	0.00	0.08	192.1
"	Nongburi	23.2	4.8	10.4	3.1	99.6	3.9	11.1	16.5	0.00	0.11	93.5
Pasak	Saraburi	46.8	4.9	6.7	2.9	164.6	0.3	3.9	19.0	0.01	0.17	65.9
Average of 30 Rivers		19.8	3.7	10.7	2.5	82.6	3.3	12.7	16.0	0.00	0.14	112.0

Source: Agriculture Investigation Vol.46, 1958

Note : SS: Suspended Solid

3.6. Agro-economy

3.6. Agro-economy

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Table A.3.6-1 Results of 30 Farm Survey (1)

Sr. No.	Sample No.	Farming Operating Size (rai)								Farm Family Income (B)			On-farm Expense (B)	Agricultural Credit (B)				Household Cash Expense (B)
		Paddy Field				Upland Field								Loan	Repayment		Out-standing	
		Owned	Rented	Leased	Total	Owned	Rented	Leased	Total	On-farm	Off-farm	Total		Received	Principal	Interest		
1	I-1	35	-	-	35	-	-	-	-	66,800	1,000	67,800	15,800	6,000	-	720	6,000	15,525
2	I-2	13	-	-	13	-	-	-	-	20,300	-	20,300	2,685	-	-	-	-	7,739
3	I-3	-	9	-	9	-	-	-	-	3,500	7,000	10,500	1,765	7,000	-	840	7,000	5,850
4	I-4	-	20	-	20	-	-	-	-	11,550	8,440	19,990	2,200	6,000	-	720	6,000	15,320
5	II-1	-	-	-	-	1	-	-	1	640	28,000	28,640	300	-	-	-	-	24,305
6	II-2	3	-	-	3	6	-	-	6	15,000	21,600	36,600	5,790	-	-	-	-	24,878
7	II-3	-	-	-	-	12	-	-	12	4,680	22,000	26,680	2,300	-	-	-	-	20,980
8	II-4	-	-	-	-	20	-	-	20	79,000	4,000	83,000	17,098	25,000	-	3,000	25,000	42,905
9	II-5	9	-	-	9	11	10	-	21	43,850	-	43,850	11,410	65,000	-	7,800	65,000	19,150
10	III-1	5	-	-	5	5	-	-	5	6,300	5,000	11,300	1,504	-	-	-	-	6,450
11	III-2	15	-	-	15	-	-	-	-	10,125	3,000	13,125	2,300	5,000	-	1,250	5,000	7,610
12	III-3	20	-	-	20	-	-	-	-	22,040	-	22,040	6,610	5,000	5,000	1,250	-	6,010
13	III-4	20	12	-	32	-	-	-	-	23,310	3,650	26,960	8,525	-	-	-	-	8,295
14	III-5	65	-	-	65	-	-	-	-	54,250	-	54,250	20,640	50,000	50,000	6,000	-	10,992
15	IV-1	8	-	-	8	-	-	-	-	7,400	54,000	61,400	3,720	-	-	-	-	18,440
16	IV-2	11	-	-	11	-	-	-	-	3,610	10,000	13,610	3,060	5,000	5,000	1,000	-	8,135
17	IV-3	15	-	-	15	-	-	-	-	21,275	-	21,275	6,655	-	-	-	-	7,155
18	IV-4	-	15	-	15	-	-	-	-	10,491	-	10,491	4,750	1,000	-	300	1,000	4,754
19	IV-5	-	30	-	30	-	-	-	-	-	15,750	15,750	6,754	10,000	-	1,200	10,000	9,270
20	IV-6	17	-	-	17	40	-	-	40	30,172	-	30,172	10,940	-	-	-	-	11,505
21	V-1	10	-	-	10	-	-	-	-	14,630	8,000	22,630	5,165	-	-	-	-	4,920
22	V-2	15	-	-	15	-	-	-	-	19,760	2,000	21,760	10,020	6,000	-	720	6,000	4,766
23	V-3	16	-	-	16	-	-	-	-	19,800	10,000	29,800	7,245	8,000	8,000	960	-	4,970
24	V-4	-	16	-	16	-	-	-	-	11,600	13,800	25,400	6,460	10,000	-	1,200	10,000	29,760
25	V-5	45	-	-	45	-	-	-	-	24,420	-	24,420	12,460	-	-	-	-	7,605
26	V-6	53	-	-	53	-	-	-	-	78,000	-	78,000	23,300	5,000	-	600	5,000	21,371
27	VI-1	10	-	-	10	-	-	-	-	10,500	13,800	24,300	4,200	-	-	-	-	9,908
28	VI-2	20	-	-	20	-	-	-	-	15,600	6,000	21,600	3,790	-	-	-	-	7,050
29	VI-3	20	-	-	20	-	-	-	-	12,000	-	12,000	7,310	5,000	5,000	650	-	6,390
30	VI-4	-	36	-	36	-	-	-	-	28,000	12,000	40,000	17,050	9,000	-	1,080	9,000	9,670
Total		425	138	-	563	95	10	-	105	668,603	249,040	917,643	231,806	228,000	73,000	29,290	155,000	381,678
Average		20.2	19.7	-	20.9	13.6	10	-	15.0	22,287	8,301	30,588	7,727	7,600	2,433	976	5,167	12,723

Table A.3.6-2 Results of 30 Farm Survey (2)

(Unit: Baht)

Sr. No.	Sample No.	Family Size	Rice, Cereals	Fish, Meat	Food Ingredient	Beverage, Tobacco	Clothes	House, Water, Fuel	Furniture, Household Operation	Medical Care	Transport, Communication, Recreation	Education	Taxes	Others	Total
1	I-1	3	7,500	800	200	-	600	150	-	5,800	300	-	175	-	15,525
2	I-2	4	200	3,000	400	800	2,000	100	-	500	400	-	39	300	7,739
3	I-3	5	500	1,500	500	300	1,000	490	-	200	360	1,000	-	-	5,850
4	I-4	7	7,200	1,500	300	200	3,000	420	-	1,000	1,200	500	-	-	15,320
5	II-1	8	16,000	3,000	250	220	1,500	175	-	1,600	460	1,100	-	-	24,305
6	II-2	3	3,600	1,600	100	1,860	500	420	12,000	200	3,600	750	48	200	20,878
7	II-3	6	11,000	3,000	500	500	-	1,920	-	1,000	-	3,000	60	-	20,980
8	II-4	7	5,100	3,500	200	480	1,500	720	5,000	500	500	25,000	105	300	42,905
9	II-5	7	9,000	3,000	200	800	2,000	450	-	200	2,300	1,000	100	100	19,150
10	III-1	4	400	2,000	400	300	1,000	-	-	1,500	800	-	50	-	6,450
11	III-2	2	100	600	100	300	500	100	50	500	300	5,000	60	-	7,610
12	III-3	5	200	1,400	250	150	1,600	120	-	800	400	1,000	90	-	6,010
13	III-4	3	500	1,600	100	540	1,000	240	3,000	500	500	-	155	160	8,295
14	III-5	6	600	3,000	300	900	2,500	200	-	1,000	700	1,500	292	-	10,992
15	IV-1	4	6,300	3,000	100	200	3,000	1,200	2,500	-	1,600	-	40	500	18,440
16	IV-2	5	650	1,400	400	1,800	800	480	-	1,000	550	1,000	55	-	8,135
17	IV-3	5	720	1,200	-	730	350	480	-	1,000	900	1,700	75	-	7,155
18	IV-4	2	200	2,100	100	800	350	84	-	1,000	100	-	-	20	4,754
19	IV-5	2	3,000	2,000	100	530	1,500	480	-	800	800	-	-	60	9,270
20	IV-6	6	600	2,400	500	700	2,500	120	-	4,000	400	-	285	-	11,505
21	V-1	3	500	1,400	200	350	1,000	120	-	800	500	-	50	-	4,920
22	V-2	4	300	1,200	100	300	1,000	390	-	200	200	1,000	56	20	4,766
23	V-3	10	300	800	150	500	1,000	240	-	200	200	1,500	80	-	4,970
24	V-4	5	300	2,400	100	60	1,850	20,400	2,000	150	350	2,000	-	150	29,760
25	V-5	6	300	2,500	300	450	1,800	230	-	1,200	600	-	225	-	7,605
26	V-6	4	300	2,500	200	350	1,500	2,400	-	1,200	350	12,000	371	200	21,371
27	VI-1	4	600	4,000	100	320	800	288	-	350	2,100	1,100	50	200	9,908
28	VI-2	5	600	2,500	400	710	1,500	240	-	500	500	-	100	-	7,050
29	VI-3	5	650	2,000	300	550	1,000	140	-	900	750	-	100	-	6,390
30	VI-4	6	1,500	3,040	100	250	2,000	480	-	150	700	1,200	-	250	9,670
Total		146	78,720	63,940	6,950	15,950	40,650	33,277	24,550	28,750	22,420	61,350	2,661	2,460	381,678
Average		49	2,624	2,131	232	532	1,355	1,109	818	958	747	2,045	89	82	12,722

3.7. Agricultural Institution

3.7 Agricultural Institution

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3.7.1. Khlong Luang Rice Experiment Station

This experiment station has been carring out such experiments and trials as yield trials, pure seeds maintenance, breeding, pest and disease resistance tests, fertilization tests,etc. for low land paddy and deep water paddy.

The general descriptions of the station are shown as follows.

Location : Khlong Luang Rice Experiment Station (KLG) was established in 1922, on Paholyothin Road, Khlong Nung village, Khlong Luang district, Pathumthani province; located at 46.5 kilometers north from Bangkok (14°16 N)

Soil and Climate :

1. Soil type : Ongkharak and Rangsit, pH 4.1 - 4.5
2. Annual rainfall : average 1,394 mm. with 283 mm. maximum in September
3. Temperature : minimum 26°C
   miximum 30°C
   average 28.49°C
4. Altitude : 6.07 - 7.78 ft. above mean sea level
5. Water Source : Pasak river via irrigation canal No. 9L (left)

Total Area : 87.37 hectares (546.12 rai)

1. Office and houses	18.24	hectares	(114 rai)
2. Rice breeding nursery	15.44	"	(96.52 rai)
3. Rice seed multiplication	43.80	"	(273.73 rai)
4. Others	9.47	"	(59.20 rai)
5. Rotation crops	0.42	"	(2.67 rai)

Number of Office and Houses:

1. Office	1
2. Houses for technicains	11
3. Houses for labours	7
4. Quonset hut	1
5. Seed storage	1
6. Workshop	5

Number of Farm Machines provided :

1.	Truck	1
2.	Jeep	1
3.	Tractor	4
4.	Water pump	17
5.	Rotary tiller	2

Technicians and Labourers available :

1.	Graduated officer	8
2.	Certificated officer	7
3.	Permanent labourer	29
4.	Temporary labourer	80 - 130

Remark: 1 hectare = 6.25 rai
1 acre = 2.50 rai

3.7.2. Phra Phutthabat Field Crop Experiment Station

This experiment station, located most closely to the Project Area, has been carrying out the yield trials, breedings, intermittent croppings, planting density tests, etc. for sorghum, maize, soybean, and cotton.

The general descriptions of the station are shown as follows.

Back ground : Phra Phutthabat Field Crop Experiment Station was established in 1955, named Phra Phutthabat Agricultural Experiment Station.

Location : Phra Phutthabat Field Crop Experiment Station is located in a part of Phra Phutthabat lend-settlement area. Tambon Koktoom, Amphoe Muang, Lopburi Province.
Lat. 14°47'N. Long. 100°50'E. The Elevation about 230 ft (70 m) above mean sea level. It is 144 km apart from Bangkok, and 20 km. from Lopburi.

Area : Total area : 200 rai (32 ha)
Building and Resident lots : 50 rai (8 ha)
Experimental fields : 150 rai (24 ha)

Soil : Reddish Brown Lateritic Soil, Clay Loam,
Pakchong Series
Soil test ; pH 6.7, OM 0.72%, P 0.077% , K 0.063% (1979)
Soil texture; clay 18.2%, silt 30.4%, coarse sand 35.6%, fine sand 15.9%

Irrigation : 1. Rainfed, average rainfall 1200 mm./year
Total Rainfall 950 mm. (1979)
maximum Rainfall 289.1 mm. (Sep. 1979)
minimum Rainfall 1.4 mm. (Nov. 1979)

2. Underground Water by two deep well pumps supplying the water to about 20 rai (3.2 ha) of experiment area.

Staff and Officer :

Director	1	persons
Agricultural Technologist	6	"
Agricultural officer	6	"
Finance and Accounting offier	1	"
Automotive mechanicians	1	"
Permanent Workers	66	"
Temporary workers	100	"

Staff from other divisions and other Field Crop Experiment Stations :

Agricultural technologist	3	persons
Agricultural officer	2	"
Agricultural officer assistant	3	"

Duties and Objectives of Station :

The station conducts all research programs planned by Field Crop Division that aims to improve crop varieties, cultural practices, soil and fertilizer managements and extension within the area of Lopburi and Saraburi provinces.

3.7.3. Suphanburi Rice Experiment Station

This station, located rather closely to the Project Area on the almost same altitude as that of the Changwat Saraburi including the Project Area, has been carrying out various experiments and trials to seek the method suitable for paddy growing in the Central Plain. The records and data obtained by the station were compiled to a study report entitled "Rice and Rice Cultivation" and published in 1979. The said report details on various subjects such as puddling, seeding, transplanting, water management, pest control, fertilization and so on. The study for the project has employed the regression equation used in the report, as shown in Fig. A.3.7-1 for looking into possibility of achieving the target yield.

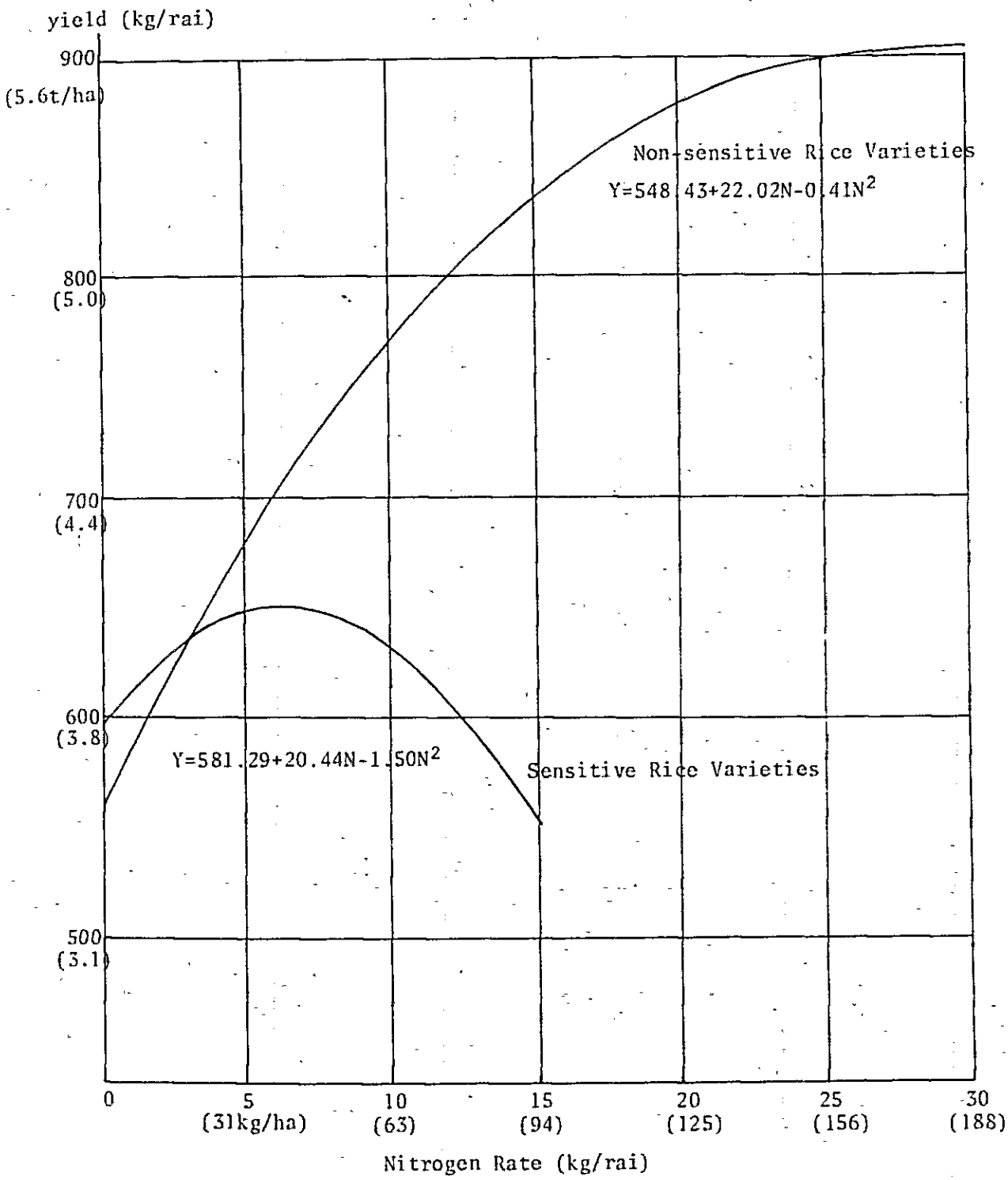
Table A.3.7-1 Fertilizer Rate for Good Rice Varieties in Central Part of Thailand

Kinds of rice	Fertilizer in transplanting period		Top dressing fertilizer in panicle initiation period						Remarks
			usual rate (kg/rai)			Use only one kind high yield rate (kg/rai)			
	choose only one formula	rate kg/rai	Ammonium sulphate 20% N	Ammonium chloride 25% N	Urea 45% N	Ammonium sulphate 20% N	Ammonium chloride 25% N	Urea 45% N	
Non-sensitive rice varieties (harvesting follow to growing age) as RD 1, RD 3, RD 5, RD 7, RD 9 and RD 11.	16-20-0	20	14	12	7	24	20	11	Choose only one formula in transplanting period. For top dressing in panicle initiation period, can choose one from all fertilizers in the same line as basal fertilizer.
	18-22-0	18	12	12	7	24	20	11	
	20-20-0	20	10	8	5	20	16	9	
			Rate 6-4-0 kg(Element)/rai			Rate8-4-0 kg(Element)/rai			
Sensitive rice varieties (harvesting follow to season) as Leung-pra-thew 123, Nang-mon S-4 and Karw dok mali 105.	16-20-0	20	4	4	2	14	12	7	
	18-22-0	18	4	4	2	14	12	7	
	20-20-0	20	-	-	-	10	8	5	
			Rate 4-4-0 kg(Element)/rai			Rate 6-4-0 kg(Element)/rai			

In sandy paddy field, should apply potassium chloride 60% K_2O 4 kg/rai too. (in transplanting period)

Fig. A.3.7-1 Rice Response for Nitrogen Fertilizer

(Kind of Soil, Clay to Crumble Soil mixed with Clay)



Source: Rice and Rice Cultivation

Suphan Buri Rice Experiment Station

Fig. A.3.7-2 Organization of Department of Cooperative Promotion

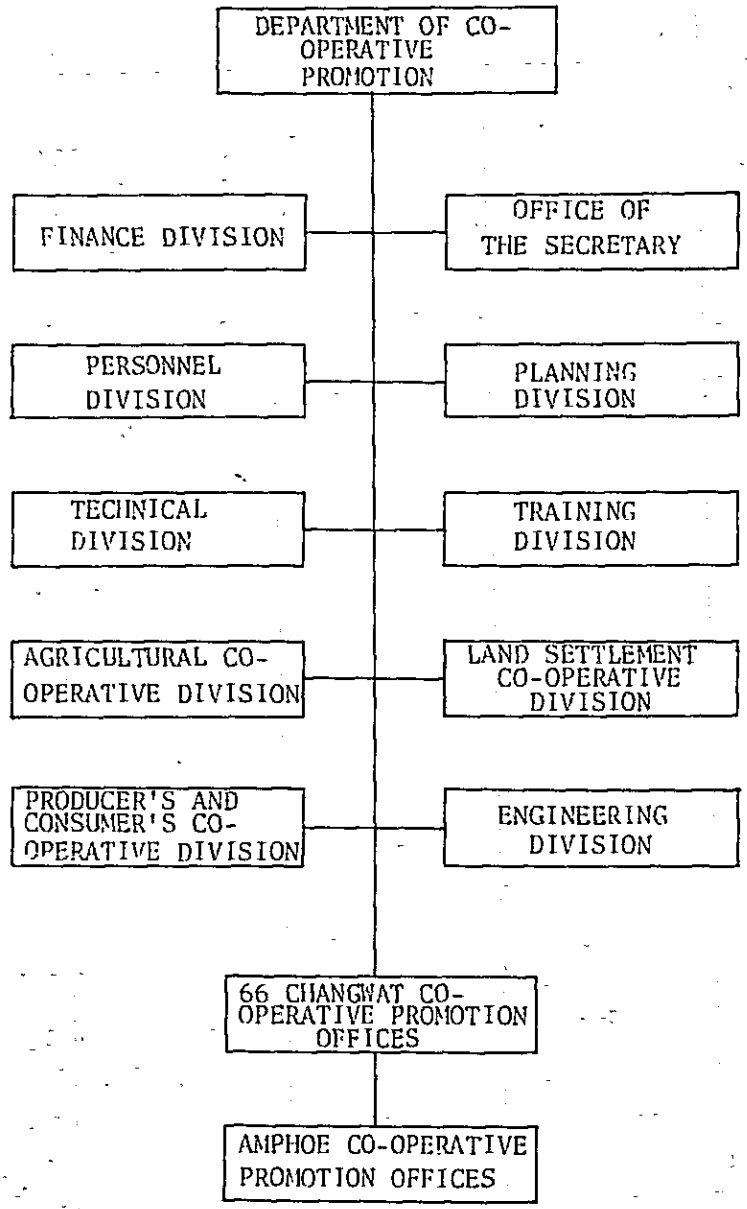


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Fig. A.3.7-3 Organization of Department of Agricultural Extension

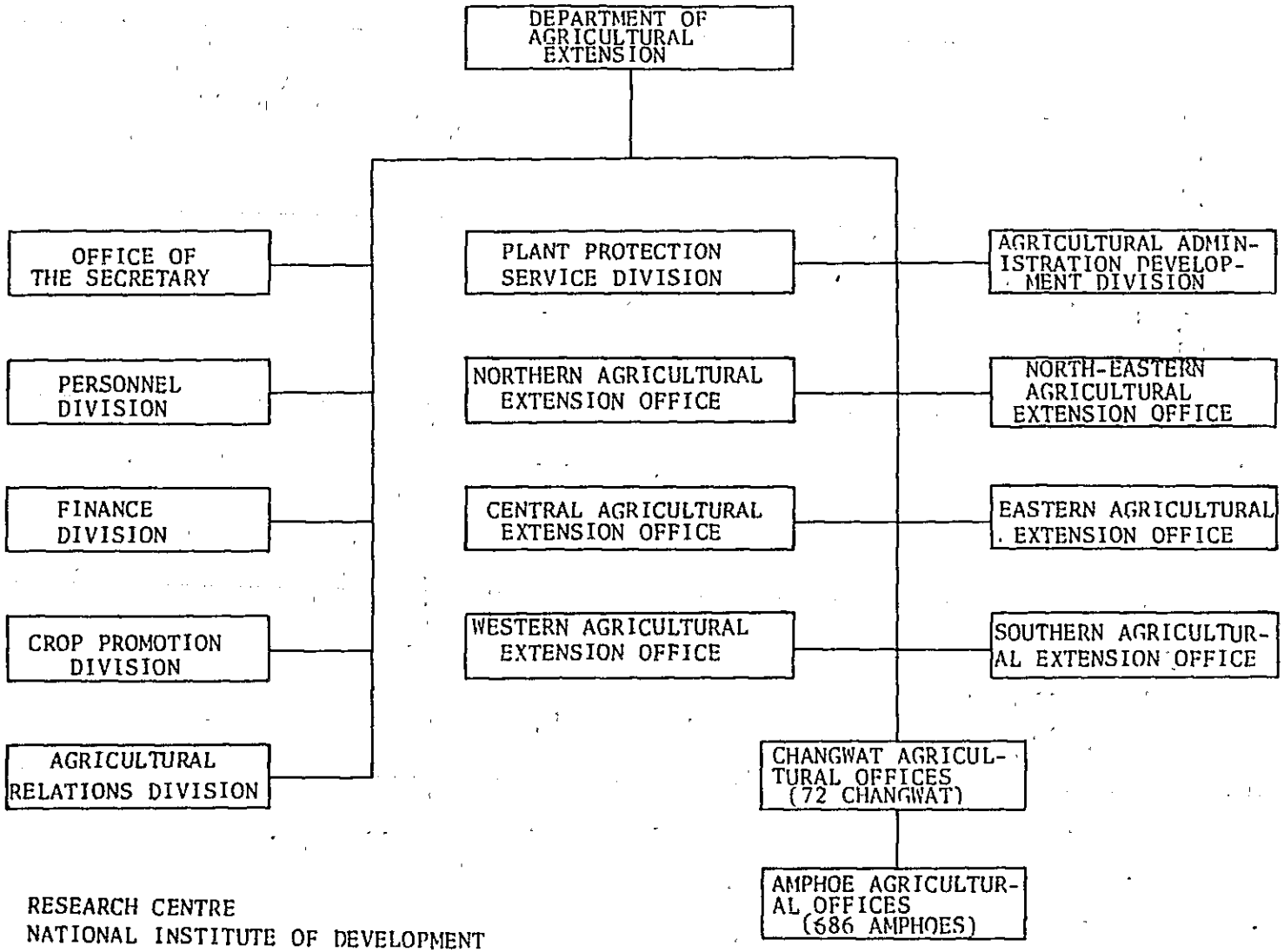

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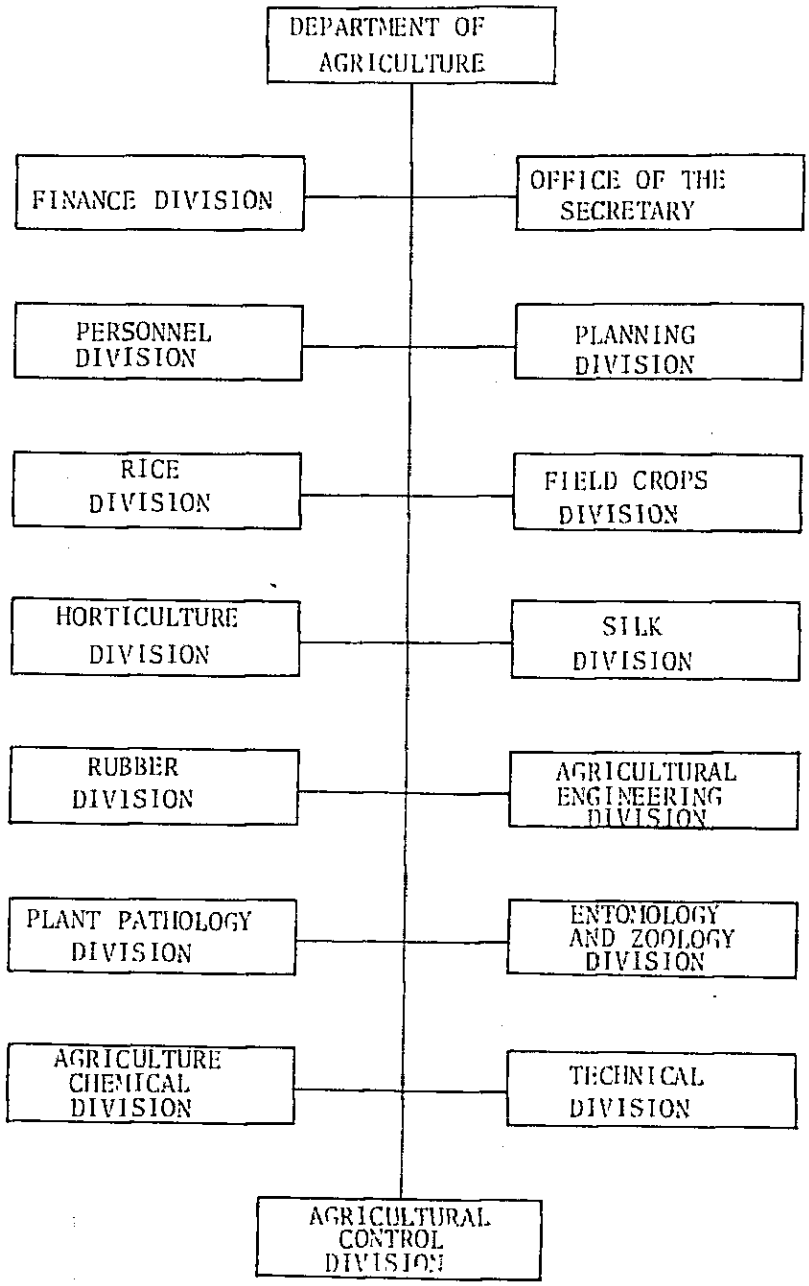
Fig. A.3.7-4 Organization of Department of Agriculture



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APPENDIX IV. THE PROJECT

APPENDIX IV THE PROJECT

4.1. Study on Availability of Water Resources

4.2. Study on Optimum Irrigtion Scheme

4.3. Assessment of Existing Pumping Project

4.4. Irrigation Scheme

4.5. Drainage Scheme

4.6. Demonstration Scheme

4.7. Agricultural Development Plan Including Supporting Services

4.8. Cost Estimate

4.1. Study on Availability of Water Resources

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4.1 Study on Availability of Water Resources

4.1.1. Irrigation Water Requirements

A. Basic concept

The following formula was applied to determine the irrigation water requirement under the Project.

- Net Water requirements (NWR) = Consumptive use of crops + percolation + water for puddling.
- Field water requirements (FWR) = NWR - Effective rainfall + field losses.
- Diversion water requirements (DWR) = FWR + Conveyance and operation losses.

B. Consumptive use of crops

The consumptive use of crops can be estimated by multiplying the estimated evapotranspiration values by crop coefficients (Kc).

B.1. Evapotranspiration (ET)

Evapotranspiration can be determined by various methods in using evaporation measurement with evaporation pan, application of empirical formula based on the climatological data, etc. For the Project, the monthly evapotranspiration was estimated by applying the modified Penman Method; the climatological data on temperature, wind velocity and so on, recorded at Lopburi Station (25 years from 1951 to 1975) were utilized.

Evapotranspiration (ET)

Month	mm/day	mm/month
April	6.7	201.0
May	5.3	164.3
June	4.7	141.0
July	4.2	130.2
August	4.0	124.0
September	3.8	114.0
October	4.2	130.2
November	4.9	147.0
December	5.5	170.5
January	5.5	170.5
February	6.0	168.0
March	6.9	213.9
Total	5.14	1,874.6

As learnt from the above, the maximum value appears in April at 6.7 mm/day with the minimum at 3.8 mm/day in September. The annual total amounts to 1,874.6 mm, which is 136 percent of the total evaporation per annum.

B.2. Crop factor

Depending on the plants' growing stage, the following crop factors were adopted for each crop. For this, reference was made to the study report on the Lam Sonthi Medium Scale Irrigation Project and FAO's Irrigation and Drainage Paper.

Crop Factors (Kc)

Month	Paddy		Upland Crops	
	L.V.	H.Y.V.	Maize	Groundnuts
1st	1.00	1.00	0.40	0.30
2nd	1.00	1.00	0.40	0.30
3rd	1.08	1.15	0.80	1.05
4th	1.15	1.15	0.80	1.05
5th	1.15	-	-	-

Consumptive use of paddy for both the local varieties and HYV varieties is shown below:

Consumptive Use

(Unit: mm/day)

Month	Wet Season				Dry Season
	Paddy				Paddy
	L.V.	H.Y.V.	Maize	Groundnut	H.Y.V.
Feb.	-	-	-	-	6.0
Mar.	-	-	-	-	7.9
Apr.	-	-	-	-	7.7
May	-	-	2.1	1.6	6.1
June	-	-	1.9	2.4	-
July	4.2	-	3.4	4.4	-
Aug.	4.0	4.0	3.2	4.2	-
Sept.	4.1	4.4	-	-	-
Oct.	4.8	4.8	-	-	-
Nov.	5.6	5.6	-	-	-

C. Percolation

Percolation rate is largely affected by soil textures. Although

there are no measured data in the Area, the soils of the Project Area is generally rich in clayey properties, and it seems that a comparatively small percolation is allowed. In considering this matter and the values applied for other project with the similar soil texture, percolation in the paddy fields was taken at 1.0 mm/day.

D. Land Preparation Water

For paddy fields, water for puddling is required in addition to the consumptive use of crops.

Estimation of the water required for puddling was made taking the specific features of the representative soils in the Project Area because no data were available on the evaporation during the puddling season, soil moisture contents, etc.

Taking into account the proposed cropping pattern and present farming practices, water for puddling was estimated at 200 mm both for the wet season and dry season cropping. The period required for puddling is fixed at 30 days. Evaporation of the standing water was estimated in referring to the evaporation data (Table 3-1) obtained at Lopburi observatory.

The result of computation, land preparation water are shown as follows.

D.1. Wet season paddy field

i) First irrigation

Duration: 20 days for H.Y.V. and 25 days for L.V.
Top soil saturation depth: 200 mm
Soil porosity: about 50%
Soil moisture: about 30%
Required watering: 70 mm = 200 mm x 0.50 x (1 - 0.30)

Percolation during the period:

20 mm = 1.0 mm/day x 20 days for H.Y.V.

25 mm = 1.0 mm/day x 25 days for L.V.

Standing water:

50 mm = 2.5 mm/day x 20 days for H.Y.V.

63 mm = 2.5 mm/day x 25 days for L.V.

Sub-total:

140 mm = 70 + 20 + 50 for H.Y.V.

158 mm = 70 + 25 + 63 for L.V.

ii) Second irrigation

Duration: 10 days

Evaporation in the period:	25 mm = 2.5 x 10 days
Percolation:	10 mm = 1.0 x 10 days
Sub-total:	35 mm = 25 + 10
Total:	175 mm = 140 + 35 for HYV
	193 mm = 158 + 35 for LV

From the result of calculation, the water requirement for land preparation will become 175 mm for H.Y.V. and 193 mm for L.V. The recommendable requirements will be 200 mm due to the same cropped area between H.Y.V. and L.V.

D.2. Dry season paddy field

i) First irrigation

Duration: 20 days

Top soil saturation depth: 200 mm

Soil porosity: about 50%

Soil moisture: about 40%

Required watering: 60 mm = 200 mm x 0.50 x (1 - 0.40)

Percolation during the period: 20 mm = 1 mm/day x 20 days

Standing water: 84 mm = 4.2 mm/day x 20 days

Sub-total: 164 mm = 60 + 20 + 84

ii) Second irrigation

Duration: 10 days

Evaporation in the period: 42 mm = 4.2 mm/day x 10 days

Percolation during the period: 10 mm = 1 mm/day x 10 days

Sub-total: 52 mm = 42 + 10

Total: 200 mm = 216 mm ÷ 164 + 52

E. Rainfall

There are four rainfall stations around the Project Area, at Kaeng Khoi, Saraburi, Sao Hai and Rama VI barrage (Tha Luang Headwork) stations.

The annual rainfall data of those stations during 1952 to 1980 are illustrated Table A.4.1-1. The averaged annual rainfalls are summarized as follows:-

Average Annual Rainfall

(Unit: mm)

Name of Station	Annual	Wet Season (Jul.-Nov.)
Muang Saraburi	1,427.2 (100)	960.8 (100)
Kaeng Khoi	1,435.0 (101)	964.7 (100)
Sao Hai	1,368.3 (96)	914.3 (95)
Rama VI Barrage	1,369.4 (96)	888.9 (93)

The rainfall data at Muang Saraburi station was selected as a

representative station based on the following reasons:-

i) It is located in the central part of the Project Area extending in strip from East to West.

ii) The averaged annual rainfall in Saraburi is not so much different from those in the other areas, indicating the very similar value to the average value of four stations.

The monthly rainfall at Muang Saraburi from 1952 to 1980 (29 years) is shown in Table 3-2 of Main Report.

F. Effective rainfall

The Master Plan Study for the Irrigated Agriculture Development Project in the Greater Mae Klong River Basin (JICA) made a tank model simulation on the basis of water holding function for the effective rainfalls to irrigation, and the simulation adopted the rainfall records of 21 stations. The relationship between rainfalls and effective rainfalls was found out as shown in the following Table . The results of computation on effective rainfall conducted by RID are found nearly same to those obtained in the study under the JICA Master Plan.

Effective Rainfall (mm)

Crops	Effective Rainfall	Upper Limit of E.R.	
		One Month	10 days
paddy	0.75 R*	200	70
Upland	0.75 R	120	40

* R: Daily rainfall

The monthly effective rainfalls estimated in using the rainfall data for 29 years period from 1952 to 1980 at Saraburi Station are as shown in Table A.4.1-2. Referring to the Table A.4.1-2, it can be said that no effective rainfall is expected for the dry season cropping, while considerable amount of effective rainfall can reduce irrigation water requirements in the wet season cropping. In particular, the expected effective rainfall in the month of July, when peak water requirement occurs under the project, is vitally important in the irrigation planning. Consequently, a study was made on the probability of effective rainfall during the period. (Refer to Table A.4.1-3 from Table A.4.1-8.)

Probability of Effective Rainfall

(Unit: mm)

Return Period	Total Year	Wet Season (Jul.-Nov.)	Jul.	Jul.-1	Jul.-2	Jul.-3
1/2	890.2	564.4	133.3	41.4	51.2	33.4
1/3	848.8	533.5	120.1	32.6	32.2	23.9
1/5	812.1	505.5	108.8	25.9	20.7	17.3
1/10	775.7	477.2	97.9	20.2	12.9	12.3

G. Irrigation efficiency

As described in the foregoing paragraphs, the irrigation efficiency can be calculated taking into consideration the efficiency in the field, conveyance and operation.

The following table was available by applying the data obtained by some experience and researches.

Irrigation Efficiency

Crop	Field Efficiency	Conveyance Efficiency	Operational Efficiency	Total
Paddy	0.70	0.90	0.95	0.60
Upland	0.60	0.60	0.90	0.51

H. Unit water requirement

The net water requirements (NWR) by crops, which was estimated based on the proposed cropping calendar and various factors discussed in this paragraph, are shown in Table A.4.1-9. Detailed computation results on NWR are shown in Table A.4.1-10 to A.4.1-14, respectively. According to the Table A.4.1-9, the peak water requirement for the wet season paddy cropping occurs in the month of July, while the runoff of the Pasak River, the water source for the Project will be the minimum in the same month. The unit diversion water requirement was, therefore, estimated based on the probable effective rainfall in July and shown in Table A.4.1-15. For the dry season cropping, no effective rainfall is expected, and the peak unit diversion water requirement appears in March by 1.725 l/sec/ha.

4.1.2. Availability of Water Resources

A. Existing and proposed irrigation projects

There are three existing irrigation projects and three NEA pumping irrigation projects being under construction. Water resources for those areas are mainly the Pasak river and the Chainat-Pasak irrigation canal which intakes from the Chao Phraya river at the Manorom head regulator.

The irrigated areas and irrigable areas are summarized in Tables A.4.1-16 and A.4.1-17.

B. Runoff of the Pasak river

The Pasak river has a drainage area of about 14,500 km^2 in the strip in north-south direction. There was a gauging station S2 nearby Amphoe Kaeng Khoi where water level had been recorded up to 1976. After 1976, the station was moved to the location of the present S9 station, about 5 km upstream of S2. The drainage area of S9 gauging station is about 14,374 km2 against the area of S2 station of 14,522 km2 and its reduction ratio of the area is only one percent. Hence,it can be judged that actual observed data of S9 station will be able to use to S2 station directly. (Refer to Table 3-3) According to the records at S2 and S9 (33 years, 1948-1980), the average annual runoff is revealed at 2,288 MCM, of which 2,053 MCM, 90 percent of the total is discharged during the wet season covering six month period from June to November. The monthly discharge appears by the maximum on October, and 924 MCM, 40 percent is discharged in one month period. As is the case, it is considered that the runoff of the Pasak river during wet season is abundant enough except July when the peak water requirement takes place, and there would be a little negative affect on the irrigation water demand in the lower basin.

In the dry season from January to May, the discharge is only 177 MCM, eight percent of the annual total, which makes it quite difficult to supply irrigation water for the Project Area.

A heavy fluctuation in discharge could be attributed to the long and narrow shape of the basin, which results in uneven rainfall distribution in the basin and reduction in the so-called basin storage capacity. For this, it will be necessary to control the flood discharge by a series of dams in the basin so as to secure a controlled runoff pattern. It is said that a study in line with the above mentioned objective is to be commenced in near future and it is expected to have the advantageous effects in the Pasak river basin, as a whole, through stabilized river discharge pattern.

10 day-discharge in the month of July at S2 gauging station is shown in Figures A.4.1-1 to A.4.1-3, and 10 day-probable discharge at the same station is shown in Fig.A.4.1-4.

C. Intake Discharge of the Chainat-Pasak Canal

Along the western boundary of the Project Area, the Chainat-Pasak canal serves for diverting water from the Chao Phraya river to the 127,840 ha of its commanding areas including Manorom, Chong Khae, Koke Katiem and Roeng Rang on the right bank. The Chainat-Pasak canal empties itself into the Pasak river at about one kilometer upstream of the Rama VI Barrage. There are four (4) regulators and 67 diversion structures provided along the Chainat-Pasak canal. Absence of a regular pattern in water distribution and lack of measured data available on its discharge at diversion point, however, have not allow to confirmed actual discharges of the canal during the term of this survey. Under the circumstances, actual irrigation water demands in each sub-project have also not been confirmed accurately.

The surplus discharge emptied into the Pasak river from the Chainat-Pasak canal together with the discharge of the Pasak river itself are diverted to Raphiphat canal through the Phra Narai regulator at the Rama VI Barrage to irrigate about 110,000 ha area. The discharge for navigation in the downstream is released from the Barrage on request as well.

As stated in the above, the surplus discharge from the Chainat-Pasak canal to the Pasak river is closely related to the availability of the water resources for the present Project. Hence, it may be necessary to fix the water availability and acreage to be developed under the Project through carrying out a water balance study on various water sources and related service areas of about 260,000 ha as stated already. For the left bank areas of the Chainat-Pasak canal, no water is supplied in principle from the canal

because of the water management policy of the Government Agencies concerned and the limited water resources available in the Chao Phraya basin.

D. Study on Availability of Water Resources

D.1. Present water use

In the neighboring areas of the Project Area, there exist several irrigation projects. Table A.4.1-17 shows the actual record on irrigation water supply in the related service areas for the period of four (4) years from 1978 to 1981. According to the table, the whole area can be irrigated in the wet season but it can cover only about 10 percent of the area in the dry season. As seen previously, the cropping acreage in the dry season largely depends on the runoff of the Chao Phraya river, rainfall and the amount of water stored in the reservoirs in the previous year. As the discharge of the Pasak river, water source for the Project, is rather limited in the dry season, it will be necessary to look into a potential irrigation area under the Project through taking into account such existing irrigation areas as commanded by the Chainat-Pasak canal, Pasak river and Raphiphat canal. The location map of the Project and existing irrigation related to it is illustrated in Figure 3-5, main report.

D.2. Premise of Water Balance Study

Flow chart on water balance study applied under the present study is as illustrated in Figure A.4.1-5.

Those assumptions employed in the water balance study are as described as follows:-

i) Inflow

* Inflow from the Chao Phraya river shall be represented by the discharge at the Manorom regulator.

* The side flow from the drainage basin on left bank of the Chainat-Pasak Canal to the Canal shall be accounted using specific discharge of the Pasak River.

* Those discharges of the Pasak River released to the downstream are not taken into account because there are no beneficial area in the downstream of Rama VI Barrage.

ii) Irrigated area and representative rainfall stations

The whole area was largely divided into three (3) parts and representative rainfall stations were selected as shown in the followings.

Name of Project	Irrigation Area	Representative Rainfall Station
* Chainat-Pasak canal	127,840 ha	Lopburi
* Kaeng Koi-Ban Mo Project * Ban Nong Bua * Sao Hai existing project * NEA Project	21,663 "	Muang-- Saraburi
* Raphiphat canal	110,000 "	Wang Noi
Total	259,503 ha	

iii) Unit water requirement

The values estimated for both dry and wet seasons under the present study shall be applied to the other two (2) existing projects.

D.3. Water Balance Computation

Water balances (16 years, 1965 - 1980) have been computed for two (2) cases, one for the whole related areas and the other for the areas getting irrigation water only from the Pasak river. The cropping intensity in dry season are assumed about 15, 20 and 30 percent of total cultivable land. The results of water balance computation are illustrated in Figure A.4.1-6 to A.4.1-10.

i) Wet season

As learnt from Fig.A.4.1-6 illustrating the Whole Area Case, seven years of the water shortage has taken place in the second decade of July, when the peak water requirements arise. On the other hand, Figure A.4.1-9 for the Pasak Case indicates that the water shortage has arisen three years in the same period.

The values of ΔQ (shortage or surplus of discharge) for July can be plotted as shown in Figure A.4.-1-12 and A.4.1-13. The figures suggest that there will be water shortages taking place twice in the Whole Area Case, while once in the Pasak River Case.

The total water requirements in July for the whole Project related areas are 290 m^3/sec on an average, whereas the river discharges available are only 247 m^3/sec as a sum of those at the Manorom regulator by about 140 m^3/sec (average for 16 years from 1965 to 1980) and from the Pasak river by

107 m^3/sec (average for 33 years from 1948 to 1980). Therefore, the remaining amount of 43 m^3/sec (290 - 140 - 107 = 43 mm/month) has to depend upon the rainfall. Figure A.4.1-11 shows the discharges at the Manorom regulator and the rainfalls observed at three stations. Studying the figure on the months of June and July when the shortage arises suggests that inadequate water control has been carried out under proper water management. As illustrated in Fig.A.4.1-6, contrarily, the peak discharge has appeared in October when the discharge features in the Pasak river have a similarity to those at the Manorom intake. Table A.4.1-18 shows the values of ΔQ, the rainfalls observed at three stations and the discharges at the Manorom intake in the representative years when the water shortage had taken place.

On one hand, the values of ΔQ vary with the rainfalls in Lopburi and Wang Noi which are the existing development projects covering a considerably large irrigation areas, and on the other hand, the proper discharge control would not have been made at Manorom even in the second decade of July 1972 when sufficient rainfall had occurred in learning from the data on the Manorom discharge and the rainfalls observed at two stations together with the fact that the Pasak river discharge was about 10 percent less than the discharge at Manorom. As a result of the above study, it can be said that the rainfalls play an important role in irrigation in the wet season. And Table A.4.1-19 shows that the water shortage has arisen every year on the decade basis, whereas only twice for 16 years on the monthly basis.

In due consideration of the above, the proper control of the discharge at Manorom */ with thorough knowledge of the

rainfalls in the Area, which can be observed at several gauging stations adjacent to the Project Area besides the above three, will be able to provide an adequate amount of water required for the Project in taking into account the capacity of the Chainat-Pasak canal at the Manorom regulator by 280 m^3/sec.

*/ --- Refer to Table A 4.1-18.

ii) Dry season

The peak water requirements for the dry season paddy cropping has taken place in March when the maximum evapo-transpiration for the said paddy cropping appears. The lowest discharge in the Pasak river, however, which usually takes place in April, has brought about the water shortage for two months, March and April, for the Pasak river case (Figure A.4.1-9 and 10). On the other hand, the least water amount diverted by the Manorom regulator which takes place in January has brought about the water shortage for two months, January and March for the Whole area case (Figure A.4.1-6 to -8). The study was made for the period of 10 years from 1971 to 1980 in taking into account the fact that it is the recent ten years that the dry season paddy cropping has been positively introduced in the Area. Since the discharge at the Manorom regulator is five to ten times larger than that in the Pasak river in the period from January to May, the determination of the cropping acreage of the dry season paddy will be largely affected by the discharge at the Manorom regulator. Therefore, the cropping acreage of the dry season paddy should be determined on the basis of the whole area case including the areas related to the Project as well. Fig.A.4.1-14 to -16 show the monthly average water balance tables of the Whole Area Case. When

taking the cropping intensity by 15 percent, the water shortage takes place three times in January, being caused generally from extreme low discharge at the Manorom regulator, and furthermore, it may result from the fact that the cropping calendar prevailing in the existing irrigated areas does not always meet the one that is proposed in the Project and the actual cropping intensity is different from that employed in the case study. When taking the cropping intensity by 20 percent, the water shortage takes place once or twice in every year. Learning from the average values for the irrigation period (January to May), there will be little problem excepting 1980. In case of 30 percent of the cropping intensity, the water shortage takes place so remarkably as to appear in five years for 10 years even limited time of the irrigation period.

Figure A.4.1-17 shows the relationship between the five-year average accumulative rainfall curve (1976 - 1980) based on the records at Saraburi, Lopburi and Wang Noi gauging stations, and the discharges obtained at the Manorom regulator.

The waters diverted in 1978 and 1980 at the Manorom regulator were extremely small in the amount, as compared with those in other years, in corresponding to the rainfalls in 1977 and 1979, respectively. In view of the actual cropping intensities of the dry season paddy in the existing irrigated areas in the period from 1978 to 1981, 9.6 percent in 1978 and 1.2 percent in 1980, which are also extremely low, correspond to the rainfalls in previous year and the diverted water amount in the relevant year (Refer to Table A.4.1-17).

The probability computation for the annual rainfall recorded at the respective gauging stations has resulted in the

following table.

Annual Rainfall and Probability

(unit: mm/year)

	Lopburi		Saraburi		Wang Noi		Mean
Year	Rain-fall	Probable Year	Rain-fall	Probable Year	Rain-fall	Probable Year	Rain-fall
1976	1,304	1/2	1,225	1/4	1,197	1/3	1,242
1977	1,043	1/5	1,060	1/20	813	1/25	972
1978	1,066	1/4	1,503	1/2	1,149	1/4	1,239
1979	766	1/80	1,012	1/35	997	1/10	925
1980	1,222	1/2	1,303	1/3	1,636	1/2	1,387

As learnt from the above table, the years of 1977 and 1979, the drought years, had the effective rainfalls so little that the dry season cropping acreage was determined by the available reservoir water stored in previous year and the river discharge available in the relevant year.

From the above, it can be judged, excepting for the severe drought year of 1979, that proper control of the diversion water at the Manorom regulator throughout the dry season, the appropriate adjustment of the water diverted to the beneficial areas of the Chainat-Pasak canal, etc. will ensure the dry season paddy cropping at least by about 20 percent of the intensity.

D.4. Total water requirement

Judging from the Table A.4.1-15, it was determined that the peak water requirement in the water balance computation for the wet season is for the second decade of the month of July with the effective rainfall of 1/3 probability, resulting in the total water requirement as follows:-

* Wet season Q = 8.791 m^3/sec (A= 14,160 ha)
* Dry season Q = 4.816 " (A= 2,800 ha)

For determination of capacities of the facilities, the total water requirement of 17.618 m^3/sec has been applied in neglecting the effective rainfall.

Total Water Requirement of Each Crops in wet season

Crops	Area	N.W.R.	Re	Q1	Q2
Paddy	13,680	6.51	3.22	8.755	17.237
Maize	430	3.36	3.22	0.022	0.331
Groundnuts	50	4.41	3.22	0.014	0.050
Total	14,160			8.791	17.618

Area : Proposed cropping area (ha)
N.W.R.: Net water requirement (mm/day)
Re : Effective rainfall (mm/day)
If : Irrigation efficiency paddy : 0.6, upland 0.5
Q_1 : (N.W.R. - Re) x A x 10^{-3}/If/8.64 (m^3/sec)
Q_2 : N.W.R. x A x 10^{-3}/If/8.64 (m^3/sec)

Note: The computation of the effective rainfall for the upland crops, which is negligibly small in the area, has been made with the same value for the paddy cropping.

E. Conclusion

Based on the study results in the foregoing paragraphs, it is recommended that the irrigation development under the present study shall conform with the standard of effective rainfall with 1/3 probability together with the level of available runoff in the Pasak river, with which the potential service area could be expanded as

large as possible.

On the other hand, a comprehensive study on water resources development in the Pasak river basin is to be commenced soon and the more stabilized water discharge in the Pasak river is expected in the near future when the completion of a series of dams in the upstream basin. Furthermore, under the Project, a rotational irrigation should also be introduced for land preparation period as coupled with proper guidances on water management for the related farmers, and the expected Project benefit can surely be generated as envisaged.

Table A.4.1-1 Annual Rainfall of Each Stations

Year	Muang.Saraburi	Kaeng Khoi	Sao Hai	Rama VI Barrage
1952	1219.6	1500.0	1423.0	******
1953	1206.6	1561.5	1227.6	1052.2
1954	1284.8	1415.0	1498.7	1397.4
1955	1413.6	1541.8	1619.4	1529.6
1956	1844.8	1925.3	1673.5	******
1957	******	2337.9	1930.1	******
1958	1730.5	974.9	1546.9	1165.4
1959	1577.4	1226.1	1467.3	******
1960	1644.5	1344.6	1363.6	1583.7
1961	1419.9	1941.4	1335.6	1556.0
1962	1699.9	2056.8	1362.7	1611.5
1963	1398.4	1809.3	1547.4	1532.7
1964	1172.7	******	1286.2	1357.1
1965	1473.3	1456.6	1408.7	1574.4
1966	2063.3	1341.4	1700.5	1651.7
1967	1187.6	1403.5	1161.0	1417.4
1968	1198.5	1092.5	985.5	1205.1
1969	1421.2	1579.4	1513.0	1630.4
1970	1808.8	1543.6	1686.6	1875.4
1971	1389.9	1361.0	1132.8	1150.6
1972	1670.7	1333.0	1378.1	1280.7
1973	1404.9	1398.4	1223.4	1189.4
1974	1397.8	1191.4	1130.7	1427.8
1975	1230.0	1376.7	1118.2	1365.7
1976	1341.7	1165.7	1375.5	1629.1
1977	1094.6	1019.1	1068.3	915.6
1978	1364.7	1186.4	1163.0	1099.1
1979	1094.5	959.1	1102.9	869.8
1980	1208.0	1138.7	1249.6	1167.2
Mean	1427.2	1435.0	1368.3	1369.4

****** : Missing data,

Data Source: Hydrology division of RID

Table A.4.1-2 Monthly Effective Rainfall for Paddy Rice (Muang Saraburi)

(Unit : mm)

YEAR	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	TOTAL
1952	35.7	52.9	108.2	147.5	175.4	97.4	183.0	18.8	0.0	0.0	0.0	3.4	822.6
1953	14.8	99.2	123.5	104.3	168.6	165.1	116.1	16.5	0.0	0.0	13.4	22.8	844.7
1954	30.8	85.7	128.6	63.5	193.1	200.0	46.6	0.0	9.0	0.0	4.0	38.4	800.2
1955	97.9	153.0	177.2	99.5	154.6	167.1	64.3	55.4	0.0	0.0	2.8	44.6	1016.9
1956	53.2	198.5	200.0	175.7	180.3	195.2	112.6	30.3	0.0	0.0	1.3	39.4	1186.9
1957	107.0	56.3	167.9	126.0	160.3	200.0	88.8	90.3	0.0	0.0	0.0	0.0	996.8
1958	0.0	137.4	137.4	167.9	200.0	196.4	35.2	0.0	0.0	0.0	12.5	68.1	955.2
1959	79.2	104.7	27.5	173.1	151.1	200.0	126.6	11.3	0.0	0.0	0.0	0.0	873.9
1960	13.8	92.3	154.5	190.3	108.1	155.6	112.8	83.6	0.0	2.4	26.2	45.5	985.4
1961	111.5	134.4	127.7	121.1	172.3	114.1	132.2	15.1	6.5	0.0	2.0	0.0	937.5
1962	140.0	86.1	112.6	122.1	135.1	200.0	95.4	0.0	0.0	0.0	0.0	6.3	897.9
1963	18.3	5.3	146.5	119.8	158.1	145.9	138.1	79.5	0.0	0.0	29.9	6.3	848.1
1964	18.0	189.5	73.4	119.1	124.5	108.2	80.2	0.0	7.6	0.0	29.6	13.3	763.9
1965	17.8	151.7	145.4	99.2	157.8	200.0	56.1	43.9	0.0	0.0	20.8	35.0	928.2
1966	39.4	200.0	151.1	144.3	165.8	103.1	161.5	31.4	27.2	0.0	0.0	0.0	1024.3
1967	43.5	96.8	79.0	137.6	138.8	200.0	79.7	0.0	0.0	0.0	63.4	0.0	839.1
1968	57.9	78.4	140.0	128.9	163.8	130.5	15.8	36.2	0.0	70.0	0.0	0.0	821.8
1969	8.3	92.7	171.6	157.6	141.7	167.7	62.2	19.9	0.0	0.0	37.7	0.0	860.2
1970	43.5	154.5	180.9	145.5	163.1	200.0	48.8	5.1	62.7	0.0	35.6	13.1	1053.0
1971	67.2	48.2	115.5	125.8	200.0	140.9	107.7	0.0	1.4	0.0	5.1	37.1	849.1
1972	69.4	32.0	166.2	101.8	116.7	200.0	51.0	164.1	36.9	0.0	1.7	38.7	979.1
1973	0.0	136.0	147.7	188.9	141.6	135.2	85.3	26.3	0.0	0.3	2.8	47.3	911.9
1974	60.0	100.8	69.5	174.7	122.1	141.5	142.9	56.2	3.1	69.3	2.8	50.9	994.3
1975	54.2	100.1	169.8	126.2	105.1	123.8	79.5	33.7	27.3	0.0	0.0	0.0	820.2
1976	0.0	61.7	120.4	154.8	184.9	124.5	153.0	8.7	0.0	6.8	9.5	71.0	895.8
1977	33.8	103.7	84.9	137.1	83.6	175.2	77.3	3.0	1.1	3.4	91.8	0.0	795.4
1978	21.1	168.9	98.6	173.7	102.3	200.0	69.1	0.6	0.0	9.6	0.6	0.0	845.0
1979	23.8	98.0	89.1	107.6	104.7	181.3	16.3	0.0	0.0	0.0	10.7	61.4	693.5
1980	26.3	63.7	115.9	133.4	167.5	124.2	129.9	0.0	0.0	0.0	0.0	0.0	758.9
Mean	44.4	106.3	128.6	136.8	149.7	161.8	92.0	28.6	6.3	5.6	13.9	22.2	896.5

Table A.4.1-3 Probability of Annual Effective Rainfall

X : EFFECTIVE RAINFALL OF YEAR(PADDY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(%)	HAZEN PLOT(%)	X**2	X**3
1	1970	693.500	2.84105	366.520	2.56410	6.57460	96.67	98.28	480942.25	333533440.00
2	1944	763.900	2.88304	436.920	2.64040	6.97172	93.33	94.83	583543.00	445769192.00
3	1977	795.400	2.90059	468.420	2.67064	7.13220	90.00	91.38	632661.00	503218432.00
4	1954	800.200	2.90320	473.220	2.67506	7.15596	86.67	87.93	640319.94	512383744.00
5	1975	820.200	2.91392	493.220	2.69304	7.25246	83.33	84.48	672727.94	551771392.00
6	1949	821.800	2.91477	494.820	2.69445	7.26004	80.00	81.03	675354.88	555026464.00
7	1957	822.600	2.91519	495.620	2.69515	7.26382	76.67	77.59	676670.50	556629992.00
8	1980	825.900	2.91693	498.920	2.69803	7.27937	73.33	74.14	682110.81	563354990.00
9	1967	839.100	2.92381	512.120	2.70937	7.34069	70.00	70.69	704088.81	590800384.00
10	1953	844.700	2.92670	517.720	2.71410	7.36631	66.67	67.24	713518.09	602709490.00
11	1979	845.000	2.92686	518.020	2.71435	7.36767	63.33	63.79	714025.00	603351040.00
12	1963	848.100	2.92845	521.120	2.71694	7.38175	60.00	60.34	719273.61	610015490.00
13	1971	849.100	2.92896	522.120	2.71777	7.38623	56.67	56.90	720970.81	612175872.00
14	1969	860.200	2.93460	533.220	2.72691	7.43602	53.33	53.45	739943.94	636499712.00
15	1959	873.900	2.94146	546.920	2.73792	7.49620	50.00	50.00	763701.00	667398144.00
16	1976	895.800	2.95221	568.820	2.75497	7.58986	46.67	46.55	802457.25	718840832.00
17	1962	897.900	2.95323	570.920	2.75657	7.59870	43.33	43.10	806224.19	723909608.00
18	1739	911.900	2.95995	584.920	2.76710	7.65682	40.00	39.66	831561.39	758320672.00
19	19650	928.200	2.96764	601.220	2.77903	7.72302	36.67	36.21	861555.13	799695350.00
20	19410	937.500	2.97197	610.520	2.78570	7.76012	33.33	32.76	878906.25	823974600.00
21	19580	955.200	2.98009	628.220	2.79811	7.82943	30.00	29.31	912407.04	871531008.00
22	19730	979.100	2.99083	652.120	2.81433	7.92045	26.67	25.86	958636.81	938600704.00
23	19610	985.700	2.99375	658.720	2.81870	7.94507	23.33	22.41	971604.38	957710336.00
24	19740	994.300	2.99752	667.320	2.82433	7.97684	20.00	18.97	988632.49	982996480.00
25	19570	996.900	2.99865	669.920	2.82601	7.98633	16.67	15.52	993809.61	990728960.00
26	19550	1016.900	3.00729	689.920	2.83880	8.05878	13.33	12.07	1034085.61	1051561216.00
27	19660	1024.300	3.01043	697.320	2.84343	8.08510	10.00	8.62	1049190.49	1074684928.00
28	19700	1053.000	3.02243	726.020	2.86095	8.18503	6.67	5.17	1108809.00	1167575936.00
29	19560	1186.900	3.07441	859.920	2.93446	8.61104	3.33	1.72	1408731.00	1672022528.00
TOTAL		26067.350	85.57085		79.77049	219.59135			23726192.00	21876416512.00
MEAN	XM =	898.866	2.95107	YM =	2.75071	7.57211 = YYM			818144.50	754359040.00

B = ROOT((2*N/(N-1))*(YYM-YM*YM)) = 0.10893

SX = ROOT(XXM-XM*XM) = 109.93562

CS = (XXXM-3*XXM*XM+2*XM**3)/(SX**3) = 0.62560

X : EFFECTIVE RAINFALL OF YEAR(PADDY) (MM)

***** B - V A L U E *****

ORDER	XI	XS	XI*XS	XI*XS-XP**2	XI+XS	2*XP-(XI+XS)	BI
1	693.500	1186.900	823115.063	1880.400	25041.125	-93.700	-267.247
2	763.900	1053.000	804386.563	1816.900	6312.625	-30.200	-209.026
3	795.400	1024.300	814727.919	1819.700	16653.070	-33.000	-504.567
						TOTAL BI =	-980.839
						MEAN B =	-326.980
						B =	-326.980

***** THE PROBABLE VALUES BY IWAI'S METHOD *****

RETURN-PERIOD (YEAR)	E	B	E*B	A=YM+E*B	C=10**A	B	X=C-B
2	0.0	0.1090	0.0	2.7507	563.255	-326.980	890.235
3	0.3045	0.1090	-0.0332	2.7175	521.819	-326.980	848.799
5	0.5951	0.1090	-0.0649	2.6858	485.133	-326.980	812.113
7	0.7547	0.1090	-0.0822	2.6685	466.277	-326.980	793.257
10	0.9062	0.1090	-0.0988	2.6519	448.691	-326.980	775.671
15	1.0614	0.1090	-0.1157	2.6350	431.552	-326.980	758.532
20	1.1629	0.1090	-0.1267	2.6240	420.669	-326.980	747.649
50	1.4520	0.1090	-0.1582	2.5925	391.261	-326.980	718.241

Table A.4.1-4 Probability of Effective Rainfall during Wet Season

X : EFFECTIVE RAINFALL OF WET SEASON(PADDY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(%)	HAZEN PLOT(%)	X**2	X**3
1	1979	409.900	2.61268	409.900	2.61268	6.82623	96.67	98.28	168017.99	68870496.00
2	1964	432.000	2.63548	432.000	2.63548	6.94577	93.33	94.83	186624.00	80621568.00
3	1976	468.300	2.67052	468.300	2.67052	7.13170	90.00	91.38	219304.69	102700336.00
4	1968	475.200	2.67679	475.200	2.67698	7.16566	86.67	87.93	225814.94	107307312.00
5	1977	476.200	2.67779	476.200	2.67779	7.17055	83.33	84.48	226766.39	107986128.00
6	1956	503.200	2.70174	503.200	2.70174	7.29940	80.00	81.03	253210.19	127415344.00
7	1965	540.900	2.73312	540.900	2.73312	7.46992	76.67	77.59	292572.69	158252528.00
8	1970	545.700	2.73695	545.700	2.73695	7.49092	73.33	74.14	297788.39	162503088.00
9	1969	549.100	2.73965	549.100	2.73965	7.50569	70.00	70.69	301510.63	165559440.00
10	1962	552.600	2.74241	552.600	2.74241	7.52082	66.67	67.24	305366.56	168745504.00
11	1961	554.800	2.74414	554.800	2.74414	7.53029	63.33	63.79	307802.81	170768928.00
12	1980	555.000	2.74429	555.000	2.74429	7.53114	60.00	60.34	308025.00	170953872.00
13	1967	556.100	2.74515	556.100	2.74515	7.53594	56.67	56.90	309247.00	171972208.00
14	1966	557.000	2.74586	557.000	2.74586	7.53972	53.33	53.45	310249.00	172808688.00
15	1973	562.500	2.75012	562.500	2.75012	7.56317	50.00	50.00	316406.25	177978512.00
16	1953	570.600	2.75633	570.600	2.75633	7.59736	46.67	46.55	325584.19	185778240.00
17	1971	574.400	2.75921	574.400	2.75921	7.61326	43.33	43.10	329935.19	189514736.00
18	1972	577.300	2.76140	577.300	2.76140	7.62534	40.00	39.66	333275.06	192399616.00
19	1958	599.500	2.77779	599.500	2.77779	7.71611	36.67	36.21	359400.25	215460448.00
20	1966	606.100	2.78254	606.100	2.78254	7.74255	33.33	32.76	367357.00	222655008.00
21	1952	622.100	2.79386	622.100	2.79386	7.80565	30.00	29.31	387008.19	240757728.00
22	1974	625.900	2.79650	625.900	2.79650	7.82043	26.67	25.86	391750.69	245196704.00
23	1978	633.600	2.80182	633.600	2.80182	7.85017	23.33	22.41	401448.75	254357856.00
24	1974	637.400	2.80441	637.400	2.80441	7.86473	20.00	18.97	406278.63	258961752.00
25	1963	641.400	2.80713	641.400	2.80713	7.87997	16.67	15.52	411393.81	263867936.00
26	1960	650.400	2.81318	650.400	2.81318	7.91398	13.33	12.07	423020.00	275132160.00
27	1959	662.100	2.82092	662.100	2.82092	7.95761	10.00	8.62	438376.19	290248736.00
28	1957	665.400	2.82308	665.400	2.82309	7.96979	6.67	5.17	442757.00	294610432.00
29	1955	694.100	2.84142	694.100	2.84142	8.07367	3.33	1.72	481774.56	334399488.00
TOTAL		16492.762	79.79620		79.79620	219.65717			9529059.00	5577769940.00
MEAN	XM =	568.723	2.75159		YM = 2.75159	7.57439 = YYM			328553.69	192336849.00

B = ROOT(N*N/(N-1)*(YYM-YM*YM)) = 0.08941

SX = ROOT(XXM-XM*XM) = 69.96281

CS =(XXXM-3*XXM*XM+2*XM**3)/(SX**3)=-0.40541

X : EFFECTIVE RAINFALL OF WET SEASON(PADDY) (MM)

***** B - VALUE *****

ORDER	XT	XS	XT*XS	XT*XS-XO**2	XT+XS	2*XO-(XT+XS)	BI
1	409.900	694.100	284511.438	1104.000	-34042.939	24.113	-1371.994
2	432.000	665.400	287452.750	1097.400	-31101.625	21.413	-999.100
3	468.300	662.100	310061.188	1133.400	-34013.188	-1.527	5351.191

TOTAL BI = 2980.097

MEAN B = 996.366

B = 0.0

***** THE PROBABLE VALUES BY IWAI METHOD *****

RETURN PERIOD (YEAR)	E	?	E*B	A=YM+E*B	C=10**A	B	X=C-B
2	0.0	0.0894	0.0	2.7516	564.496	0.0	564.496
3	0.3045	0.0894	-0.0245	2.7271	533.465	0.0	533.465
5	0.5951	0.0894	-0.0479	2.7037	505.571	0.0	505.571
7	0.7547	0.0894	-0.0607	2.6909	490.927	0.0	490.927
10	0.9062	0.0894	-0.0729	2.6787	477.226	0.0	477.226
15	1.0614	0.0894	-0.0853	2.6662	463.798	0.0	463.798
20	1.1630	0.0894	-0.0935	2.6581	455.067	0.0	455.067
50	1.4520	0.0894	-0.1167	2.6348	431.357	0.0	431.357

Table A.4.1-5 Probability of Effective Rainfall in July

X : EFFECTIVE RAINFALL (JULY)(PADDY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(%)	HAZEN PLOT(%)	X**2	X**3
1	1964	63.500	1.80277	63.500	1.80277	3.24999	96.67	98.28	4032.25	256047.88
2	1965	99.200	1.99651	99.200	1.99651	3.98605	93.33	94.83	9840.64	976191.13
3	1966	99.500	1.99782	99.500	1.99782	3.99139	90.00	91.38	9900.25	985074.88
4	1972	101.900	2.00775	101.900	2.00775	4.03135	86.67	87.93	10383.23	1054977.00
5	1963	104.300	2.01829	104.300	2.01829	4.07347	83.33	84.48	10878.49	1134675.00
6	1979	107.600	2.03181	107.600	2.03181	4.12826	80.00	81.03	11577.76	1245756.00
7	1964	119.100	2.07591	119.100	2.07591	4.30941	76.67	77.59	14184.80	1689410.00
8	1963	119.900	2.07846	119.900	2.07846	4.31973	73.33	74.14	14352.04	1719973.00
9	1961	121.100	2.08314	121.100	2.08314	4.33949	70.00	70.69	14665.21	1775354.00
10	1962	122.100	2.08671	122.100	2.08671	4.35438	66.67	67.24	14909.41	1820314.00
11	1971	125.800	2.09968	125.800	2.09968	4.40856	63.33	63.79	15825.64	1990364.00
12	1957	126.000	2.10037	126.000	2.10037	4.41155	60.00	60.34	15876.00	2000376.00
13	1975	126.200	2.10106	126.200	2.10106	4.41445	56.67	56.90	15926.44	2009914.00
14	1968	128.900	2.11025	128.900	2.11025	4.45317	53.33	53.45	16615.21	2141700.00
15	1980	133.400	2.12516	133.400	2.12516	4.51629	50.00	50.00	17795.56	2373924.00
16	1977	137.100	2.13704	137.100	2.13704	4.56683	46.67	46.55	18796.41	2576997.00
17	1967	137.600	2.13862	137.600	2.13862	4.57368	43.33	43.10	18933.75	2605284.00
18	1966	144.300	2.15927	144.300	2.15927	4.66243	40.00	39.66	20822.49	3004684.00
19	1970	145.500	2.16286	145.500	2.16286	4.67797	36.67	36.21	21170.25	3080271.00
20	1952	147.500	2.16878	147.500	2.16878	4.70365	33.33	32.76	21756.25	3209844.00
21	1978	154.800	2.18977	154.800	2.18977	4.79509	30.00	29.31	23963.04	3709477.00
22	1969	157.600	2.19756	157.600	2.19756	4.82925	26.67	25.86	24837.75	3914439.00
23	1958	167.900	2.22505	167.900	2.22505	4.95035	23.33	22.41	28190.41	4733149.00
24	1959	173.100	2.23833	173.100	2.23833	5.00997	20.00	19.07	29963.61	5184699.00
25	1973	173.700	2.23990	173.700	2.23990	5.01670	16.67	15.52	30171.69	5243823.00
26	1974	174.700	2.24229	174.700	2.24229	5.02737	13.33	12.07	30520.09	5331259.00
27	1956	175.700	2.24477	175.700	2.24477	5.03833	10.00	8.62	30870.49	5423044.00
28	1973	188.900	2.27623	188.900	2.27623	5.18173	6.67	5.17	35683.21	6741367.00
29	1960	190.300	2.27944	190.300	2.27944	5.19584	3.33	1.72	36214.09	6891539.00
TOTAL		3946.997	61.61519		61.61520	131.21776			569634.98	84823157.00
MEAN	XM =	136.793	2.12467	XM =	2.12467	4.52475 = YYM			19609.10	2924936.00

S = SQRT((1/(N-1))*(YYM-XM*XM)) = 0.14781

SX = SQRT(XXM-XM*XM) = 30.92953

CS = (1/XXXM-3*XM*XXM+2*XM**3)/(SX**3) = -0.09000

X : EFFECTIVE RAINFALL (JULY)(PADDY) (MM)

***** B - VALUES *****

ORDER	XI	XS	XI*XS	XI*XS-XM**2	XI+XS	2*XM-(XI+XS)	BI
1	63.500	190.300	12084.047	253.900	-6671.313	12.689	-446.620
2	99.200	188.900	18739.875	292.100	993.516	-21.692	-45.530
3	99.500	175.700	17482.148	275.200	-273.211	-8.702	31.399
						TOTAL BI =	-460.752
						MEAN B =	-153.584
						B =	0.0

***** THE PROBABLE VALUES BY "IWAI" METHOD *****

RETURN-PERIOD (YEAR)	E	S	E*S	A=YM+E*S	C=10**A	B	X=C-B
2	0.0	0.1478	0.0	2.1247	133.249	0.0	133.249
3	0.3045	0.1478	-0.0450	2.0797	120.131	0.0	120.131
5	0.5951	0.1478	-0.0880	2.0367	108.818	0.0	108.818
7	0.7547	0.1478	-0.1115	2.0131	103.065	0.0	103.065
10	0.9062	0.1478	-0.1339	1.9907	97.885	0.0	97.885
15	1.0614	0.1478	-0.1569	1.9677	92.369	0.0	92.369
20	1.1630	0.1478	-0.1719	1.9528	89.693	0.0	89.693
50	1.4520	0.1478	-0.2146	1.9100	81.291	0.0	81.291

Table A.4.1-6 Probability of Effective Rainfall in First Decade of July

X & EFFECTIVE RAINFALL OF JULI (PADDY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(I)	HAZEN PLOT(I)	X**2	X**3
1	1954	11.600	1.06445	11.600	1.06445	1.13307	96.66	98.27	134.55	1560.89
2	1972	11.700	1.06818	11.700	1.06818	1.14102	93.33	94.82	136.88	1601.61
3	1963	17.300	1.23804	17.300	1.23804	1.53275	90.00	91.37	299.28	5177.71
4	1961	20.500	1.31175	20.500	1.31175	1.72069	86.66	87.93	420.25	8615.12
5	1980	21.500	1.33243	21.500	1.33243	1.77539	83.33	84.48	462.25	9938.37
6	1979	23.900	1.37839	23.900	1.37839	1.89997	80.00	81.03	571.20	13651.91
7	1966	30.000	1.47712	30.000	1.47712	2.18189	76.66	77.58	900.00	27000.00
8	1964	30.400	1.48287	30.400	1.48287	2.19891	73.33	74.13	924.16	28094.45
9	1952	31.700	1.50105	31.700	1.50105	2.25317	70.00	70.68	1004.88	31855.00
10	1970	34.200	1.53402	34.200	1.53402	2.35323	66.66	67.24	1169.63	40001.07
11	1974	34.700	1.54032	34.700	1.54032	2.37261	63.33	63.79	1204.08	41781.90
12	1968	36.200	1.55870	36.200	1.55870	2.42957	60.00	60.34	1310.43	47437.91
13	1965	43.600	1.63946	43.600	1.63946	2.68791	56.66	56.89	1900.95	82881.64
14	1955	44.600	1.64933	44.600	1.64933	2.72030	53.33	53.44	1989.15	88716.53
15	1953	46.500	1.66745	46.500	1.66745	2.78039	50.00	50.00	2162.25	100544.64
16	1973	48.900	1.68930	48.900	1.68930	2.85375	46.66	46.55	2391.20	116930.10
17	1967	53.600	1.72916	53.600	1.72916	2.99000	43.33	43.10	2872.95	153990.62
18	1957	56.000	1.74818	56.000	1.74818	3.05615	40.00	39.65	3136.00	175616.03
19	1962	70.000	1.84509	70.000	1.84509	3.40438	36.66	36.20	4900.00	343000.06
20	1956	70.000	1.84509	70.000	1.84509	3.40438	33.33	32.75	4900.00	343000.06
21	1958	70.000	1.84509	70.000	1.84509	3.40438	30.00	29.31	4900.00	343000.06
22	1959	70.000	1.84509	70.000	1.84509	3.40438	26.66	25.86	4900.00	343000.06
23	1960	70.000	1.84509	70.000	1.84509	3.40438	23.33	22.41	4900.00	343000.06
24	1969	70.000	1.84509	70.000	1.84509	3.40438	20.00	18.96	4900.00	343000.06
25	1971	70.000	1.84509	70.000	1.84509	3.40438	16.66	15.51	4900.00	343000.06
26	1975	70.000	1.84509	70.000	1.84509	3.40438	13.33	12.06	4900.00	343000.06
27	1976	70.000	1.84509	70.000	1.84509	3.40438	10.00	8.62	4900.00	343000.06
28	1977	70.000	1.84509	70.000	1.84509	3.40438	6.66	5.17	4900.00	343000.06
29	1978	70.000	1.84509	70.000	1.84509	3.40438	3.33	1.72	4900.00	343000.06
TOTAL		1366.899	46.90634		46.90634	77.52900			76890.20	4743396.01
MEAN	XM =	47.134	1.61746	YM =	1.61746	2.67341 = YYM			2651.38	163737.78

R = ROOT((2*N/(N-1))*(YYM-YM*YM)) = 0.34432
SX = ROOT(XXM-(XM*XM)) = 20.72967
CS =(XXXM-3*XXM*XM+2*XM**3)/(SX**3)=-0.19576

X & EFFECTIVE RAINFALL OF JULI (MM)

***** B - V A L U E *****

ORDER	XI	XS	XI*XS	XI*XS-XC**2	XI+XS	2*XO-(XI+XS)	BI
1	11.600	70.000	812.000	81.600	-905.590	1.287	-703.292
2	11.700	70.000	819.000	81.700	-898.590	1.187	-756.619
3	17.300	70.000	1211.000	87.300	-506.590	-4.412	114.811
						TOTAL BI =	-1345.100
						MEAN B =	-448.366
						B =	0.000

***** THE PROBABLE VALUES BY, IWAI METHOD *****

RETURN-PERIOD (YEAR)	E	R	E*R	A=YM+E*R	C=10**A	B	X=C-B
2	0.0000	0.3443	0.0000	1.6174	41.443	0.000	41.443
3	0.3045	0.3443	-0.1048	1.5126	32.554	0.000	32.554
5	0.5951	0.3443	-0.2049	1.4125	25.855	0.000	25.855
7	0.7547	0.3443	-0.2599	1.3575	22.782	0.000	22.782
10	0.9062	0.3443	-0.3120	1.3054	20.203	[illegible]	20.203
15	1.0614	0.3443	-0.3654	1.2519	17.864	0.000	17.864
20	1.1639	0.3443	-0.4004	1.2170	16.481	0.000	16.481
50	1.4520	0.3443	-0.4999	1.1174	13.106	0.000	13.106

Table A.4.1-7 Probability of Effective Rainfall in Second Decade of July

X : EFFECTIVE RAINFALL OF JU2 (PADDY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(I)	HAZEN PLOT(I)	X**2	X**3
1	1976	14.800	1.17026	14.800	1.17026	1.36951	96.55	98.21	219.03	3241.79
2	1964	18.700	1.27184	18.700	1.27184	1.61757	93.10	94.64	349.68	6539.20
3	1977	21.800	1.33845	21.800	1.33845	1.79146	89.65	91.07	475.23	10360.23
4	1968	22.600	1.35410	22.600	1.35410	1.83360	86.20	87.50	510.75	11543.17
5	1954	24.900	1.39619	24.900	1.39619	1.94937	82.75	83.92	620.00	15438.24
6	1971	27.100	1.43296	27.100	1.43296	2.05340	79.31	80.35	734.41	19902.50
7	1958	27.900	1.44560	27.900	1.44560	2.08977	75.86	76.78	778.40	21717.63
8	1956	30.000	1.47712	30.000	1.47712	2.18188	72.41	73.21	900.00	27000.00
9	1961	30.500	1.48429	30.500	1.48429	2.20314	68.96	69.64	930.25	28372.62
10	1959	33.100	1.51992	33.100	1.51992	2.30987	65.51	66.07	1095.61	36264.68
11	1975	36.500	1.56229	36.500	1.56229	2.44075	62.06	62.50	1332.25	48627.13
12	1970	41.200	1.61489	41.200	1.61489	2.60789	58.62	59.92	1697.43	69934.51
13	1965	44.200	1.64542	44.200	1.64542	2.70741	55.17	55.35	1953.63	86350.07
14	1955	46.600	1.66838	46.600	1.66838	2.78351	51.72	51.78	2171.56	101194.66
15	1979	55.100	1.74115	55.100	1.74115	3.03160	48.27	48.21	3036.01	167284.15
16	1969	57.600	1.76042	57.600	1.76042	3.09903	44.82	44.64	3317.76	191102.98
17	1978	59.500	1.77451	59.500	1.77451	3.14890	41.37	41.07	3540.25	210644.90
18	1967	62.900	1.79865	62.900	1.79865	3.23514	37.93	37.50	3956.40	248858.12
19	1956	66.400	1.82216	66.400	1.82216	3.32029	34.48	33.92	4408.96	292754.87
20	1963	66.700	1.82412	66.700	1.82412	3.32749	31.03	30.35	4448.58	296740.67
21	1952	70.000	1.84509	70.000	1.84509	3.40438	27.58	26.78	4900.00	343000.06
22	1960	70.000	1.84509	70.000	1.84509	3.40438	24.13	23.21	4900.00	343000.06
23	1962	70.000	1.84509	70.000	1.84509	3.40438	20.68	19.64	4900.00	343000.06
24	1972	70.000	1.84509	70.000	1.84509	3.40438	17.24	16.07	4900.00	343000.06
25	1973	70.000	1.84509	70.000	1.84509	3.40438	13.79	12.50	4900.00	343000.06
26	1974	70.000	1.84509	70.000	1.84509	3.40438	10.34	8.92	4900.00	343000.06
27	1980	70.000	1.84509	70.000	1.84509	3.40438	6.89	5.35	4900.00	343000.06
28	1957	7030.000	3.84695	7030.000	3.84695	14.79505	3.44	1.78	49420904.10	347428946816.00
TOTAL		8308.099	47.86531		47.86531	87.73133			49491680.10	347433206528.00
MEAN	XM =	296.717	1.70947		XY = 1.70947	3.13326 = YYM			1767559.75	12408329216.00

R = ROOT[(2*N/(N-1))*(YYM-Y'*Y')] = 0.86146

SX = ROOT[XX'-XM*XM] = 1295.95240

CS = (XX'-3*XM*XM+2*XM**3)/(SX**3) = 5.00193

X : EFFECTIVE RAINFALL OF JU2 (MM)

***** B - V A L U E *****

ORDER	XI	XS	XI*XS	XI*XS-XC**2	XI*XS	Z*XC-(XI*XS)	BI
1	14.500	7030.000	104044.000	7044.800	101420.078	-694.391	-14.508
2	18.700	70.000	1309.000	88.700	-1814.914	13.748	-95.641
3	21.800	70.000	1526.000	91.800	-1097.914	10.648	-103.106
						TOTAL BI =	-213.357
						MEAN B =	-71.119
						B =	0.000

***** THE PROBABLE VALUES BY 'WAI' METHOD *****

RETURN-PERIOD (YEAR)	E	R	E*R	A=YM+E*R	C=10**A	B	X=C-B
2	0.0000	0.8614	0.0000	1.7094	51.224	0.000	51.224
3	0.3045	0.8614	-0.2014	1.5080	32.215	0.000	32.215
5	0.5951	0.8614	-0.3935	1.3158	20.693	0.000	20.693
7	0.7547	0.8614	-0.4992	1.2102	16.228	0.000	16.228
10	0.9062	0.8614	-0.5994	1.1100	12.884	0.000	12.884
15	1.0614	0.8614	-0.7020	1.0073	10.171	0.000	10.171
20	1.1630	0.8614	-0.7692	0.9401	8.713	0.000	8.713
30	1.4520	0.8614	-0.9604	0.7490	5.610	0.000	5.610

Table A.4.1-8 Probability of Effective Rainfall in Third Decade of July

X : EFFECTIVE RAINFALL OF JUL3 (READY) (MM)

ORDER	YEAR	X	LOG(X)	X+B	Y = LOG(X+B)	YY = Y**2	THOMAS PLOT(I)	HAZEN PLOT(I)	X**2	X**3
1	1966	4.300	0.63346	4.300	0.63346	0.40128	96.55	98.21	18.48	79.50
2	1952	7.500	0.87506	7.500	0.87506	0.76573	93.10	94.64	56.25	421.87
3	1955	8.200	0.91381	8.200	0.91381	0.83505	89.65	91.07	67.23	551.36
4	1965	11.300	1.05307	11.300	1.05307	1.10897	86.20	87.50	127.69	1442.89
5	1975	19.600	1.29225	19.600	1.29225	1.66992	82.75	83.92	384.16	7529.53
6	1972	20.000	1.30102	20.000	1.30102	1.69267	79.31	80.35	400.00	8000.00
7	1962	20.400	1.30962	20.400	1.30962	1.71513	75.86	76.78	416.16	8489.66
8	1967	21.030	1.32221	21.000	1.32221	1.74826	72.41	73.21	441.00	9261.00
9	1954	26.900	1.42975	26.900	1.42975	2.04419	68.96	69.64	723.60	19465.10
10	1979	28.500	1.45484	28.500	1.45484	2.11657	65.51	66.07	812.25	23149.12
11	1971	28.600	1.45636	28.600	1.45636	2.12100	62.06	62.50	817.95	23393.65
12	1969	29.900	1.47567	29.900	1.47567	2.17750	58.62	58.92	894.00	26730.89
13	1963	35.700	1.55266	35.700	1.55266	2.41077	55.17	55.35	1274.48	45499.28
14	1956	39.200	1.59328	39.200	1.59328	2.53855	51.72	51.78	1536.63	60236.27
15	1980	41.900	1.62221	41.900	1.62221	2.63157	48.27	48.21	1755.60	73560.03
16	1978	44.200	1.64542	44.200	1.64542	2.70741	44.82	44.64	1953.63	86350.87
17	1977	45.200	1.65513	45.200	1.65513	2.73948	41.37	41.07	2043.03	92345.39
18	1960	50.300	1.70156	50.300	1.70156	2.89533	37.93	37.50	2530.09	127263.46
19	1953	57.700	1.76117	57.700	1.76117	3.10173	34.48	33.92	3329.29	192100.00
20	1958	70.000	1.84509	70.000	1.84509	3.40438	31.03	30.35	4900.01	343000.06
21	1959	70.000	1.84509	70.000	1.84509	3.40438	27.58	26.78	4900.00	343000.06
22	1961	70.000	1.84509	70.000	1.84509	3.40438	24.13	23.21	4900.00	343000.06
23	1964	70.000	1.84509	70.000	1.84509	3.40438	20.68	19.64	4900.00	343000.06
24	1968	70.000	1.84509	70.000	1.84509	3.40438	17.24	16.07	4900.00	343000.06
25	1970	70.000	1.84509	70.000	1.84509	3.40438	13.79	12.50	4900.00	343000.06
26	1973	70.000	1.84509	70.000	1.84509	3.40438	10.34	8.92	4900.00	343000.06
27	1974	70.000	1.84509	70.000	1.84509	3.40438	6.89	5.35	4900.00	343000.06
28	1975	70.000	1.84509	70.000	1.84509	3.40438	3.44	1.78	4900.00	343000.06
TOTAL		1170.399	42.65449		-2.65449	66.06008			83681.61	3892870.00
MEAN	XM =	41.799	1.52337	YM =	1.52337	2.43073 = YYM			2274.34	139031.06

R = ROOT((2*XM/(N-1))*(YYM-YM*YM)) = 0.47779

SX = ROOT(XXM-XM*XM) = 22.95874

CS = ((XXXM-3*XM*XM+2*XM**3)/(SX**3))=-0.00845

X : EFFECTIVE RAINFALL OF JUL3 (MM)

***** B - VALUE *****

ORDER	XI	XS	XI*XS	XI*XS-XI**2	XI+XS	Z*(C-(XI+XS))	BI
1	4.300	70.000	301.000	74.300	-312.649	-7.557	107.533
2	7.500	70.000	525.000	77.500	-588.649	-10.757	54.721
3	8.200	70.000	574.000	78.200	-539.649	-11.457	47.101
						TOTAL BI =	209.355
						MEAN B =	69.785
						B =	0.000

***** THE PROBABLE VALUES BY 'HAZEN' METHOD *****

RETURN-PERIOD (YEAR)	Z	R	Z*R	A=YM+Z*R	C=10**A	B	X=C-B
2	0.0000	0.4777	0.0000	1.5233	33.371	0.000	33.371
3	0.3045	0.4777	-0.1454	1.3778	23.871	0.000	23.871
5	0.5991	0.4777	-0.2863	1.2369	17.339	0.000	17.339
7	0.7547	0.4777	-0.3605	1.1627	14.547	0.000	14.547
10	0.9062	0.4777	-0.4329	1.0903	12.313	0.000	12.313
15	1.0614	0.4777	-0.5071	1.0162	10.381	0.000	10.381
20	1.1630	0.4777	-0.5556	0.9676	9.283	0.000	9.283
50	1.4520	0.4777	-0.6937	0.8296	6.754	0.000	6.754

Table A.4.1-9 Net Water Requirement of Each Crops

(Unit : mm/day)

Month	Rice		Upland Crop	
	H.Y.V.	L.V.	Maize	Groundnuts
Apr. 1	8.70	-	-	-
" 2	7.22	-	-	-
" 3	4.35	-	-	-
May. 1	1.07	-	0.38	0.29
" 2	-	-	1.06	0.80
" 3	-	-	1.78	1.34
Jun. 1	-	-	1.88	2.35
" 2	-	2.80	1.88	2.35
" 3	-	5.80	1.88	2.35
Jul. 1	6.60	5.80	3.36	4.41
" 2	6.70	6.32	3.36	4.41
" 3	7.64	1.51	2.18	4.41
Aug. 1	2.50	2.90	1.06	3.53
" 2	4.25	4.25	0.32	2.10
" 3	5.00	5.00	-	0.76
Sep. 1	5.37	5.10	-	-
" 2	5.37	5.10	-	-
" 3	5.37	5.10	-	-
Oct. 1	5.83	5.83	-	-
" 2	4.84	5.83	-	-
" 3	2.92	5.83	-	-
Nov. 1	1.66	6.63	-	-
" 2	-	6.63	-	-
" 3	-	1.66	-	-
Dec. 1	-	1.83	-	-
" 2	-	-	-	-
" 3	-	-	-	-
Jan. 1	6.60	-	-	-
" 2	6.60	-	-	-
" 3	7.78	-	-	-
Feb. 1	3.50	-	-	-
" 2	5.81	-	-	-
" 3	7.00	-	-	-
Mar. 1	8.94	-	-	-
" 2	8.94	-	-	-
" 3	8.94	-	-	-

Table A.4.1-10 Net Water Requirement for Paddy (H.Y.V.) in Wet Season

(Unit: mm/day)

	Jul.			Aug.			Sep.			Oct.			Nov.
	1	2	3	1	2	3	1	2	3	1	2	3	1
Evapo transpiration (ET)			4.2	4.0			3.8			4.2			4.9
K.C. Value			1.0	1.0			1.15			1.15			1.15
E.T' (ET x K.C.)			4.20	4.00			4.37			4.83			5.64
Percolation							1.00 mm/day						→
Total			5.20	5.00			5.37			5.83			6.64
Ratio			0.18	0.50	0.85	1.00	1.00	1.00	1.00	1.00	0.83	0.50	0.25
Water requirement (1)			0.94	2.50	4.25	5.00	5.37	5.37	5.37	5.83	4.84	2.92	1.66
Land preparation (L.P)	200 mm →												
Ratio	0.33	0.33	0.33										
Water requirement (2)	6.60	6.70	6.70										
Total (1) + (2)	6.60	6.70	7.64	2.50	4.25	5.00	5.37	5.37	5.37	5.83	4.84	2.92	1.66

Table A.4.1-11 Net Water Requirement for Paddy (L.V) in Wet Season

(Unit: mm/day)

	Jun.		Jul.			Aug.			Sep.			Oct.			Nov.			Dec.
	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1
Evapo transpiration					4.2		4.0			3.8			4.2			4.9		5.5
K.C. Value					1.0		1.0			1.08			1.15			1.15		1.15
ET' (ET x K.C.)					4.20		4.0			4.10			4.83			5.63		6.33
Percolation										1.0 mm/day								
Total					5.20		5.00			5.10			5.83			6.63		7.33
Ratio				0.10	0.29	0.58	0.85	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.25	0.25
Water requirement (1)				0.52	1.51	2.90	4.25	5.00	5.10	5.10	5.10	5.83	5.83	5.83	6.63	6.63	1.66	1.83
Land preparation		200 mm																
Ratio	0.14	0.29	0.29	0.29														
Water requirement (2)	2.80	5.80	5.80	5.80														
Total (1) + (2)	2.80	5.80	5.80	6.32	1.51	2.90	4.25	5.00	5.10	5.10	5.10	5.83	5.83	5.83	6.63	6.63	1.66	1.83

Table A.4.1-12 Net Water Requirement for Paddy (H.Y.V.) in Dry Season

(Unit: mm/day)

	Jan.			Feb.			Mar.			Apr.			May
	1	2	3	1	2	3	1	2	3	1	2	3	1
Evapo transpiration (ET)			5.5		6.0			6.9			6.7		5.3
K.C. Value			1.0		1.0			1.15			1.15		1.15
ET' (ET x K.C.)			5.5		6.0			7.94			7.70		6.10
Percolation								1.0 mm/day					
Total			6.5		7.0			8.94			8.70		7.10
Ratio			0.15	0.50	0.83	1.00	1.00	1.00	1.00	1.00	0.83	0.50	0.15
Water requirement (1)			0.98	3.50	5.81	7.00	8.94	8.94	8.94	8.70	7.22	4.35	1.07
Land preparation		200 mm											
Ratio	0.38	0.33	0.34										
Water requirement (2)	6.60	6.60	6.80										
Total (1) + (2)	6.60	6.60	7.78	3.50	5.81	7.00	8.94	8.94	8.94	8.70	7.22	4.35	1.07

Table A.4.1-13 Net Water Requirement for Maize in Wet Season

(Unit: mm/day)

	May			Jun.			Jul.			Aug.	
	1	2	3	1	2	3	1	2	3	1	2
Evapo transpiration (ET)	5.3			4.7			4.2			4.0	
K.C. Value	0.4			0.4			0.8			0.8	
ET' (ET x K.C.)	2.12			1.88			3.36			3.20	
Percolation	0.0			0.0			0.0			0.0	
Total	2.12			1.88			3.36			3.20	
Ratio	0.18	0.50	0.84	1.00	1.00	1.00	1.00	1.00	0.65	0.33	0.10
Water requirement	0.38	1.06	1.78	1.88	1.88	1.88	3.36	3.36	2.18	1.06	0.32

Table A.4.1-14 Net Water Requirement for Groundnut in Wet Season

(Unit: mm/day)

	May			Jun.			Jul.			Aug.		
	1	2	3	1	2	3	1	2	3	1	2	3
Evapo transpiration (ET)		5.3			4.7			4.2			4.0	
K.C. Value		0.3			0.5			1.05			1.05	
ET' (ET x K.C.)		1.59			2.35			4.41			4.20	
Percolation		0.0			0.0			0.0			0.0	
Total		1.59			2.35			4.41			4.20	
Ratio	0.18	0.50	0.84	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.50	0.18
Water requirement	0.29	0.80	1.34	2.35	2.35	2.35	4.41	4.41	4.41	3.53	2.10	0.76

Table A.4.1-15 Probability Computation on Unit Diversion Water Requirement

i) In case of two years return period of effective rainfall

	Dc	Re	We	Q_1	Q_2
JUL-1	6.20	4.14	3.43	0.397	1.196
JUL-2	6.51	3.26	5.42	0.626	1.256
Jul-3	4.58	2.55	3,38	0.392	0.883

ii) In case of three years return period of effective rainfall

	Dc	Re	We	Q_1	Q_2
JUL-1	6.20	3.26	4.90	0.567	1.196
JUL-2	6.51	3.22	5.48	0.635	1.256
JUL-3	4.58	2.17	4.01	0.465	0.883

iii) In case of four years return period of effective rainfall

	Dc	Re	We	Q_1	Q_2
JUL-1	6.20	2.81	5.65	0.654	1.196
JUL-2	6.51	2.44	6.78	0.785	1.256
JUL-3	4.58	1.74	4.73	0.548	0.883

iv) In case of five years return period of effective rainfall

	Dc	Re	We	Q_1	Q_2
JUL-1	6.20	2.59	6.02	0.696	1.196
JUL-2	6.51	2.07	7.40	0.856	1.256
JUL-3	4.58	1.57	5.02	0.581	0.883

Note Dc : Land Preparation + Percolation + Consumtive use (mm/day)
Re : Effective Rainfall (mm/day)
If : Irrigation Efficiency 0.6
We : (Dc-Re)/If (mm/day)
Q_1 : We/8.64 (ℓ/sec/ha)
Q_2 : Dc/8.64xIf (ℓ/sec/ha)

Table A.4.1-16 Existing Irrigated Area and Proposed Irrigable Area

(Unit: hectare)

Name of Project	Water Resources	Irrigated Acreage	Proposed Acreage	Total
1. Kaeng Khoi-Ban Mo	Pasak	-	-	-
1.1 Proposed NEA	-	-	1,489	1,489
- Ban Tao Pun	-	-	672	672
- Ban Song Khon	-	-	560	560
- Ban Ta Toom	-	-	257	257
1.2 New proposed	"	-	12,671	12,671
Sub-total		-	14,160	14,160
2. Sao Hai	"	5,760	-	5,760
3. NEA Project	"			
3.1 Ban Nong Bua	-	-	720	720
3.2 Ban Ta Toom	-	-	1,023	1,023
Sub-total		-	1,743	1,743
Total (1 - 3)		5,760	15,903	21,663
4. Chainat-Pasak	Chao Phraya	127,840*	-	127,840
5. Raphiphat	Chao Phraya and Pasak	110,000*	-	110,000
Total		237,840	-	237,840
Grand Total		243,600	15,903	259,503

Note: * --- Detailed acreages are shown in Table A.4.1-17.

Table A.4.1-17 Current Irrigation Area of Existing Project

(Unit : hectare)

Name of Project		Wet	Dry Season			
Name of canal	Sub-area	Season	1978	1979	1980	1981
Chainat-Pasak	— Manorom	30,720	2,853	12,722	280	3,517
	Chong Khai	38,080	5,979	6,914	170	4,539
	Khok Kathiam	31,360	1,838	1,256	-	3,012
	— Roeng Rang	27,680	856	1,552	-	3,928
	TOTAL	127,840	11,526	22,444	450	14,996
	(Proportion)	(100)	(9.0)	(17.6)	(0.4)	(11.7)
Raphiphat	— Nakhon Luang	35,200	443	1,336	92	1,239
	Tha Luang	36,160	1,357	4,017	198	5,650
	— North Rangsit*	38,640	9,465	9,900	2,187	9,930
	TOTAL	110,000	11,265	15,253	2,477	16,819
	(Proportion)	(100)	(10.2)	(13.9)	(2.3)	(15.3)
	Grand total	237,840	22,791	37,697	2,927	31,815
	(Proportion)	(100)	(9.6)	(15.8)	(1.2)	(13.4)

The averaged cropping acreage in current four year for dry season indicates about 23,800 ha. (10% of total irrigable area).

Note: *; Total commanded area of North Rangsit is assumed about 50 percent of original total area 72,640 ha. which was irrigated by other water resources in some part.

Table A.4.1 - 18 Rainfalls and Discahrge in Shortage Months

YEAR	Month	ΔQ (m^3/sec)	Rainfall (mm/10 days)				Manorom Discharge (m^3/sec)
			Lopburi	Wang Noi	Mean	Saraburi	
	Aug.- 1	98.6	16.0	146.5	81.3	73.1	127.7
1967	Aug.- 2	-58.9	7.6	65.1	36.4	30.7	83.2
	Aug.- 3	26.8	44.3	56.7	50.5	81.4	117.4
	Jul.- 1	60.0	54.1	68.3	61.2	48.4	119.3
1968	Jul.- 2	-9.2	29.1	36.4	32.8	30.2	173.4
	Jul.- 3	81.6	29.5	26.1	27.8	96.7	166.5
	Jul.- 1	146.4	39.8	99.5	69.7	45.7	163.3
1970	Jul.- 2	-9.8	16.3	37.8	27.1	55.0	132.3
	Jul.- 3	158.1	104.4	23.7	64.1	211.4	153.3
	Jul.- 1	-174.8	19	0.0	1.0	15.6	115.4
1972	Jul.- 2	84.1	93.8	63.0	78.4	119.2	113.0
	Jul.- 3	-68.0	2.6	1.8	2.2	26.8	134.1
	Jul.- 1	58.2	29.1	83.7	56.4	100.7	149.6
1977	Jul.- 2	-122.3	7.8	8.7	8.3	29.1	160.1
	JUl.- 3	70.4	29.9	51.4	40.7	60.4	150.1

Table A.4.1-19 Water Balance Computation
(Cropping intensity 115%)

Definition of the symbol in the table are described as follows;

Month

1 1 - First decade of January
2 - Second "
3 - Third "
- Mean value of January

(1) Chainat - Pasak Canal
(2) Raphipat Canal } Water requirement
(3) Kaeng Khoi

(5) Pasak river discharge
(6) Manorom discharge } Available discharge
(7) *Side flow

N.A means non available data.

Side flow (Drainage Area 2,580 km^2) was calculated from the specific discharge of Pasak river (Drainage Area 14,520 km^2) and it is only taking account of the month from July to November.

Table A.4.1-19(1) WATER BALANCE OF KAENG KHOI PROJECT 1965 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	32.60	N.A	32.60	-16.96
	2	24.41	21.01	4.14	49.56	30.70	N.A	30.70	-18.86
	3	28.78	24.76	4.88	58.42	28.82	N.A	28.82	-29.60
2	1	25.87	22.26	4.38	52.51	30.71	N.A	30.71	-21.81
	2	12.95	11.14	2.19	26.28	28.20	N.A	28.20	1.92
	3	21.49	18.49	3.64	43.63	25.00	N.A	25.00	-18.63
3	1	25.89	22.28	4.39	52.56	24.88	N.A	24.88	-27.69
	2	20.11	17.30	3.41	40.82	26.02	N.A	26.02	-14.80
	3	33.07	28.45	5.60	67.13	21.30	N.A	21.30	-45.83
		33.07	28.45	5.60	67.13	22.20	N.A	22.20	-44.93
		33.07	28.45	5.60	67.13	21.45	N.A	21.45	-45.67
		33.07	28.45	5.60	67.13	21.65	N.A	21.65	-45.48
4	1	32.18	27.69	5.45	65.33	23.60	27.10	50.70	-14.63
	2	26.71	22.98	4.53	54.21	24.90	31.10	56.00	1.79
	3	16.09	13.85	2.73	32.66	27.60	39.70	67.30	34.64
5	1	24.99	21.51	4.24	50.73	25.37	32.63	58.00	7.27
	2	3.96	3.41	0.67	8.03	28.00	39.40	67.40	59.37
	3	0.0	0.0	0.0	0.0	26.20	41.20	67.40	67.40
		0.0	0.0	0.0	0.0	32.91	39.09	72.00	72.00
6	1	1.32	1.14	0.22	2.68	29.04	39.90	68.93	66.26
	2	0.0	0.0	0.0	0.0	31.40	43.20	80.19	80.19
	3	0.0	0.0	0.0	0.0	37.50	84.50	128.67	128.67
		33.05	0.0	0.0	33.05	72.10	106.90	191.83	158.79
7	1	11.02	0.0	0.0	11.02	47.00	78.20	133.57	122.55
	2	127.56	115.01	7.67	250.23	133.60	113.10	270.48	20.25
	3	138.90	100.26	8.71	247.87	53.30	97.10	159.89	-87.99
		0.0	48.86	14.84	63.70	21.55	127.73	153.11	89.41
8	1	88.82	88.04	10.41	187.27	69.48	112.64	194.49	7.22
	2	0.0	24.03	0.0	24.03	77.30	179.80	270.86	246.83
	3	0.0	4.56	10.30	14.86	57.80	99.00	167.09	152.22
		0.0	0.0	0.0	0.0	94.82	139.09	250.79	250.79
9	1	0.0	9.53	3.43	12.96	76.64	139.30	229.58	216.61
	2	17.69	0.0	0.0	17.69	182.70	205.30	420.52	402.83
	3	0.0	0.0	0.0	0.0	250.20	211.70	506.44	506.44
		0.0	13.79	0.0	13.79	429.00	189.20	694.56	680.77
10	1	5.90	4.60	0.0	10.50	287.30	202.07	540.51	530.01
	2	62.02	30.29	13.02	105.33	348.50	220.40	630.93	525.60
	3	13.69	82.75	22.32	118.76	230.40	216.90	488.31	369.55
		76.07	57.93	7.28	141.27	75.00	197.00	285.35	144.08
11	1	50.59	56.99	14.20	121.79	217.97	211.43	468.20	346.41
	2	0.0	88.06	9.04	97.10	48.60	203.60	260.85	163.75
	3	45.81	49.60	3.81	99.22	32.00	144.90	182.60	83.38
		20.47	17.61	3.47	41.55	33.40	148.50	187.85	146.30
12	1	22.09	51.76	5.44	79.29	38.00	165.67	210.43	131.14
	2	22.13	12.84	3.84	38.82	29.80	58.30	88.10	49.28
	3	0.0	0.0	0.0	0.0	30.70	40.30	71.00	71.00
		0.0	0.0	0.0	0.0	27.82	19.64	47.45	47.45
		7.38	4.28	1.28	12.94	29.44	39.41	68.85	55.91

Table A.4.1-19 (2) WATER BALANCE OF KAENG KHOI PROJECT 1966 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	29.00	20.30	49.30	-0.26
	2	24.41	21.01	4.14	49.56	26.10	21.90	48.00	-1.56
	3	28.78	24.76	4.88	58.42	21.73	8.73	30.45	-27.96
		25.87	22.26	4.38	52.51	25.61	16.98	42.58	-9.93
2	1	12.95	11.14	2.19	26.28	20.10	9.00	29.10	2.82
	2	21.49	18.49	3.64	43.63	15.60	9.80	25.40	-18.23
	3	25.89	22.28	4.39	52.56	22.88	20.50	43.38	-9.19
		20.11	17.30	3.41	40.82	19.52	13.10	32.62	-8.20
3	1	33.07	28.45	5.60	67.13	20.10	19.50	39.60	-27.53
	2	33.07	28.45	5.60	67.13	19.60	38.90	58.50	-8.63
	3	33.07	28.45	5.60	67.13	17.55	18.45	36.00	-31.13
		33.07	28.45	5.60	67.13	19.08	25.62	44.70	-22.43
4	1	32.18	27.69	5.45	65.33	21.50	18.60	40.10	-25.23
	2	26.71	22.98	4.53	54.21	26.70	17.30	44.00	-10.21
	3	16.09	13.85	2.73	32.66	23.10	16.80	39.90	7.24
		24.99	21.51	4.24	50.73	23.77	17.57	41.33	-9.40
5	1	3.96	3.41	0.67	8.03	22.90	15.70	38.60	30.57
	2	0.0	0.0	0.0	0.0	26.00	17.30	43.30	43.30
	3	0.0	0.0	0.0	0.0	73.55	10.55	84.09	84.09
		1.32	1.14	0.22	2.68	40.82	14.52	55.33	52.65
6	1	0.0	0.0	0.0	0.0	66.70	27.60	106.17	106.17
	2	0.0	0.0	0.0	0.0	51.30	48.40	108.83	108.83
	3	0.0	0.0	0.0	0.0	34.50	105.50	146.14	146.14
		0.0	0.0	0.0	0.0	50.83	60.50	120.38	120.38
7	1	7.15	46.74	0.0	53.89	43.20	124.00	174.89	121.00
	2	31.26	0.0	0.0	31.26	29.00	114.10	148.26	117.00
	3	54.26	97.18	17.49	168.94	50.18	133.55	192.66	23.72
		30.89	47.97	5.83	84.69	40.79	123.88	171.94	87.24
8	1	0.0	0.0	0.47	0.47	45.10	184.80	237.93	237.46
	2	29.35	1.70	0.0	31.04	84.70	176.70	276.48	245.43
	3	0.0	0.0	0.0	0.0	165.82	136.00	331.33	331.33
		9.78	0.57	0.16	10.50	98.54	165.83	281.91	271.41
9	1	22.69	87.32	8.04	118.05	300.40	134.00	487.87	369.82
	2	0.0	0.0	0.0	0.0	512.00	133.50	736.64	736.64
	3	127.19	74.90	21.90	223.99	609.60	138.90	857.01	633.02
		49.96	54.07	9.98	114.01	474.00	135.47	693.84	579.83
10	1	0.0	0.0	0.0	0.0	344.00	224.30	629.53	629.53
	2	115.23	93.74	7.62	216.58	98.10	193.60	309.16	92.58
	3	0.0	19.73	0.0	19.73	142.00	123.00	290.28	270.54
		38.41	37.82	2.54	78.77	194.70	180.30	409.66	330.89
11	1	102.34	88.06	17.34	207.74	156.10	174.80	358.69	150.94
	2	72.07	2.97	11.56	86.60	38.10	186.10	230.98	144.39
	3	6.04	0.0	0.0	6.04	28.40	159.30	192.76	186.71
		60.15	30.34	9.63	100.13	74.20	173.40	260.81	160.68
12	1	0.0	19.52	3.84	23.37	32.00	58.90	90.90	67.53
	2	0.0	0.0	0.0	0.0	32.30	41.90	74.20	74.20
	3	0.0	0.0	0.0	0.0	29.00	40.55	69.55	69.55
		0.0	6.51	1.28	7.79	31.10	47.12	78.22	70.43

Table A.4.1-19 (3) WATER BALANCE OF KAENG KHOI PROJECT 1967 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	13.60	47.90	61.50	11.94
	2	24.41	21.01	4.14	49.56	10.97	48.40	59.37	9.81
	3	28.78	24.76	4.88	58.42	11.44	27.64	39.07	-19.35
2	1	25.87	22.26	4.38	52.51	12.00	41.31	53.31	0.80
	2	12.95	11.14	2.19	26.28	15.30	20.60	35.90	9.62
	3	21.49	18.49	3.64	43.63	10.49	25.00	35.49	-8.14
		25.89	22.28	4.39	52.56	10.92	29.25	40.17	-12.39
3	1	20.11	17.30	3.41	40.82	12.24	24.95	37.19	-3.63
	2	33.07	28.45	5.60	67.13	12.30	25.40	37.70	-29.43
	3	33.07	28.45	5.60	67.13	11.21	26.60	37.81	-29.32
		33.07	28.45	5.60	67.13	8.88	29.45	38.34	-28.79
4	1	33.07	28.45	5.60	67.13	10.80	27.15	37.95	-29.18
	2	32.18	27.69	5.45	65.33	2.97	31.50	34.47	-30.86
	3	26.71	22.98	4.53	54.21	6.85	26.60	33.45	-20.76
		16.09	13.85	2.73	32.66	18.02	27.50	45.52	12.86
5	1	24.99	21.51	4.24	50.73	9.28	28.53	37.81	-12.92
	2	3.96	3.41	0.67	8.03	6.40	19.30	25.70	17.67
	3	0.0	0.0	0.0	0.0	10.29	26.30	36.59	36.59
		0.0	0.0	0.0	0.0	12.10	41.55	53.65	53.65
6	1	1.32	1.14	0.22	2.68	9.60	29.05	38.65	35.97
	2	0.0	0.0	0.0	0.0	11.08	51.60	64.65	64.65
	3	0.0	0.0	0.0	0.0	6.25	84.90	92.26	92.26
		11.59	0.0	9.83	21.42	9.62	105.90	117.23	95.81
7	1	3.86	0.0	3.28	7.14	8.98	80.80	91.38	84.24
	2	6.97	0.0	3.47	10.44	6.86	88.90	96.98	86.55
	3	70.28	34.53	0.91	105.73	6.08	112.00	119.16	13.44
		10.21	15.15	11.13	36.50	14.18	83.73	100.43	63.94
8	1	29.15	16.56	5.17	50.89	9.04	94.88	105.53	54.64
	2	36.99	12.09	0.0	49.09	17.00	127.70	147.73	98.64
	3	90.75	58.99	8.14	157.88	13.40	83.20	98.99	-58.89
		48.82	82.08	0.0	130.90	34.27	117.36	157.74	26.84
9	1	58.85	51.05	2.71	112.62	21.56	109.42	134.82	22.20
	2	16.03	11.72	0.0	27.75	108.70	138.60	266.65	238.90
	3	0.0	0.0	0.0	0.0	91.90	136.70	244.96	244.96
		39.70	0.0	0.0	39.70	162.50	166.90	358.32	318.62
10	1	18.58	3.91	0.0	22.49	121.03	147.40	289.98	267.49
	2	30.95	58.46	0.0	89.41	350.80	102.80	516.04	426.63
	3	108.01	101.53	17.83	227.38	318.40	220.90	595.97	368.59
		95.91	92.94	16.77	205.61	166.55	219.91	416.10	210.49
11	1	78.29	84.31	11.53	174.13	278.58	181.20	509.37	335.24
	2	102.34	76.60	17.34	196.29	22.20	215.50	241.65	45.37
	3	0.0	70.45	13.87	84.32	19.30	161.40	184.14	99.81
		15.66	17.61	3.47	36.74	15.80	112.20	130.81	94.07
12	1	39.33	54.89	11.56	105.78	19.10	163.03	185.53	79.75
	2	22.69	19.52	3.84	46.05	10.52	62.80	73.32	27.27
	3	0.0	0.0	0.0	0.0	8.26	82.70	90.96	90.96
		0.0	0.0	0.0	0.0	7.02	71.55	78.56	78.56
		7.56	6.51	1.28	15.35	8.60	72.35	80.95	65.60

Table A.4.1-19 (4) WATER BALANCE OF KAENG KHOI PROJECT 1968 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) HANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	6.92	68.90	75.82	26.26
	2	24.41	21.01	4.14	49.56	5.24	64.40	69.64	20.08
	3	28.78	24.76	4.88	58.42	3.25	42.27	45.52	-12.90
		25.87	22.26	4.38	52.51	5.14	58.52	63.66	11.15
2	1	12.95	11.14	2.19	26.28	4.57	45.00	49.57	23.29
	2	21.49	18.49	3.64	43.63	7.04	24.70	31.74	-11.89
	3	25.89	22.28	4.39	52.56	6.53	24.11	30.64	-21.92
		20.11	17.30	3.41	40.82	6.05	31.27	37.32	-3.50
3	1	33.07	28.45	5.60	67.13	4.28	21.70	25.98	-41.15
	2	33.07	28.45	5.60	67.13	4.07	26.40	30.47	-36.66
	3	33.07	28.45	5.60	67.13	3.62	26.36	29.98	-37.15
		33.07	28.45	5.60	67.13	3.99	24.82	28.81	-38.32
4	1	32.18	27.69	5.45	65.33	3.03	30.00	33.03	-32.30
	2	26.71	22.98	4.53	54.21	3.15	26.50	29.65	-24.56
	3	16.09	13.85	2.73	32.66	3.48	26.50	29.98	-2.68
		24.99	21.51	4.24	50.73	3.22	27.67	30.89	-19.85
5	1	3.96	3.41	0.67	8.03	3.19	43.40	46.59	38.56
	2	0.0	0.0	0.0	0.0	13.71	35.40	49.11	49.11
	3	0.0	0.0	0.0	0.0	20.82	67.55	88.36	88.36
		1.32	1.14	0.22	2.68	12.57	48.78	61.35	58.68
6	1	0.0	0.0	0.0	0.0	18.00	69.50	90.70	90.70
	2	17.88	22.55	0.0	40.42	20.60	112.20	136.47	96.04
	3	5.49	61.54	12.12	79.14	35.60	124.80	166.74	87.59
		7.79	28.03	4.04	39.86	24.73	102.17	131.30	91.45
7	1	52.84	22.86	10.74	86.44	23.00	119.30	146.39	59.95
	2	106.72	80.21	17.74	204.67	18.70	173.40	195.43	-9.24
	3	63.34	59.42	0.0	122.77	32.09	166.55	204.35	81.58
		74.30	54.17	9.49	137.96	24.60	153.08	182.06	44.10
8	1	0.0	0.0	1.10	1.10	71.30	160.10	244.09	242.99
	2	72.07	55.65	0.0	127.72	74.40	113.50	201.14	73.43
	3	37.21	17.70	0.0	54.91	41.55	208.27	257.21	202.30
		36.43	24.45	0.37	61.24	62.42	160.62	234.15	172.91
9	1	49.69	20.32	10.74	80.75	34.10	150.50	190.67	109.92
	2	0.0	4.72	0.0	4.72	38.10	175.20	220.08	215.36
	3	26.02	0.0	4.10	30.11	58.20	203.00	271.56	241.45
		25.24	8.35	4.95	38.53	43.47	176.23	227.44	188.91
10	1	13.19	0.0	17.72	30.91	40.20	119.90	167.26	136.34
	2	130.02	96.92	22.32	249.26	28.40	89.70	123.16	-126.10
	3	108.01	81.08	18.30	207.39	33.82	115.27	155.11	-52.28
		83.74	59.33	19.45	162.52	34.14	108.29	148.51	-14.01
11	1	52.03	68.33	2.20	122.56	16.90	93.50	113.41	-9.16
	2	81.87	52.62	13.87	148.37	9.51	47.40	58.60	-89.77
	3	20.47	17.61	3.47	41.55	7.18	54.40	62.86	21.31
		51.46	46.19	6.52	104.16	11.20	65.10	78.29	-25.87
12	1	22.69	19.52	3.84	46.05	8.89	75.20	84.09	38.04
	2	0.0	0.0	0.0	0.0	6.28	31.70	37.98	37.98
	3	0.0	0.0	0.0	0.0	3.78	31.91	35.69	35.69
		7.56	6.51	1.28	15.35	6.32	46.27	52.59	37.24

Table A.4.1-19 (5) WATER BALANCE OF KAENG KHOI PROJECT 1969 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	2.59	32.20	34.79	-14.77
	2	24.41	21.01	4.14	49.56	3.25	29.50	32.75	-16.81
	3	28.78	24.76	4.88	58.42	2.96	30.64	33.60	-24.82
2	1	25.87	22.26	4.38	52.51	2.93	30.78	33.71	-18.80
	2	12.95	11.14	2.19	26.28	3.20	50.80	54.00	27.72
	3	21.49	18.49	3.64	43.63	2.55	24.90	27.45	-16.18
3	1	25.89	22.28	4.39	52.56	2.01	19.88	21.89	-30.67
	2	20.11	17.30	3.41	40.82	2.59	31.86	34.45	-6.38
	3	33.07	28.45	5.60	67.13	1.62	19.70	21.32	-45.81
4	1	33.07	28.45	5.60	67.13	1.19	16.60	17.79	-49.34
	2	33.07	28.45	5.60	67.13	1.81	14.27	16.08	-51.05
	3	32.18	27.69	5.45	65.33	1.54	16.86	18.40	-48.73
5	1	26.71	22.98	4.53	54.21	3.53	21.10	24.63	-40.70
	2	16.09	13.85	2.73	32.66	4.14	19.10	23.24	-30.97
	3	24.99	21.51	4.24	50.73	3.02	17.30	20.32	-12.34
6	1	3.96	3.41	0.67	8.03	3.56	19.17	22.73	-28.00
	2	0.0	0.0	0.0	0.0	2.41	13.00	15.41	7.38
	3	0.0	0.0	0.0	0.0	0.55	15.10	15.65	15.65
7	1	1.32	1.14	0.22	2.68	0.45	19.09	19.54	19.54
	2	0.0	0.0	0.0	0.0	1.14	15.73	16.87	14.19
	3	0.0	0.0	0.0	0.0	2.17	30.40	32.96	32.96
8	1	43.40	0.0	0.0	43.40	9.72	66.00	77.45	77.45
	2	14.47	0.0	0.0	14.47	11.55	132.30	145.91	102.50
	3	0.0	0.0	0.0	0.0	7.81	76.23	85.44	70.97
9	1	29.22	0.0	3.10	32.33	22.16	118.60	144.70	144.70
	2	61.33	79.24	7.77	148.34	50.50	148.50	207.99	175.66
	3	30.18	26.41	3.62	60.22	43.55	138.09	189.39	41.05
10	1	15.72	57.29	0.0	73.01	38.74	135.06	180.69	120.47
	2	0.0	0.0	0.0	0.0	44.50	154.10	206.52	133.51
	3	96.06	0.0	5.71	101.77	49.20	165.40	223.36	223.36
11	1	37.26	19.10	1.90	58.26	67.09	217.73	296.76	194.99
	2	0.0	0.0	0.0	0.0	53.60	179.08	242.21	183.95
	3	0.0	0.0	0.0	0.0	130.60	150.30	304.15	304.15
12	1	66.71	25.25	10.30	102.26	367.50	190.10	623.01	623.01
	2	22.24	8.42	3.43	34.09	826.40	152.10	1125.60	1023.34
	3	67.20	0.0	24.36	91.56	441.50	164.17	684.25	650.17
		65.66	51.88	19.87	137.41	612.40	227.10	948.51	856.94
		73.54	0.0	0.0	73.54	279.80	220.50	550.10	412.69
		68.80	17.29	14.75	100.84	63.00	208.64	282.85	209.31
		75.89	54.80	9.01	139.70	318.40	218.75	593.82	492.98
		81.87	70.45	13.87	166.20	68.50	198.80	279.49	139.80
		20.47	17.61	3.47	41.55	36.10	206.70	249.23	83.03
		59.41	47.62	8.78	115.81	16.90	171.10	191.01	149.46
		22.69	19.52	3.84	46.05	40.50	192.20	239.91	124.10
		0.0	0.0	0.0	0.0	12.90	84.90	97.80	51.75
		0.0	0.0	0.0	0.0	12.70	63.20	75.90	75.90
		7.56	6.51	1.28	15.35	11.91	53.64	65.55	65.55
						12.50	67.25	79.75	64.40

Table A.4.1-19 (6) WATER BALANCE OF KAENG KHOI PROJECT 1970 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	11.11	51.40	62.51	12.95
	2	24.41	21.01	4.14	49.56	12.00	55.60	67.60	18.04
	3	28.78	24.76	4.88	58.42	11.37	52.00	63.37	4.95
		25.87	22.26	4.38	52.51	11.49	53.00	64.49	11.98
2	1	12.95	11.14	2.19	26.28	12.18	49.70	61.88	35.60
	2	21.49	18.49	3.64	43.63	10.73	38.40	49.13	5.50
	3	25.89	22.28	4.39	52.56	13.50	51.63	65.13	12.56
		20.11	17.30	3.41	40.82	12.14	46.57	58.71	17.89
3	1	33.07	28.45	5.60	67.13	13.10	55.00	68.10	0.97
	2	33.07	28.45	5.60	67.13	10.25	42.90	53.15	-13.98
	3	33.07	28.45	5.60	67.13	8.35	29.73	38.08	-29.05
		33.07	28.45	5.60	67.13	10.57	42.54	53.11	-14.02
4	1	32.18	27.69	5.45	65.33	8.10	37.40	45.50	-19.83
	2	26.71	22.98	4.53	54.21	17.11	37.30	54.41	0.20
	3	16.09	13.85	2.73	32.66	12.77	45.30	58.07	25.41
		24.99	21.51	4.24	50.73	12.66	40.00	52.66	1.93
5	1	3.96	3.41	0.67	8.03	9.79	47.30	57.09	49.06
	2	0.0	0.0	0.0	0.0	11.98	51.40	63.38	63.38
	3	0.0	0.0	0.0	0.0	11.29	74.27	85.56	85.56
		1.32	1.14	0.22	2.68	11.02	57.66	68.68	66.00
6	1	0.0	0.0	0.0	0.0	11.44	126.30	139.78	139.78
	2	0.0	0.0	0.0	0.0	18.10	100.90	122.22	122.22
	3	0.0	15.07	0.0	15.07	37.80	122.60	167.13	152.06
		0.0	5.02	0.0	5.02	22.45	116.60	143.04	138.02
7	1	79.28	0.0	11.59	90.87	62.80	163.30	237.28	146.41
	2	130.39	77.98	9.97	218.34	64.70	132.30	208.52	-9.82
	3	0.0	62.90	0.0	62.90	57.45	153.27	220.95	158.06
		69.89	46.96	7.18	124.04	61.65	149.62	222.25	98.21
8	1	0.0	0.0	0.0	0.0	58.00	138.10	206.42	206.42
	2	18.06	0.0	2.31	20.37	86.90	166.10	268.47	248.10
	3	0.0	0.0	0.0	0.0	176.36	154.64	362.39	362.39
		6.02	0.0	0.77	6.79	107.09	152.95	279.09	272.30
9	1	45.07	83.02	0.0	128.09	261.30	207.10	514.91	386.82
	2	0.0	0.0	0.0	0.0	333.30	230.70	623.33	623.33
	3	66.71	0.0	0.0	66.71	296.50	256.90	606.18	539.47
		37.26	27.67	0.0	64.93	297.03	231.57	581.47	516.54
10	1	139.70	110.34	21.07	271.11	351.00	251.10	664.58	393.46
	2	0.0	0.0	13.73	13.73	100.00	241.20	359.00	345.27
	3	24.11	0.0	10.55	34.67	58.64	211.45	280.53	245.86
		54.60	36.78	15.12	106.50	169.88	234.58	434.70	328.20
11	1	102.34	88.06	17.34	207.74	45.90	161.80	215.87	8.13
	2	81.87	70.45	13.87	166.20	46.00	147.00	201.19	34.99
	3	0.12	0.0	1.34	1.46	15.70	177.30	195.79	194.33
		61.45	52.84	10.85	125.13	35.87	162.03	204.28	79.15
12	1	0.0	0.0	0.0	0.0	15.10	133.40	148.50	148.50
	2	0.0	0.0	0.0	0.0	14.50	116.40	130.90	130.90
	3	0.0	0.0	0.0	0.0	13.45	114.55	128.00	128.00
		0.0	0.0	0.0	0.0	14.35	121.45	135.80	135.80

Table A.4.1-19 (7) WATER BALANCE OF KAENG KHOI PROJECT 1971 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	10.74	86.80	97.54	47.98
	2	24.41	21.01	4.14	49.56	10.23	79.60	89.83	40.27
	3	28.78	24.76	4.88	58.42	10.94	81.73	92.66	34.25
2	1	25.87	22.26	4.38	52.51	10.64	82.71	93.34	40.83
	2	12.95	11.14	2.19	26.28	11.64	80.70	92.34	66.06
	3	21.49	18.49	3.64	43.63	9.83	80.20	90.03	46.40
3	1	25.89	22.28	4.39	52.56	10.32	81.63	91.95	39.39
	2	20.11	17.30	3.41	40.82	10.60	80.84	91.44	50.62
	3	33.07	28.45	5.60	67.13	10.08	52.80	62.88	-4.25
4	1	33.07	28.45	5.60	67.13	10.79	60.10	70.89	3.76
	2	33.07	28.45	5.60	67.13	11.25	59.45	70.71	3.58
	3	33.07	28.45	5.60	67.13	10.71	57.45	68.16	1.03
5	1	32.18	27.69	5.45	65.33	11.13	54.70	65.83	0.50
	2	26.71	22.98	4.53	54.21	10.88	63.10	73.98	19.77
	3	16.09	13.85	2.73	32.66	10.99	59.50	70.49	37.83
6	1	24.99	21.51	4.24	50.73	11.00	59.10	70.10	19.37
	2	3.96	3.41	0.67	8.03	9.22	65.10	74.32	66.29
	3	0.0	0.0	0.0	0.0	17.57	70.60	88.17	88.17
7	1	0.0	0.0	0.0	0.0	14.18	67.00	81.18	81.18
	2	1.32	1.14	0.22	2.68	13.66	67.57	81.22	78.55
	3	0.0	0.0	0.0	0.0	9.93	113.40	125.10	125.10
8	1	0.0	0.0	0.0	0.0	3.41	127.40	131.42	131.42
	2	4.75	43.39	1.24	49.38	15.93	119.00	137.77	88.38
	3	1.58	14.46	0.41	16.46	9.76	119.93	131.43	114.97
9	1	120.34	88.11	0.0	208.46	20.10	103.20	126.88	-81.58
	2	121.51	97.40	15.86	234.77	10.67	151.10	163.67	-71.10
	3	91.93	78.52	8.26	178.70	10.66	176.27	188.83	10.13
10	1	111.26	88.01	8.04	207.31	13.81	143.52	159.79	-47.52
	2	0.0	15.91	0.0	15.91	10.58	213.30	225.76	209.85
	3	0.0	0.0	0.0	0.0	13.71	216.40	232.55	232.55
11	1	43.44	7.43	0.0	50.86	164.27	199.27	392.79	341.92
	2	14.48	7.78	0.0	22.26	62.85	209.66	283.70	261.44
	3	45.62	59.47	8.26	113.35	216.60	225.50	480.65	367.30
12	1	0.0	56.76	5.88	62.64	152.90	227.90	408.02	345.37
	2	42.29	39.41	0.0	81.71	167.60	238.20	435.63	353.93
	3	29.30	51.88	4.72	85.90	179.03	230.53	441.43	355.53
		66.83	0.0	10.51	77.34	157.80	249.70	436.59	358.25
		114.30	101.37	20.40	236.08	132.60	250.40	406.60	170.52
		0.0	77.31	0.0	77.31	87.73	233.55	336.89	259.57
		60.38	59.56	10.31	130.25	126.04	244.55	393.03	262.78
		91.06	88.06	17.34	196.46	10.51	255.30	267.68	71.22
		81.87	70.45	13.87	166.20	10.36	223.60	235.80	69.61
		17.69	17.61	3.47	38.77	10.10	114.00	125.90	87.12
		63.54	58.71	11.56	133.81	10.32	197.63	209.79	75.98
		22.69	19.52	3.84	46.05	3.67	14.40	18.07	-27.98
		0.0	0.0	0.0	0.0	4.10	4.40	8.50	8.50
		0.0	0.0	0.0	0.0	9.53	8.18	17.71	17.71
		7.56	6.51	1.28	15.35	5.77	8.99	14.76	-0.59

Table A.4.1-19 (8) WATER BALANCE OF KAENG KHOI PROJECT 1972 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	8.75	8.00	16.75	-32.81
	2	24.41	21.01	4.14	49.56	8.72	13.20	21.92	-27.64
	3	28.78	24.76	4.88	58.42	7.65	30.00	37.65	-20.77
		25.87	22.26	4.38	52.51	8.37	17.07	25.44	-27.07
2	1	12.95	11.14	2.19	26.29	10.97	81.30	92.27	65.99
	2	21.49	18.49	3.64	43.63	11.80	73.10	84.90	41.27
	3	25.89	22.28	4.39	52.56	10.97	59.67	70.63	18.07
		20.11	17.30	3.41	40.82	11.25	71.36	82.60	41.78
3	1	33.07	28.45	5.60	67.13	13.20	70.70	83.90	16.77
	2	33.07	28.45	5.60	67.13	13.13	54.00	67.13	0.00
	3	33.07	28.45	5.60	67.13	12.91	68.82	81.73	14.60
		33.07	28.45	5.60	67.13	13.08	64.51	77.59	10.46
4	1	32.18	27.69	5.45	65.33	14.90	61.20	76.10	10.77
	2	26.71	22.98	4.53	54.21	14.80	80.10	94.90	40.69
	3	16.09	13.85	2.73	32.66	14.40	82.20	96.60	63.94
		24.99	21.51	4.24	50.73	14.70	74.50	89.20	38.47
5	1	3.96	3.41	0.67	8.03	13.50	54.10	67.60	59.57
	2	0.0	0.0	0.0	0.0	13.50	80.40	93.90	93.90
	3	0.0	0.0	0.0	0.0	9.32	83.82	93.14	93.14
		1.32	1.14	0.22	2.68	12.11	72.77	84.88	82.20
6	1	0.0	0.0	0.0	0.0	12.14	103.40	117.70	117.70
	2	0.0	25.89	0.0	25.89	8.56	138.40	148.48	122.60
	3	59.31	61.54	0.0	120.84	4.12	83.80	88.65	-32.19
		19.77	29.14	0.0	48.91	8.27	108.53	118.28	69.37
7	1	149.38	131.56	21.02	301.96	10.00	115.40	127.18	-174.78
	2	0.0	37.88	0.0	37.88	7.64	113.00	122.00	84.12
	3	108.57	94.58	11.50	214.66	10.71	134.09	146.71	-67.95
		85.98	88.00	10.84	184.83	9.45	120.83	131.96	-52.87
8	1	0.0	3.18	0.0	3.18	11.41	139.50	152.94	149.76
	2	62.45	74.59	12.78	149.82	11.47	169.50	183.01	33.20
	3	28.98	0.05	0.0	29.02	17.27	183.73	204.07	175.05
		30.48	25.94	4.26	60.67	13.38	164.24	180.01	119.33
9	1	0.0	0.0	0.0	0.0	76.80	161.20	251.67	251.67
	2	0.0	0.0	0.0	0.0	282.80	90.10	423.24	423.24
	3	48.21	78.72	0.0	126.93	319.90	17.80	394.64	267.71
		16.07	26.24	0.0	42.31	226.50	89.70	356.52	314.21
10	1	0.0	73.10	3.27	76.37	309.90	38.30	403.36	326.99
	2	31.81	81.96	22.07	135.84	212.40	148.30	398.51	262.67
	3	107.84	62.70	18.30	188.85	187.09	206.82	427.21	238.36
		46.55	72.59	14.55	133.69	236.46	131.14	409.69	276.01
11	1	45.56	88.06	0.0	133.62	120.30	168.90	310.61	176.99
	2	0.0	0.0	0.0	0.0	47.10	145.30	200.78	200.78
	3	0.0	0.0	0.0	0.0	30.10	129.70	165.16	165.16
		15.19	29.35	0.0	44.54	65.83	147.97	225.52	180.98
12	1	0.0	0.0	0.0	0.0	22.50	105.50	128.00	128.00
	2	0.0	0.0	0.0	0.0	13.69	61.50	75.19	75.19
	3	0.0	0.0	0.0	0.0	13.44	49.36	62.80	62.80
		0.0	0.0	0.0	0.0	16.54	72.12	88.66	88.66

Table A.4.1-19 (9) WATER BALANCE OF KAENG KHOI PROJECT 1973 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) NANORON REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	14.50	46.60	61.10	11.54
	2	24.41	21.01	4.14	49.56	15.70	41.30	57.00	7.44
	3	28.78	24.76	4.88	58.42	11.48	60.36	71.85	13.43
2	1	25.87	22.26	4.38	52.51	13.89	49.42	63.32	10.80
	2	12.95	11.14	2.19	26.28	10.44	50.20	60.64	34.36
	3	21.49	18.49	3.64	43.63	11.63	29.90	41.53	-2.10
3	1	25.89	22.28	4.39	52.56	13.13	63.50	76.63	24.06
	2	20.11	17.30	3.41	40.82	11.73	47.87	59.60	18.78
	3	33.07	28.45	5.60	67.13	10.71	47.90	58.61	-8.52
4	1	33.07	28.45	5.60	67.13	11.65	65.90	77.55	10.42
	2	33.07	28.45	5.60	67.13	11.91	62.09	74.00	6.87
	3	33.07	28.45	5.60	67.13	11.42	58.63	70.05	2.92
5	1	32.18	27.69	5.45	65.33	11.10	71.30	82.40	17.07
	2	26.71	22.98	4.53	54.21	0.0	56.20	56.20	1.99
	3	16.09	13.85	2.73	32.66	13.30	55.30	68.60	35.94
6	1	24.99	21.51	4.24	50.73	8.13	60.93	69.07	18.33
	2	3.96	3.41	0.67	8.03	15.60	71.60	87.20	79.17
	3	0.0	0.0	0.0	0.0	14.40	100.10	114.50	114.50
7	1	0.0	0.0	0.0	0.0	15.27	99.18	114.45	114.45
	2	1.32	1.14	0.22	2.68	15.09	90.29	105.38	102.71
	3	0.0	0.0	0.0	0.0	14.20	119.70	136.43	136.43
8	1	0.0	0.0	0.0	0.0	16.17	125.10	144.15	144.15
	2	65.78	61.54	0.0	127.32	12.30	139.40	153.89	26.57
	3	21.93	20.51	0.0	42.44	14.22	128.07	144.82	102.38
9	1	116.46	93.52	5.44	215.43	13.95	106.30	122.73	-92.69
	2	105.79	74.00	0.0	179.80	13.04	136.00	151.36	-28.43
	3	31.90	0.0	0.0	31.90	16.27	179.27	198.44	166.54
10	1	84.72	55.84	1.81	142.37	14.42	140.52	157.51	15.14
	2	17.57	22.28	4.17	44.02	27.20	190.30	222.34	178.32
	3	75.03	0.0	0.0	75.03	21.30	209.30	234.39	159.36
11	1	50.67	55.75	0.12	106.54	17.73	197.55	218.43	111.89
	2	47.76	26.01	1.43	75.20	22.08	199.05	225.05	149.86
	3	51.54	74.43	1.53	127.49	75.50	221.60	310.54	183.05
12	1	0.0	0.0	15.00	15.00	159.80	221.70	409.94	394.94
	2	0.0	34.32	0.0	34.32	198.00	233.50	466.74	432.42
	3	17.18	36.25	5.51	58.94	144.43	225.60	395.74	336.80
		19.85	56.71	0.0	76.56	277.00	255.10	581.41	504.85
		131.69	74.64	16.17	222.50	214.60	260.60	513.40	290.90
		108.01	92.94	18.08	219.03	88.73	254.91	359.43	140.40
		86.52	74.76	11.42	172.70	193.44	256.87	484.74	312.05
		101.23	88.06	17.34	206.63	16.24	229.20	248.33	41.70
		61.53	16.98	2.84	81.35	15.00	187.70	205.37	124.02
		20.47	17.61	3.47	41.55	15.50	125.40	143.66	102.11
		81.08	40.88	7.88	109.84	15.58	180.77	199.12	89.28
		22.50	19.52	3.84	45.87	14.90	43.60	58.50	12.63
		0.0	0.0	0.0	0.0	15.90	28.20	44.10	44.10
		0.0	0.0	0.0	0.0	10.47	18.36	28.84	28.84
		7.50	6.51	1.28	15.29	13.76	30.05	43.81	28.52

Table A.4.1-19 (10) WATER BALANCE OF KAENG KHOI PROJECT 1974 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	4.73	29.20	33.93	-15.63
	2	24.41	21.01	4.14	49.56	15.10	54.80	69.90	20.34
	3	28.78	24.76	4.88	58.42	14.87	60.00	74.87	16.45
		25.87	22.26	4.38	52.51	11.57	48.00	59.57	7.06
2	1	12.95	11.14	2.19	26.28	0.0	57.50	57.50	31.22
	2	21.49	18.49	3.64	43.63	0.0	60.80	60.80	17.17
	3	25.89	22.28	4.39	52.56	0.0	71.50	71.50	18.94
		20.11	17.30	3.41	40.82	0.0	63.27	63.27	22.44
3	1	33.07	28.45	5.60	67.13	11.67	64.80	76.47	9.34
	2	33.07	28.45	5.60	67.13	18.60	78.00	96.60	29.47
	3	33.07	28.45	5.60	67.13	10.25	65.55	75.79	8.66
		33.07	28.45	5.60	67.13	13.51	69.45	82.95	15.82
4	1	32.18	27.69	5.45	65.33	12.82	107.10	119.92	54.59
	2	26.71	22.98	4.53	54.21	12.74	118.40	131.14	76.93
	3	16.09	13.85	2.73	32.66	10.63	104.80	115.43	82.77
		24.99	21.51	4.24	50.73	12.06	110.10	122.16	71.43
5	1	3.96	3.41	0.67	8.03	3.00	100.40	103.40	95.37
	2	0.0	0.0	0.0	0.0	21.60	119.20	140.80	140.80
	3	0.0	0.0	0.0	0.0	34.09	104.00	138.09	138.09
		1.32	1.14	0.22	2.68	19.56	107.37	127.43	124.75
6	1	0.0	0.0	0.0	0.0	10.95	84.80	97.70	97.70
	2	0.0	0.0	0.0	0.0	8.10	99.50	109.04	109.04
	3	0.0	38.14	5.13	43.27	11.74	150.60	164.43	121.16
		0.0	12.71	1.71	14.42	10.26	111.63	123.72	109.30
7	1	48.95	0.0	11.40	60.35	9.29	135.30	146.24	85.89
	2	122.07	121.11	0.0	243.18	8.55	105.60	115.67	-127.51
	3	2.48	0.0	0.0	2.48	10.17	121.00	132.98	130.51
		57.83	40.37	3.80	102.00	9.34	120.63	131.63	29.63
8	1	0.0	7.80	0.19	7.99	21.50	201.70	227.03	219.04
	2	86.50	85.09	7.07	178.66	12.86	185.60	200.75	22.09
	3	0.0	5.98	0.0	5.98	19.09	215.16	237.85	231.87
		28.83	32.96	2.42	64.21	17.82	200.89	221.88	157.67
9	1	31.57	4.56	1.49	37.62	46.10	216.40	270.71	233.08
	2	0.0	0.0	3.78	3.78	74.90	229.70	317.93	314.15
	3	0.0	47.37	1.27	48.65	114.00	241.80	376.09	327.45
		10.52	17.31	2.18	30.02	78.33	229.30	321.58	291.56
10	1	0.0	0.0	0.0	0.0	187.70	236.50	457.61	457.61
	2	0.0	0.0	0.0	0.0	314.30	105.50	475.75	475.75
	3	83.97	13.51	12.52	110.00	141.91	186.73	353.90	243.89
		27.99	4.50	4.17	36.67	214.64	176.24	429.08	392.42
11	1	30.21	0.0	0.0	30.21	109.30	166.40	295.16	264.95
	2	70.96	0.0	13.87	84.84	110.10	183.80	313.50	228.66
	3	20.47	17.61	3.47	41.55	64.10	59.60	135.11	93.56
		40.55	5.87	5.78	52.20	94.50	136.60	247.92	195.72
12	1	17.69	18.73	2.53	38.95	30.60	24.20	54.80	15.85
	2	0.0	0.0	0.0	0.0	23.40	112.30	135.70	135.70
	3	0.0	0.0	0.0	0.0	20.73	67.45	88.18	88.18
		5.90	6.24	0.84	12.98	24.91	67.98	92.89	79.91

Table A.4.1-19 (11) WATER BALANCE OF KAENG KHOI PROJECT 1975 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	20.00	63.30	83.30	33.74
	2	24.41	21.01	4.14	49.56	18.10	46.90	65.00	15.44
	3	28.78	24.76	4.88	58.42	16.43	32.45	48.88	-9.54
2	1	25.87	22.26	4.38	52.51	18.18	47.55	65.73	13.22
	2	12.95	11.14	2.19	26.28	15.10	47.30	62.40	36.12
	3	21.49	18.49	3.64	43.63	15.00	68.00	83.00	39.37
3	1	25.89	22.28	4.39	52.56	14.67	75.50	90.17	37.61
	2	20.11	17.30	3.41	40.82	14.92	63.60	78.52	37.70
	3	33.07	28.45	5.60	67.13	17.20	87.50	104.70	37.57
4	1	33.07	28.45	5.60	67.13	17.90	93.60	111.50	44.37
	2	33.07	28.45	5.60	67.13	17.91	87.91	105.82	38.69
	3	32.18	27.69	5.45	65.33	16.60	96.50	113.10	47.77
5	1	26.71	22.98	4.53	54.21	16.20	105.90	122.10	67.89
	2	16.09	13.85	2.73	32.66	17.20	140.20	157.40	124.74
	3	24.99	21.51	4.24	50.73	16.67	114.20	130.87	80.13
6	1	3.96	3.41	0.67	8.03	16.07	125.50	141.57	133.54
	2	0.0	0.0	0.0	0.0	14.24	98.00	112.24	112.24
	3	0.0	0.0	0.0	0.0	19.18	104.09	123.27	123.27
7	1	1.32	1.14	0.22	2.68	16.50	109.20	125.69	123.07
	2	0.0	0.0	0.0	0.0	32.90	107.30	146.06	146.06
	3	0.31	0.0	0.0	0.31	24.10	113.50	141.89	141.58
8	1	0.0	36.87	0.0	36.87	21.30	158.90	183.99	147.12
	2	0.10	12.29	0.0	12.39	26.10	126.57	157.31	144.92
	3	0.0	52.62	0.0	52.62	23.70	151.20	179.12	126.50
9	1	22.93	9.71	11.91	44.55	65.40	148.10	225.14	180.59
	2	103.87	79.82	11.68	195.36	125.27	189.64	337.21	141.84
	3	42.27	47.38	7.86	97.51	71.46	162.98	247.16	149.64
10	1	62.88	55.86	8.65	127.39	95.80	200.90	313.75	186.36
	2	1.97	0.0	5.69	7.67	74.00	214.60	301.77	294.10
	3	0.0	38.68	0.0	38.68	66.55	217.18	295.57	256.90
11	1	21.62	31.51	4.78	57.91	78.78	210.89	303.70	245.79
	2	0.0	0.0	6.76	6.76	157.80	243.70	429.59	422.83
	3	118.49	53.90	10.71	183.10	515.40	261.40	868.54	685.44
12	1	0.0	47.69	0.0	47.69	599.30	269.10	975.07	927.38
	2	39.50	33.86	5.82	79.18	424.17	258.07	757.73	678.55
	3	31.32	62.76	16.50	110.57	616.10	179.80	905.57	794.99
		119.67	0.0	3.23	122.89	598.70	241.50	946.77	823.87
		0.0	0.0	12.58	12.58	327.09	257.82	643.13	630.55
		50.33	20.92	10.77	82.01	513.96	226.37	831.82	749.81
		32.98	88.06	8.07	129.11	87.50	266.00	369.07	239.97
		32.49	41.32	9.05	82.86	50.20	201.40	260.54	177.67
		20.47	17.61	3.47	41.55	36.00	92.70	135.11	93.56
		28.65	49.00	6.86	84.51	57.90	186.70	254.91	170.40
		7.15	0.0	0.0	7.15	31.50	66.10	97.60	90.45
		0.0	0.0	0.0	0.0	23.10	31.50	54.60	54.60
		0.0	0.0	0.0	0.0	17.00	35.73	52.73	52.73
		2.38	0.0	0.0	2.38	23.87	44.44	68.31	65.93

Table A.4.1-19 (12) WATER BALANCE OF KAENG KHOI PROJECT 1976 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	15.95	32.10	48.05	-1.51
	2	24.41	21.01	4.14	49.56	12.41	29.60	42.01	-7.55
	3	28.78	24.76	4.88	58.42	11.51	45.64	57.15	-1.27
		25.87	22.26	4.38	52.51	13.29	35.78	49.07	-3.44
2	1	12.95	11.14	2.19	26.28	16.20	80.30	96.50	70.22
	2	21.49	18.49	3.64	43.63	11.89	110.50	122.39	78.76
	3	25.89	22.28	4.39	52.56	9.02	98.00	107.02	54.46
		20.11	17.30	3.41	40.82	12.37	96.27	108.64	67.81
3	1	33.07	28.45	5.60	67.13	11.74	123.60	135.34	68.21
	2	33.07	28.45	5.60	67.13	18.90	147.10	166.00	98.87
	3	33.07	28.45	5.60	67.13	19.55	55.00	74.55	7.42
		33.07	28.45	5.60	67.13	16.73	108.57	125.30	58.17
4	1	32.18	27.69	5.45	65.33	20.90	151.40	172.30	106.97
	2	26.71	22.98	4.53	54.21	16.47	150.70	167.17	112.96
	3	16.09	13.85	2.73	32.66	18.32	159.00	177.32	144.66
		24.99	21.51	4.24	50.73	18.56	153.70	172.26	121.53
5	1	3.96	3.41	0.67	8.03	24.93	112.40	137.33	129.30
	2	0.0	0.0	0.0	0.0	14.58	58.60	73.18	73.18
	3	0.0	0.0	0.0	0.0	31.45	157.27	188.73	188.73
		1.32	1.14	0.22	2.68	23.65	109.42	133.08	130.40
6	1	0.0	0.0	0.0	0.0	23.50	168.10	195.78	195.78
	2	6.23	0.0	0.0	6.23	18.50	186.60	208.39	202.17
	3	24.17	0.0	0.0	24.17	22.70	211.10	237.84	213.67
		10.13	0.0	0.0	10.13	21.57	188.60	214.01	203.87
7	1	20.10	0.0	0.0	20.10	18.51	190.10	211.90	191.81
	2	68.06	14.00	21.00	103.07	14.26	185.90	202.70	99.63
	3	0.0	11.39	0.0	11.39	34.73	197.36	238.27	226.88
		29.39	8.47	7.00	44.85	22.50	191.12	217.63	172.77
8	1	0.0	0.0	0.0	0.0	36.00	200.70	243.11	243.11
	2	0.0	89.39	0.0	89.39	73.30	212.80	299.15	209.76
	3	0.0	0.0	0.0	0.0	179.18	119.44	330.71	330.71
		0.0	29.80	0.0	29.80	96.16	177.71	290.99	261.19
9	1	0.0	9.02	0.0	9.02	272.60	135.50	456.62	447.60
	2	36.00	91.77	18.23	146.01	342.00	218.40	621.28	475.27
	3	59.49	0.0	2.78	62.27	343.10	220.10	624.27	562.00
		31.83	33.60	7.00	72.43	319.23	191.33	567.39	494.96
10	1	100.68	43.18	10.01	153.87	438.50	238.90	755.45	601.59
	2	54.19	113.31	0.50	168.00	510.10	236.80	837.70	669.69
	3	0.0	23.35	0.0	23.35	328.73	249.45	636.69	613.34
		51.62	59.95	3.50	115.07	425.78	241.72	743.28	628.21
11	1	76.45	71.83	13.68	161.95	264.70	221.70	533.52	371.57
	2	81.97	70.45	13.87	166.70	158.30	191.70	378.18	211.98
	3	20.47	17.61	3.47	41.55	59.40	159.90	229.87	188.32
		59.60	53.30	10.34	123.23	160.80	191.10	380.52	257.29
12	1	22.69	19.52	3.84	46.05	37.30	72.60	109.90	63.85
	2	0.0	0.0	0.0	0.0	27.70	53.90	81.60	81.60
	3	0.0	0.0	0.0	0.0	20.00	59.27	79.27	79.27
		7.56	6.51	1.28	15.35	28.33	61.92	90.26	74.91

Table A.4.1-19 (13)

WATER BALANCE OF KAENG KHOI PROJECT 1977 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	17.80	157.70	175.50	125.94
	2	24.41	21.01	4.14	49.56	14.30	154.90	169.20	119.64
	3	28.78	24.76	4.88	58.42	10.68	148.73	159.41	100.99
2	1	25.87	22.26	4.38	52.51	14.26	153.78	168.04	115.52
	2	12.95	11.14	2.19	26.28	8.65	79.30	87.95	61.67
	3	21.49	18.49	3.64	43.63	7.24	126.60	133.84	90.21
3	1	25.89	22.28	4.39	52.56	6.47	101.00	107.47	54.91
	2	20.11	17.30	3.41	40.82	7.45	102.30	109.75	68.93
	3	33.07	28.45	5.60	67.13	6.04	130.50	136.54	69.41
4	1	33.07	28.45	5.60	67.13	6.01	130.30	136.31	69.18
	2	33.07	28.45	5.60	67.13	6.51	144.64	151.15	84.02
	3	32.18	27.69	5.45	65.33	6.19	135.15	141.33	74.20
5	1	26.71	22.98	4.53	54.21	7.84	119.30	127.14	61.81
	2	16.09	13.85	2.73	32.66	6.55	122.40	128.95	74.74
	3	24.99	21.51	4.24	50.73	8.46	168.90	177.36	144.70
6	1	3.96	3.41	0.67	8.03	7.62	136.87	144.48	93.75
	2	0.0	0.0	0.0	0.0	25.60	168.20	193.80	185.77
	3	0.0	0.0	0.0	0.0	17.90	172.00	189.90	189.90
7	1	1.32	1.14	0.22	2.68	18.27	165.09	183.36	183.36
	2	0.0	0.0	0.0	0.0	20.59	168.43	189.02	186.34
	3	0.0	0.0	0.0	0.0	19.80	147.70	171.02	171.02
8	1	54.87	54.53	0.0	109.40	14.00	160.90	177.39	177.39
	2	18.29	18.18	0.0	36.47	9.11	124.90	135.63	26.23
	3	99.07	0.0	0.0	99.07	14.30	144.50	161.35	124.88
9	1	146.11	124.29	18.09	288.49	6.53	149.60	157.29	58.22
	2	62.67	22.82	1.93	87.42	5.17	160.10	166.19	-122.30
	3	102.62	49.04	6.67	158.33	6.55	150.09	157.80	70.38
10	1	0.0	0.0	0.34	0.34	6.08	153.26	160.43	2.10
	2	82.24	37.98	7.29	127.52	6.67	134.50	142.36	142.01
	3	1.91	70.94	8.56	81.40	6.88	133.20	141.30	13.79
11	1	28.05	36.31	5.40	69.76	45.64	168.64	222.40	140.99
	2	49.69	60.26	3.31	113.27	19.73	145.45	168.69	98.93
	3	0.0	0.0	0.0	0.0	85.60	180.70	281.54	168.27
12	1	0.0	0.0	0.0	0.0	188.70	224.40	446.69	446.69
	2	16.56	20.09	1.10	37.76	498.10	240.80	827.56	827.56
	3	117.51	93.95	13.46	224.91	257.47	215.30	518.60	480.84
		68.80	49.18	16.30	134.28	383.10	211.50	662.79	437.88
		29.32	61.83	4.31	95.47	92.90	205.70	315.14	180.86
		71.88	68.32	11.36	151.55	40.55	185.64	233.40	137.93
		102.34	85.67	17.34	205.36	172.18	200.95	403.78	252.22
		81.87	70.45	13.87	166.20	17.40	194.90	215.40	10.04
		11.22	17.61	2.18	31.02	13.19	145.80	161.34	-4.86
		65.14	57.91	11.13	134.19	9.08	144.60	155.30	124.28
		22.69	19.52	3.84	46.05	13.22	161.77	177.34	43.15
		0.0	0.0	0.0	0.0	8.24	109.10	117.34	71.29
		0.0	0.0	0.0	0.0	8.36	39.20	47.56	47.56
		7.56	6.51	1.28	15.35	9.35	41.27	50.63	50.63
						8.65	63.19	71.84	56.49

Table A.4.1-19 (14) WATER BALANCE OF KAENG KHOI PROJECT 1978 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
I	1	24.41	21.01	4.14	49.56	8.11	28.90	37.01	-12.55
	2	24.41	21.01	4.14	49.56	7.15	36.60	43.75	-5.81
	3	28.78	24.76	4.88	58.42	5.12	31.55	36.66	-21.76
		25.87	22.26	4.38	52.51	6.79	32.35	39.14	-13.37
2	1	12.95	11.14	2.19	26.28	4.38	43.80	48.18	21.90
	2	21.49	18.49	3.64	43.63	3.68	96.90	100.58	56.95
	3	25.89	22.28	4.39	52.56	3.82	47.88	51.70	-0.86
		20.11	17.30	3.41	40.82	3.96	62.86	66.82	26.00
3	1	33.07	28.45	5.60	67.13	3.38	73.00	76.38	9.25
	2	33.07	28.45	5.60	67.13	2.76	82.70	85.46	18.33
	3	33.07	28.45	5.60	67.13	2.76	78.55	81.31	14.18
		33.07	28.45	5.60	67.13	2.97	78.08	81.05	13.92
4	1	32.18	27.69	5.45	65.33	2.90	78.70	81.60	16.27
	2	26.71	22.98	4.53	54.21	6.88	94.20	101.08	46.87
	3	16.09	13.85	2.73	32.66	11.24	87.60	98.84	66.18
		24.99	21.51	4.24	50.73	7.01	86.83	93.84	43.11
5	1	3.96	3.41	0.67	8.03	7.45	75.50	82.95	74.92
	2	0.0	0.0	0.0	0.0	13.98	48.00	61.98	61.98
	3	0.0	0.0	0.0	0.0	21.55	28.18	49.73	49.73
		1.32	1.14	0.22	2.68	14.33	50.56	64.89	62.21
6	1	0.0	0.0	0.0	0.0	15.70	36.40	54.31	54.31
	2	0.0	0.0	0.0	0.0	14.50	57.70	74.78	74.78
	3	0.0	0.0	0.0	0.0	26.50	81.30	112.52	112.52
		0.0	0.0	0.0	0.0	18.73	58.47	80.53	80.53
7	1	40.26	14.75	0.0	55.01	29.00	76.80	110.96	55.96
	2	75.65	41.38	2.32	119.34	145.20	108.20	279.25	159.90
	3	0.0	5.60	2.33	7.93	299.45	48.18	400.94	393.01
		38.63	20.58	1.55	60.76	157.88	77.73	263.72	202.95
8	1	34.77	25.14	0.0	59.92	327.80	82.40	468.55	408.63
	2	0.12	49.76	0.0	49.88	246.50	160.60	450.98	401.09
	3	106.66	94.23	16.11	217.00	334.64	177.45	571.66	354.66
		47.18	56.38	5.37	108.93	302.98	140.15	497.06	388.13
9	1	70.59	56.44	0.0	127.03	311.80	223.50	590.80	463.77
	2	0.0	25.09	0.0	25.09	239.50	226.20	508.33	483.24
	3	0.0	0.0	0.0	0.0	585.10	75.50	764.75	764.75
		23.53	27.18	0.0	50.71	378.80	175.07	621.29	570.58
10	1	125.09	0.0	20.79	145.88	2159.70	0.0	2544.13	2398.24
	2	131.69	91.03	0.0	222.72	714.70	23.50	865.42	642.70
	3	107.00	92.94	17.08	217.02	201.64	113.82	351.35	134.32
		121.26	61.32	12.62	195.21	1025.35	45.77	1253.63	1058.42
11	1	102.34	88.06	17.09	207.49	55.30	220.90	286.04	78.55
	2	81.87	70.45	13.87	166.20	34.80	215.10	256.09	89.90
	3	20.47	17.61	3.47	41.55	30.10	180.60	216.06	174.51
		68.23	58.71	11.48	138.41	40.07	205.53	252.73	114.32
12	1	22.69	19.52	3.84	46.05	29.80	100.50	130.30	84.25
	2	0.0	0.0	0.0	0.0	26.10	34.80	60.90	60.90
	3	0.0	0.0	0.0	0.0	22.36	101.55	123.91	123.91
		7.56	6.51	1.28	15.35	26.09	78.95	105.04	89.68

Table A.4.1-19 (15)

WATER BALANCE OF KAENG KHOI PROJECT 1979 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	18.80	72.70	91.50	41.94
	2	24.41	21.01	4.14	49.56	16.50	91.20	107.70	58.14
	3	28.78	24.76	4.88	58.42	12.27	72.55	84.82	26.40
2	1	25.87	22.26	4.38	52.51	15.86	78.82	94.67	42.16
	2	12.95	11.14	2.19	26.28	10.90	69.80	80.70	54.42
	3	21.49	18.49	3.64	43.63	9.85	97.70	107.55	63.92
3	1	25.89	22.28	4.39	52.56	9.11	125.50	134.61	82.05
	2	20.11	17.30	3.41	40.82	9.95	97.67	107.62	66.80
	3	33.07	28.45	5.60	67.13	9.27	116.80	126.07	58.94
4	1	33.07	28.45	5.60	67.13	8.46	142.10	150.56	83.43
	2	33.07	28.45	5.60	67.13	9.33	147.82	157.15	90.02
	3	33.07	28.45	5.60	67.13	9.02	135.57	144.59	77.46
5	1	32.18	27.69	5.45	65.33	4.71	158.00	162.71	97.38
	2	26.71	22.98	4.53	54.21	5.33	164.90	170.23	116.02
	3	16.09	13.85	2.73	32.66	6.73	141.30	148.03	115.37
6	1	24.99	21.51	4.24	50.73	5.59	154.73	160.32	109.59
	2	3.96	3.41	0.67	8.03	9.19	147.40	156.59	148.56
	3	0.0	0.0	0.0	0.0	14.79	132.30	147.09	147.09
7	1	0.0	0.0	0.0	0.0	54.15	88.45	142.61	142.61
	2	1.32	1.14	0.22	2.68	26.04	122.72	148.76	146.08
	3	0.0	0.0	0.0	0.0	17.19	123.90	144.15	144.15
8	1	15.84	19.84	2.37	38.06	25.75	134.50	164.83	126.78
	2	58.01	53.58	0.0	111.59	29.78	140.50	175.58	63.99
	3	24.62	24.47	0.79	49.88	24.24	132.97	161.52	111.64
9	1	152.34	131.56	15.88	299.78	60.20	182.00	252.92	-46.86
	2	110.60	0.0	4.14	114.74	27.71	156.40	189.04	74.30
	3	15.93	28.32	8.31	52.56	20.37	155.82	179.82	127.26
10	1	92.96	53.29	9.44	155.69	36.09	164.74	207.26	51.57
	2	41.43	20.53	2.19	64.15	14.61	136.30	153.51	89.36
	3	79.28	0.0	8.26	87.55	40.90	164.70	212.88	125.33
11	1	80.26	0.0	0.0	80.26	59.06	152.00	221.58	141.32
	2	66.99	6.84	3.49	77.32	38.19	151.00	195.99	118.67
	3	51.36	109.76	4.63	165.74	71.67	155.70	240.13	74.39
12	1	0.0	0.0	0.0	0.0	50.14	176.80	235.86	235.86
	2	0.0	0.0	0.0	0.0	127.16	116.70	266.49	266.49
	3	17.12	36.59	1.54	55.25	82.99	149.73	247.50	192.25
		143.77	83.60	24.36	251.74	237.63	164.40	444.33	192.59
		131.69	113.31	22.32	267.31	89.87	158.30	264.17	-3.15
		108.01	51.71	12.09	171.81	17.39	132.91	153.40	-18.42
		127.82	82.87	19.59	230.29	114.96	151.87	287.30	57.01
		102.34	88.06	17.34	207.74	10.94	152.40	165.29	-42.46
		81.87	70.45	13.87	166.20	9.55	150.80	162.05	-4.15
		20.47	17.61	3.47	41.55	8.59	127.10	137.22	95.67
		68.23	58.71	11.56	138.50	9.69	143.43	154.85	16.36
		22.69	19.52	3.84	46.05	7.61	95.90	103.51	57.46
		0.0	0.0	0.0	0.0	5.96	43.80	49.76	49.76
		0.0	0.0	0.0	0.0	5.80	53.18	58.98	58.98
		7.56	6.51	1.28	15.35	6.46	64.29	70.75	55.40

Table A.4.1-19 (16) WATER BALANCE OF KAENG KHOI PROJECT 1980 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	24.41	21.01	4.14	49.56	5.26	46.90	52.16	2.60
	2	24.41	21.01	4.14	49.56	4.55	32.70	37.25	-12.31
	3	28.78	24.76	4.88	58.42	3.62	75.45	79.07	20.65
		25.87	22.26	4.38	52.51	4.48	51.68	56.16	3.65
2	1	12.95	11.14	2.19	26.28	3.06	24.70	27.76	1.48
	2	21.49	18.49	3.64	43.63	2.56	31.50	34.06	-9.57
	3	25.89	22.28	4.39	52.56	2.91	4.56	7.47	-45.10
		20.11	17.30	3.41	40.82	2.84	20.25	23.10	-17.73
3	1	33.07	28.45	5.60	67.13	2.26	28.50	30.76	-36.37
	2	33.07	28.45	5.60	67.13	2.46	37.80	40.26	-26.87
	3	33.07	28.45	5.60	67.13	3.04	41.64	44.67	-22.46
		33.07	28.45	5.60	67.13	2.59	35.98	38.56	-28.56
4	1	32.18	27.69	5.45	65.33	6.48	39.20	45.68	-19.65
	2	26.71	22.98	4.53	54.21	4.02	34.80	38.82	-15.39
	3	16.09	13.85	2.73	32.66	5.31	30.10	35.41	2.75
		24.99	21.51	4.24	50.73	5.27	34.70	39.97	-10.76
5	1	3.96	3.41	0.67	8.03	5.67	36.90	42.57	34.54
	2	0.0	0.0	0.0	0.0	7.74	64.10	71.84	71.84
	3	0.0	0.0	0.0	0.0	6.87	156.18	163.05	163.05
		1.32	1.14	0.22	2.68	6.76	85.73	92.49	89.81
6	1	0.0	0.0	0.0	0.0	20.83	175.70	200.24	200.24
	2	0.0	0.0	0.0	0.0	37.34	153.00	196.99	196.99
	3	0.0	0.0	2.06	2.06	39.94	115.80	162.85	160.79
		0.0	0.0	0.69	0.69	32.70	148.17	186.69	186.00
7	1	99.63	118.83	16.88	235.34	117.56	181.10	319.59	84.25
	2	0.0	115.22	0.0	115.22	86.85	148.90	251.21	135.99
	3	18.45	0.0	3.18	21.63	44.21	168.73	220.81	199.17
		39.36	78.02	6.69	124.06	82.87	166.24	263.87	139.80
8	1	0.0	0.0	0.0	0.0	125.48	216.40	364.22	364.22
	2	0.0	9.18	0.0	9.18	154.61	174.50	356.63	347.45
	3	21.07	0.0	0.0	21.07	56.89	154.00	221.02	199.94
		7.02	3.06	0.0	10.08	112.33	181.63	313.95	303.87
9	1	0.0	0.0	0.0	0.0	134.35	155.60	313.86	313.86
	2	75.58	0.0	15.32	90.90	226.88	124.10	391.36	300.46
	3	0.0	0.0	5.79	5.79	449.44	129.60	659.04	653.25
		25.19	0.0	7.03	32.23	270.22	136.43	454.76	422.53
10	1	20.78	0.0	5.34	26.12	771.61	82.80	991.76	965.64
	2	71.02	0.0	0.0	71.02	527.10	246.80	867.72	796.70
	3	69.00	23.64	9.81	102.46	224.69	97.91	362.59	260.14
		53.60	7.88	5.05	66.53	507.80	142.50	740.69	674.16
11	1	23.55	88.06	17.34	128.95	79.58	182.20	275.95	146.99
	2	78.17	70.45	13.87	162.50	43.88	200.40	252.09	89.59
	3	20.47	17.61	3.47	41.55	30.20	181.40	216.98	175.43
		40.73	58.71	11.56	111.00	51.22	188.00	248.34	137.34
12	1	22.69	19.52	3.84	46.05	23.52	80.00	103.52	57.47
	2	0.0	0.0	0.0	0.0	19.52	39.30	58.82	58.82
	3	0.0	0.0	0.0	0.0	16.04	38.09	54.13	54.13
		7.56	6.51	1.28	15.35	19.69	52.46	72.16	56.80

Table A.4.1-20 Water Balance Computation

(Cropping intensity 120%)

Definition of the symbol in the table are described as follows;

Month

1. 1 - First decade of January
   2 - Second "
   3 - Third "
   - Mean value of January

(1) Chainat - Pasak Canal	Water requirement
(2) Raphipat Canal	
(3) Kaeng Khoi	

(5) Pasak river discharge	Available discharge
(6) Manorom discharge	
(7) * Side flow	

Side Flow (Drainage Area 2,580 km^2) was calculated from the specific discharge of Pasak river (Drainage Area 14,520 km^2) and it is only taking account of the month from July to November.

Table A.4.1-20 (1) WATER BALANCE OF KAENG KHOI PROJECT 1965 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	32.60	N.A	32.60	-33.48
	2	32.55	28.01	5.52	66.08	30.70	N.A	30.70	-35.38
	3	38.37	33.02	6.50	77.89	28.82	N.A	28.82	-49.07
		34.49	29.68	5.85	70.02	30.71	N.A	30.71	-39.31
2	1	17.26	14.85	2.93	35.04	28.20	N.A	28.20	-6.84
	2	28.66	24.66	4.86	58.17	25.00	N.A	25.00	-33.17
	3	34.52	29.71	5.85	70.08	24.88	N.A	24.88	-45.21
		26.81	23.07	4.54	54.43	26.02	N.A	26.02	-28.41
3	1	44.09	37.94	7.47	89.51	21.30	N.A	21.30	-68.21
	2	44.09	37.94	7.47	89.51	22.20	N.A	22.20	-67.31
	3	44.09	37.94	7.47	89.51	21.45	N.A	21.45	-68.05
		44.09	37.94	7.47	89.51	21.65	N.A	21.65	-67.85
4	1	42.91	36.92	7.27	87.10	23.60	27.10	50.70	-36.40
	2	35.61	30.64	6.03	72.28	24.90	31.10	56.00	-16.28
	3	21.45	18.46	3.64	43.55	27.60	39.70	67.30	23.75
		33.32	28.67	5.65	67.65	25.37	32.63	58.00	-9.65
5	1	5.28	4.54	0.89	10.71	28.00	39.40	67.40	56.69
	2	0.0	0.0	0.0	0.0	26.20	41.20	67.40	67.40
	3	0.0	0.0	0.0	0.0	32.91	39.09	72.00	72.00
		1.76	1.51	0.30	3.57	29.04	39.90	68.93	65.36
6	1	0.0	0.0	0.0	0.0	31.40	43.20	80.19	80.19
	2	0.0	0.0	0.0	0.0	37.50	84.50	128.67	128.67
	3	33.05	0.0	0.0	33.05	72.10	106.90	191.83	158.79
		11.02	0.0	0.0	11.02	47.00	78.20	133.57	122.55
7	1	127.56	115.01	7.67	250.23	133.60	113.10	270.48	20.25
	2	138.90	100.26	8.71	247.87	53.30	97.10	159.89	-87.99
	3	0.0	48.86	14.84	63.70	21.55	127.73	153.11	89.41
		88.82	88.04	10.41	187.27	69.48	112.64	194.49	7.22
8	1	0.0	24.03	0.0	24.03	77.30	179.80	270.86	246.83
	2	0.0	4.56	10.30	14.86	57.80	99.00	167.09	152.22
	3	0.0	0.0	0.0	0.0	94.82	139.09	250.79	250.79
		0.0	9.53	3.43	12.96	76.64	139.30	229.58	216.61
9	1	17.69	0.0	0.0	17.69	182.70	205.30	420.52	402.83
	2	0.0	0.0	0.0	0.0	250.20	211.70	506.44	506.44
	3	0.0	13.79	0.0	13.79	429.00	189.20	694.56	680.77
		5.90	4.60	0.0	10.50	287.30	202.07	540.51	530.01
10	1	62.02	30.29	13.02	105.33	348.50	220.40	630.93	525.60
	2	13.69	82.75	22.32	118.76	230.40	216.90	488.31	369.55
	3	76.07	57.93	7.28	141.27	75.00	197.00	285.35	144.08
		50.59	56.99	14.20	121.79	217.97	211.43	468.20	346.41
11	1	0.0	88.06	9.04	97.10	48.60	203.60	260.85	163.75
	2	45.81	49.60	3.81	99.22	32.00	144.90	182.60	83.38
	3	20.47	17.61	3.47	41.55	33.40	148.50	187.85	146.30
		22.09	51.76	5.44	79.29	38.00	165.67	210.43	131.14
12	1	22.13	12.84	3.84	38.82	29.80	58.30	88.10	49.28
	2	0.0	0.0	0.0	0.0	30.70	40.30	71.00	71.00
	3	0.0	0.0	0.0	0.0	27.82	19.64	47.45	47.45
		7.38	4.24	1.28	12.94	29.44	39.41	68.85	55.91

Table A.4.1-20 (2)

WATER BALANCE OF KAENG KHOI PROJECT 1967 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	13.60	47.90	61.50	-4.58
	2	32.55	28.01	5.52	66.08	10.97	48.40	59.37	-6.71
	3	38.37	33.02	6.50	77.89	11.44	27.64	39.07	-38.82
2	1	34.49	29.68	5.85	70.02	12.00	41.31	53.31	-16.70
	2	17.26	14.85	2.93	35.04	15.30	20.60	35.90	0.86
	3	28.66	24.66	4.86	58.17	10.49	25.00	35.49	-22.68
3	1	34.52	29.71	5.85	70.08	10.92	29.25	40.17	-29.91
	2	26.81	23.07	4.54	54.43	12.24	24.95	37.19	-17.24
	3	44.09	37.94	7.47	89.51	12.30	25.40	37.70	-51.81
4	1	44.09	37.94	7.47	89.51	11.21	26.60	37.81	-51.70
	2	44.09	37.94	7.47	89.51	8.88	29.45	38.34	-51.17
	3	44.09	37.94	7.47	89.51	10.80	27.15	37.95	-51.56
5	1	42.91	36.92	7.27	87.10	2.97	31.50	34.47	-52.63
	2	35.61	30.64	6.03	72.28	6.85	26.60	33.45	-38.83
	3	21.45	18.46	3.64	43.55	18.02	27.50	45.52	1.97
6	1	33.32	28.67	5.65	67.65	9.28	28.53	37.81	-29.83
	2	5.28	4.54	0.89	10.71	6.40	19.30	25.70	14.99
	3	0.0	0.0	0.0	0.0	10.29	26.30	36.59	36.59
7	1	0.0	0.0	0.0	0.0	12.10	41.55	53.65	53.65
	2	1.76	1.51	0.30	3.57	9.60	29.05	38.65	35.07
	3	0.0	0.0	0.0	0.0	11.08	51.60	64.65	64.65
8	1	0.0	0.0	0.0	0.0	6.25	84.90	92.26	92.26
	2	11.59	0.0	9.83	21.42	9.62	105.90	117.23	95.81
	3	3.86	0.0	3.28	7.14	8.98	80.80	91.38	84.24
9	1	6.97	0.0	3.47	10.44	6.86	88.90	96.98	86.55
	2	70.28	34.53	0.91	105.73	6.08	112.00	119.16	13.44
	3	10.21	15.15	11.13	36.50	14.18	83.73	100.43	63.94
10	1	29.15	16.56	5.17	50.89	9.04	94.88	105.53	54.64
	2	36.99	12.09	0.0	49.09	17.00	127.70	147.73	98.64
	3	90.75	58.99	8.14	157.88	13.40	83.20	98.99	-58.89
11	1	48.82	82.08	0.0	130.90	34.27	117.36	157.74	26.84
	2	58.85	51.05	2.71	112.62	21.56	109.42	134.82	22.20
	3	16.03	11.72	0.0	27.75	108.70	138.60	266.65	238.90
12	1	0.0	0.0	0.0	0.0	91.90	136.70	244.96	244.96
	2	39.70	0.0	0.0	39.70	162.50	166.90	358.32	318.62
	3	18.58	3.91	0.0	22.49	121.03	147.40	289.98	267.49
		30.95	58.46	0.0	89.41	350.80	102.80	516.04	426.63
		108.01	101.53	17.83	227.38	318.40	220.90	595.97	368.59
		95.91	92.94	16.77	205.61	166.55	219.91	416.10	210.49
		78.79	84.31	11.53	174.13	278.58	181.20	509.37	335.24
		102.34	76.60	17.34	196.29	22.20	215.50	241.65	45.37
		0.0	77.45	13.87	84.32	19.30	161.40	184.14	99.81
		15.66	17.61	3.47	36.74	15.80	112.20	130.81	94.07
		39.33	54.89	11.56	105.78	19.10	163.03	185.53	79.75
		22.69	19.52	3.84	46.05	10.52	62.80	73.32	27.27
		0.0	[illegible]	0.0	0.0	8.26	82.70	90.96	90.96
		0.0	0.0	0.0	0.0	7.02	71.55	78.56	78.56
		7.56	6.51	1.28	15.35	8.60	72.35	80.95	65.60

Table A.4.1-20 (3) WATER BALANCE OF KAENG KHOI PROJECT 1968 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	6.92	68.90	75.82	9.74
	2	32.55	28.01	5.52	66.08	5.24	64.40	69.64	3.56
	3	38.37	33.02	6.50	77.89	3.25	42.27	45.52	-32.37
		34.49	29.68	5.85	70.02	5.14	58.52	63.66	-6.36
2	1	17.26	14.85	2.93	35.04	4.57	45.00	49.57	14.53
	2	28.66	24.66	4.86	58.17	7.04	24.70	31.74	-26.43
	3	34.52	29.71	5.85	70.08	6.53	24.11	30.64	-39.44
		26.81	23.07	4.54	54.43	6.05	31.27	37.32	-17.11
3	1	44.09	37.94	7.47	89.51	4.28	21.70	25.98	-63.53
	2	44.09	37.94	7.47	89.51	4.07	26.40	30.47	-59.04
	3	44.09	37.94	7.47	89.51	3.62	26.36	29.98	-59.52
		44.09	37.94	7.47	89.51	3.99	24.82	28.81	-60.69
4	1	42.91	36.92	7.27	87.10	3.03	30.00	33.03	-54.07
	2	35.61	30.64	6.03	72.28	3.15	26.50	29.65	-42.63
	3	21.45	18.46	3.64	43.55	3.48	26.50	29.98	-13.57
		33.32	28.67	5.65	67.65	3.22	27.67	30.89	-36.76
5	1	5.28	4.54	0.89	10.71	3.19	43.40	46.59	35.88
	2	0.0	0.0	0.0	0.0	13.71	35.40	49.11	49.11
	3	0.0	0.0	0.0	0.0	20.82	67.55	88.36	88.36
		1.76	1.51	0.30	3.57	12.57	48.78	61.35	57.78
6	1	0.0	0.0	0.0	0.0	18.00	69.50	90.70	90.70
	2	17.88	22.55	0.0	40.42	20.60	112.20	136.47	96.04
	3	5.49	61.54	12.12	79.14	35.60	124.80	166.74	87.59
		7.79	28.03	4.04	39.86	24.73	102.17	131.30	91.45
7	1	52.84	22.86	10.74	86.44	23.00	119.30	146.39	59.95
	2	106.72	80.21	17.74	204.67	18.70	173.40	195.43	-9.24
	3	63.34	59.42	0.0	122.77	32.09	166.55	204.35	81.58
		74.30	54.17	9.49	137.96	24.60	153.08	182.06	44.10
8	1	0.0	0.0	1.10	1.10	71.30	160.10	244.09	242.99
	2	72.07	55.65	0.0	127.72	74.40	113.50	201.14	73.43
	3	37.21	17.70	0.0	54.91	41.55	208.27	257.21	202.30
		36.43	24.45	0.37	61.24	62.42	160.62	234.15	172.91
9	1	49.69	20.32	10.74	80.75	34.10	150.50	190.67	109.92
	2	0.0	4.72	0.0	4.72	38.10	175.20	220.08	215.36
	3	26.02	0.0	4.10	30.11	58.20	203.00	271.56	241.45
		25.74	8.35	4.95	38.53	43.47	176.23	227.44	188.91
10	1	13.19	0.0	17.72	30.91	40.20	119.90	167.26	136.34
	2	130.02	96.92	22.32	249.26	28.40	89.70	123.16	-126.10
	3	108.01	81.08	18.30	207.39	33.82	115.27	155.11	-52.28
		83.74	59.33	19.45	162.52	34.14	108.29	148.51	-14.01
11	1	52.03	68.33	2.20	122.56	16.90	93.50	113.41	-9.16
	2	81.87	52.62	13.87	148.37	9.51	47.40	58.60	-89.77
	3	20.47	17.61	3.47	41.55	7.18	54.40	62.86	21.31
		51.46	46.19	6.52	104.16	11.20	65.10	78.29	-25.87
12	1	22.69	19.52	3.84	46.05	8.89	75.20	84.09	38.04
	2	0.0	0.0	0.0	0.0	6.28	31.70	37.98	37.98
	3	0.0	0.0	0.0	0.0	3.78	31.91	35.69	35.69
		7.56	6.51	1.28	15.35	6.32	46.27	52.59	37.24

Table A.4.1-20 (4) WATER BALANCE OF KAENG KHOI PROJECT 1966 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	29.00	20.30	49.30	-16.78
	2	32.55	28.01	5.52	66.08	26.10	21.90	48.00	-18.08
	3	30.37	33.02	6.50	77.89	21.73	8.73	30.45	-47.44
2	1	34.49	29.68	5.85	70.02	25.61	16.98	42.58	-27.43
	2	17.26	14.85	2.93	35.04	20.10	9.00	29.10	-5.94
	3	28.66	24.66	4.86	58.17	15.60	9.80	25.40	-32.77
3	1	34.52	29.71	5.85	70.08	22.88	20.50	43.38	-26.71
	2	26.81	23.07	4.54	54.43	19.52	13.10	32.62	-21.81
	3	44.09	37.94	7.47	89.51	20.10	19.50	39.60	-49.91
4	1	44.09	37.94	7.47	89.51	19.60	38.90	58.50	-31.01
	2	44.09	37.94	7.47	89.51	17.55	18.45	36.00	-53.51
	3	42.91	36.92	7.27	87.10	19.08	25.62	44.70	-44.81
5	1	35.61	30.64	6.03	72.28	21.50	18.60	40.10	-47.00
	2	21.45	18.46	3.64	43.55	26.70	17.30	44.00	-28.28
	3	33.32	28.67	5.65	67.65	23.10	16.80	39.90	-3.65
6	1	5.28	4.54	0.89	10.71	23.77	17.57	41.33	-26.31
	2	0.0	0.0	0.0	0.0	22.90	15.70	38.60	27.89
	3	0.0	0.0	0.0	0.0	26.00	17.30	43.30	43.30
7	1	1.76	1.51	0.30	3.57	73.55	10.55	84.09	84.09
	2	0.0	0.0	0.0	0.0	40.82	14.52	55.33	51.76
	3	0.0	0.0	0.0	0.0	66.70	27.60	106.17	106.17
8	1	0.0	0.0	0.0	0.0	51.30	48.40	108.83	108.83
	2	0.0	0.0	0.0	0.0	34.50	105.50	146.14	146.14
	3	7.15	46.74	0.0	53.89	50.83	60.50	120.38	120.38
9	1	31.26	0.0	0.0	31.26	43.20	124.00	174.89	121.00
	2	54.26	97.18	17.49	168.94	29.00	114.10	148.26	117.00
	3	30.89	47.97	5.83	84.69	50.18	133.55	192.66	23.72
10	1	0.0	0.0	0.47	0.47	40.79	123.88	171.94	87.24
	2	29.35	1.70	0.0	31.04	45.10	184.80	237.93	237.46
	3	0.0	0.0	0.0	0.0	84.70	176.70	276.48	245.43
11	1	9.78	0.57	0.16	10.50	165.82	136.00	331.33	331.33
	2	22.69	87.32	8.04	118.05	98.54	165.83	281.91	271.41
	3	0.0	0.0	0.0	0.0	300.40	134.00	487.87	369.82
12	1	127.19	74.90	21.90	223.99	609.60	138.90	857.01	736.64
	2	49.96	94.07	9.98	114.01	474.00	135.47	693.84	633.02
	3	0.0	0.0	0.0	0.0	344.00	224.30	629.53	579.83
		115.23	93.74	7.62	216.58	98.10	193.60	309.16	629.53
		0.0	19.73	0.0	19.73	142.00	123.00	290.28	92.58
		38.41	37.82	2.54	78.77	194.70	180.30	409.66	270.54
		102.34	88.06	17.34	207.74	156.10	174.80	358.69	330.89
		72.07	2.97	11.56	86.60	38.10	186.10	230.98	150.94
		6.04	0.0	0.0	6.04	28.40	159.30	192.76	144.39
		60.15	30.34	9.63	100.13	74.20	173.40	260.81	186.71
		0.0	19.52	3.84	23.37	32.00	58.90	90.90	160.68
		0.0	0.0	0.0	0.0	32.30	41.90	74.20	67.53
		0.0	0.0	0.0	0.0	29.00	40.55	69.55	74.20
		0.0	6.51	1.28	7.79	31.10	47.17	78.27	69.55
									70.43

Table A.4.1-20 (5) WATER BALANCE OF KAENG KHOI PROJECT 1969 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	2.59	32.20	34.79	-31.29
	2	32.55	28.01	5.52	66.08	3.25	29.50	32.75	-33.33
	3	38.37	33.02	6.50	77.89	2.96	30.64	33.60	-44.29
		34.49	29.68	5.85	70.02	2.93	30.78	33.71	-36.30
2	1	17.26	14.85	2.93	35.04	3.20	50.80	54.00	18.96
	2	28.66	24.66	4.86	58.17	2.55	24.90	27.45	-30.72
	3	34.52	29.71	5.85	70.08	2.01	19.88	21.89	-48.19
		26.81	23.07	4.54	54.43	2.59	31.86	34.45	-19.98
3	1	44.09	37.94	7.47	89.51	1.62	19.70	21.32	-68.19
	2	44.09	37.94	7.47	89.51	1.19	16.60	17.79	-71.72
	3	44.09	37.94	7.47	89.51	1.81	14.27	16.08	-73.42
		44.09	37.94	7.47	89.51	1.54	16.86	18.40	-71.11
4	1	42.91	36.92	7.27	87.10	3.53	21.10	24.63	-62.47
	2	35.61	30.64	6.03	72.28	4.14	19.10	23.24	-49.04
	3	21.45	18.46	3.64	43.55	3.02	17.30	20.32	-23.23
		33.32	28.67	5.65	67.65	3.56	19.17	22.73	-44.92
5	1	5.28	4.54	0.89	10.71	2.41	13.00	15.41	4.70
	2	0.0	0.0	0.0	0.0	0.55	15.10	15.65	15.65
	3	0.0	0.0	0.0	0.0	0.45	19.09	19.54	19.54
		1.76	1.51	0.30	3.57	1.14	15.73	16.87	13.29
6	1	0.0	0.0	0.0	0.0	2.17	30.40	32.96	32.96
	2	0.0	0.0	0.0	0.0	9.72	66.00	77.45	77.45
	3	43.40	0.0	0.0	43.40	11.55	132.30	145.91	102.50
		14.47	0.0	0.0	14.47	7.81	76.23	85.44	70.97
7	1	0.0	0.0	0.0	0.0	22.16	118.60	144.70	144.70
	2	29.22	0.0	3.10	32.33	50.50	148.50	207.99	175.66
	3	61.33	79.24	7.77	148.34	43.55	138.09	189.39	41.05
		30.18	26.41	3.62	60.22	38.74	135.06	180.69	120.47
8	1	15.72	57.29	0.0	73.01	44.50	154.10	206.52	133.51
	2	0.0	0.0	0.0	0.0	49.20	165.40	223.36	223.36
	3	96.06	0.0	5.71	101.77	67.09	217.73	296.76	194.99
		37.26	19.10	1.90	58.26	53.60	179.08	242.21	183.95
9	1	0.0	0.0	0.0	0.0	130.60	150.30	304.15	304.15
	2	0.0	0.0	0.0	0.0	367.50	190.10	623.01	623.01
	3	66.71	25.25	10.30	102.26	826.40	152.10	1125.60	1023.34
		22.24	8.42	3.43	34.09	441.50	164.17	684.25	650.17
10	1	67.20	0.0	24.36	91.56	612.40	227.10	948.51	856.94
	2	65.66	51.88	19.87	137.41	279.80	220.50	550.10	412.69
	3	73.54	0.0	0.0	73.54	63.00	208.64	282.85	209.31
		68.80	17.29	14.75	100.84	318.40	218.75	593.82	492.98
11	1	75.89	54.80	9.01	139.70	68.50	198.80	279.49	139.80
	2	81.87	70.45	13.87	166.20	36.10	206.70	249.23	83.03
	3	20.47	17.61	3.47	41.55	16.90	171.10	191.01	149.46
		59.41	47.62	8.78	115.81	40.50	192.20	239.91	124.10
12	1	22.69	19.52	3.84	46.05	12.90	84.90	97.80	51.75
	2	0.0	0.0	0.0	0.0	12.70	63.20	75.90	75.90
	3	0.0	0.0	0.0	0.0	11.91	53.64	65.55	65.55
		7.56	6.51	1.28	15.35	12.50	67.25	79.75	64.40

Table A.4.1-20 (6) WATER BALANCE OF KAENG KHOI PROJECT 1970 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	11.11	51.40	62.51	-3.57
	2	32.55	28.01	5.52	66.08	12.00	55.60	67.60	1.52
	3	38.37	33.02	6.50	77.89	11.37	52.00	63.37	-14.52
		34.49	29.68	5.85	70.02	11.49	53.00	64.49	-5.52
2	1	17.26	14.85	2.93	35.04	12.18	49.70	61.88	26.84
	2	28.66	24.66	4.86	58.17	10.73	38.40	49.13	-9.04
	3	34.52	29.71	5.85	70.08	13.50	51.63	65.13	-4.96
		26.81	23.07	4.54	54.43	12.14	46.57	58.71	4.28
3	1	44.09	37.94	7.47	89.51	13.10	55.00	68.10	-21.41
	2	44.09	37.94	7.47	89.51	10.25	42.90	53.15	-36.36
	3	44.09	37.94	7.47	89.51	8.35	29.73	38.08	-51.42
		44.09	37.94	7.47	89.51	10.57	42.54	53.11	-36.39
4	1	42.91	36.92	7.27	87.10	8.10	37.40	45.50	-41.60
	2	35.61	30.64	6.03	72.28	17.11	37.30	54.41	-17.87
	3	21.45	18.46	3.64	43.55	12.77	45.30	58.07	14.52
		33.32	28.67	5.65	67.65	12.66	40.00	52.66	-14.99
5	1	5.28	4.54	0.89	10.71	9.79	47.30	57.09	46.38
	2	0.0	0.0	0.0	0.0	11.98	51.40	63.38	63.38
	3	0.0	0.0	0.0	0.0	11.29	74.27	85.56	85.56
		1.76	1.51	0.30	3.57	11.02	57.66	68.68	65.11
6	1	0.0	0.0	0.0	0.0	11.44	126.30	139.78	139.78
	2	0.0	0.0	0.0	0.0	18.10	100.90	122.22	122.22
	3	0.0	15.07	0.0	15.07	37.80	122.60	167.13	152.06
		0.0	5.02	0.0	5.02	22.45	116.60	143.04	138.02
7	1	79.28	0.0	11.59	90.87	62.80	163.30	237.28	146.41
	2	130.39	77.98	9.97	218.34	64.70	132.30	208.52	-9.82
	3	0.0	62.90	0.0	62.90	57.45	153.27	220.95	158.06
		69.89	46.96	7.18	124.04	61.65	149.62	222.25	98.21
8	1	0.0	0.0	0.0	0.0	58.00	138.10	206.42	206.42
	2	18.06	0.0	2.31	20.37	86.90	166.10	268.47	248.10
	3	0.0	0.0	0.0	0.0	176.36	154.64	362.39	362.39
		6.02	0.0	0.77	6.79	107.09	152.95	279.09	272.30
9	1	45.07	83.02	0.0	128.09	261.30	207.10	514.91	386.82
	2	0.0	0.0	0.0	0.0	333.30	230.70	623.33	623.33
	3	66.71	0.0	0.0	66.71	296.50	256.90	606.18	539.47
		37.26	27.67	0.0	64.93	297.03	231.57	581.47	516.54
10	1	139.70	110.34	21.07	271.11	351.00	251.10	664.58	393.46
	2	0.0	0.0	13.73	13.73	100.00	241.20	359.00	345.27
	3	24.11	0.0	10.55	34.67	58.64	211.45	280.53	245.86
		54.60	36.78	15.12	106.50	169.88	234.58	434.70	328.20
11	1	102.34	88.06	17.34	207.74	45.90	161.80	215.87	8.13
	2	81.87	70.45	13.87	166.20	46.00	147.00	201.19	34.99
	3	0.12	0.0	1.34	1.46	15.70	177.30	195.79	194.33
		61.45	52.84	10.85	125.13	35.87	162.03	204.28	79.15
12	1	0.0	0.0	0.0	0.0	15.10	133.40	148.50	148.50
	2	0.0	0.0	0.0	0.0	14.50	116.40	130.90	130.90
	3	0.0	0.0	0.0	0.0	13.45	114.55	128.00	128.00
		0.0	0.0	0.0	0.0	14.35	121.45	135.80	135.80

Table A.4.1-20 (7) WATER BALANCE OF KAENG KHOI PROJECT 1971 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	10.74	86.80	97.54	31.46
	2	32.55	28.01	5.52	66.08	10.23	79.60	89.83	23.75
	3	38.37	33.02	6.50	77.89	10.94	81.73	92.66	14.77
		34.49	29.68	5.85	70.02	10.64	82.71	93.34	23.33
2	1	17.26	14.85	2.93	35.04	11.64	80.70	92.34	57.30
	2	28.66	24.66	4.86	58.17	9.83	80.20	90.03	31.86
	3	34.52	29.71	5.85	70.08	10.32	81.63	91.95	21.87
		26.81	23.07	4.54	54.43	10.60	80.84	91.44	37.01
3	1	44.09	37.94	7.47	89.51	10.08	52.80	62.88	-26.63
	2	44.09	37.94	7.47	89.51	10.79	60.10	70.89	-18.62
	3	44.09	37.94	7.47	89.51	11.25	59.45	70.71	-18.80
		44.09	37.94	7.47	89.51	10.71	57.45	68.16	-21.35
4	1	42.91	36.92	7.27	87.10	11.13	54.70	65.83	-21.27
	2	35.61	30.64	6.03	72.28	10.88	63.10	73.98	1.70
	3	21.45	18.46	3.64	43.55	10.99	59.50	70.49	26.94
		33.32	28.67	5.65	67.65	11.00	59.10	70.10	2.45
5	1	5.28	4.54	0.89	10.71	9.22	65.10	74.32	63.61
	2	0.0	0.0	0.0	0.0	17.57	70.60	88.17	88.17
	3	0.0	0.0	0.0	0.0	14.18	67.00	81.18	81.18
		1.76	1.51	0.30	3.57	13.66	67.57	81.22	77.65
6	1	0.0	0.0	0.0	0.0	9.93	113.40	125.10	125.10
	2	0.0	0.0	0.0	0.0	3.41	127.40	131.42	131.42
	3	4.75	43.39	1.24	49.38	15.93	119.00	137.77	88.38
		1.58	14.46	0.41	16.46	9.76	119.93	131.43	114.97
7	1	120.34	88.11	0.0	208.46	20.10	103.20	126.88	-81.58
	2	121.51	97.40	15.86	234.77	10.67	151.10	163.67	-71.10
	3	91.93	78.52	8.26	178.70	10.66	176.27	188.83	10.13
		111.26	88.01	8.04	207.31	13.81	143.52	159.79	-47.52
8	1	0.0	15.91	0.0	15.91	10.58	213.30	225.76	209.85
	2	0.0	0.0	0.0	0.0	13.71	216.40	232.55	232.55
	3	43.44	7.43	0.0	50.86	164.27	199.27	392.79	341.92
		14.48	7.78	0.0	22.26	62.85	209.66	283.70	261.44
9	1	45.62	59.47	8.26	113.35	216.60	225.50	480.65	367.30
	2	0.0	56.76	5.88	62.64	152.90	227.90	408.02	345.37
	3	42.29	39.41	0.0	81.71	167.60	238.20	435.63	353.93
		29.30	51.88	4.72	85.90	179.03	230.53	441.43	355.53
10	1	66.83	0.0	10.51	77.34	157.80	249.70	435.59	358.25
	2	114.30	101.37	20.40	236.08	132.60	250.40	406.60	170.52
	3	0.0	77.31	0.0	77.31	87.73	233.55	336.89	259.57
		60.38	59.56	10.31	130.25	126.04	244.55	393.03	262.78
11	1	91.06	88.06	17.34	196.46	10.51	255.30	267.68	71.22
	2	81.87	70.45	13.87	166.20	10.36	223.60	235.80	69.61
	3	17.69	17.61	3.47	38.77	10.10	114.00	125.90	87.12
		63.54	58.71	11.56	133.81	10.32	197.63	209.79	75.98
12	1	22.69	19.52	3.84	46.05	3.67	14.40	18.07	-27.98
	2	0.0	0.0	0.0	0.0	4.10	4.40	8.50	8.50
	3	0.0	0.0	0.0	0.0	9.53	8.18	17.71	17.71
		7.56	6.51	1.28	15.35	5.77	8.99	14.76	-0.59

Table A.4.1-20 (8) WATER BALANCE OF KAENG KHOI PROJECT 1972 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	8.75	8.00	16.75	-49.33
	2	32.55	28.01	5.52	66.08	8.72	13.20	21.92	-44.16
	3	38.37	33.02	6.50	77.89	7.65	30.00	37.65	-40.25
		34.49	29.68	5.85	70.02	8.37	17.07	25.44	-44.58
2	1	17.26	14.85	2.93	35.04	10.97	81.30	92.27	57.23
	2	28.66	24.66	4.86	58.17	11.80	73.10	84.90	26.73
	3	34.52	29.71	5.85	70.08	10.97	59.67	70.63	0.55
		26.81	23.07	4.54	54.43	11.25	71.36	82.60	28.17
3	1	44.09	37.94	7.47	89.51	13.20	70.70	83.90	-5.61
	2	44.09	37.94	7.47	89.51	13.13	54.00	67.13	-22.38
	3	44.09	37.94	7.47	89.51	12.91	68.82	81.73	-7.78
		44.09	37.94	7.47	89.51	13.08	64.51	77.59	-11.92
4	1	42.91	36.92	7.27	87.10	14.90	61.20	76.10	-11.00
	2	35.61	30.64	6.03	72.28	14.80	80.10	94.90	22.62
	3	21.45	18.46	3.64	43.55	14.40	82.20	96.60	53.05
		33.32	28.67	5.65	67.65	14.70	74.50	89.20	21.55
5	1	5.28	4.54	0.89	10.71	13.50	54.10	67.60	56.89
	2	0.0	0.0	0.0	0.0	13.50	80.40	93.90	93.90
	3	0.0	0.0	0.0	0.0	9.32	83.82	93.14	93.14
		1.76	1.51	0.30	3.57	12.11	72.77	84.88	81.31
6	1	0.0	0.0	0.0	0.0	12.14	103.40	117.70	117.70
	2	0.0	25.89	0.0	25.89	8.56	138.40	148.48	122.60
	3	59.31	61.54	0.0	120.84	4.12	83.80	88.65	-32.19
		19.77	29.14	0.0	48.91	8.27	108.53	118.28	69.37
7	1	149.38	131.56	21.02	301.96	10.00	115.40	127.18	-174.78
	2	0.0	37.88	0.0	37.88	7.64	113.00	122.00	84.12
	3	108.57	94.58	11.50	214.66	10.71	134.09	146.71	-67.95
		85.98	88.00	10.84	184.83	9.45	120.83	131.96	-52.87
8	1	0.0	3.18	0.0	3.18	11.41	139.50	152.94	149.76
	2	62.45	74.59	12.78	149.82	11.47	169.50	183.01	33.20
	3	28.98	0.05	0.0	29.02	17.27	183.73	204.07	175.05
		30.48	25.94	4.26	60.67	13.38	164.24	180.01	119.33
9	1	0.0	0.0	0.0	0.0	76.80	161.20	251.67	251.67
	2	0.0	0.0	0.0	0.0	282.80	90.10	423.24	423.24
	3	48.21	78.72	0.0	126.93	319.90	17.80	394.64	267.71
		16.07	26.24	0.0	42.31	226.50	89.70	356.52	314.21
10	1	0.0	73.10	3.27	76.37	309.90	38.30	403.36	326.99
	2	31.81	81.96	22.07	135.84	212.40	148.30	398.51	262.67
	3	107.84	62.70	18.30	188.85	187.09	206.82	427.21	238.36
		46.55	72.59	14.55	133.69	236.46	131.14	409.69	276.01
11	1	45.56	88.06	0.0	133.62	120.30	168.90	310.61	176.99
	2	0.0	0.0	0.0	0.0	47.10	145.30	200.78	200.78
	3	0.0	0.0	0.0	0.0	30.10	129.70	165.16	165.16
		15.19	29.35	0.0	44.54	65.83	147.97	225.52	180.98
12	1	0.0	0.0	0.0	0.0	22.50	105.50	128.00	128.00
	2	0.0	0.0	0.0	0.0	13.69	61.50	75.19	75.19
	3	0.0	0.0	0.0	0.0	13.44	49.36	62.80	62.80
		0.0	0.0	0.0	0.0	16.54	72.12	88.66	88.66

Table A.4.1-20 (9) WATER BALANCE OF KAENG KHOI PROJECT 1973 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	14.50	46.60	61.10	-4.98
	2	32.55	28.01	5.52	66.08	15.70	41.30	57.00	-9.08
	3	38.37	33.02	6.50	77.89	11.48	60.36	71.85	-6.05
		34.49	29.68	5.85	70.02	13.89	49.42	63.32	-6.70
2	1	17.26	14.85	2.93	35.04	10.44	50.20	60.64	25.60
	2	28.66	24.66	4.86	58.17	11.63	29.90	41.53	-16.64
	3	34.52	29.71	5.85	70.08	13.13	63.50	76.63	6.54
		26.81	23.07	4.54	54.43	11.73	47.87	59.60	5.17
3	1	44.09	37.94	7.47	89.51	10.71	47.90	58.61	-30.90
	2	44.09	37.94	7.47	89.51	11.65	65.90	77.55	-11.96
	3	44.09	37.94	7.47	89.51	11.91	62.09	74.00	-15.51
		44.09	37.94	7.47	89.51	11.42	58.63	70.05	-19.45
4	1	42.91	36.92	7.27	87.10	11.10	71.30	82.40	-4.70
	2	35.61	30.64	6.03	72.28	0.0	56.20	56.20	-16.08
	3	21.45	18.46	3.64	43.55	13.30	55.30	68.60	25.05
		33.32	28.67	5.65	67.65	8.13	60.93	69.07	1.42
5	1	5.28	4.54	0.89	10.71	15.60	71.60	87.20	76.49
	2	0.0	0.0	0.0	0.0	14.40	100.10	114.50	114.50
	3	0.0	0.0	0.0	0.0	15.27	99.18	114.45	114.45
		1.76	1.51	0.30	3.57	15.09	90.29	105.38	101.81
6	1	0.0	0.0	0.0	0.0	14.20	119.70	136.43	136.43
	2	0.0	0.0	0.0	0.0	16.17	125.10	144.15	144.15
	3	65.78	61.54	0.0	127.32	12.30	139.40	153.89	26.57
		21.93	20.51	0.0	42.44	14.22	128.07	144.82	102.38
7	1	116.46	93.52	5.44	215.43	13.95	106.30	122.73	-92.69
	2	105.79	74.00	0.0	179.80	13.04	136.00	151.36	-28.43
	3	31.90	0.0	0.0	31.90	16.27	179.27	198.44	166.54
		84.72	55.84	1.81	142.37	14.42	140.52	157.51	15.14
8	1	17.57	22.28	4.17	44.02	27.20	190.30	222.34	178.32
	2	75.03	0.0	0.0	75.03	21.30	209.30	234.39	159.36
	3	50.67	55.75	0.12	106.54	17.73	197.55	218.43	111.89
		47.76	26.01	1.43	75.20	22.08	199.05	225.05	149.86
9	1	51.54	74.43	1.53	127.49	75.50	221.60	310.54	183.05
	2	0.0	0.0	15.00	15.00	159.80	221.70	409.94	394.94
	3	0.0	34.32	0.0	34.32	198.00	233.50	466.74	432.42
		17.18	36.25	5.51	58.94	144.43	225.60	395.74	336.80
10	1	19.85	56.71	0.0	76.56	277.00	255.10	581.41	504.85
	2	131.69	74.64	16.17	222.50	214.60	260.60	513.40	290.90
	3	108.01	92.94	18.08	219.03	88.73	254.91	359.43	140.40
		86.52	74.76	11.42	172.70	193.44	256.87	484.74	312.05
11	1	101.23	88.06	17.34	206.63	16.24	229.20	248.33	41.70
	2	61.53	16.98	2.84	81.35	15.00	187.70	205.37	124.02
	3	20.47	17.61	3.47	41.55	15.50	125.40	143.66	102.11
		61.08	40.88	7.88	109.84	15.58	180.77	199.12	89.28
12	1	22.50	19.52	3.84	45.87	14.90	43.60	58.50	12.63
	2	0.0	0.0	0.0	0.0	15.90	28.20	44.10	44.10
	3	0.0	0.0	0.0	0.0	10.47	18.36	28.84	28.84
		7.50	6.51	1.28	15.29	13.76	30.05	43.81	28.52

Table A.4.1-20 (10) WATER BALANCE OF KAENG KHOI PROJECT 1974 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	4.73	29.20	33.93	-32.15
	2	32.55	28.01	5.52	66.08	15.10	54.80	69.90	3.82
	3	38.37	33.02	6.50	77.89	14.87	60.00	74.87	-3.02
2	1	34.49	29.68	5.85	70.02	11.57	48.00	59.57	-10.45
	2	17.26	14.85	2.93	35.04	0.0	57.50	57.50	22.46
	3	28.66	24.66	4.86	58.17	0.0	60.80	60.80	2.63
3	1	34.52	29.71	5.85	70.08	0.0	71.50	71.50	1.42
	2	26.81	23.07	4.54	54.43	0.0	63.27	63.27	8.84
	3	44.09	37.94	7.47	89.51	11.67	64.80	76.47	-13.04
4	1	44.09	37.94	7.47	89.51	18.60	78.00	96.60	7.09
	2	44.09	37.94	7.47	89.51	10.25	65.55	75.79	-13.71
	3	44.09	37.94	7.47	89.51	13.51	69.45	82.95	-6.55
5	1	42.91	36.92	7.27	87.10	12.82	107.10	119.92	32.82
	2	35.61	30.64	6.03	72.28	12.74	118.40	131.14	58.86
	3	21.45	18.46	3.64	43.55	10.63	104.80	115.43	71.88
6	1	33.32	28.67	5.65	67.65	12.06	110.10	122.16	54.52
	2	5.28	4.54	0.89	10.71	3.00	100.40	103.40	92.69
	3	0.0	0.0	0.0	0.0	21.60	119.20	140.80	140.80
7	1	0.0	0.0	0.0	0.0	34.09	104.00	138.09	138.09
	2	1.76	1.51	0.30	3.57	19.56	107.87	127.43	123.86
	3	0.0	0.0	0.0	0.0	10.95	84.80	97.70	97.70
8	1	0.0	0.0	0.0	0.0	8.10	99.50	109.04	109.04
	2	0.0	38.14	5.13	43.27	11.74	150.60	164.43	121.16
	3	0.0	12.71	1.71	14.42	10.26	111.63	123.72	109.30
9	1	48.95	0.0	11.40	60.35	9.29	135.30	146.24	85.89
	2	122.07	121.11	0.0	243.18	8.55	105.60	115.67	-127.51
	3	2.48	0.0	0.0	2.48	10.17	121.00	132.98	130.51
10	1	57.83	40.37	3.80	102.00	9.34	120.63	131.63	29.63
	2	0.0	7.80	0.19	7.99	21.50	201.70	227.03	219.04
	3	86.50	85.09	7.07	178.66	12.86	185.60	200.75	22.09
11	1	0.0	5.98	0.0	5.98	19.09	215.36	237.85	231.87
	2	28.83	32.96	2.42	64.21	17.82	200.89	221.88	157.67
	3	31.57	4.56	1.49	37.62	46.10	216.40	270.71	233.08
12	1	0.0	0.0	3.78	3.78	74.90	229.70	317.93	314.15
	2	0.0	47.37	1.27	48.65	114.00	241.80	376.09	327.45
	3	10.52	17.31	2.18	30.02	78.33	229.30	321.58	291.56
		0.0	0.0	0.0	0.0	187.70	236.50	457.61	457.61
		0.0	0.0	0.0	0.0	314.30	105.50	475.75	475.75
		83.97	13.51	12.52	110.00	141.91	186.73	353.90	243.89
		27.99	4.50	4.17	36.67	214.64	176.24	429.08	392.42
		30.21	0.0	0.0	30.21	109.30	166.40	295.16	264.95
		70.96	0.0	13.87	84.84	110.10	183.80	313.50	228.66
		20.47	17.61	3.47	41.55	64.10	59.60	135.11	.).56
		40.55	5.87	5.78	52.20	94.50	136.60	247.92	195.72
		17.69	18.73	2.53	38.95	30.60	24.20	54.80	15.85
		0.0	0.0	0.0	0.0	23.40	112.30	135.70	135.70
		0.0	0.0	0.0	0.0	20.73	67.45	88.18	88.18
		5.90	6.24	0.84	12.98	24.91	67.98	92.89	79.91

Table A.4.1-20 (11) WATER BALANCE OF KAENG KHOI PROJECT 1975 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	20.00	63.30	83.30	17.22
	2	32.55	28.01	5.52	66.08	18.10	46.90	65.00	-1.08
	3	38.37	33.02	6.50	77.89	16.43	32.45	48.88	-29.01
		34.49	29.68	5.85	70.02	18.18	47.55	65.73	-4.29
2	1	17.26	14.85	2.93	35.04	15.10	47.30	62.40	27.36
	2	28.66	24.66	4.86	58.17	15.00	68.00	83.00	24.83
	3	34.52	29.71	5.85	70.08	14.67	75.50	90.17	20.09
		26.81	23.07	4.54	54.43	14.92	63.60	78.52	24.09
3	1	44.09	37.94	7.47	89.51	17.20	87.50	104.70	15.19
	2	44.09	37.94	7.47	89.51	17.90	93.60	111.50	21.99
	3	44.09	37.94	7.47	89.51	17.91	87.91	105.82	16.31
		44.09	37.94	7.47	89.51	17.67	89.67	107.34	17.83
4	1	42.91	36.92	7.27	87.10	16.60	96.50	113.10	26.00
	2	35.61	30.64	6.03	72.28	16.20	105.90	122.10	49.82
	3	21.45	18.46	3.64	43.55	17.20	140.20	157.40	113.85
		33.32	28.67	5.65	67.65	16.67	114.20	130.87	63.22
5	1	5.28	4.54	0.89	10.71	16.07	125.50	141.57	130.86
	2	0.0	0.0	0.0	0.0	14.24	98.00	112.24	112.24
	3	0.0	0.0	0.0	0.0	19.18	104.09	123.27	123.27
		1.76	1.51	0.30	3.57	16.50	109.20	125.69	122.12
6	1	0.0	0.0	0.0	0.0	32.90	107.30	146.06	146.06
	2	0.31	0.0	0.0	0.31	24.10	113.50	141.89	141.58
	3	0.0	36.87	0.0	36.87	21.30	158.90	183.99	147.12
		0.10	12.29	0.0	12.39	26.10	126.57	157.31	144.92
7	1	0.0	52.62	0.0	52.62	23.70	151.20	179.12	126.50
	2	22.93	9.71	11.91	44.55	65.40	148.10	225.14	180.59
	3	103.87	79.82	11.68	195.36	125.27	189.64	337.21	141.84
		42.27	47.38	7.86	97.51	71.46	162.98	247.16	149.64
8	1	62.88	55.86	8.65	127.39	95.80	200.90	313.75	186.36
	2	1.97	0.0	5.69	7.67	74.00	214.60	301.77	294.10
	3	0.0	38.68	0.0	38.68	66.55	217.18	295.57	256.90
		21.62	31.51	4.78	57.91	78.78	210.89	303.70	245.79
9	1	0.0	0.0	6.76	6.76	157.80	243.70	429.59	422.83
	2	118.49	53.90	10.71	183.10	515.40	261.40	868.54	685.44
	3	0.0	47.69	0.0	47.69	599.30	269.10	975.07	927.38
		39.50	33.86	5.82	79.18	424.17	258.07	757.73	678.55
10	1	31.32	62.76	16.50	110.57	616.10	179.80	905.57	794.99
	2	119.67	0.0	3.23	122.89	598.70	241.50	946.77	823.87
	3	0.0	0.0	12.58	12.58	327.09	257.82	643.13	630.55
		50.33	20.92	10.77	82.01	513.96	226.37	831.82	749.81
11	1	32.98	88.06	8.07	129.11	87.50	266.00	369.07	239.97
	2	32.49	41.32	9.05	82.86	50.20	201.40	260.54	177.67
	3	20.47	17.61	3.47	41.55	36.00	92.70	135.11	93.56
		28.65	49.00	6.86	84.51	57.90	186.70	254.91	170.40
12	1	7.15	0.0	0.0	7.15	31.50	66.10	97.60	90.45
	2	0.0	0.0	0.0	0.0	23.10	31.50	54.60	54.60
	3	0.0	0.0	0.0	0.0	17.00	35.73	52.73	52.73
		2.38	0.0	0.0	2.38	23.87	44.44	68.31	65.93

Table A.4.1-20 (12) WATER BALANCE OF KAENG KHOI PROJECT 1976 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	15.95	32.10	48.05	-18.03
	2	32.55	28.01	5.52	66.08	12.41	29.60	42.01	-24.07
	3	38.37	33.02	6.50	77.89	11.51	45.64	57.15	-20.75
2	1	34.49	29.68	5.85	70.02	13.29	35.78	49.07	-20.95
	2	17.26	14.85	2.93	35.04	16.20	80.30	96.50	61.46
	3	28.66	24.66	4.86	58.17	11.89	110.50	122.39	64.22
3	1	34.52	29.71	5.85	70.08	9.02	98.00	107.02	36.94
	2	26.81	23.07	4.54	54.43	12.37	96.27	108.64	54.21
	3	44.09	37.94	7.47	89.51	11.74	123.60	135.34	45.83
4	1	44.09	37.94	7.47	89.51	18.90	147.10	166.00	76.49
	2	44.09	37.94	7.47	89.51	19.55	55.00	74.55	-14.96
	3	44.09	37.94	7.47	89.51	16.73	108.57	125.30	35.79
5	1	42.91	36.92	7.27	87.10	20.90	151.40	172.30	85.20
	2	35.61	30.64	6.03	72.28	16.47	150.70	167.17	94.89
	3	21.45	18.46	3.64	43.55	18.32	159.00	177.32	133.77
6	1	33.32	28.67	5.65	67.65	18.56	153.70	172.26	104.62
	2	5.28	4.54	0.89	10.71	24.93	112.40	137.33	126.62
	3	0.0	0.0	0.0	0.0	14.58	58.60	73.18	73.18
7	1	0.0	0.0	0.0	0.0	31.45	157.27	188.73	188.73
	2	1.76	1.51	0.30	3.57	23.65	109.42	133.08	129.51
	3	0.0	0.0	0.0	0.0	23.50	168.10	195.78	195.78
8	1	6.23	0.0	0.0	6.23	18.50	186.60	208.39	202.17
	2	24.17	0.0	0.0	24.17	22.70	211.10	237.84	213.67
	3	10.13	0.0	0.0	10.13	21.57	188.60	214.01	203.87
9	1	20.10	0.0	0.0	20.10	18.51	190.10	211.90	191.81
	2	68.06	14.00	21.00	103.07	14.26	185.90	202.70	99.63
	3	0.0	11.39	0.0	11.39	34.73	197.36	238.27	226.88
10	1	29.39	8.47	7.00	44.85	22.50	191.12	217.63	172.77
	2	0.0	0.0	0.0	0.0	36.00	200.70	243.11	243.11
	3	0.0	89.39	0.0	89.39	73.30	212.80	299.15	209.76
11	1	0.0	0.0	0.0	0.0	179.18	119.64	330.71	330.71
	2	0.0	29.80	0.0	29.80	96.16	177.71	290.99	261.19
	3	0.0	9.02	0.0	9.02	272.60	135.50	456.62	447.60
12	1	36.00	91.77	18.23	146.01	342.00	218.40	621.28	475.27
	2	59.49	0.0	2.78	62.27	343.10	220.1[illegible]	624.27	562.00
	3	31.83	33.60	7.00	72.43	319.23	191.3[illegible]	567.39	494.96
	1	100.68	43.18	10.01	153.87	438.50	238.9[illegible]	755.45	601.59
	2	54.19	113.31	0.50	168.00	510.10	236.80	837.70	669.69
	3	0.0	23.35	0.0	23.35	328.73	249.45	636.69	613.34
		51.62	59.95	3.50	115.07	425.78	241.72	743.28	628.21
	1	76.45	71.83	13.68	161.95	264.70	221.70	533.52	371.57
	2	81.87	70.45	13.87	166.20	158.30	191.70	378.18	211.98
	3	20.47	17.61	3.47	41.55	59.40	159.90	229.87	188.32
		59.60	53.30	10.34	123.23	160.80	191.10	380.52	257.29
12	1	22.69	19.52	3.84	46.05	37.30	72.60	109.90	63.85
	2	0.0	0.0	0.0	0.0	27.70	53.90	81.60	81.60
	3	0.0	0.0	0.0	0.0	20.00	59.27	79.27	79.27
		7.56	6.51	1.28	15.35	28.33	61.92	90.26	74.91

Table A.4.1-20 (13) WATER BALANCE OF KAENG KHOI PROJECT 1977 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	17.80	157.70	175.50	109.42
	2	32.55	28.01	5.52	66.08	14.30	154.90	169.20	103.12
	3	38.37	33.02	6.50	77.89	10.68	148.73	159.41	81.52
		34.49	29.68	5.85	70.02	14.26	153.78	168.04	98.02
2	1	17.26	14.85	2.93	35.04	8.65	79.30	87.95	52.91
	2	28.66	24.66	4.86	58.17	7.24	126.60	133.84	75.67
	3	34.52	29.71	5.85	70.08	6.47	101.00	107.47	37.39
		26.81	23.07	4.54	54.43	7.45	102.30	109.75	55.32
3	1	44.09	37.94	7.47	89.51	6.04	130.50	136.54	47.03
	2	44.09	37.94	7.47	89.51	6.01	130.30	136.31	46.80
	3	44.09	37.94	7.47	89.51	6.51	144.64	151.15	61.64
		44.09	37.94	7.47	89.51	6.19	135.15	141.33	51.83
4	1	42.91	36.92	7.27	87.10	7.84	119.30	127.14	40.04
	2	35.61	30.64	6.03	72.28	6.55	122.40	128.95	56.67
	3	21.45	18.46	3.64	43.55	8.46	168.90	177.36	133.81
		33.32	28.67	5.65	67.65	7.62	136.87	144.48	76.84
5	1	5.28	4.54	0.89	10.71	25.60	168.20	193.80	183.09
	2	0.0	0.0	0.0	0.0	17.90	172.00	189.90	189.90
	3	0.0	0.0	0.0	0.0	18.27	165.09	183.36	183.36
		1.76	1.51	0.30	3.57	20.59	168.43	189.02	185.45
6	1	0.0	0.0	0.0	0.0	19.80	147.70	171.02	171.02
	2	0.0	0.0	0.0	0.0	14.00	160.90	177.39	177.39
	3	54.87	54.53	0.0	109.40	9.11	124.90	135.63	26.23
		18.29	18.18	0.0	36.47	14.30	144.50	161.35	124.88
7	1	99.07	0.0	0.0	99.07	6.53	149.60	157.29	58.22
	2	146.11	124.29	18.09	288.49	5.17	160.10	166.19	-122.30
	3	62.67	22.82	1.93	87.42	6.55	150.09	157.80	70.38
		102.62	49.04	6.67	158.33	6.08	153.26	160.43	2.10
8	1	0.0	0.0	0.34	0.34	6.67	134.50	142.36	142.01
	2	82.24	37.98	7.29	127.52	6.88	133.20	141.30	13.79
	3	1.91	70.94	8.56	81.40	45.64	168.64	222.40	140.99
		28.05	36.31	5.40	69.76	19.73	145.45	168.69	98.93
9	1	49.69	60.26	3.31	113.27	85.60	180.70	281.54	168.27
	2	0.0	0.0	0.0	0.0	188.70	224.40	446.69	446.69
	3	0.0	0.0	0.0	0.0	498.10	240.80	827.56	827.56
		16.56	20.09	1.10	37.76	257.47	215.30	518.60	480.84
10	1	117.51	93.95	13.46	224.91	383.10	211.50	662.79	437.88
	2	68.80	49.18	16.30	134.28	92.90	205.70	315.14	180.86
	3	29.32	61.83	4.31	95.47	40.55	185.64	233.40	137.93
		71.88	68.32	11.36	151.55	172.18	200.95	403.78	252.22
11	1	102.34	85.67	17.34	205.36	17.40	194.90	215.40	10.04
	2	81.87	70.45	13.87	166.20	13.19	145.80	161.34	-4.86
	3	11.22	17.61	2.18	31.02	9.08	144.60	155.30	124.28
		65.14	57.91	11.13	134.19	13.22	161.77	177.34	43.15
12	1	22.69	19.52	3.84	46.05	8.24	109.10	117.34	71.29
	2	0.0	0.0	0.0	0.0	8.36	39.20	47.56	47.56
	3	0.0	0.0	0.0	0.0	9.35	41.27	50.63	50.63
		7.56	6.51	1.28	15.35	8.65	63.19	71.84	56.49

Table A.4.1-20 (14) WATER BALANCE OF KAENG KHOI PROJECT 1978 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	8.11	28.90	37.01	-29.07
	2	32.55	28.01	5.52	66.08	7.15	36.60	43.75	-22.33
	3	38.37	33.02	6.50	77.89	5.12	31.55	36.66	-41.23
2	1	34.49	29.68	5.85	70.02	6.79	32.35	39.14	-30.87
	2	17.26	14.85	2.93	35.04	4.38	43.80	48.18	13.14
	3	28.66	24.66	4.86	58.17	3.68	96.90	100.58	42.41
3	1	34.52	29.71	5.85	70.08	3.82	47.88	51.70	-18.38
	2	26.81	23.07	4.54	54.43	3.96	62.86	66.82	12.39
	3	44.09	37.94	7.47	89.51	3.38	73.00	76.38	-13.13
4	1	44.09	37.94	7.47	89.51	2.76	82.70	85.46	-4.05
	2	44.09	37.94	7.47	89.51	2.76	78.55	81.31	-8.20
	3	42.91	36.92	7.27	87.10	2.97	78.08	81.05	-8.46
5	1	35.61	30.64	6.03	72.28	2.90	78.70	81.60	-5.50
	2	21.45	18.46	3.64	43.55	6.88	94.20	101.08	28.80
	3	33.32	28.67	5.65	67.65	11.24	87.60	98.84	55.29
6	1	5.28	4.54	0.89	10.71	7.01	86.83	93.84	26.19
	2	0.0	0.0	0.0	0.0	7.45	75.50	82.95	72.24
	3	0.0	0.0	0.0	0.0	13.98	48.00	61.98	61.98
7	1	1.76	1.51	0.30	3.57	21.55	28.18	49.73	49.73
	2	0.0	0.0	0.0	0.0	14.33	50.56	64.89	61.31
	3	0.0	0.0	0.0	0.0	15.20	36.40	54.31	54.31
8	1	0.0	0.0	0.0	0.0	14.50	57.70	74.78	74.78
	2	0.0	0.0	0.0	0.0	26.50	81.30	112.52	112.52
	3	40.26	14.75	0.0	55.01	18.73	58.47	80.53	80.53
9	1	75.65	41.38	2.32	119.34	29.00	76.80	110.96	55.96
	2	0.0	5.60	2.33	7.93	145.20	108.20	279.25	159.90
	3	38.63	20.58	1.55	60.76	299.45	48.18	400.94	393.01
10	1	34.77	25.14	0.0	59.92	157.88	77.73	263.72	202.95
	2	0.12	49.76	0.0	49.88	327.80	82.40	468.55	408.63
	3	106.66	94.23	16.11	217.00	246.50	160.60	450.98	401.09
11	1	47.18	56.38	5.37	108.93	334.64	177.45	571.66	354.66
	2	70.59	56.44	0.0	127.03	302.98	140.15	497.06	388.13
	3	0.0	25.09	0.0	25.09	311.80	223.50	590.80	463.77
12	1	0.0	0.0	0.0	0.0	239.50	226.20	508.33	483.24
	2	23.53	27.18	0.0	50.71	585.10	75.50	764.75	764.75
	3	125.09	0.0	20.79	145.88	378.80	175.07	621.29	570.58
		131.69	91.03	0.0	222.72	2159.70	0.0	2544.13	2398.24
		107.00	92.94	17.08	217.02	714.70	23.50	865.42	642.70
		121.26	61.32	12.62	195.21	201.64	113.82	351.35	134.32
		102.34	88.06	17.09	207.49	1025.35	45.77	1253.63	1058.42
		81.87	70.45	13.87	166.20	55.30	220.90	286.04	78.55
		20.47	17.61	3.47	41.55	34.80	215.10	256.09	89.90
		68.23	58.71	11.48	138.41	30.10	180.60	216.06	174.51
		22.69	19.52	3.84	46.05	40.07	205.53	252.73	114.32
		0.0	0.0	0.0	0.0	29.80	100.50	130.30	84.25
		0.0	0.0	0.0	0.0	26.10	34.80	60.90	60.90
		7.56	6.51	1.28	15.35	22.36	101.55	123.91	123.91
						26.09	78.95	105.04	89.68

Table A.4.1-20 (15) WATER BALANCE OF KAENG KHOI PROJECT 1979 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	18.80	72.70	91.50	25.42
	2	32.55	28.01	5.52	66.08	16.50	91.20	107.70	41.62
	3	38.37	33.02	6.50	77.89	12.27	72.55	84.82	6.93
		34.49	29.68	5.85	70.02	15.86	78.82	94.67	24.66
2	1	17.26	14.85	2.93	35.04	10.90	69.80	80.70	45.66
	2	28.66	24.66	4.86	58.17	9.85	97.70	107.55	49.38
	3	34.52	29.71	5.85	70.08	9.11	125.50	134.61	64.53
		26.81	23.07	4.54	54.43	9.95	97.67	107.62	53.19
3	1	44.09	37.94	7.47	89.51	9.27	116.80	126.07	36.56
	2	44.09	37.94	7.47	89.51	8.46	142.10	150.56	61.05
	3	44.09	37.94	7.47	89.51	9.33	147.82	157.15	67.64
		44.09	37.94	7.47	89.51	9.02	135.57	144.59	55.09
4	1	42.91	36.92	7.27	87.10	4.71	158.00	162.71	75.61
	2	35.61	30.64	6.03	72.28	5.33	164.90	170.23	97.95
	3	21.45	18.46	3.64	43.55	6.73	141.30	148.03	104.48
		33.32	28.67	5.65	67.65	5.59	154.73	160.32	92.68
5	1	5.28	4.54	0.89	10.71	9.19	147.40	156.59	145.88
	2	0.0	0.0	0.0	0.0	14.79	132.30	147.09	147.09
	3	0.0	0.0	0.0	0.0	54.15	88.45	142.61	142.61
		1.76	1.51	0.30	3.57	26.04	122.72	148.76	145.19
6	1	0.0	0.0	0.0	0.0	17.19	123.90	144.15	144.15
	2	15.84	19.84	2.37	38.06	25.75	134.50	164.83	126.78
	3	58.01	53.58	0.0	111.59	29.78	140.50	175.58	63.99
		24.62	24.47	0.79	49.88	24.24	132.97	161.52	111.64
7	1	152.34	131.56	15.88	299.78	60.20	182.00	252.92	-46.86
	2	110.60	0.0	4.14	114.74	27.71	156.40	189.04	74.30
	3	15.93	28.32	8.31	52.56	20.37	155.82	179.82	127.26
		92.96	53.29	9.44	155.69	36.09	164.74	207.26	51.57
8	1	41.43	20.53	2.19	64.15	14.61	136.30	153.51	89.36
	2	79.28	0.0	8.26	87.55	40.90	164.70	212.88	125.33
	3	80.26	0.0	0.0	80.26	59.06	152.00	221.58	141.32
		66.99	6.84	3.49	77.32	38.19	151.00	195.99	118.67
9	1	51.36	109.76	4.63	165.74	71.67	155.70	240.13	74.39
	2	0.0	0.0	0.0	0.0	50.14	176.80	235.86	235.86
	3	0.0	0.0	0.0	0.0	127.16	116.70	266.49	266.49
		17.12	36.59	1.54	55.25	82.99	149.73	247.50	192.25
10	1	143.77	83.60	24.36	251.74	237.63	164.40	444.33	192.59
	2	131.69	113.31	22.32	267.31	89.87	158.30	264.17	-3.15
	3	108.01	51.71	17.09	171.81	17.39	132.91	153.40	-18.42
		127.82	82.87	19.59	230.29	114.96	151.87	287.30	57.01
11	1	102.34	88.06	17.34	207.74	10.94	152.40	165.29	-42.46
	2	81.87	70.45	13.87	166.20	9.55	150.80	162.05	-4.15
	3	20.47	17.61	3.47	41.55	8.59	127.10	137.22	95.67
		68.23	58.71	11.56	138.50	9.69	143.43	154.85	16.36
12	1	22.69	19.52	3.84	46.05	7.61	95.90	103.51	57.46
	2	0.0	0.0	0.0	0.0	5.96	43.80	49.76	49.76
	3	0.0	0.0	0.0	0.0	5.80	53.18	58.98	58.98
		7.56	6.51	1.28	15.35	6.46	64.29	70.75	55.40

Table A.4.1-20 (16) WATER BALANCE OF KAENG KHOI PROJECT 1980 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	32.55	28.01	5.52	66.08	5.26	46.90	52.16	-13.92
	2	32.55	28.01	5.52	66.08	4.55	32.70	37.25	-28.83
	3	38.37	33.02	6.50	77.89	3.62	75.45	79.07	1.18
2	1	34.49	29.68	5.85	70.02	4.48	51.68	56.16	-13.85
	2	17.26	14.85	2.93	35.04	3.06	24.70	27.76	-7.28
	3	28.66	24.66	4.86	58.17	2.56	31.50	34.06	-24.11
3	1	34.52	29.71	5.85	70.08	2.91	4.56	7.47	-62.62
	2	26.81	23.07	4.54	54.43	2.84	20.25	23.10	-31.34
	3	44.09	37.94	7.47	89.51	2.26	28.50	30.76	-58.75
4	1	44.09	37.94	7.47	89.51	2.46	37.80	40.26	-49.25
	2	44.09	37.94	7.47	89.51	3.04	41.64	44.67	-44.83
	3	44.09	37.94	7.47	89.51	2.59	35.98	38.56	-50.94
5	1	42.91	36.92	7.27	87.10	6.48	39.20	45.68	-41.42
	2	35.61	30.64	6.03	72.28	4.02	34.80	38.82	-33.46
	3	21.45	18.46	3.64	43.55	5.31	30.10	35.41	-8.14
6	1	33.32	28.67	5.65	67.65	5.27	34.70	39.97	-27.68
	2	5.28	4.54	0.89	10.71	5.67	36.90	42.57	31.86
	3	0.0	0.0	0.0	0.0	7.74	64.10	71.84	71.84
7	1	0.0	0.0	0.0	0.0	6.87	156.18	163.05	163.05
	2	1.76	1.51	0.30	3.57	6.76	85.73	92.49	88.92
	3	0.0	0.0	0.0	0.0	20.83	175.70	200.24	200.24
8	1	0.0	0.0	0.0	0.0	37.34	153.00	196.99	196.99
	2	0.0	0.0	2.06	2.06	39.94	115.80	162.85	160.79
	3	0.0	0.0	0.69	0.69	32.70	148.17	186.69	186.00
9	1	99.63	118.83	16.88	235.34	117.56	181.10	319.59	84.25
	2	0.0	115.22	0.0	115.22	86.85	148.90	251.21	135.99
	3	18.45	0.0	3.18	21.63	44.21	168.73	220.81	199.17
10	1	39.36	78.02	6.69	124.06	82.87	166.24	263.87	139.80
	2	0.0	0.0	0.0	0.0	125.48	216.40	364.22	364.22
	3	0.0	9.18	0.0	9.18	154.61	174.50	356.63	347.45
11	1	21.07	0.0	0.0	21.07	56.89	154.00	221.02	199.94
	2	7.02	3.06	0.0	10.08	112.33	181.63	313.95	303.87
	3	0.0	0.0	0.0	0.0	134.35	155.60	313.86	313.86
12	1	75.58	0.0	15.32	90.90	226.88	124.10	391.36	300.46
	2	0.0	0.0	5.79	5.79	449.44	129.60	659.04	653.25
	3	25.19	0.0	7.03	32.23	270.22	136.43	454.76	422.53
		20.78	0.0	5.34	26.12	771.61	82.80	991.76	965.64
		71.02	0.0	0.0	71.02	527.10	246.80	867.72	796.70
		69.00	23.64	9.81	102.46	224.69	97.91	362.59	260.14
		53.60	7.88	5.05	66.53	507.80	142.50	740.69	674.16
		23.55	88.06	17.34	128.95	79.58	182.20	275.95	146.99
		78.17	70.43	13.87	162.50	43.88	200.40	252.09	89.59
		20.47	17.61	3.47	41.55	30.20	181.40	216.98	175.43
		40.73	58.71	11.56	111.00	51.22	188.00	248.34	137.34
		22.69	19.52	3.84	46.05	23.52	80.00	103.52	57.47
		0.0	0.0	0.0	0.0	19.52	39.30	58.82	58.82
		0.0	0.0	0.0	0.0	16.04	38.09	54.13	54.13
		7.56	6.51	1.28	15.35	19.69	52.46	72.16	56.80

Table A.4.1-21 Water Balance Computation
(Cropping intensity 130%)

Definition of the symbol in the table are described as follows;

Month

1. 1 - First decade of January
   2 - Second " .
   3 - Third "
   - Mean value of January

(1) Chainat - Pasak Canal (2) Raphipat Canal (3) Kaeng Khoi	Water requirement
(5) Pasak river discharge (6) Manorom discharge (7) *Side flow	Available discharge

Side flow (Drainage Area 2,580 km^2) was calculated from the specific discharge of Pasak river (Drainage Area 14,520 km^2) and it is only taking account of the month from July to November.

Table A.4.1-21(1) WATER BALANCE OF KAENG KHOI PROJECT 1965 YEAR (CMS)

		(1) CHATNAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	32.60	N.A	32.60	-66.52
	2	48.83	42.01	8.27	99.12	30.70	N.A	30.70	-68.42
	3	57.56	49.53	9.75	116.84	28.92	N.A	28.92	-88.02
2	1	51.74	44.52	8.77	105.02	30.71	N.A	30.71	-74.32
	2	25.89	22.28	4.39	52.56	28.20	N.A	28.20	-24.36
	3	42.98	36.98	7.28	87.25	25.00	N.A	25.00	-62.25
		51.79	44.56	8.78	105.12	24.88	N.A	24.88	-80.25
		40.22	34.61	6.82	81.65	26.02	N.A	26.02	-55.62
3	1	66.14	56.91	11.21	134.26	21.30	N.A	21.30	-112.96
	2	66.14	56.91	11.21	134.26	22.20	N.A	22.20	-112.06
	3	66.14	56.91	11.21	134.26	21.45	N.A	21.45	-112.80
		66.14	56.91	11.21	134.26	21.65	N.A	21.65	-112.61
4	1	64.36	55.38	10.91	130.65	23.60	27.10	50.70	-79.95
	2	53.41	45.96	9.05	108.43	24.90	31.10	56.00	-52.43
	3	32.18	27.69	5.45	65.33	27.60	39.70	67.30	1.97
		49.99	43.01	8.47	101.47	25.37	32.63	58.00	-43.47
5	1	7.92	6.81	1.34	16.07	28.00	39.40	67.40	51.33
	2	0.0	0.0	0.0	0.0	26.20	41.20	67.40	67.40
	3	0.0	0.0	0.0	0.0	32.91	39.09	72.00	72.00
		2.64	2.27	0.45	5.36	29.04	39.90	68.93	63.58
6	1	0.0	0.0	0.0	0.0	31.40	43.20	80.19	80.19
	2	0.0	0.0	0.0	0.0	37.50	84.50	128.67	128.67
	3	33.05	0.0	0.0	33.05	72.10	106.90	191.83	158.79
		11.02	0.0	0.0	11.02	47.00	78.20	133.57	122.55
7	1	127.56	115.01	7.67	250.23	133.60	113.10	270.48	20.25
	2	138.90	100.26	8.71	247.87	53.30	97.10	159.89	-87.99
	3	0.0	48.86	14.84	63.70	21.55	127.73	153.11	89.41
		88.82	88.04	10.41	187.27	69.48	113.64	194.49	7.22
8	1	0.0	24.03	0.0	24.03	77.30	179.80	270.86	246.83
	2	0.0	4.56	10.30	14.86	57.80	99.00	167.09	152.22
	3	0.0	0.0	0.0	0.0	94.82	139.09	250.79	250.79
		0.0	9.53	3.43	12.96	76.64	139.30	229.58	216.61
9	1	17.69	0.0	0.0	17.69	182.70	205.30	420.52	402.83
	2	0.0	0.0	0.0	0.0	250.20	211.70	506.44	506.44
	3	0.0	13.79	0.0	13.79	429.00	189.20	694.56	680.77
		5.90	4.60	0.0	10.50	287.30	202.07	540.51	530.01
10	1	62.02	30.29	13.07	105.33	348.50	220.40	630.93	525.60
	2	13.69	82.75	22.32	118.76	230.40	216.90	488.31	369.55
	3	76.07	57.93	7.28	141.27	75.00	197.00	285.35	144.08
		50.59	56.99	14.20	121.79	217.97	211.43	468.20	346.41
11	1	0.0	88.06	9.04	97.10	48.60	203.60	260.95	163.75
	2	45.81	49.60	3.81	99.22	32.00	144.90	182.60	83.38
	3	20.47	17.61	3.47	41.55	33.40	148.50	187.85	146.30
		22.09	51.76	5.44	79.29	38.90	165.67	210.43	131.14
12	1	22.13	12.84	3.84	38.82	29.90	58.30	98.10	49.28
	2	0.0	0.0	0.0	0.0	30.70	40.30	71.00	71.00
	3	0.0	0.0	0.0	0.0	27.82	19.64	47.45	47.45
		7.38	4.28	1.28	12.94	29.44	39.41	68.85	55.91

Table A.4.1-21 (2) WATER BALANCE OF KAENG KHOI PROJECT 1966 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	29.00	20.30	49.30	-49.82
	2	48.83	42.01	8.27	99.12	26.10	21.90	48.00	-51.12
	3	57.56	49.53	9.75	116.84	21.73	8.73	30.45	-86.38
		51.74	44.52	8.77	105.02	25.61	16.98	42.58	-62.44
2	1	25.89	22.28	4.39	52.56	20.10	9.00	29.10	-23.46
	2	42.98	36.98	7.28	87.25	15.60	9.80	25.40	-61.85
	3	51.79	44.56	8.78	105.12	22.88	20.50	43.38	-61.75
		40.22	34.61	6.82	81.65	19.52	13.10	32.62	-49.02
3	1	66.14	56.91	11.21	134.26	20.10	19.50	39.60	-94.66
	2	66.14	56.91	11.21	134.26	19.60	38.90	58.50	-75.76
	3	66.14	56.91	11.21	134.26	17.55	18.45	36.00	-98.26
		66.14	56.91	11.21	134.26	19.08	25.62	44.70	-89.56
4	1	64.36	55.38	10.91	130.65	21.50	18.60	40.10	-90.55
	2	53.41	45.96	9.05	108.43	26.70	17.30	44.00	-64.43
	3	32.18	27.69	5.45	65.33	23.10	16.80	39.90	-25.43
		49.99	43.01	8.47	101.47	23.77	17.57	41.33	-60.14
5	1	7.92	6.81	1.34	16.07	22.90	15.70	38.60	22.53
	2	0.0	0.0	0.0	0.0	26.00	17.30	43.30	43.30
	3	0.0	0.0	0.0	0.0	73.55	10.55	84.09	84.09
		2.64	2.27	0.45	5.36	40.82	14.52	55.33	49.97
6	1	0.0	0.0	0.0	0.0	66.70	27.60	106.17	106.17
	2	0.0	0.0	0.0	0.0	51.30	48.40	108.83	108.83
	3	0.0	0.0	0.0	0.0	34.50	105.50	146.14	146.14
		0.0	0.0	0.0	0.0	50.83	60.50	120.38	120.38
7	1	7.15	46.74	0.0	53.89	43.20	124.00	174.89	121.00
	2	31.26	0.0	0.0	31.26	29.00	114.10	148.26	117.00
	3	54.26	97.18	17.49	168.94	50.18	133.55	192.66	23.72
		30.89	47.97	5.83	84.69	40.79	123.88	171.94	87.24
8	1	0.0	0.0	0.47	0.47	45.10	184.80	237.93	237.46
	2	29.35	1.70	0.0	31.04	84.70	176.70	276.48	245.43
	3	0.0	0.0	0.0	0.0	165.82	136.00	331.33	331.33
		9.78	0.57	0.16	10.50	98.54	165.83	281.91	271.41
9	1	22.69	87.32	8.04	118.05	300.40	134.00	487.87	369.82
	2	0.0	0.0	0.0	0.0	512.00	133.50	736.64	736.64
	3	127.19	74.90	21.90	223.99	609.60	138.90	857.01	633.02
		49.96	54.07	9.98	114.01	474.00	135.47	693.84	579.83
10	1	0.0	0.0	0.0	0.0	344.00	224.30	629.53	629.53
	2	115.23	93.74	7.62	216.58	98.10	193.60	309.16	92.58
	3	0.0	19.73	0.0	19.73	142.00	123.00	290.28	270.54
		38.41	37.82	2.54	78.77	194.70	180.30	409.66	330.89
11	1	102.34	88.06	17.34	207.74	156.10	174.80	358.69	150.94
	2	72.07	2.97	11.56	86.60	38.10	186.10	230.98	144.39
	3	6.04	0.0	0.0	6.04	28.40	159.30	192.76	186.71
		60.15	30.34	9.63	100.13	74.20	173.40	260.81	160.68
12	1	0.0	19.52	3.84	23.37	32.00	58.90	90.90	67.53
	2	0.0	0.0	0.0	0.0	32.30	41.90	74.20	74.20
	3	0.0	0.0	0.0	0.0	29.00	40.55	69.55	69.55
		0.0	6.51	1.28	7.79	31.10	47.12	78.22	70.43

Table A.4.1-21 (3) WATER BALANCE OF KAENG KHOI PROJECT 1967 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	13.60	47.90	61.50	-37.62
	2	48.83	42.01	8.27	99.12	10.97	48.40	59.37	-39.75
	3	57.56	49.53	9.75	116.84	11.44	27.64	39.07	-77.76
2	1	51.74	44.52	8.77	105.02	12.00	41.31	53.31	-51.71
	2	25.89	22.28	4.39	52.56	15.30	20.60	35.90	-16.66
	3	42.98	36.98	7.28	87.25	10.49	25.00	35.49	-51.76
		51.79	44.56	8.78	105.12	10.97	29.25	40.17	-64.95
		40.22	34.61	6.82	81.65	12.24	24.95	37.19	-44.46
3	1	66.14	56.91	11.21	134.26	12.30	25.40	37.70	-96.56
	2	66.14	56.91	11.21	134.26	11.21	26.60	37.81	-96.45
	3	66.14	56.91	11.21	134.26	8.88	29.45	38.34	-95.92
		66.14	56.91	11.21	134.26	10.80	27.15	37.95	-96.31
4	1	64.36	55.38	10.91	130.65	2.97	31.50	34.47	-96.18
	2	53.41	45.96	9.05	108.43	6.85	26.60	33.45	-74.98
	3	32.18	27.69	5.45	65.33	18.02	27.50	45.52	-19.81
		49.99	43.01	8.47	101.47	9.28	28.53	37.81	-63.66
5	1	7.97	6.81	1.34	16.07	6.40	19.30	25.70	9.63
	2	0.0	0.0	0.0	0.0	10.29	26.30	36.59	36.59
	3	0.0	0.0	0.0	0.0	12.10	41.55	53.65	53.65
		2.64	2.27	0.45	5.36	9.60	29.05	38.65	33.29
6	1	0.0	0.0	0.0	0.0	11.08	53.60	64.65	64.65
	2	0.0	0.0	0.0	0.0	6.25	84.90	92.26	92.26
	3	11.59	0.0	9.83	21.42	9.62	105.90	117.23	95.81
		3.86	0.0	3.28	7.14	8.98	80.80	91.38	84.24
7	1	6.97	0.0	3.47	10.44	6.86	88.90	96.98	86.55
	2	70.28	34.53	0.91	105.73	6.08	112.00	119.16	13.44
	3	10.21	15.15	11.13	36.50	14.19	83.73	100.43	63.94
		29.15	16.56	5.17	50.89	9.04	94.88	105.53	54.64
8	1	36.99	12.09	0.0	49.09	17.00	127.70	147.71	98.64
	2	90.75	58.99	8.14	157.88	13.40	83.20	98.99	-58.89
	3	48.82	82.08	0.0	130.90	34.27	117.36	157.74	26.84
		58.85	51.05	2.71	112.62	21.56	109.42	134.87	22.20
9	1	16.03	11.72	0.0	27.75	108.70	138.60	266.65	238.90
	2	0.0	0.0	0.0	0.0	91.90	136.70	244.96	244.96
	3	39.70	0.0	0.0	39.70	162.50	166.90	358.32	318.62
		18.58	3.91	0.0	22.49	121.03	147.49	289.98	267.49
10	1	30.95	58.46	0.0	89.41	350.80	102.80	516.04	426.63
	2	108.01	101.53	17.83	227.38	318.40	220.90	595.97	368.59
	3	95.91	92.94	16.77	205.61	166.55	219.91	416.10	210.49
		78.29	84.31	11.53	174.13	278.58	181.20	509.37	335.24
11	1	102.34	76.60	17.34	196.29	22.20	215.50	241.65	45.37
	2	0.0	70.45	13.87	84.32	19.30	161.40	184.14	99.81
	3	15.66	17.61	3.47	36.74	15.80	112.20	130.81	94.07
		39.33	54.89	11.56	105.78	19.10	163.03	185.53	79.75
12	1	22.69	19.52	3.84	46.05	10.52	62.80	73.32	27.27
	2	0.0	0.0	0.0	0.0	8.26	82.70	90.96	90.96
	3	0.0	0.0	0.0	0.0	7.02	71.55	78.56	78.56
		7.56	6.51	1.28	15.35	8.60	72.35	80.95	65.60

Table A.4.1-21 (4) WATER BALANCE OF KAENG KHOI PROJECT 1968 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	6.92	68.90	75.82	-23.30
	2	48.83	42.01	8.27	99.12	5.24	64.40	69.64	-29.48
	3	57.56	49.53	9.75	116.84	3.25	42.27	45.52	-71.32
		51.74	44.52	8.77	105.02	5.14	58.52	63.66	-41.36
2	1	25.89	22.28	4.39	52.56	4.57	45.00	49.57	-2.99
	2	42.98	36.98	7.28	87.25	7.04	24.70	31.74	-55.51
	3	51.79	44.56	8.78	105.12	6.53	24.11	30.64	-74.48
		40.22	34.61	6.82	81.65	6.05	31.27	37.32	-44.33
3	1	66.14	56.91	11.21	134.26	4.28	21.70	25.98	-108.28
	2	66.14	56.91	11.21	134.26	4.07	26.40	30.47	-103.79
	3	66.14	56.91	11.21	134.26	3.62	26.36	29.98	-104.28
		66.14	56.91	11.21	134.26	3.99	24.82	28.81	-105.45
4	1	64.36	55.38	10.91	130.65	3.03	30.00	33.03	-97.62
	2	53.41	45.96	9.05	108.43	3.15	26.50	29.65	-78.78
	3	32.18	27.69	5.45	65.33	3.48	26.50	29.98	-35.35
		49.99	43.01	8.47	101.47	3.22	27.67	30.89	-70.58
5	1	7.92	6.81	1.34	16.07	3.19	43.40	46.59	30.52
	2	0.0	0.0	0.0	0.0	13.71	35.40	49.11	49.11
	3	0.0	0.0	0.0	0.0	20.82	67.55	88.36	88.36
		2.64	2.27	0.45	5.36	12.57	48.78	61.35	56.00
6	1	0.0	0.0	0.0	0.0	18.00	69.50	90.70	90.70
	2	17.88	22.55	0.0	40.42	20.60	112.20	136.47	96.04
	3	5.49	61.54	12.12	79.14	35.60	124.80	166.74	87.59
		7.79	28.03	4.04	39.86	24.73	102.17	131.30	91.45
7	1	52.84	22.86	10.74	86.44	23.00	119.30	146.39	59.95
	2	106.72	80.21	17.74	204.67	18.70	173.40	195.43	-9.24
	3	63.34	59.42	0.0	122.77	32.09	166.55	204.35	81.58
		74.30	54.17	9.49	137.96	24.60	153.08	182.06	44.10
8	1	0.0	0.0	1.10	1.10	71.30	160.10	244.09	242.99
	2	72.07	55.65	0.0	127.72	74.40	113.50	201.14	73.43
	3	37.21	17.70	0.0	54.91	41.55	208.27	257.21	202.30
		36.43	24.45	0.37	61.24	62.42	160.62	234.15	172.91
9	1	49.69	20.32	10.74	80.75	34.10	150.50	190.67	109.92
	2	0.0	4.72	0.0	4.72	38.10	175.20	220.08	215.36
	3	26.02	0.0	4.10	30.11	58.20	203.00	271.56	241.45
		25.24	8.35	4.95	38.53	43.47	176.23	227.44	188.91
10	1	13.19	0.0	17.72	30.91	40.20	119.90	167.26	136.34
	2	130.02	96.92	22.32	249.26	28.40	89.70	123.16	-126.10
	3	108.01	81.08	18.30	207.39	33.82	115.27	155.11	-52.28
		83.74	59.33	19.45	162.52	34.14	108.29	148.51	-14.01
11	1	52.03	68.33	2.20	122.56	16.90	93.50	113.41	-9.16
	2	81.87	52.62	13.87	148.37	9.51	47.40	58.60	-89.77
	3	20.47	17.61	3.47	41.55	7.18	54.40	62.86	21.31
		51.46	46.19	6.52	104.16	11.20	65.10	78.29	-25.87
12	1	22.69	19.52	3.84	46.05	8.89	75.20	84.09	38.04
	2	0.0	0.0	0.0	0.0	6.28	31.70	37.98	37.98
	3	0.0	0.0	0.0	0.0	3.78	31.91	35.69	35.69
		7.56	6.51	1.28	15.35	6.32	46.27	52.59	37.24

Table A.4.1-21 (5) WATER BALANCE OF KAENG KHOI PROJECT 1969 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDRON REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	2.59	32.20	34.79	-64.33
	2	48.83	42.01	8.27	99.12	3.25	29.50	32.75	-66.37
	3	57.56	49.53	9.75	116.84	2.96	30.64	33.60	-83.24
2	1	51.74	44.52	8.77	105.02	2.93	30.78	33.71	-71.31
	2	25.89	22.28	4.39	52.56	3.20	50.80	54.00	1.44
	3	42.98	36.98	7.28	87.25	2.55	24.90	27.45	-59.80
3	1	51.79	44.56	8.78	105.12	2.01	19.88	21.89	-83.24
	2	40.22	34.61	6.82	81.65	2.59	31.86	34.45	-47.20
	3	66.14	56.91	11.21	134.26	1.62	19.70	21.32	-112.94
4	1	66.14	56.91	11.21	134.26	1.19	16.60	17.79	-116.47
	2	66.14	56.91	11.21	134.26	1.81	14.27	16.08	-118.18
	3	66.14	56.91	11.21	134.26	1.54	16.86	18.40	-115.86
5	1	64.36	55.38	10.91	130.65	3.53	21.10	24.63	-106.02
	2	53.41	45.96	9.05	108.43	4.14	19.10	23.24	-85.19
	3	32.18	27.69	5.45	65.33	3.02	17.30	20.32	-45.01
6	1	49.99	43.01	8.47	101.47	3.56	19.17	22.73	-78.74
	2	7.92	6.81	1.34	16.07	2.41	13.00	15.41	-0.66
	3	0.0	0.0	0.0	0.0	0.55	15.10	15.65	15.65
7	1	0.0	0.0	0.0	0.0	0.45	19.09	19.54	19.54
	2	2.64	2.27	0.45	5.36	1.14	15.73	16.87	11.51
	3	0.0	0.0	0.0	0.0	2.17	30.40	32.96	32.96
8	1	0.0	0.0	0.0	0.0	9.72	66.00	77.45	77.45
	2	43.40	0.0	0.0	43.40	11.55	132.30	145.91	102.50
	3	14.47	0.0	0.0	14.47	7.81	76.23	85.44	70.97
9	1	0.0	0.0	0.0	0.0	22.16	118.60	144.70	144.70
	2	29.22	0.0	3.10	32.33	50.50	148.50	207.99	175.66
	3	61.33	79.24	7.77	148.34	43.55	138.09	189.39	41.05
10	1	30.18	26.41	3.62	60.22	38.74	135.06	180.69	120.47
	2	15.72	57.29	0.0	73.01	44.50	154.10	206.52	133.51
	3	0.0	0.0	0.0	0.0	49.20	165.40	223.36	223.36
11	1	96.06	0.0	5.71	101.77	67.09	217.73	296.76	194.99
	2	37.26	19.10	1.90	58.26	53.60	179.08	242.21	183.95
	3	0.0	0.0	0.0	0.0	130.60	150.30	304.15	304.15
12	1	0.0	0.0	0.0	0.0	367.50	190.10	623.01	623.01
	2	66.71	25.25	10.30	102.26	826.40	152.10	1125.60	1023.34
	3	22.24	8.42	3.43	34.09	441.50	166.17	684.25	650.17
	1	67.20	0.0	24.36	91.56	612.40	227.10	948.51	856.94
	2	65.66	51.88	19.87	137.41	279.80	220.50	550.10	412.69
	3	73.54	0.0	0.0	73.54	63.00	208.64	282.85	209.31
	1	68.80	17.29	14.75	90.84	318.40	218.75	593.82	497.98
	2	75.89	54.80	8.01	138.70	68.50	198.80	279.49	139.80
	3	81.87	70.45	13.87	166.20	36.10	206.70	249.23	83.03
	1	20.47	17.61	3.47	41.55	16.90	171.10	191.01	149.46
	2	59.41	47.62	8.78	115.81	40.50	192.20	239.91	124.10
	3	22.69	19.52	3.84	46.05	12.90	84.90	97.80	51.75
	1	0.0	0.0	0.0	0.0	12.70	63.20	75.90	75.90
	2	0.0	0.0	0.0	0.0	11.91	53.64	65.55	65.55
	3	7.56	6.51	1.28	15.35	12.50	67.25	79.75	64.40

Table A.4.1-21 (6) WATER BALANCE OF KAENG KHOI PROJECT 1970 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDRON REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	11.11	51.40	62.51	-36.61
	2	48.83	42.01	8.27	99.12	12.00	55.60	67.60	-31.52
	3	57.56	49.53	9.75	116.84	11.37	52.00	63.37	-53.46
		51.74	44.52	8.77	105.02	11.49	53.00	64.49	-40.53
2	1	25.89	22.28	4.39	52.56	12.18	49.70	61.88	9.32
	2	42.98	36.98	7.28	87.25	10.73	38.40	49.13	-38.12
	3	51.79	44.56	8.78	105.12	13.50	51.63	65.13	-40.00
		40.22	34.61	6.82	81.65	12.14	46.57	58.71	-22.93
3	1	66.14	56.91	11.21	134.26	13.10	55.00	68.10	-66.16
	2	66.14	56.91	11.21	134.26	10.25	42.90	53.15	-81.11
	3	66.14	56.91	11.21	134.26	8.35	29.73	38.08	-96.18
		66.14	56.91	11.21	134.26	10.57	42.54	53.11	-81.15
4	1	64.36	55.38	10.91	130.65	8.10	37.40	45.50	-85.15
	2	53.41	45.96	9.05	108.43	17.11	37.30	54.41	-54.02
	3	32.18	27.69	5.45	65.33	12.77	45.30	58.07	-7.26
		49.99	43.01	8.47	101.47	12.66	40.00	52.66	-48.81
5	1	7.92	6.81	1.34	16.07	9.79	47.30	57.09	41.02
	2	0.0	0.0	0.0	0.0	11.98	51.40	63.38	63.38
	3	0.0	0.0	0.0	0.0	11.29	74.27	85.56	85.56
		2.64	2.27	0.45	5.36	11.02	57.66	68.68	63.32
6	1	0.0	0.0	0.0	0.0	11.44	126.30	139.78	139.78
	2	0.0	0.0	0.0	0.0	18.10	100.90	122.22	122.22
	3	0.0	15.07	0.0	15.07	37.80	122.60	167.13	152.06
		0.0	5.02	0.0	5.02	22.45	116.60	143.04	138.02
7	1	79.28	0.0	11.59	90.87	62.80	163.30	237.28	146.41
	2	130.39	77.98	9.97	218.34	64.70	132.30	208.52	-9.82
	3	0.0	62.90	0.0	62.90	57.45	153.27	220.95	158.06
		69.89	46.96	7.18	124.04	61.65	149.62	222.25	98.21
8	1	0.0	0.0	0.0	0.0	58.00	138.10	206.42	206.42
	2	18.06	0.0	2.31	20.37	86.90	166.10	268.47	248.10
	3	0.0	0.0	0.0	0.0	176.36	154.64	362.39	362.39
		6.02	0.0	0.77	6.79	107.09	152.95	279.09	272.30
9	1	45.07	83.02	0.0	128.09	261.30	207.10	514.91	386.82
	2	0.0	0.0	0.0	0.0	333.30	230.70	623.33	623.33
	3	66.71	0.0	0.0	66.71	296.50	256.90	606.18	539.47
		37.26	27.67	0.0	64.93	297.03	231.57	581.47	516.54
10	1	139.70	110.34	21.07	271.11	351.00	251.10	664.58	393.46
	2	0.0	0.0	13.73	13.73	100.00	241.20	359.00	345.27
	3	24.11	0.0	10.55	34.67	58.64	211.45	280.53	245.86
		54.60	36.78	15.12	106.50	169.88	234.58	434.70	328.20
11	1	102.34	88.06	17.34	207.74	45.90	161.80	215.87	8.13
	2	81.87	70.45	13.87	166.20	46.00	147.00	201.19	34.99
	3	0.12	0.0	1.34	1.46	15.70	177.30	195.79	194.33
		61.45	52.84	10.85	125.13	35.87	162.03	204.28	79.15
12	1	0.0	0.0	0.0	0.0	15.10	133.40	148.50	148.50
	2	0.0	0.0	0.0	0.0	14.50	116.40	130.90	130.90
	3	0.0	0.0	0.0	0.0	13.45	114.55	128.00	128.00
		0.0	0.0	0.0	0.0	14.35	121.45	135.80	135.80

Table A.4.1-21 (7) WATER BALANCE OF KAENG KHOI PROJECT 1971 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANOROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	10.74	86.80	97.54	-1.58
	2	48.83	42.01	8.27	99.12	10.23	79.60	89.93	-9.29
	3	57.56	49.53	9.75	116.84	10.94	81.73	92.66	-24.17
		51.74	44.52	8.77	105.02	10.64	82.71	93.34	-11.68
2	1	25.89	22.28	4.39	52.56	11.64	80.70	92.34	39.78
	2	42.98	36.98	7.28	87.25	9.83	80.20	90.03	2.78
	3	51.79	44.56	8.78	105.12	10.32	81.63	91.95	-13.17
		40.22	34.61	6.82	81.65	10.60	80.84	91.44	9.79
3	1	66.14	56.91	11.21	134.26	10.08	52.80	62.88	-71.38
	2	66.14	56.91	11.21	134.26	10.79	60.10	70.89	-63.37
	3	66.14	56.91	11.21	134.26	11.25	59.45	70.71	-63.55
		66.14	56.91	11.21	134.26	10.71	57.45	68.16	-66.10
4	1	64.36	55.38	10.91	130.65	11.13	54.70	65.83	-64.82
	2	53.41	45.96	9.05	108.43	10.88	63.10	73.99	-34.45
	3	32.18	27.69	5.45	65.33	10.99	59.50	70.49	5.16
		49.99	43.01	8.47	101.47	11.00	59.10	70.10	-31.37
5	1	7.92	6.81	1.34	16.07	9.22	65.10	74.32	58.25
	2	0.0	0.0	0.0	0.0	17.57	70.60	88.17	88.17
	3	0.0	0.0	0.0	0.0	14.18	67.00	81.18	81.18
		2.64	2.27	0.45	5.36	13.66	67.57	81.22	75.87
6	1	0.0	0.0	0.0	0.0	9.93	113.40	125.10	125.10
	2	0.0	0.0	0.0	0.0	3.41	127.40	131.42	131.42
	3	4.75	43.39	1.24	49.38	15.93	119.00	137.77	88.38
		1.58	14.46	0.41	16.46	9.76	119.93	131.43	114.97
7	1	120.34	88.11	0.0	208.46	20.10	103.20	126.88	-81.58
	2	121.51	97.40	15.86	234.77	10.67	151.10	163.67	-71.10
	3	91.93	78.52	8.26	178.70	10.66	176.27	188.93	10.13
		111.26	88.01	8.04	207.31	13.81	143.52	159.79	-47.52
8	1	0.0	15.91	0.0	15.91	10.58	213.30	225.76	209.85
	2	0.0	0.0	0.0	0.0	13.71	216.40	232.55	232.55
	3	43.44	7.43	0.0	50.86	164.27	199.27	392.79	341.92
		14.48	7.78	0.0	22.26	62.85	209.66	283.70	261.44
9	1	45.62	59.47	8.26	113.35	216.60	225.50	480.65	367.30
	2	0.0	56.76	5.88	62.64	157.90	227.90	408.02	345.37
	3	42.79	39.41	0.0	81.71	167.60	238.20	435.63	353.93
		29.30	51.88	4.72	85.90	179.03	230.52	441.43	355.53
10	1	66.83	0.0	10.51	77.34	157.80	249.70	435.59	358.25
	2	114.30	101.37	20.40	236.08	137.60	250.40	406.60	170.52
	3	0.0	77.31	0.0	77.31	97.73	233.55	336.89	259.57
		60.38	59.56	10.31	130.25	126.04	244.55	393.03	262.79
11	1	91.06	88.06	17.34	196.46	10.51	255.30	267.68	71.22
	2	81.87	70.45	13.87	166.20	10.36	223.60	235.80	69.61
	3	17.69	17.61	3.47	38.77	10.10	114.00	125.90	87.12
		63.54	58.71	11.56	133.81	10.32	197.63	209.79	75.98
12	1	22.69	19.52	3.84	46.05	3.67	14.40	18.07	-27.98
	2	0.0	0.0	0.0	0.0	4.10	4.40	8.50	8.50
	3	0.0	0.0	0.0	0.0	9.53	8.19	17.71	17.71
		7.56	6.51	1.28	15.35	5.77	8.99	14.76	-0.59

Table A.4.1-21 (8) WATER BALANCE OF KAENG KHOI PROJECT 1972 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	8.75	8.00	16.75	-82.37
	2	48.83	42.01	8.27	99.12	8.72	13.20	21.92	-77.20
	3	57.56	49.53	9.75	116.84	7.65	30.00	37.65	-79.19
		51.74	44.52	8.77	105.02	8.37	17.07	25.44	-79.58
2	1	25.89	22.28	4.39	52.56	10.97	81.30	92.27	39.71
	2	42.98	36.98	7.28	87.25	11.80	73.10	84.90	-2.35
	3	51.79	44.56	8.78	105.12	10.97	59.67	70.63	-34.49
		40.22	34.61	6.82	81.65	11.25	71.36	82.60	0.96
3	1	66.14	56.91	11.21	134.26	13.20	70.70	83.90	-50.36
	2	66.14	56.91	11.21	134.26	13.13	54.00	67.13	-67.13
	3	66.14	56.91	11.21	134.26	12.91	68.82	81.73	-52.53
		66.14	56.91	11.21	134.26	13.08	64.51	77.59	-56.67
4	1	64.36	55.38	10.91	130.65	14.90	61.20	76.10	-54.55
	2	53.41	45.96	9.05	108.43	14.80	80.10	94.90	-13.53
	3	32.18	27.69	5.45	65.33	14.40	82.20	96.60	31.27
		49.99	43.01	8.47	101.47	14.70	74.50	89.20	-12.27
5	1	7.92	6.81	1.34	16.07	13.50	54.10	67.60	51.53
	2	0.0	0.0	0.0	0.0	13.50	80.40	93.90	93.90
	3	0.0	0.0	0.0	0.0	9.32	83.82	93.14	93.14
		2.64	2.27	0.45	5.36	12.11	72.77	84.88	79.52
6	1	0.0	0.0	0.0	0.0	12.14	103.40	117.70	117.70
	2	0.0	25.89	0.0	25.89	8.56	138.40	148.48	122.60
	3	59.31	61.54	0.0	120.84	4.12	83.80	88.65	-32.19
		19.77	29.14	0.0	48.91	8.27	108.53	118.28	69.37
7	1	149.38	131.56	21.02	301.96	10.00	115.40	127.18	-174.78
	2	0.0	37.88	0.0	37.88	7.64	113.00	122.00	84.12
	3	108.57	96.58	11.50	214.66	10.71	134.09	146.71	-67.95
		85.98	88.00	10.84	184.83	9.45	120.83	131.96	-52.87
8	1	0.0	3.18	0.0	3.18	11.41	139.50	152.94	149.76
	2	62.45	74.59	12.78	149.82	11.47	169.50	183.01	33.20
	3	28.98	0.05	0.0	29.02	17.27	183.73	204.07	175.05
		30.48	25.94	4.26	60.67	13.38	164.24	180.01	119.33
9	1	0.0	0.0	0.0	0.0	76.80	161.20	251.67	251.67
	2	0.0	0.0	0.0	0.0	282.80	90.10	423.24	423.24
	3	48.21	78.72	0.0	126.93	319.90	17.80	394.64	267.71
		16.07	26.24	0.0	42.31	226.50	89.70	356.52	314.21
10	1	0.0	73.10	3.27	76.37	309.90	38.30	403.36	326.99
	2	31.81	81.96	22.07	135.84	212.40	148.30	398.51	262.67
	3	107.84	62.70	18.30	188.85	187.09	206.92	427.71	238.36
		46.55	72.59	14.55	133.69	236.46	131.14	409.69	276.01
11	1	45.56	88.06	0.0	133.62	120.30	168.90	310.61	176.99
	2	0.0	0.0	0.0	0.0	47.10	145.30	200.78	200.78
	3	0.0	0.0	0.0	0.0	30.10	129.70	165.16	165.16
		15.19	29.35	0.0	44.54	65.83	147.97	225.52	180.98
12	1	0.0	0.0	0.0	0.0	22.50	105.50	128.00	128.00
	2	0.0	0.0	0.0	0.0	13.69	61.50	75.19	75.19
	3	0.0	0.0	0.0	0.0	13.44	49.36	62.80	62.80
		0.0	0.0	0.0	0.0	16.54	72.12	88.66	88.66

Table A.4.1-21 (9) WATER BALANCE OF KAENG KHOI PROJECT 1973 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.93	42.01	8.27	99.12	14.50	46.60	61.10	-38.02
	2	48.83	42.01	8.27	99.12	15.70	41.30	57.00	-42.12
	3	57.56	49.53	9.75	116.84	11.48	60.36	71.85	-44.99
2	1	51.74	44.52	8.77	105.02	13.89	49.42	63.32	-41.71
	2	25.89	22.28	4.39	52.56	10.44	50.20	60.64	8.08
	3	42.98	36.98	7.28	87.25	11.63	29.90	41.53	-45.72
3	1	51.79	44.56	8.78	105.12	13.13	63.50	76.63	-28.50
	2	40.22	34.61	6.82	81.65	11.73	47.87	59.60	-22.05
	3	66.14	56.91	11.21	134.26	10.71	47.90	58.61	-75.65
		66.14	56.91	11.21	134.26	11.65	65.90	77.55	-56.71
		66.14	56.91	11.21	134.26	11.91	67.09	74.00	-60.26
4	1	64.36	55.38	10.91	130.65	11.10	71.30	82.40	-48.25
	2	53.41	45.96	9.05	108.43	0.0	56.20	56.20	-52.23
	3	32.18	27.69	5.45	65.33	13.30	55.30	68.60	3.27
		49.99	43.01	8.47	101.47	8.13	60.93	69.07	-32.40
5	1	7.92	6.81	1.34	16.07	15.60	71.60	87.20	71.13
	2	0.0	0.0	0.0	0.0	14.40	100.10	114.50	114.50
	3	0.0	0.0	0.0	0.0	15.27	99.18	114.45	114.45
		2.64	2.27	0.45	5.36	15.09	90.29	105.38	100.03
6	1	0.0	0.0	0.0	0.0	14.20	119.70	136.43	136.43
	2	0.0	0.0	0.0	0.0	16.17	125.10	144.15	144.15
	3	65.78	61.54	0.0	127.32	12.30	139.40	153.88	26.57
		21.93	20.51	0.0	42.44	14.22	128.07	144.82	102.38
7	1	116.46	93.52	5.44	215.43	13.95	106.30	122.73	-92.69
	2	105.79	74.00	0.0	179.80	13.04	136.00	151.36	-28.43
	3	31.90	0.0	0.0	31.90	16.27	179.27	198.44	166.54
		84.72	55.84	1.81	142.37	14.42	140.52	157.51	15.14
8	1	17.57	22.28	4.17	44.02	27.20	190.30	222.34	178.32
	2	75.03	0.0	0.0	75.03	21.30	209.30	234.39	159.36
	3	50.67	55.75	0.12	106.54	17.73	197.55	218.43	111.89
		47.76	26.01	1.43	75.20	22.08	199.05	225.05	149.86
9	1	51.54	74.43	1.53	127.49	75.50	221.60	310.54	183.05
	2	0.0	0.0	15.00	15.00	159.80	221.70	409.94	394.94
	3	0.0	34.32	0.0	34.32	198.00	233.50	466.74	432.42
		17.19	36.25	5.51	58.94	144.43	225.60	395.74	336.80
10	1	19.85	56.71	0.0	76.56	277.00	255.10	581.41	504.85
	2	131.69	74.64	16.17	222.50	214.60	260.60	513.40	290.90
	3	108.01	92.94	18.08	219.03	88.73	254.91	359.43	140.40
		86.52	74.76	11.42	172.70	193.44	256.87	484.74	312.05
11	1	101.23	88.06	17.34	206.63	16.24	229.20	248.33	41.70
	2	61.53	16.98	2.84	81.35	15.00	187.70	205.37	124.02
	3	20.47	17.61	3.47	41.55	15.50	125.40	143.66	102.11
		61.08	40.88	7.88	109.84	15.58	180.77	199.12	89.28
12	1	22.50	19.52	3.84	45.87	14.90	43.60	58.50	12.63
	2	0.0	0.0	0.0	0.0	15.80	28.30	44.10	44.10
	3	0.0	0.0	0.0	0.0	10.47	19.16	29.94	29.94
		7.50	6.51	1.28	15.29	13.76	30.05	43.81	28.52

Table A.4.1-21 (10) WATER BALANCE OF KAENG KHOI PROJECT 1974 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	4.73	29.20	33.93	-65.19
	2	48.83	42.01	8.27	99.12	15.10	54.80	69.90	-29.22
	3	57.56	49.53	9.75	116.84	14.87	60.00	74.87	-41.96
2	1	51.74	44.52	8.77	105.02	11.57	48.00	59.57	-45.46
	2	25.89	22.28	4.39	52.56	0.0	57.50	57.50	4.94
	3	42.98	36.98	7.28	87.25	0.0	60.80	60.80	-26.45
		51.79	44.56	8.78	105.12	0.0	71.50	71.50	-33.62
		40.22	34.61	6.82	81.65	0.0	63.27	63.27	-18.38
3	1	66.14	56.91	11.21	134.26	11.67	64.80	76.47	-57.79
	2	66.14	56.91	11.21	134.26	18.60	78.00	96.60	-37.66
	3	66.14	56.91	11.21	134.26	10.35	65.55	75.79	-58.47
		66.14	56.91	11.21	134.26	13.51	69.45	82.95	-51.30
4	1	64.36	55.38	10.91	130.65	12.82	107.10	119.92	-10.73
	2	53.41	45.96	9.05	108.43	12.74	118.40	131.14	22.71
	3	32.18	27.69	5.45	65.33	10.63	104.80	115.43	50.10
		49.99	43.01	8.47	101.47	12.06	110.10	122.16	20.69
5	1	7.92	6.81	1.34	16.07	3.00	100.40	103.40	87.33
	2	0.0	0.0	0.0	0.0	21.60	119.20	140.80	140.80
	3	0.0	0.0	0.0	0.0	34.09	104.00	138.09	138.09
		2.64	2.27	0.45	5.36	19.56	107.87	127.43	122.07
6	1	0.0	0.0	0.0	0.0	10.95	84.80	97.70	97.70
	2	0.0	0.0	0.0	0.0	9.10	99.50	109.04	109.04
	3	0.0	38.14	5.13	43.27	11.74	150.60	164.43	121.16
		0.0	12.71	1.71	14.42	10.26	111.63	123.72	109.30
7	1	48.95	0.0	11.40	60.35	9.29	135.30	146.24	85.89
	2	122.07	121.11	0.0	243.18	9.55	105.60	115.67	-127.51
	3	2.48	0.0	0.0	2.48	10.17	121.00	132.98	130.51
		57.83	40.37	3.80	102.00	9.34	120.63	131.63	29.63
8	1	0.0	7.80	0.19	7.99	21.50	201.70	227.03	219.04
	2	86.50	85.09	7.07	178.66	12.86	185.60	200.75	22.09
	3	0.0	5.98	0.0	5.98	19.09	215.36	237.85	231.87
		28.83	32.96	2.42	64.21	17.82	200.89	221.88	157.67
9	1	31.57	4.56	1.49	37.62	46.10	216.40	270.71	233.08
	2	0.0	0.0	3.78	3.78	74.90	229.70	317.93	314.15
	3	0.0	47.37	1.27	48.65	114.00	241.80	376.09	327.45
		10.52	17.31	2.18	30.02	78.33	229.30	321.58	291.56
10	1	0.0	0.0	0.0	0.0	187.70	236.50	457.61	457.61
	2	0.0	0.0	0.0	0.0	314.30	105.50	475.75	475.75
	3	83.97	13.51	12.52	110.00	141.91	186.73	353.90	243.89
		27.99	4.50	4.17	36.67	214.64	176.24	429.08	392.42
11	1	30.21	0.0	0.0	30.21	109.30	166.60	295.16	264.95
	2	70.96	0.0	13.87	84.84	110.10	183.90	313.50	228.66
	3	20.47	17.61	3.47	41.55	64.10	59.60	135.11	93.56
		40.55	5.87	5.78	52.20	94.50	136.60	247.92	195.72
12	1	17.69	18.73	2.53	38.95	30.60	24.20	54.80	15.85
	2	0.0	0.0	0.0	0.0	23.40	112.30	135.70	135.70
	3	0.0	0.0	0.0	0.0	20.73	67.45	98.18	88.18
		5.90	6.24	0.84	12.99	24.91	67.98	92.89	79.91

Table A.4.1-21 (11) WATER BALANCE OF KAENG KHOI PROJECT 1975 YEAR (CMS)

		(1) CHAINAT-PASAK CANAL	(2) RAPHIPAT CANAL	(3) KAENG KHOI	(4) TOTAL	(5) PASAK RIVER	(6) MANDROM REGULATOR	(7) (5)+(6)+ SIDE FLOW	(8) (7)-(4)
1	1	48.83	42.01	8.27	99.12	20.00	63.30	83.30	-15.82
	2	48.83	42.01	8.27	99.12	18.10	46.90	65.00	-34.12
	3	57.66	49.53	9.75	116.84	16.43	32.45	48.88	-67.96
		51.74	44.52	8.77	105.02	18.18	47.55	65.73	-39.30
2	1	25.89	22.28	4.39	52.56	15.10	47.30	62.40	9.84
	2	42.98	36.98	7.28	87.25	15.00	68.00	83.00	-4.25
	3	51.79	44.56	8.78	105.12	14.67	75.50	90.17	-14.95
		40.22	34.61	6.82	81.65	14.92	63.60	78.52	-3.12
3	1	66.14	56.91	11.21	134.26	17.20	87.50	104.70	-29.56
	2	66.14	56.91	11.21	134.26	17.90	93.60	111.50	-22.76
	3	66.14	56.91	11.21	134.26	17.91	87.91	105.82	-28.44
		66.14	56.91	11.21	134.26	17.67	89.67	107.34	-26.92
4	1	64.36	55.38	10.91	130.65	16.60	96.50	113.10	-17.55
	2	53.41	45.96	9.05	108.43	16.20	105.90	122.10	-13.67
	3	32.18	27.69	5.45	65.33	17.20	140.20	157.40	92.07
		49.99	43.01	8.47	101.47	16.67	114.20	130.87	29.40
5	1	7.92	6.81	1.34	16.07	16.07	125.50	141.57	125.50
	2	0.0	0.0	0.0	0.0	14.24	98.00	112.24	112.24
	3	0.0	0.0	0.0	0.0	19.18	104.09	123.27	123.27
		2.64	2.27	0.45	5.36	16.50	109.20	125.69	120.34
6	1	0.0	0.0	0.0	0.0	32.90	107.30	146.06	146.06
	2	0.31	0.0	0.0	0.31	24.10	113.50	141.89	141.58
	3	0.0	36.87	0.0	36.87	21.30	158.90	183.99	147.12
		0.10	12.29	0.0	12.39	26.10	126.57	157.31	144.92
7	1	0.0	52.62	0.0	52.62	23.70	151.20	179.17	126.50
	2	22.93	9.71	11.91	44.55	65.40	148.10	225.14	180.59
	3	103.87	79.82	11.69	195.36	125.27	189.64	337.21	141.84
		42.27	47.38	7.86	97.51	71.46	162.98	247.16	149.64
8	1	62.88	55.86	8.65	127.39	95.80	200.90	313.75	186.36
	2	1.97	0.0	5.69	7.67	74.00	214.60	301.27	294.10
	3	0.0	38.68	0.0	38.68	66.55	217.18	295.57	256.90
		21.62	31.51	4.78	57.91	78.78	210.89	303.70	245.79
9	1	0.0	0.0	6.76	6.76	157.80	243.70	429.59	422.83
	2	118.49	53.90	10.71	183.10	515.40	261.40	868.54	685.44
	3	0.0	47.69	0.0	47.69	599.30	269.10	975.07	927.38
		39.50	33.86	5.82	79.18	424.17	258.07	757.73	678.55
10	1	31.32	62.76	16.50	110.57	616.10	179.80	905.57	794.99
	2	119.67	0.0	3.23	122.89	598.70	241.50	946.77	823.87
	3	0.0	0.0	12.58	12.58	327.09	257.82	643.13	630.55
		50.33	20.92	10.77	82.01	513.96	226.37	831.82	749.81
11	1	32.98	98.06	8.07	129.11	87.50	266.00	369.07	239.97
	2	32.49	41.32	9.05	82.86	50.20	201.40	260.54	177.67
	3	20.47	17.61	3.47	41.55	36.00	92.70	135.11	93.56
		28.65	49.00	6.86	84.51	57.90	186.70	264.91	170.40
12	1	7.15	0.0	0.0	7.15	31.50	66.10	97.60	90.45
	2	0.0	0.0	0.0	0.0	23.10	31.50	54.60	54.60
	3	0.0	0.0	0.0	0.0	17.00	35.73	52.73	52.73
		2.38	0.0	0.0	2.38	23.87	44.44	68.31	65.93