KINGDOM OF THAILAND
MINISTRY OF INTERIOR
PUBLIC WORKS DEPARTMENT

FEASIBILITY STUDY
ON
THE SANITARY DISTRICT WATER WORKS PROJECT
IN
THE NORTH-EASTERN REGION OF THAILAND

APPENDICES

FEBRUARY 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

KINGDOM OF THALAND
FEASIBILITY STUDY ON THE SANITARY DISTRICT WATER WORKS PROJECT
IN THE NORTH-EASTERN REGION OF THAILAND
APPENDIC

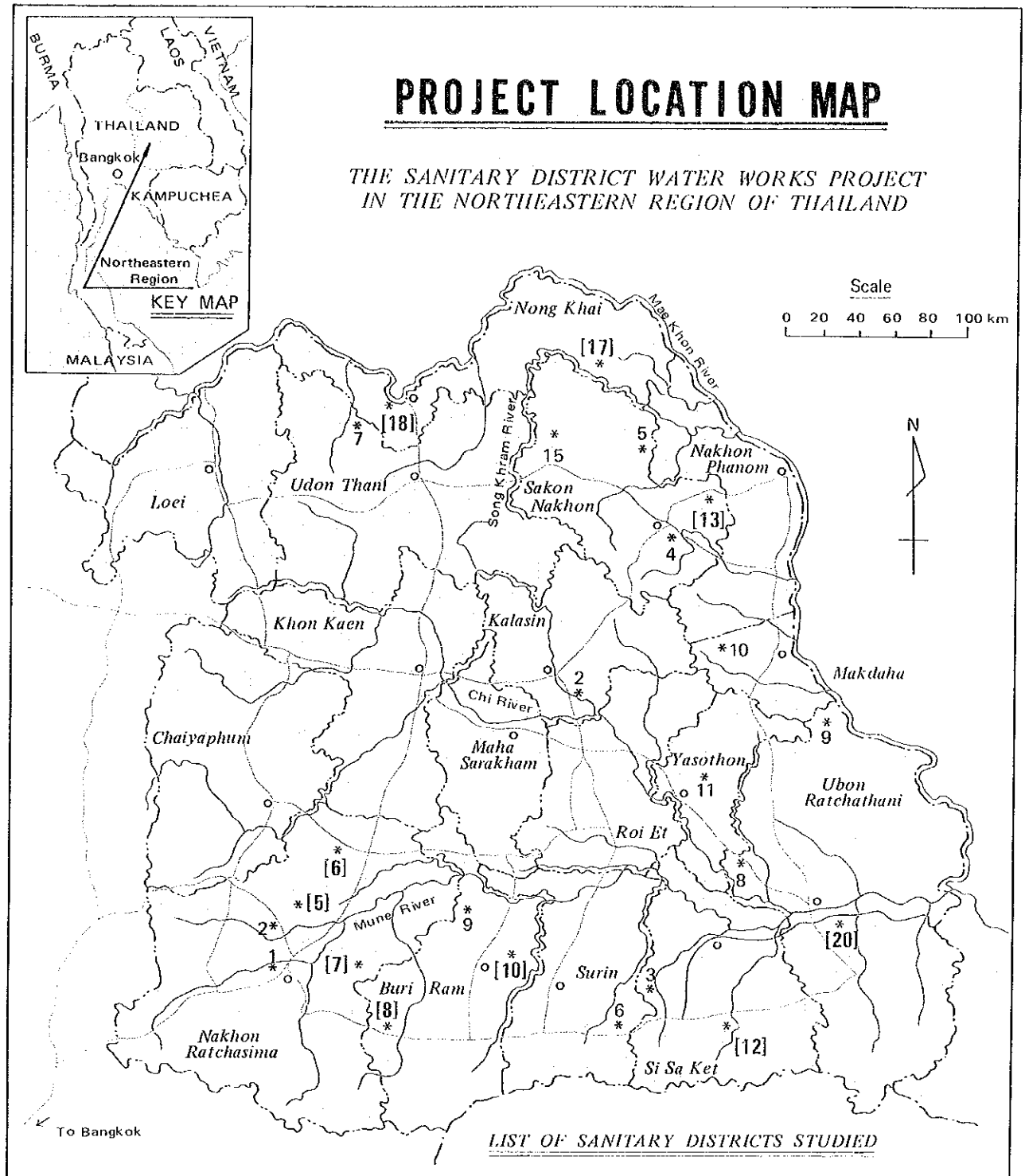
KINGDOM OF THAILAND
MINISTRY OF INTERIOR
PUBLIC WORKS DEPARTMENT

FEASIBILITY STUDY
ON
THE SANITARY DISTRICT WATER WORKS PROJECT
IN
THE NORTH-EASTERN REGION OF THAILAND

APPENDICES

FEBRUARY 1986

JAPAN INTERNATIONAL COOPERATION AGENCY



LIST OF SANITARY DISTRICTS STUDIED

LEGEND

—·—	National Boundary
——·——	Provincial (Changwat) Boundary
o	Provincial Capital
	National Highway
	River
* 2	NSD Studied
* [5]	Proposed 10 NSDs
* 1	ESD Studied

New Sanitary District Without Water Works (NSD)

2	Rong Kham
[5]	Kham Sakae Sang
[6]	Nong Bua Lai
[7]	Huai Thalaeng
[8]	Nong Ki
9	Hin Lek Fai
[10]	Huai Rat
11	Sai Mun
[12]	Khun Han
[13]	Kusuman
15	Don Khuang
[17]	Phon Charoen
[18]	Nong Song Hong
[20]	Huai Kha Yung

Existing Sanitary District With Water Works (ESD)

1	Cho Ho
2	Non Thai
3	Prang Ku
4	Tha Rae
5	Akat Amnuai
6	Sankha
7	Ban Phu
8	Khuang Nai
9	Chanuman
10	Khamcha-i

APPENDICES

APPENDIX A. WATER DEMAND, WATER SOURCES AND WATER QUALITY

APPENDIX A: WATER DEMAND, WATER SOURCES AND WATER QUALITY

A.1. POPULATION

A.2. WATER DEMAND

A.3. METEOROLOGY AND HYDROLOGY

A.4. HYDROGEOLOGY

A.5. WATER QUALITY

A.1. POPULATION

LIST OF TABLES

Table A-1-1 Trend of Population and Household (1960 - 1980)

Province	Population (persons) 1960 Total	1960 Agri-culture	1970 Total	1970 Agri-culture	1980 Total	1980 Agri-culture	Yearly Increase Ratio of Population (%) 1960 - 1970 Total	1960 - 1970 Agri-culture	1960 - 1970 Non-agri-culture	1970 - 1980 Total	1970 - 1980 Agri-culture	1970 - 1980 Non-agri-culture	1960 - 1980 Total	1960 - 1980 Agri-culture	1960 - 1980 Non-agri-culture
1. Kalasin	426,795	396,051	571,121	-	722,581	596,617	2.96	-	-	2.38	-	-	2.67	2.07	7.31
2. Khon Kaen	844,075	721,475	1,048,656	-	1,253,575	928,553	2.19	-	-	1.8	-	-	2	1.27	5
3. Chaiyaphum	486,472	441,879	632,241	-	817,594	669,309	2.66	-	-	2.6	-	-	2.63	2.1	6.19
4. Nakhon Phnom	436,482	379,654	564,879	-	768,617	626,116	2.61	-	-	3.15	-	-	2.87	2.53	4.7
5. Nakhon Ratchasima	1,094,774	920,402	1,493,955	-	1,948,287	1,386,871	3.16	-	-	2.69	-	-	2.92	2.07	6.02
6. Buri Ram	583,585	512,470	799,613	-	1,098,251	900,564	3.2	-	-	3.22	-	-	3.21	2.86	5.24
7. Maha Sarakham	499,373	459,476	612,832	-	733,144	624,433	2.07	-	-	1.81	-	-	1.94	1.55	5.14
8. Roi Et	668,193	620,665	785,329	-	948,234	806,602	1.63	-	-	1.9	-	-	1.77	1.32	5.61
9. Loei	210,535	189,073	324,684	-	441,342	367,196	4.43	-	-	3.12	-	-	3.77	3.37	6.39
10. Si Sa Ket	601,356	562,570	796,295	-	1,063,253	910,754	2.85	-	-	2.93	-	-	2.89	2.44	7.09
11. Sakon Nakhon	426,755	377,517	598,334	-	805,721	664,502	3.44	-	-	3.02	-	-	3.23	2.87	5.41
12. Surin	581,732	528,474	755,283	-	999,795	829,698	2.65	-	-	2.84	-	-	2.74	2.28	5.98
13. Nong Khai	256,530	202,359	443,984	-	618,316	485,257	5.64	-	-	3.37	-	-	4.5	4.47	4.6
14. Udon Thani	744,174	638,513	1,113,232	-	1,462,199	1,080,940	4.11	-	-	2.76	-	-	3.43	2.67	6.63
15. Ubon Ratchathani	1,130,712	990,029	1,484,702	-	2,017,965	1,593,157	2.76	-	-	3.12	-	-	2.94	2.41	5.68
Total	8,991,543	7,940,607	12,025,140	-	15,698,874	12,470,569	2.95	-	-	2.7	-	-	2.83	2.28	5.77

Province	Households (persons) 1960 Total	1960 Agri-culture	1970 Total	1970 Agri-culture	1980 Total	1980 Agri-culture	Yearly Increase Ratio of Households (%) 1960 - 1970 Total	1960 - 1970 Agri-culture	1960 - 1970 Non-agri-culture	1970 - 1980 Total	1970 - 1980 Agri-culture	1970 - 1980 Non-agri-culture	1960 - 1980 Total	1960 - 1980 Agri-culture	1960 - 1980 Non-agri-culture
1. Kalasin	69,212	63,278	90,399	73,056	123,207	99,627	2.71	1.45	11.3	3.14	3.15	3.12	2.93	2.3	7.14
2. Khon Kaen	140,175	117,343	169,884	127,940	221,773	159,443	1.94	0.87	6.27	2.7	2.23	4.04	2.32	1.54	5.15
3. Chaiyaphum	84,918	76,430	107,985	88,355	153,343	122,792	2.43	1.46	8.75	3.57	3.35	4.52	3	2.4	6.61
4. Nakhon Phnom	72,251	61,566	93,347	72,692	127,007	98,627	2.59	1.68	6.81	3.13	3.1	3.23	2.86	2.38	5.01
5. Nakhon Ratchasima	186,395	155,065	249,651	178,278	347,355	240,614	2.97	1.4	8.58	3.36	3.04	4.11	3.16	2.22	6.32
6. Buri Ram	95,256	82,245	128,968	104,550	186,848	149,417	3.08	2.43	6.5	3.78	3.64	4.36	3.43	3.03	5.43
7. Maha Sarakham	79,852	72,544	97,210	83,860	126,356	105,119	1.99	1.46	6.21	2.66	2.29	4.75	2.32	1.87	5.48
8. Roi Et	109,249	100,408	129,618	106,356	167,793	140,169	1.72	0.58	10.2	2.62	2.8	1.73	2.17	1.68	5.86
9. Loei	34,246	30,302	53,378	44,679	80,951	65,962	4.54	3.96	8.23	4.25	3.97	5.59	4.4	3.97	6.9
10. Si Sa Ket	96,796	89,840	128,905	110,128	182,066	153,122	2.91	2.06	10.4	3.51	3.35	4.42	3.21	2.7	7.39
11. Sakon Nakhon	73,338	63,796	98,836	77,918	137,516	110,416	3.03	2.02	8.17	3.36	3.55	2.62	3.19	2.78	5.36
12. Surin	94,684	85,183	123,852	99,961	176,850	142,517	2.72	1.61	9.66	3.63	3.61	3.69	3.17	2.61	6.63
13. Nong Khai	45,315	35,243	72,391	54,523	105,101	80,114	4.8	4.46	5.9	3.8	3.92	3.41	4.3	4.19	4.65
14. Udon Thani	122,778	103,755	181,057	131,600	246,048	176,044	3.96	2.41	10.0	3.11	2.95	3.54	3.54	2.68	6.73
15. Ubon Ratchatchani	190,553	163,464	240,035	186,083	342,697	262,802	2.34	1.3	7.13	3.62	3.51	4	2.98	2.4	5.56
Total	1,495,018	1,300,460	1,965,516	1,539,979	2,724,911	2,106,785	2.77	1.7	8.14	3.32	3.18	3.8	3.05	2.44	5.95

Source: Population Census, National Statistical Office, Office of the Prime Minister.

Table A-1-2 Population Projection (1990 - 2000)

(Unit: persons)

No	NSD	1984			1990			1995			2000		
		Total	Agri-culture	Non-agri-culture	Total	Agri-culture	Non-agri-culture	Total	Agri-culture	Non-agri-culture	Total	Agri-culture	Non-agri-culture
2	Rong Khantho	4,886	3,811	1,075	5,875	4,368	1,507	6,892	4,894	1,998	8,132	5,483	2,649
5	Kam Sakae San	4,816	3,227	1,589	5,926	3,698	2,228	7,098	4,144	2,954	8,559	4,643	3,916
6	Non Bua Lai	3,314	1,756	1,558	4,197	2,012	2,185	5,151	2,255	2,896	6,366	2,526	3,840
7	Huai Thalaeng	9,598	4,511	5,087	12,304	5,170	7,134	15,251	5,793	9,458	19,028	6,490	12,538
8	Nong Ki	13,100	7,991	5,109	16,324	9,159	7,165	19,761	10,262	9,499	24,089	11,497	12,592
9	Hin Lek Hai	5,086	3,458	1,628	6,246	3,963	2,283	7,466	4,440	3,026	8,987	4,975	4,012
10	Huai Rat	3,785	2,233	1,552	4,735	2,559	2,176	5,752	2,867	2,885	7,037	3,212	3,825
11	Sai Mun	6,087	4,748	1,339	7,320	5,442	1,878	8,586	6,097	2,489	10,131	6,831	3,300
12	Khun Han	3,139	533	2,606	4,266	612	3,654	5,529	685	4,844	7,190	768	6,422
13	Kusuman	5,248	4,041	1,207	6,323	4,631	1,692	7,433	5,189	2,244	8,788	5,814	2,974
15	Don Khuang	13,460	-	-	15,885	-	-	18,237	-	-	20,938	-	-
17	Phon Charoen	9,697	-	-	11,444	-	-	13,139	-	-	15,084	-	-
18	Nong Song Hong	7,914	-	-	9,340	-	-	10,723	-	-	12,310	-	-
20	Huai Kha Yung	3,813	2,326	1,487	4,751	2,666	2,085	5,751	2,987	2,764	7,011	3,346	3,665

Note: The future population is estimated by the following method.

$y = yo(1+r)^x$ where y : population x years after the base year of 1984
yo: population in 1984
x : years counted from the base year
r : increasing rate of population per year
0.023 for agricultural population
0.058 for non-agricultural population
0.028 for total population

Table A-1-3 Rate of Service and Water Consumption in 1983

Water Works	Population (1)	Rate of Service (2)	Population Served (3)	Average Consumption cu.m/y (4)	Average Consumption lcd (5) *1
1.Large Scale					
Phitsanulok	72,839	97	70,654	3,986,593	155
Nakhon Rachasima	191,462	32	61,268	7,726,282	345
Average	132,151	65	65,961	5,856,438	243
2.Medium Scale					
Uthai Thani	17,487	90	15,738	805,391	140
Ayuttaya	55,301	68	37,605	2,052,835	150
Saraburi	48,669	60	29,201	1,565,939	147
Phuket	45,917	44	20,203	2,225,294	302
Ratburi	44,979	61	27,437	2,403,162	240
Uttaradit	31,699	59	18,702	812,035	119
Hua Hin	32,017	54	17,289	1,006,309	159
Average	39,438	62	23,739	1,552,995	179
3.Small Scale					
Potharam	10,881	80	8,705	441,581	139
Chum Sang	13,950	48	6,696	272,941	112
Nong Kae	11,668	53	6,184	244,851	108
Kratumban	12,446	94	11,699	499,000	117
Average	12,236	69	8,321	364,593	120

Note: *1 ..... (5) = (4)/(3)/365 ^{days} x 1,000

A.2. WATER DEMAND

LIST OF TABLES

LIST OF FIGURE

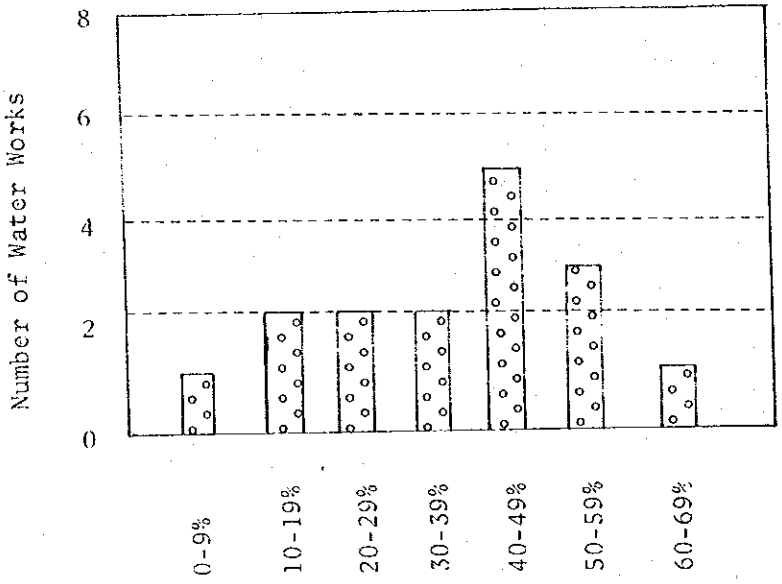
Table A-2-1 ESD: Water Charge Collected, Water Charge and Water Consumption in 1980 to 1984

f=(a-b*12*d)/c/365 g=f/e*1000

No.	ESD	Year	Water Charge Collected ฿/y	Water Charge: Basic Rate ฿/mth.	Water Charge: Meter Rate ฿/cu.m	No. of Water Meters	Population served	Water Consumption: cu.m/d	Water Consumption: lcd	Plant Capacity cu.m/d	f/h %
			a	b	c	d	e	f	g	h	i
1	Cho Ho	1980	262,392	2	4.0	-	-				
		1981	309,162	2	4.0	-	-				
		1982	492,111	2	4.0	-	-				
		1983	540,717	2	4.0	-	-				
		1984	630,850	2	4.0	623	5,974	422	71		
		means	447,046	2	4.0	623	5,974	296	50	1,200	25
2	Non Thai	1980	72,630	5	2.0	490	-	59			
		1981	186,041	5	2.0	-	-				
		1982	95,271	5	2.0	-	-				
		1983	322,161	5	4.0	403	1,291	204	158		
		1984	276,803	5	4.0	442	1,879	171	91		
		means	190,581	5	3.0	445	1,585	150	95	720	21
3	Prang Ku	1980	44,834	0	4.0	-	-				
		1981	51,453	0	4.0	-	-				
		1982	45,411	0	4.0	-	-				
		1983	44,763	0	4.0	77	446	31	70		
		1984	-	0	4.0	77	446				
		means	46,615	0	4.0	77	446	32	72	240	13
4	Tha Rae	1980	86,036	1	3.0	-	-				
		1981	109,152	1	4.0	-	-				
		1982	117,254	1	4.0	-	-				
		1983	142,010	1	4.0	350	2,163	94	43		
		1984	119,498	1	5.0	370	-	63			
		means	114,790	1	4.0	360	2,163	76	35	1,200	6
5	Akat Amnuai	1980	-	2	2.5	-	-				
		1981	-	2	2.5	-	-				
		1982	-	2	2.5	-	-				
		1983	128,500	2	2.5	456	2,667	129	48		
		1984	143,733	2	2.5	471	2,871	145	51		
		means	136,117	2	2.5	464	2,769	137	49	720	19
6	Sankha	1980	71,793	1	4.0	214	-	47			
		1981	159,021	1	4.0	234	-	107			
		1982	192,172	1	4.0	267	2,156	129	60		
		1983	185,071	1	4.0	306	2,450	124	51		
		1984	365,588	1	4.0	367	2,966	247	83		
		means	194,729	1	4.0	278	2,524	131	52	720	18
7	Ban Phu	1980	171,042	0	3.0	-	-				
		1981	171,532	0	3.0	-	-				
		1982	169,551	0	3.0	567	1,911	155	81		
		1983	121,255	0	3.0	567	1,844	111	60		
		1984	124,857	0	3.0	570	2,525	114	45		
		means	151,651	0	3.0	568	2,094	138	66	480	29
8	Khuang Nai	1980	-	0	4.0	185	1,363				
		1981	67,699	0	4.0	197	1,196	46	38		
		1982	92,384	0	4.0	201	1,247	63	51		
		1983	100,808	0	4.0	270	1,320	69	52		
		1984	74,247	0	4.0	270	1,341	51	38		
		means	83,785	0	4.0	225	1,293	57	44	720	8
9	Chanuman	1980	86,859	7	2.0	447	1,445	68	47		
		1981	107,987	7	2.0	447	1,449	96	66		
		1982	138,563	7	2.5	448	1,480	111	75		
		1983	241,230	7	2.5	450	1,637	223	136		
		1984	190,158	7	3.0	498	1,426	135	95		
		means	152,959	7	2.0	458	1,487	157	106	480	33
10	Khamcha-i	1984	-	5	5.0	74	549				
	means		168,697	2	3.0	389	2,259	146	65	720	20

Table A-2-2 Leakage and Wastage Record, 1983

	Water Works	Supplied Water (cu.m/d)	Water Consumption (cu.m/d)	Unaccounted-for water Amount (cu.m/d)	Unaccounted-for water Rate (%)
1	Potharam	1,669	1,210	459	28
2	Pitsanuloke	15,230	10,922	4,308	28
3	Utitani	4,331	2,207	2,124	49
4	Chumsang	1,676	748	928	55
5	Nakhonsri	10,177	5,624	2,553	45
6	Saraburi	6,792	4,290	2,502	37
7	Phuket	7,453	6,097	1,356	18
8	Ratburi	10,749	6,584	4,165	39
9	Nakhonratsima	63,946	21,167	42,779	67
10	Nakhonpathom	20,331	10,437	9,894	49
11	Uttaradit	5,319	2,225	3,094	58
12	Nongkae	1,201	671	530	44
13	Kratumban	2,638	1,367	1,271	48
14	Houahin	5,658	2,757	2,901	51
15	Kokmung	499	441	58	12
16	Nawanakhon	2,334	2,263	71	3
	Average	160,003		78,993	49



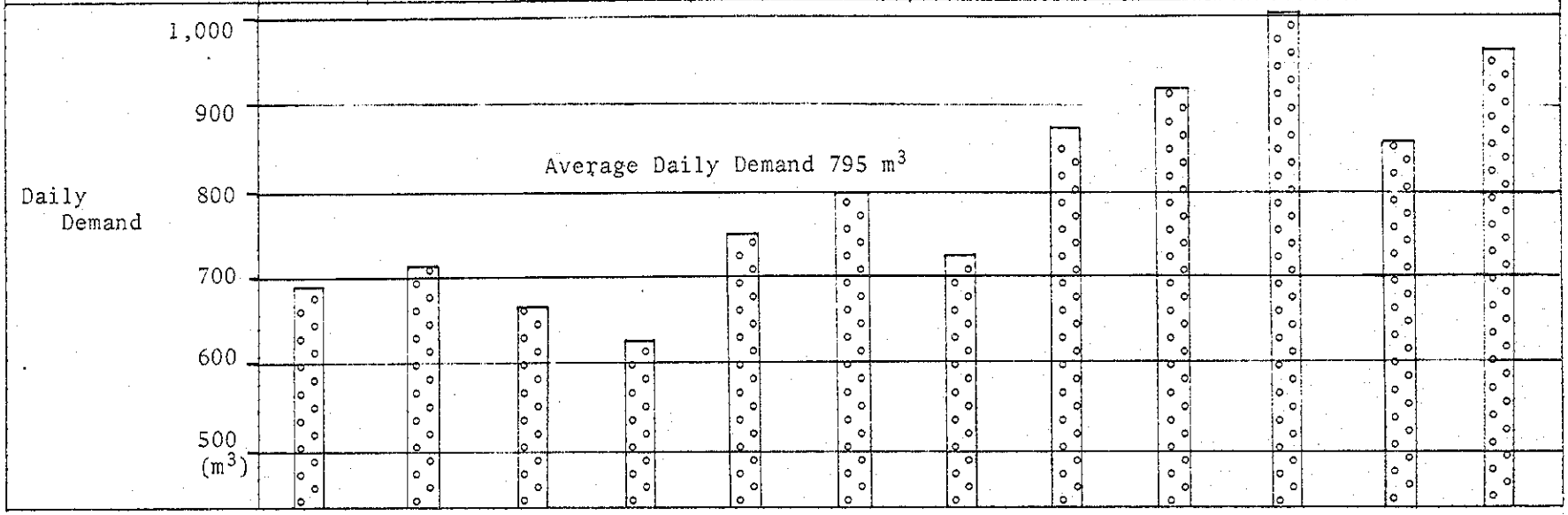
Leakage and Wastage Record, 1983

Table A-2-3 Hourly Water Released Record at Chonnabot ESD

			Hourly released water (cu.m/hr)	Ratio
July 15,	PM	6:00	60	1.51
		7:00	57	1.44
		8:00	45	1.14
		9:00	30	0.76
		10:00	27	0.68
		11:00	24	0.61
		12:00	18	0.45
July 16,	AM	1:00	9	0.23
		2:00	9	0.23
		3:00	9	0.23
		4:00	9	0.23
		5:00	36	0.91
		6:00	78	1.97
		7:00	48	1.21
		8:00	63	1.59
July 16,	AM	9:00	51	1.29
		10:00	45	1.41
		11:00	48	1.21
		12:00	39	0.98
	PM	1:00	45	1.14
		2:00	36	0.91
		3:00	42	1.06
		4:00	51	1.29
		5:00	66	1.67
		6:00		

Figure A-2-1 Monthly Water Demand in Chonnabot SD

Month / (m^3)	1984 Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	1985 Jan.	Feb.	Mar.	Apr.	May	Jun.
Distributed Water	21,452	22,024	29,944	29,506	22,408	24,590	22,444	24,040	28,300	30,258	26,568	28,555
Average Daily Demand (A)	290,089 ÷ 365 = 795											
Monthly Daily Demand (B)	692	710	665	629	747	793	724	859	913	1,009	857	952
(B)/(A)	0.87	0.89	0.84	0.79	0.94	1.00	0.91	1.08	1.15	1.27	1.08	1.20



A.3. METEOROLOGY AND HYDROLOGY

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

A.3. METEOROLOGY AND HYDROLOGY

A.3.1. Meteorology

Table A-3-1 Meteorological Data at Nakhon Ratchasima

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (^{0}C.)													
Mean	22.9	25.7	28.1	29.0	28.4	28.1	27.6	27.3	26.5	25.9	24.2	22.5	26.4
Mean Max.	31.0	33.5	35.9	36.5	35.0	34.1	33.4	32.9	31.9	30.8	29.8	29.6	32.9
Mean Min.	16.2	19.3	22.0	23.5	24.0	23.9	23.6	23.4	23.1	22.3	19.5	16.6	21.5
Ext. Max.	37.8	40.6	42.5	42.7	41.4	40.1	40.0	38.1	38.0	35.3	35.3	35.8	42.7
Ext. Min.	4.9	10.6	11.6	15.7	20.7	21.2	21.1	20.5	19.7	16.2	9.1	6.2	4.9
Relative Humidity (%)													
Mean	67.0	65.0	65.0	68.0	76.0	76.0	77.0	78.0	83.0	81.0	76.0	69.0	73.0
Mean Max.	88.6	86.4	86.1	87.2	91.3	91.1	91.4	92.2	95.1	94.2	92.0	90.4	90.5
Mean Min.	43.0	40.9	40.4	43.9	53.4	55.2	56.5	58.6	64.0	63.0	56.2	48.6	52.0
Ext. Min.	22.0	14.0	12.0	19.0	23.0	23.0	35.0	35.0	39.0	31.0	27.0	20.0	12.0
Evaporation (mm.)													
Mean - Pan	146.4	152.0	193.0	194.4	182.9	173.4	168.9	159.8	132.2	137.2	134.8	140.5	1,915.5
Sunshine Duration (hr.)													
Mean	283.0	244.7	248.4	245.3	244.5	207.4	194.7	185.8	166.1	225.0	258.6	277.1	2,780.6
Wind (Knots)													
Prevailing wind	NE	NE	NE	SW	SW	SW	W	W	W	NE	NE	NE	-
Mean Wind Speed	2.5	2.6	2.5	2.9	2.8	3.7	3.8	3.6	2.4	2.7	3.2	2.9	-
Max. Wind Speed	28 ENE	37 E	43 SSW	53 S	46 SE	58 SW	41 W	35 SE	33 S, WSW	54 SE	44 NE, E	40 NE	58 SW
Rainfall (mm.)													
Mean	3.5	22.9	55.2	70.0	157.6	116.2	131.0	126.9	263.3	157.7	30.0	3.1	1,137.4
Mean rainy days	1.2	2.9	6.1	7.9	15.9	15.0	15.6	16.5	19.5	12.1	3.8	0.9	117.4
Greatest in 24 hr.	17.1	59.7	97.3	91.8	134.5	114.8	104.1	72.3	143.7	136.0	108.6	20.6	143.7
Day/Year	26/54	23/65	10/74	4/73	13/52	27.69	10/75	27/64	12/68	25/76	9/55	3/70	12/68

Data Source : Meteorological Department
Remark : 1. Evaporation 1962-1980
2. Sunshin Duration 1957-1980

Table A-3-2 Meteorogical Data at Ubon Ratchatani

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (^{0}C.)													
Mean	23.9	26.1	28.8	29.9	29.1	28.2	27.8	27.4	27.1	26.7	25.2	23.8	27.0
Mean Max.	31.1	33.2	35.3	35.9	34.4	32.7	32.0	31.4	31.2	31.2	30.7	30.2	32.4
Mean Min.	17.0	19.2	22.3	24.2	24.6	24.4	24.2	24.0	23.7	22.5	19.9	17.8	22.0
Ext. Max.	37.0	38.5	40.2	41.8	40.2	38.5	36.2	37.8	34.6	34.8	35.8	34.9	41.8
Ext. Min.	7.6	11.7	13.0	15.9	19.4	21.0	20.8	20.8	20.6	15.7	12.5	8.5	7.6
Relative Humidity (%)													
Mean	66.0	64.0	63.0	67.0	76.0	80.0	81.0	83.0	83.0	77.0	72.0	69.0	73.0
Mean Max.	87.4	84.9	82.3	84.0	90.4	92.5	92.8	93.7	94.3	90.3	87.8	87.7	89.0
Mean Min.	42.1	40.9	41.5	46.0	55.8	62.4	64.4	66.8	67.6	60.9	53.3	46.6	54.0
Ext. Min.	22.0	23.0	20.0	21.0	32.0	37.0	47.0	46.0	42.0	36.0	26.0	30.0	20.0
Evaporation (mm.)													
Mean - Pan	180.1	180.3	220.8	214.4	193.6	166.6	171.5	155.1	138.6	172.2	182.1	180.1	2,155.4
Sunshine Duration (hr.)													
Mean	272.0	233.0	245.1	254.7	237.0	192.3	193.9	160.3	160.5	230.2	254.5	263.9	2,697.4
Wind (Knots)													
Prevailing wind	NNE	NNE	S	S	S	S	S	S	W	NNE	NNE	NNE	-
Mean Wind Speed	4.3	3.8	3.6	3.6	3.6	4.2	4.4	4.4	3.2	4.5	6.1	5.6	-
Max. Wind Speed	33 NE	46 NE	41 N	56 SW	60 ENE	60 WSW	41 WSW	68 S	46 E	55 NE	40 NE	51 NE	68 S
Rainfall (mm.)													
Mean	0.7	8.5	43.3	78.7	206.3	252.7	282.5	322.3	279.0	91.5	20.3	1.8	1,587.6
Mean rainy days	0.5	1.2	3.8	7.5	15.3	18.5	19.5	22.3	20.4	10.6	3.3	0.7	123.6
Greatest in 24 hr.	6.4	44.7	124.1	100.2	138.5	189.4	203.9	182.8	130.3	113.4	71.8	8.2	203.9
Day/Year	25/54	23/72	14/60	12/78	18/56	4/72	7/70	7/51	5/68	9/67	5/64	15/66	7/70

Data Source : Meteorological Department
Remark : 1. Evaporation 1961-1980
2. Sunshine Duration 1954-1980

Table A-3-3 Meteorological Data at Sakhon Nakhon

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (^{0}C.)													
Mean	22.5	24.6	27.7	29.4	28.6	28.2	28.0	27.4	27.2	26.6	24.7	22.6	26.5
Mean Max.	29.1	30.9	33.7	35.0	33.4	32.2	31.9	31.1	31.0	31.0	30.1	28.9	31.5
Mean Min.	14.3	17.2	20.9	23.3	24.1	24.4	24.3	24.0	23.5	21.4	17.9	14.7	20.8
Ext. Max.	36.4	39.2	41.2	41.9	39.9	39.8	36.8	36.5	35.4	35.4	36.9	35.5	41.9
Ext. Min.	0.5	7.6	9.6	14.0	18.8	21.0	21.2	21.0	19.2	13.3	6.9	4.0	0.5
Relative Humidity (%)													
Mean	64.0	63.0	62.0	65.0	77.0	80.0	80.0	82.0	82.0	74.0	69.0	67.0	72.0
Mean Max.	90.8	86.4	83.5	84.5	90.4	91.2	91.3	93.0	93.9	91.8	91.6	92.3	90.1
Mean Min.	45.0	44.6	44.6	48.7	61.5	67.4	67.7	70.2	68.4	58.5	50.8	47.7	56.3
Ext. Min.	15.0	14.0	13.0	18.0	29.0	36.0	49.0	51.0	41.0	25.0	20.0	24.0	13.0
Evaporation (mm.)													
Mean - Pan	193.8	196.5	245.3	219.3	173.3	150.2	152.3	139.4	137.8	184.6	188.6	185.6	2,166.7
Sunshine Duration (hr.)													
Mean	267.4	219.8	237.1	232.8	208.9	159.4	179.2	146.6	171.1	252.0	262.3	279.4	2,616.0
Wind (Knots)													
Prevailing wind	E	E	E	E	S	S	SW	SW	E	E	E	E	-
Mean Wind Speed	4.4	4.9	4.5	4.1	3.3	3.5	3.9	3.6	3.0	3.6	4.1	4.1	-
Max. Wind Speed	33 NE	41 WSW	49 N	53 E	45 N	35 W	40 S	40 E, SW W	35 N, S	32 ENE	25 NE	30 NE	53 E
Rainfall (mm.)													
Mean	7.0	15.6	41.7	84.9	229.6	260.8	208.1	319.2	260.4	62.2	5.7	2.5	1,497.7
Mean rainy days	1.2	2.6	5.3	8.3	18.0	19.4	19.7	23.1	19.1	7.1	1.2	0.4	125.4
Greatest in 24 hr.	26.6	52.6	73.6	69.7	220.1	131.6	184.2	457.1	214.3	122.9	52.2	35.3	457.1
Day/Year	19/69	2/53	1/60	9/54	19/71	17/53	11/69	16/74	15/54	3/72	9/63	20/71	16/74

Data Source : Meteorological Department
Remark : 1. Temperature 1953-1980
2. Evaporation 1957-1980
2. Sunshine Duration 1961-1980

Table A-3-4 Meteorological Data at Udon Thani

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (^{0}C.)													
Mean	21.7	24.2	27.2	29.1	28.5	28.1	27.7	27.5	27.0	26.4	24.3	21.9	26.1
Mean Max.	29.6	31.8	34.6	35.9	34.3	32.8	32.4	31.6	31.3	31.3	30.3	29.2	32.1
Mean Min.	15.1	17.9	21.3	23.8	24.5	24.8	24.5	24.3	23.9	22.5	19.2	15.8	21.5
Ext. Max.	36.5	38.5	42.2	43.9	42.6	39.7	37.2	37.1	35.8	35.9	37.2	35.1	43.9
Ext. Min.	2.5	9.4	10.0	11.8	18.8	21.5	20.8	21.0	20.5	15.6	8.4	5.5	2.5
Relative Humidity (%)													
Mean	69.0	66.0	63.0	66.0	77.0	80.0	80.0	83.0	83.0	77.0	72.0	70.0	74.0
Mean Max.	89.6	86.4	83.6	85.4	91.0	92.0	92.2	93.4	94.4	91.8	90.6	90.3	90.1
Mean Min.	44.3	42.5	40.7	44.5	56.7	63.0	63.8	66.7	66.1	57.0	49.9	45.5	53.4
Ext. Min.	13.0	15.0	13.0	18.0	30.0	35.0	44.0	45.0	36.0	18.0	21.0	17.0	13.0
Evaporation (mm.)													
Mean - Pan						No Observation							
Sunshine Duration (hr.)													
Mean						No Observation							
Wind (Knots)													
Prevailing wind	E	E	E	S	S	S	S	S	S	E	NE	NE	-
Mean Wind Speed	2.7	3.1	3.2	3.4	3.2	3.0	3.3	3.0	2.9	2.8	2.9	2.8	-
Max. Wind Speed	30 E,W	33 NE SW,W,NW	53 NW	67 WSW	51 SW	52 SW	42 NNW	48 SE	43 E	43 SE	27 NE,E	27 E	67 WSW
Rainfall (mm.)													
Mean	7.2	20.3	39.0	80.0	217.9	240.7	228.4	289.6	282.9	79.7	7.4	2.6	1,495.7
Mean rainy days	1.3	2.7	4.5	7.8	17.3	17.9	19.6	20.9	19.5	7.9	1.4	0.4	121.2
Greatest in 24 hr.	26.4	125.1	84.8	112.4	146.0	153.6	106.3	247.0	155.0	94.5	65.7	37.7	247.0
Day/Year	10/51	20/64	11/72	19/77	21/80	12/67	13/71	16/74	24/52	13/60	8/63	20/71	16/74

Data Source : Meteorological Department

Table A-3-5 Meteorological Data at Khon Kaeng

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (^{0}C.)													
Mean	23.2	25.7	28.8	30.2	29.4	28.7	28.1	27.7	27.2	26.7	25.0	23.2	27.0
Mean Max.	30.5	32.7	35.4	36.5	34.8	33.2	32.6	32.0	31.5	31.4	30.8	30.0	32.6
Mean Min.	16.0	18.8	22.1	24.2	24.7	24.6	24.2	24.1	23.6	22.3	19.2	16.3	21.7
Ext. Max.	37.2	41.0	41.8	42.8	41.2	39.4	38.0	37.0	35.5	35.8	37.2	35.8	42.8
Ext. Min.	5.7	10.4	10.3	14.0	19.8	20.7	20.2	20.8	19.3	14.0	9.4	5.6	5.6
Relative Humidity (%)													
Mean	63.0	62.0	60.0	63.0	72.0	76.0	77.0	80.0	82.0	76.0	70.0	66.0	70.0
Mean Max.	85.8	83.2	81.2	82.3	87.7	88.9	90.0	91.4	93.0	90.7	87.8	87.1	87.4
Mean Min.	43.5	41.5	39.9	43.3	53.8	60.0	61.7	64.6	66.4	59.2	49.7	44.8	52.4
Ext. Min.	11.0	10.0	10.0	14.0	27.0	33.0	34.0	37.0	45.0	26.0	21.0	15.0	10.0
Evaporation (mm.)													
Mean -Pan	161.6	168.1	215.6	225.0	203.5	168.5	171.2	151.9	138.0	160.7	159.2	160.6	2,083.9
Sunshine Duration (hr.)													
Mean	275.3	242.8	243.1	255.9	247.2	196.9	183.5	162.3	163.6	243.5	255.6	286.1	2,755.8
Wind (Knots)													
Prevailing wind	NE	NE	NE	SW	SW	SW	SW	SW	SW	NE	NE	NE	-
Mean Wind Speed	3.2	3.0	3.5	3.7	3.6	3.9	4.1	3.8	2.8	3.4	3.8	3.6	-
Max. Wind Speed	33 NE	33 N,SW W,NW	40 NE	46 W	47 SW	59 SW	55 W	40 E	33 N,NE SW,W	34 NE	35 N	38 NE	59 SW,WSW
Rainfall (mm.)													
Mean	7.7	15.4	34.2	62.7	171.8	180.8	156.5	188.3	276.9	86.0	13.5	2.9	1,196.7
Mean rainy days	1.1	2.5	4.3	6.8	13.7	14.7	16.1	17.7	18.2	9.2	1.6	0.6	106.5
Greatest in 24 hr.	31.6	63.4	70.2	65.7	96.9	123.8	92.8	134.8	141.6	124.5	81.0	26.6	141.6
Day/Year	31/53	3/66	11/52	6/65	9/52	12/70	26/63	12/78	7/51	26/69	10/74	20/71	7/51

Data Source : Meteorological Department
Remark : 1. Evaporation 1961-1980
2. Sunshine Duration 1957-1980

Table A-3-6 Monthly Rainfall at Nakhon Ratchasima

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1963	159.0	105.7	96.0	118.3	181.0	263.8	219.9	91.6	0.0	0.0	3.7	26.2	1,265.2
1964	34.3	318.8	69.2	163.0	161.0	257.5	227.3	30.0	0.1	0.0	94.7	26.3	1,382.2
1965	93.7	197.7	45.2	87.1	193.5	251.7	72.3	16.3	0.0	0.1	56.5	58.7	1,072.8
1966	61.7	313.4	50.5	191.2	155.7	286.2	123.4	11.9	1.4	0.0	0.3	2.7	1,198.4
1967	95.6	180.9	135.5	86.4	110.6	182.2	61.2	65.0	0.0	0.0	0.0	0.0	917.4
1968	85.0	175.9	146.8	142.8	174.7	242.6	36.3	0.0	0.0	22.1	0.0	43.3	1,069.5
1969	24.1	147.2	223.9	83.0	59.1	300.8	201.1	20.9	0.0	1.5	0.0	50.6	1,112.2
1970	46.1	187.1	123.4	92.7	157.7	231.0	89.2	2.7	33.8	1.7	9.8	50.2	1,025.4
1971	87.8	113.6	211.9	92.7	122.3	262.2	62.1	0.0	6.5	0.0	5.3	74.4	1,038.8
1972	147.9	31.6	185.9	50.4	56.5	425.5	192.7	60.4	16.7	0.0	1.8	32.2	1,201.6
1973	128.4	80.0	162.4	146.2	47.0	269.0	77.9	15.4	0.0	6.6	54.2	139.1	1,126.2
1974	50.7	182.0	74.4	110.9	102.8	251.9	227.2	111.9	0.1	16.1	0.3	24.6	1,152.9
1975	17.2	191.4	121.5	199.4	62.4	228.1	129.7	51.0	9.7	0.0	30.6	62.3	1,103.3
1976	21.2	102.5	43.4	126.7	141.0	217.2	236.2	7.1	0.0	0.0	0.0	22.7	918.0
1977	85.2	76.9	64.6	66.0	289.5	186.3	83.8	3.0	6.1	0.0	45.6	28.9	935.9
1978	29.6	111.6	62.0	86.6	76.1	199.3	89.1	30.5	0.0	0.0	6.7	0.0	691.5
1979	51.0	99.7	86.1	57.8	62.2	229.5	48.4	1.1	0.0	0.0	6.0	82.6	724.4
1980	29.8	196.6	251.4	161.1	166.4	282.9	115.1	23.6	0.0	0.0	47.6	4.2	1,278.7
1981	44.2	171.5	40.2	166.2	60.6	184.2	83.4	132.6	0.1	0.0	38.2	23.5	944.7
1982	39.6	48.6	172.4	166.1	161.8	310.5	53.5	7.9	18.1	9.8	20.4	2.8	1,011.5
1983	26.9	48.4	96.3	194.0	211.1	283.7	311.5	54.0	0.3	0.0	11.2	11.5	1,248.9
1984	55.1	244.3	80.1	112.0	168.2	167.0	143.7	22.6	0.0	74.0	63.2	23.4	1,153.6

Data Source : RID

Table A-3-7 Monthly Rainfall at Ubon Ratchathani

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1963	11.4	184.1	267.5	278.9	269.5	232.2	110.8	65.5	0.0	5.5	0.0	51.4	1,476.8
1964	64.4	502.5	192.2	147.1	245.8	284.5	61.3	80.0	0.0	0.0	5.1	1.3	1,584.2
1965	175.5	280.5	377.1	120.1	128.1	169.0	17.3	22.3	1.3	0.0	0.0	83.2	1,374.4
1966	123.0	664.3	276.3	445.6	400.4	179.0	49.4	23.0	8.9	0.0	0.0	0.0	2,169.9
1967	182.4	75.5	130.5	208.9	344.6	187.0	135.3	23.2	0.0	2.7	0.2	5.7	1,296.0
1968	71.3	166.5	282.4	152.6	289.1	499.3	4.0	0.8	0.0	0.0	5.3	12.9	1,484.2
1969	74.5	203.9	310.4	435.9	148.8	346.7	50.0	34.7	0.0	0.4	0.7	0.5	1.606.5
1970	79.9	169.4	278.5	406.8	571.9	189.4	30.5	6.1	17.4	0.0	13.1	0.4	1,763.4
1971	58.5	225.4	231.8	307.3	317.8	173.1	20.9	0.6	3.7	0.0	57.9	108.9	1,505.9
1972	39.0	76.0	476.9	464.9	312.7	293.5	77.3	16.9	8.7	0.0	21.9	0.2	1,788.0
1973	39.3	166.8	187.2	410.1	257.8	298.6	31.5	3.9	0.0	1.1	2.4	18.2	1,416.9
1974	106.7	272.1	182.3	293.8	438.8	248.3	127.7	40.6	3.4	2.2	16.6	6.7	1,739.2
1975	31.7	208.6	212.4	299.1	408.3	268.6	99.1	70.2	4.1	0.0	0.2	10.7	1,613.0
1976	93.9	145.9	291.7	242.5	366.3	210.3	94.2	35.7	0.0	0.0	0.0	14.2	1,494.7
1977	63.5	146.6	81.1	172.7	338.9	426.8	38.8	0.0	4.0	2.5	0.4	23.5	1,298.8
1978	222.8	113.8	293.3	325.5	459.6	410.3	81.6	13.3	0.0	0.6	2.0	3.1	1,925.9
1979	108.5	231.4	462.9	99.4	512.0	291.9	3.0	0.7	0.0	0.0	2.5	0.7	1,713.0
1980	48.4	244.4	435.0	350.9	139.8	363.7	110.8	31.0	0.0	0.0	23.5	2.4	1,749.9
1981	96.1	166.6	316.8	202.5	254.2	133.9	90.4	37.4	0.0	0.0	0.0	7.0	1,304.9
1982	78.3	135.7	331.0	209.4	292.6	503.5	90.2	29.8	0.0	0.0	0.0	1.5	1,672.0
1983	47.7	163.0	427.3	164.4	250.0	303.7	203.3	6.6	0.1	0.0	0.0	102.6	1,668.7
1984	184.0	235.4	204.5	187.3	568.3	330.8	303.4	80.8	0.0	4.4	114.0	50.7	2,263.6

Data Source: RID

Table A-3-8 Monthly Rainfall at Sakon Nakhon

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1963	14.9	202.8	291.6	362.8	321.2	179.3	23.5	59.2	0.0	0.0	0.2	25.7	1,481.2
1964	127.7	216.2	240.2	146.9	277.5	262.7	189.3	1.8	0.2	0.0	0.0	29.1	1,491.6
1965	94.6	446.8	174.2	120.6	297.4	153.6	27.7	0.0	0.0	0.0	66.1	112.9	1,493.9
1966	108.7	214.9	148.1	210.7	383.1	108.3	78.7	0.0	14.4	0.0	0.8	0.2	1,267.9
1967	37.5	379.3	268.8	132.1	107.0	386.3	2.0	8.2	0.0	2.5	12.2	27.1	1,363.0
1968	32.8	199.8	215.7	129.6	147.7	451.1	29.8	0.0	2.0	47.3	0.0	70.0	1,325.8
1969	74.4	216.7	375.6	361.7	144.2	162.2	78.8	6.0	0.0	0.0	0.0	16.0	1,435.6
1970	61.8	182.8	408.9	136.6	612.1	357.9	58.1	0.9	0.3	3.4	93.5	2.5	1,918.8
1971	120.1	337.2	439.6	327.2	251.4	331.7	49.0	1.6	44.5	0.0	38.1	82.6	2,023.0
1972	77.3	238.3	218.7	129.5	273.5	136.4	268.2	3.2	0.0	0.0	0.0	0.0	1,345.1
1973	90.4	197.9	229.9	328.3	224.8	237.6	50.7	3.3	0.0	21.0	0.8	63.8	1,448.5
1974	111.1	208.8	262.0	155.2	1,001.2	128.1	28.9	16.3	0.6	13.6	25.2	15.9	1,966.9
1975	18.7	218.5	320.1	356.1	413.7	266.6	25.6	5.3	0.0	0.0	1.2	44.2	1,670.0
1976	163.1	78.5	155.7	223.9	193.2	167.9	116.9	3.3	0.0	6.3	0.0	4.7	1,113.5
1977	81.5	156.7	83.4	137.9	358.5	284.9	35.4	0.3	12.5	7.6	3.7	33.8	1,196.2
1978	145.0	307.3	155.1	234.9	548.4	228.4	18.5	4.6	0.0	0.6	13.3	19.4	1,675.5
1979	109.0	458.2	463.0	97.8	265.7	132.1	0.0	0.0	0.0	0.0	3.4	21.4	1,550.6
1980	86.4	226.3	207.1	329.9	289.4	411.1	69.8	0.0	0.0	0.0	16.2	87.3	1,723.5
1981	118.0	278.0	342.3	303.6	341.6	126.6	133.9	7.6	0.0	0.0	85.5	143.6	1,880.7
1982	138.6	224.9	219.7	252.6	365.3	379.0	153.6	1.7	3.6	21.5	6.3	0.8	1,767.6
1983	55.1	135.8	269.9	83.0	520.4	137.7	167.8	0.0	0.4	0.0	0.7	9.3	1,380.1
1984	126.6	121.5	190.6	360.0	438.2	273.1	87.8	31.5	0.0	6.0	45.4	76.7	1,757.4

Data Source: RID

Table A-3-9 Monthly Rainfall at Nong Khai

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
	149.5	203.2	300.4	334.4	247.1	238.0	66.3	47.9	4.8	4.1	31.3	30.8	1,657.8
1963	149.5	372.2	264.6	203.8	243.5	251.7	139.0	0.2	0.0	0.0	6.3	5.0	1,635.8
1964	162.9	160.5	296.1	201.2	243.8	397.1	48.8	0.0	0.0	0.8	7.7	63.7	1,582.6
1965	117.7	297.9	231.3	185.4	539.4	118.5	55.3	0.1	0.0	3.2	1.1	8.9	1,558.8
1966	146.8	126.0	215.2	210.9	264.7	620.5	1.5	12.5	0.0	0.6	0.4	16.7	1,615.8
1967	133.2	291.9	246.9	202.4	252.4	335.5	36.6	0.0	0.0	37.9	0.0	118.2	1,655.0
1968	75.4	182.7	326.4	404.7	167.2	287.7	38.3	19.2	0.0	0.0	0.0	26.6	1,528.2
1969	87.6	311.3	529.1	187.4	547.2	390.9	19.6	0.2	6.9	0.8	8.7	14.2	2,103.9
1970	53.1	464.9	379.4	425.0	231.5	171.0	53.2	2.1	10.2	0.0	0.3	33.5	1,824.2
1971	124.4	127.2	313.3	130.9	390.6	104.2	138.4	34.4	9.3	0.0	0.0	9.0	1,381.7
1972	19.7	180.0	166.7	275.0	287.7	291.4	35.3	0.8	0.0	0.0	0.1	35.0	1,291.7
1973	73.7	144.6	161.3	267.1	462.9	71.1	58.5	23.8	0.0	20.7	28.6	17.6	1,329.9
1974	54.2	352.9	380.9	247.4	519.2	367.8	120.6	9.2	0.0	0.0	24.2	28.6	2,105.0
1975	115.4	209.1	257.4	163.7	253.0	330.8	102.4	0.0	0.0	18.4	0.0	30.7	1,480.9
1976	57.4	171.3	106.5	177.4	307.2	219.4	20.1	11.0	29.6	7.7	23.5	13.4	1,144.5
1977	116.8	276.2	229.9	393.6	432.8	293.9	18.9	7.6	0.0	0.9	26.0	10.9	1,807.5
1978	83.6	278.5	273.2	103.1	205.8	192.4	2.1	0.0	0.0	0.0	2.2	11.5	1,152.4
1979	94.0	331.0	530.6	283.0	276.4	378.6	61.8	0.0	0.0	0.0	8.9	4.4	1,968.7
1980	107.3	287.7	274.5	427.2	183.7	206.5	159.3	59.7	0.0	0.0	12.6	90.0	1,808.5
1981	64.1	183.0	219.7	315.5	346.4	361.0	109.0	26.7	4.7	0.0	19.8	1.3	1,651.2
1982	72.7	128.7	200.7	205.7	428.0	199.6	136.6	0.0	10.4	0.3	4.3	53.3	1,440.3
1983	87.4	207.8	189.6	329.2	458.9	254.0	182.0	14.3	0.0	15.1	20.8	11.6	1,770.7

Data Source: RID

Table A-3-10 Monthly Evaporation at Nakhon Ratchasima

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1963	164.0	178.0	170.0	158.0	155.0	125.0	-	115.0	124.0	149.0	154.0	186.0	-
1964	200.0	148.0	184.0	157.0	167.0	122.0	130.0	116.0	126.0	130.0	118.0	166.0	1,764.0
1965	187.0	165.0	162.0	177.0	155.0	143.0	146.0	149.0	158.0	152.0	144.3	216.9	1,955.2
1966	-	167.8	193.3	169.8	142.2	139.7	136.4	127.5	126.6	156.2	146.8	211.6	-
1967	196.6	189.1	180.6	179.1	176.4	135.8	141.1	133.9	146.0	156.4	163.6	197.8	1,996.4
1968	187.9	184.0	182.0	174.6	189.9	149.4	149.5	166.1	163.9	154.2	199.8	222.7	2,124.0
1969	216.6	182.0	172.0	150.2	162.9	143.1	142.9	135.2	148.7	147.4	105.8	209.7	1,916.5
1970	173.6	178.7	147.8	163.9	137.8	140.8	139.3	133.2	122.8	147.5	140.1	193.0	1,818.5
1971	183.5	160.7	156.9	142.8	152.1	138.2	83.7	144.8	143.1	155.0	174.5	181.1	1,816.4
1972	175.9	260.5	170.3	201.1	199.5	126.4	140.0	120.3	128.7	153.2	169.0	186.6	1,031.5
1973	206.5	193.4	181.7	155.0	159.4	138.5	140.0	135.7	146.4	136.3	150.8	149.9	1,893.6
1974	174.6	174.2	175.4	185.0	140.0	149.2	136.1	118.5	140.7	117.1	149.6	171.4	1,831.8
1975	216.8	172.8	166.1	168.1	151.3	125.4	123.3	125.3	139.3	148.9	141.0	180.3	1,858.6
1976	200.1	174.1	218.8	185.8	138.3	137.7	157.3	140.5	133.0	134.9	144.2	189.4	1,954.1
1977	190.4	186.5	214.3	172.5	145.4	110.6	138.6	126.4	153.3	145.4	131.3	199.3	1,914.0
1978	196.1	174.0	181.1	128.4	150.8	119.3	144.9	134.4	145.8	156.8	173.5	250.1	1,955.2
1979	214.1	204.4	132.9	178.9	165.8	116.5	162.4	172.1	146.0	144.0	159.6	188.1	1,984.8
1980	189.7	194.2	131.9	180.7	168.5	110.6	113.6	124.0	132.4	140.7	157.4	196.4	1,840.1
1981	175.2	157.8	161.5	142.4	165.2	147.6	136.1	107.5	127.0	129.0	141.7	168.7	1,759.7
1982	169.3	195.0	187.8	198.6	159.7	112.0	126.0	128.0	119.7	123.0	135.8	192.5	1,847.4
1983	217.8	189.2	153.2	159.6	131.7	111.0	107.9	116.2	117.5	121.2	150.8	179.2	1,755.3
1984	190.6	168.2	165.3	165.0	154.7	133.2	122.1	130.3	139.5	127.7	137.0	175.4	1,809.0

Data Source: MD

Table A-3-11 Monthly Evaporation at Ubon Ratchathani

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1964	209.7	159.1	185.2	199.5	163.6	160.9	178.1	178.5	187.5	186.0	182.1	231.3	2,221.5
1965	237.0	208.0	170.1	190.1	192.1	170.9	233.3	200.3	215.3	194.0	192.3	229.2	2,432.7
1966	211.5	155.9	204.9	177.1	158.7	165.6	200.5	242.6	188.0	203.4	202.1	250.2	2,360.5
1967	214.0	212.7	196.3	181.9	196.1	133.5	206.3	193.8	209.5	182.7	180.7	214.7	2,322.2
1968	213.6	214.0	177.4	-	-	129.8	227.0	218.5	201.0	219.3	209.6	229.9	-
1969	239.8	223.9	175.4	182.9	178.8	161.7	162.5	194.7	200.5	173.1	173.2	248.0	2,314.5
1970	205.4	179.0	137.0	170.2	136.9	125.4	175.5	204.1	172.4	196.0	171.6	237.4	2,110.9
1971	208.0	176.4	123.3	157.3	137.3	130.1	172.4	219.6	208.7	207.5	177.4	196.9	2,114.9
1972	186.0	247.5	152.9	182.4	150.3	158.5	142.3	155.9	171.2	186.0	183.4	218.2	2,134.6
1973	292.3	186.6	170.7	150.7	143.7	144.1	167.5	187.4	193.0	171.6	194.4	205.7	2,207.7
1974	217.2	195.6	177.8	126.5	135.2	156.3	141.5	152.1	163.9	168.2	159.6	197.7	1,991.6
1975	242.4	180.6	140.9	147.8	148.3	123.7	111.9	138.3	158.4	153.3	151.2	191.1	1,887.9
1976	196.4	174.9	171.9	140.8	127.5	120.0	142.7	154.5	145.1	153.0	169.5	203.9	1,900.2
1977	198.7	208.0	211.5	162.2	146.2	126.9	163.6	162.0	147.7	147.3	154.6	191.1	2.019.8
1978	167.0	160.7	155.4	133.6	130.5	102.7	164.8	147.0	145.7	155.4	151.4	214.6	1,828.8
1979	208.9	161.3	129.6	179.7	160.4	140.2	193.4	192.4	177.6	163.3	183.2	218.8	2,108.8
1980	222.6	205.5	143.3	172.2	158.9	128.2	148.2	158.4	144.9	170.6	153.5	200.4	2,006.7
1981	191.4	188.9	140.8	123.9	149.5	145.0	144.3	140.7	141.9	152.6	151.8	187.7	1,858.5
1982	188.0	189.7	144.1	148.8	120.9	114.9	138.7	136.5	139.7	161.1	144.8	212.9	1,840.1
1983	229.7	217.1	148.2	159.8	143.4	114.8	123.0	148.0	139.7	155.1	174.6	193.3	1,946.7
1984	186.7	140.0	148.2	143.8	131.8	113.2	126.9	128.8	148.5	142.8	137.7	195.2	1,743.6

Data Source: MD

Table A-3-12 Monthly Evaporation at Sakon Nakhon

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1965	196.6	161.0	110.6	159.8	146.4	159.9	293.4	216.0	215.0	138.0	149.9	192.4	2,119.0
1966	162.7	141.0	145.5	140.4	102.9	144.8	194.9	219.0	206.1	254.8	234.8	310.0	2,256.9
1967	229.7	176.6	180.6	172.8	164.9	122.8	180.4	227.1	217.1	189.1	212.8	281.6	2,355.5
1968	287.5	192.1	177.6	230.0	209.7	168.0	189.4	227.0	196.5	173.8	205.5	228.0	2,485.1
1969	217.4	208.2	142.5	151.1	163.0	152.0	212.7	200.6	219.0	244.0	249.0	332.0	2,491.5
1970	243.5	180.0	132.6	165.0	126.7	126.0	205.5	204.1	198.0	223.0	216.0	304.0	2,324.4
1971	256.0	166.5	110.0	148.6	113.9	117.8	190.4	216.5	187.3	198.0	209.2	222.5	2,136.7
1972	174.8	169.8	131.9	151.6	123.7	141.7	140.0	177.0	183.9	227.8	257.1	302.3	2,181.6
1973	273.2	165.4	131.1	124.3	129.7	102.2	164.6	179.9	206.9	178.1	185.5	192.1	2,033.0
1974	198.5	170.5	151.9	147.7	128.7	157.8	188.8	182.6	179.6	177.8	195.2	235.1	2,114.2
1975	270.6	164.6	129.8	161.7	113.5	151.4	176.4	183.8	174.5	185.5	171.7	204.0	2,087.5
1976	212.2	171.5	177.5	155.6	156.1	139.4	180.5	159.8	163.8	170.6	181.3	237.3	2,105.6
1977	192.6	214.7	212.6	155.5	170.2	144.1	177.3	168.5	160.0	169.9	150.1	206.3	2,121.8
1978	187.6	161.9	156.3	111.1	125.4	120.2	174.7	176.6	176.3	151.6	181.9	248.6	1,972.2
1979	207,9	169.3	148.6	151.6	134.6	159.9	190.4	200.6	171.7	219.0	234.4	222.5	2,210.5
1980	197.6	158.9	164.3	127.0	131.0	140.4	155.3	139.0	150.6	158.8	162.3	221.2	1,906.4
1981	160.5	-	121.1	114.6	111.2	126.5	124.5	139.7	135.9	152.1	118.0	172.7	-
1982	159.6	169.1	168.6	-	103.4	-	135.0	132.4	116.6	124.6	135.8	209.2	-
1983	226.5	169.3	174.1	157.5	136.9	121.6	128.6	148.8	135.2	114.4	168.7	211.8	1,893.4
1984	172.3	135.4	121.0	125.9	114.9	-	118.9	122.5	131.4	137.8	97.6	-	-

Data Source: MD

Table A-3-13 Monthly Evaporation at Nong Khai

(Unit: mm)

Water Year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual
1971	205.3	160.3	138.9	132.8	104.1	109.8	119.6	119.6	107.4	112.0	135.6	157.6	1,603.0
1972	166.5	187.5	147.4	130.0	118.5	140.1	122.1	113.3	98.2	124.0	138.6	175.5	1,661.7
1973	218.2	177.1	153.6	158.4	116.2	116.8	129.5	123.0	120.4	114.7	126.2	152.1	1,706.2
1974	163.5	148.3	149.1	143.8	108.1	124.3	157.3	141.2	122.0	101.0	138.5	165.1	1,662.2
1975	229.2	158.9	136.6	148.9	120.4	134.3	141.7	119.1	125.2	129.7	124.2	152.6	1,720.8
1976	163.6	134.8	146.3	123.2	110.9	109.3	126.4	116.7	105.3	108.3	129.3	160.2	1,534.3
1977	181.5	170.3	175.1	112.3	116.4	127.3	135.4	130.9	110.4	118.4	104.8	156.0	1,638.8
1978	165.8	140.3	135.2	116.2	102.2	100.3	132.5	115.5	115.7	124.3	123.7	132.7	1,504.4
1979	174.9	148.5	101.7	145.1	96.5	113.3	137.0	132.9	115.1	103.2	118.7	159.7	1,546.6
1980	183.2	181.6	95.0	106.5	100.0	107.3	111.6	108.5	113.8	127.1	136.4	181.4	1,552.4
1981	184.3	-	-	-	-	-	-	99.5	96.2	115.4	115.8	156.9	-
1982	160.1	171.6	138.9	-	95.9	-	118.2	109.7	95.8	92.7	114.0	143.5	-
1983	171.7	-	156.4	-	-	-	-	129.6	108.4	-	-	178.7	-
1984	186.2	-	-	-	-	-	-	109.1	104.9	103.6	103.7	168.3	-

Data Source: MD

A.3.2. Rainfall Analysis

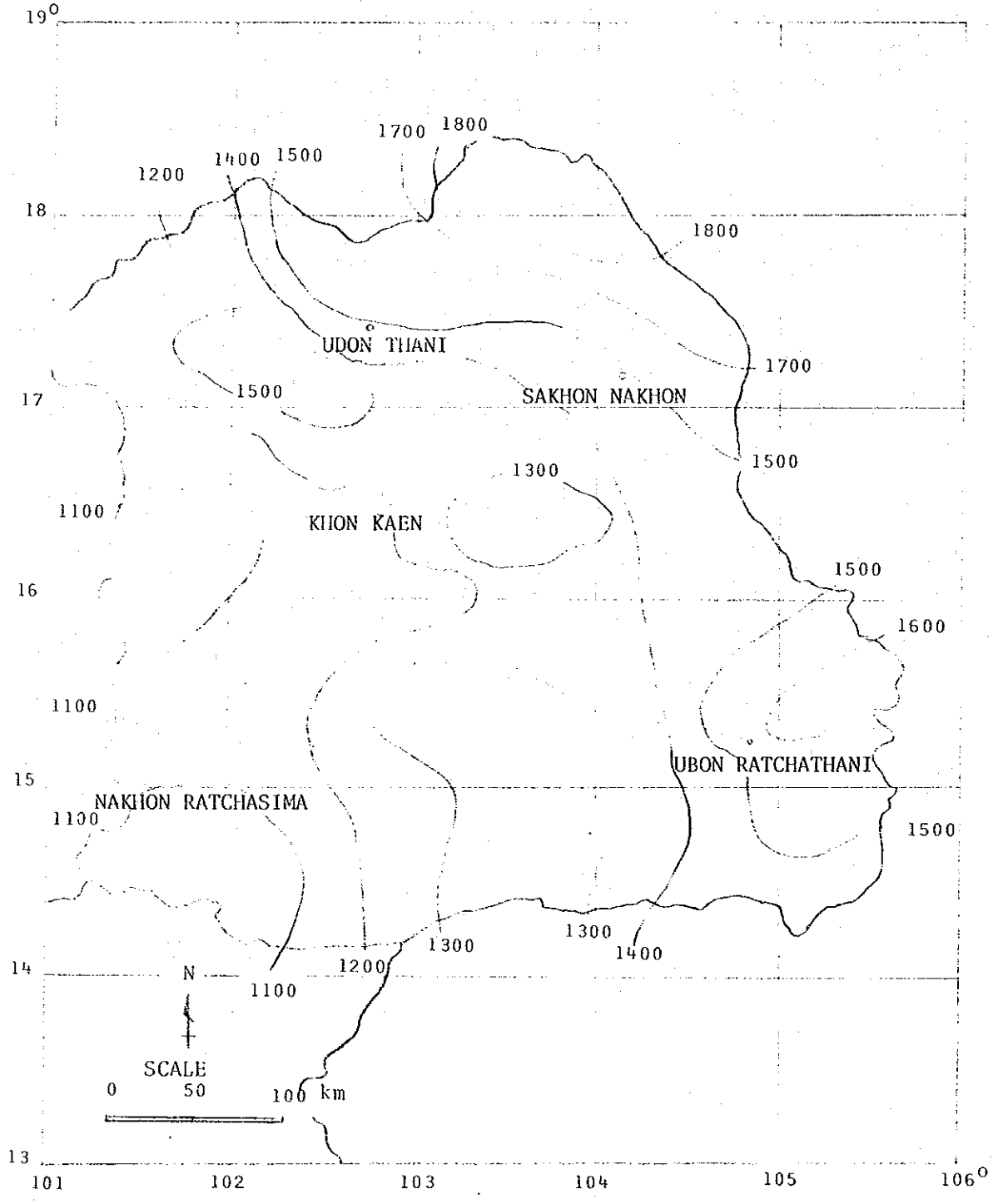


Figure A-3-1 Annual Rainfall and Location of the Meteorological stations

Table A-3-14 Correlation and Regression Coefficient & Monthly Rainfall

***** The Correlation Coef. & Regression Line of Monthly Rainfall on The Water Works Project in Thailand *****

1963 - 1984

Station → X		(1)	(2)	(3)	(4)
(1)	R	1.000	0.553	0.510	0.539
	A	1.000	0.318	0.322	0.319
	B	0.0	55.559	57.879	56.312
(2)	R	0.553	1.000	0.739	0.777
	A	0.960	1.000	0.805	0.810
	B	65.263	0.0	41.572	33.758
(3)	R	0.510	0.739	1.000	0.849
	A	0.808	0.678	1.000	0.810
	B	67.524	43.271	0.0	22.497
(4)	R	0.539	0.777	0.849	1.000
	A	0.910	0.745	0.890	1.000
	B	66.224	42.221	25.203	0.0

Y / X R : Correlation Coeficient
Regression Line: Y = A*X+B

The above-mentioned figures are obtained from the least square method which X(n) are plotted on the X Axis and Y(n) are plotted on the Y axis.
(Refer to Figure A-3-2, A-3-3, A-3-4 and A-3-5)

Note: (1) Data on the monthly rainfall at Nakhon Ratchasima (Refer to Table A-3-6)

(2) Data on the monthly rainfall at Ubon Ratchathani (Refer to Table A-3-7)

(3) Data on the monthly rainfall at Sakon Nakhon (Refer to Tabel A-3-8)

(4) Data on the monthly rainfall at Nong Khai (Refer to Table A-3-9)

Table A-3-15 Probability Analysis of Annual Rainfall at Nakhon Ratchasima (1)

NAKHON RATCHASIMA
ANNUAL RAINFALL

		X	LOG-X	Y=X-B	LOG-Y	(LOG-Y)**2	(%)	(%)	X**2	R.P.
1	1978	691.50	2.83979	691.500	2.83979	8.06442	95.65	97.73	478172.250	148.5
2	1979	724.40	2.85998	724.400	2.85998	8.17948	91.30	93.18	524755.250	72.0
3	1967	917.40	2.96256	917.400	2.96256	8.77675	86.96	88.64	841622.625	4.9
4	1976	918.00	2.96284	918.000	2.96284	8.77844	82.61	84.09	842724.000	4.9
5	1977	935.90	2.97123	935.900	2.97123	8.82820	78.26	79.55	875908.687	4.2
6	1981	944.70	2.97529	944.700	2.97529	8.85238	73.91	75.00	892458.000	3.9
7	1982	1011.50	3.00497	1011.500	3.00497	9.02962	69.57	70.45	1023132.25	2.6
8	1970	1025.40	3.01089	1025.400	3.01089	9.06546	65.22	65.91	1051445.00	2.4
9	1971	1038.80	3.01653	1038.800	3.01653	9.09946	60.87	61.36	1079106.00	2.2
10	1968	1069.50	3.02918	1069.500	3.02918	9.17593	56.52	56.82	1143830.00	*******
11	1965	1072.80	3.03052	1072.800	3.03052	9.18406	52.17	52.27	1150900.00	*******
12	1975	1103.30	3.04269	1103.300	3.04269	9.25799	47.83	47.73	1217271.00	*******
13	1969	1112.20	3.04618	1112.200	3.04618	9.27923	43.48	43.18	1236989.00	*******
14	1973	1126.20	3.05162	1126.200	3.05162	9.31236	39.13	38.64	1268326.00	*******
15	1974	1152.90	3.06179	1152.900	3.06179	9.37457	34.78	34.09	1329178.00	*******
16	1984	1153.60	3.06206	1153.600	3.06206	9.37618	30.43	29.55	1330793.00	*******
17	1966	1198.40	3.07860	1198.400	3.07860	9.47779	26.09	25.00	1436162.00	*******
18	1972	1201.60	3.07976	1201.600	3.07976	9.48492	21.74	20.45	1443843.00	*******
19	1983	1248.90	3.09653	1248.900	3.09653	9.58849	17.39	15.91	1559751.00	*******
20	1963	1265.20	3.10216	1265.200	3.10216	9.62339	13.04	11.36	1600731.00	*******
21	1980	1278.70	3.10677	1278.700	3.10677	9.65201	8.70	6.82	1635073.00	*******
22	1964	1382.20	3.14057	1382.200	3.14057	9.86318	4.35	2.27	1910477.00	*******
		23575.07	66.53241		66.53241	201.32439			25872608.0	
(1/N)		1071.50	3.02420		3.02420	9.15111			1176027.00	

Table A-3-16 Probability Analysis of Annual Rainfall at Nakhon Ratchasima (2)

NAKHON RATCHASIMA

ORDER	XI	XS	XI*XS	XI+XS	XI*XS-X0**2	2X0-(XI+XS)	BI
1	691.500	1382.200	955791.250	2073.700	-162102.750	40.911	-3962.337
2	724.400	1278.700	926290.062	2003.100	-191603.937	111.511	-1718.251
							-5680.586
						B=	0.0

******* ANNUAL RAINFALL

R	MM/ANNUAL	R	MM/ANNUAL
2	1057.305	3	981.868
4	941.569	5	914.899
6	894.947	7	880.083
8	867.613	9	857.131
10	848.260	11	840.461
12	833.563	13	827.447
14	821.892	15	816.853
16	812.220	17	807.947
18	804.067	19	800.323
20	796.926	21	793.677
22	790.654	23	787.834
24	785.081	25	782.527
26	780.077	27	777.616
28	775.539	29	773.432
30	771.440	35	762.380
40	754.874	50	742.860
60	733.404	70	725.708
80	719.244	90	713.687
100	708.813	150	690.966
200	679.044	300	663.235
400	652.584	500	644.700
700	633.145	1000	621.614

Note: R ... Return period

Table A-3-17 Probability Analysis of Annual Rainfall at Ubon Ratchathani (1)

UBON RATCHATHANI
ANNUAL RAINFALL

		X	LOG-X	Y=X+C	LOG-Y	(LOG-Y)**2	(%)	(%)	X**2	R.P.
1	1967	1296.00	3.11261	358.265	2.55420	6.52396	95.65	97.73	1679616.00	20.3
2	1977	1298.30	3.11354	361.065	2.55759	6.54124	91.30	93.18	1686681.00	19.4
3	1981	1304.90	3.11558	367.165	2.56486	6.57851	86.96	88.64	1702764.00	17.7
4	1965	1374.40	3.13811	436.665	2.64015	6.97036	82.61	84.09	1888975.00	7.5
5	1973	1416.70	3.15134	479.165	2.68048	7.18500	78.26	79.55	2007605.00	5.1
6	1963	1476.30	3.16932	539.065	2.73164	7.46186	73.91	75.00	2180938.00	3.4
7	1966	1484.20	3.17149	546.965	2.73756	7.49425	69.57	70.45	2202850.00	3.2
8	1976	1494.70	3.17459	557.465	2.74583	7.53957	65.22	65.91	2234128.00	3.0
9	1971	1505.90	3.17780	568.665	2.75447	7.58713	60.87	61.36	2267735.00	2.9
10	1964	1584.20	3.19981	646.965	2.81054	7.89916	56.52	56.82	2509690.00	2.1
11	1969	1606.50	3.20586	669.265	2.82527	7.98217	52.17	52.27	2580842.00	*******
12	1975	1613.00	3.20763	675.765	2.82947	8.00593	47.83	47.73	2601769.00	*******
13	1983	1668.70	3.22238	730.965	2.86390	8.20190	43.48	43.18	2784560.00	*******
14	1982	1672.00	3.22324	734.265	2.86585	8.21311	39.13	38.64	2795584.00	*******
15	1979	1713.00	3.23376	775.265	2.88945	8.34892	34.78	34.09	2934369.00	*******
16	1974	1739.20	3.24035	801.465	2.90388	8.43255	30.43	29.55	3024817.00	*******
17	1980	1749.90	3.24301	812.165	2.90964	8.46603	26.09	25.00	3062150.00	*******
18	1970	1763.40	3.24635	825.665	2.91680	8.50774	21.74	20.45	3109579.00	*******
19	1972	1788.00	3.25237	850.265	2.92995	8.58229	17.39	15.91	3196944.00	*******
20	1978	1925.90	3.28463	988.165	2.99483	8.96900	13.04	11.36	3709090.00	*******
21	1966	2169.90	3.33644	1232.165	3.09067	9.55223	8.70	6.82	4708465.00	*******
22	1984	2263.60	3.35480	1325.865	3.12250	9.75000	4.35	2.27	5123665.00	*******
		35904.68	70.57480		61.91908	174.79279			59993168.0	
(1/N)		1632.27	3.20795		2.81450	7.94513			2726962.00	

Table A-3-18 Probability Analysis of Annual Rainfall at Ubon Ratchathani (2)

UBON RATCHATHANI

****

ORDER	XI	XS	XI*XS	XI+XS	XI*XS-X0**2	2X0-(XI+XS)	BI
1	1296.000	2263.600	**********	3559.600	328099.000	-331.271	-990.423
2	1298.800	2169.900	**********	3468.700	212740.000	-240.371	-885.047

-1875.470

B= -937.735

******* ANNUAL RAINFALL

R	MM/ANNUAL	R	MM/ANNUAL
2	1590.120	3	1495.761
4	1448.523	5	1418.467
6	1396.609	7	1380.671
8	1367.531	9	1356.645
10	1347.547	11	1339.634
12	1332.724	13	1326.612
14	1321.125	15	1316.179
16	1311.663	17	1307.523
18	1303.786	19	1300.196
20	1296.958	21	1293.875
22	1291.018	23	1288.363
24	1285.782	25	1283.398
26	1281.117	27	1278.835
28	1276.915	29	1274.972
30	1273.143	35	1264.883
40	1258.123	50	1247.455
60	1239.193	70	1232.554
80	1227.040	90	1222.344
100	1218.256	150	1203.557
200	1193.969	300	1181.542
400	1173.352	500	1167.384
700	1158.783	1000	1150.374

Note: R ... Return period

Table A-3-19 Probability Analysis of Annual Rainfall at Sakhon Nakhon (1)

SAKON NAKHON
ANNUAL RAINFALL

		X	LOG-X	Y=X+B	LOG-Y	(LOG-Y)**2	(%)	(%)	X**2	R.P.
1	1976	1113.50	3.04669	2115.010	3.32531	11.05770	95.65	97.73	1239882.00	31.0
2	1977	1196.20	3.07780	2197.710	3.34197	11.16877	91.30	93.18	1430894.00	14.0
3	1966	1267.90	3.10308	2269.410	3.35591	11.26215	86.96	88.64	1607570.00	8.0
4	1968	1325.80	3.12248	2327.310	3.36685	11.33571	82.61	84.09	1757746.00	5.4
5	1972	1345.20	3.12875	2346.610	3.37044	11.35987	78.26	79.55	1809294.00	4.8
6	1967	1363.00	3.13450	2364.510	3.37374	11.38213	73.91	75.00	1857769.00	4.4
7	1983	1380.10	3.13991	2381.610	3.37687	11.40326	69.57	70.45	1904676.00	4.0
8	1969	1435.60	3.15703	2437.110	3.38688	11.47092	65.22	65.91	2060948.00	3.0
9	1973	1448.50	3.16092	2450.010	3.38917	11.48646	60.87	61.36	2098152.00	2.9
10	1963	1481.20	3.17061	2482.710	3.39493	11.52552	56.52	56.82	2193953.00	2.6
11	1964	1491.60	3.17365	2493.110	3.39674	11.53786	52.17	52.27	2224871.00	2.5
12	1965	1493.90	3.17432	2495.410	3.39714	11.54057	47.83	47.73	2231737.00	2.5
13	1979	1550.60	3.19050	2552.110	3.40690	11.60696	43.48	43.18	2404361.00	*******
14	1975	1670.00	3.22272	2671.510	3.42676	11.74206	39.13	38.64	2788900.00	*******
15	1978	1675.50	3.22414	2677.010	3.42765	11.74879	34.78	34.09	2807301.00	*******
16	1980	1723.50	3.23641	2725.010	3.43537	11.80176	30.43	29.55	2970453.00	*******
17	1984	1757.40	3.24487	2758.910	3.44074	11.83868	26.09	25.00	3088455.00	*******
18	1982	1767.60	3.24738	2769.110	3.44234	11.84970	21.74	20.45	3124410.00	*******
19	1981	1880.70	3.27432	2882.210	3.45973	11.96970	17.39	15.91	3537033.00	*******
20	1970	1918.60	3.28303	2920.310	3.46543	12.00920	13.04	11.36	3681794.00	*******
21	1974	1966.90	3.29378	2968.410	3.47252	12.05842	8.70	6.82	3868695.00	*******
22	1971	2023.00	3.30600	3024.510	3.48065	12.11496	4.35	2.27	4092529.00	*******
		34276.37	70.11276		74.93391	255.27156			54781344.0	
(1/N)		1559.02	3.18694		3.40609	11.60325			2490061.00	

Table A-3-20 Probability Analysis of Annual Rainfall at Sakhon Nakhon (2)

SAKON NAKHON

ORDER	XI	XS	XI*XS	XI+XS	XI*XS-X0**2	2X0-(XI+XS)	BI
1	1113.500	2023.000	**********	3136.500	-112689.000	-60.594	1859.731
2	1196.200	1966.900	**********	3163.100	-12494.000	-87.194	143.290

2003.021
B= 1001.510

******* ANNUAL RAINFALL

R	MM/ANNUAL	R	MM/ANNUAL
2	1545.830	3	1437.763
4	1378.623	5	1338.906
6	1308.881	7	1286.334
8	1267.293	9	1251.203
10	1237.518	11	1225.436
12	1214.747	13	1205.175
14	1196.490	15	1188.588
16	1181.305	17	1174.576
18	1168.449	19	1162.524
20	1157.142	21	1151.981
22	1147.178	23	1142.686
24	1138.292	25	1134.213
26	1130.296	27	1126.353
28	1123.024	29	1119.640
30	1116.442	35	1101.838
40	1089.669	50	1070.132
60	1054.645	70	1041.984
80	1031.305	90	1022.094
100	1013.986	150	984.111
200	963.973	300	937.046
400	918.756	500	905.134
700	885.047	1000	864.853

Note: R ... Return period

Table A-3-21 Probability Analysis of Annual Rainfall at Nong Khai (1)

NONG KHAI
ANNUAL RAINFALL

		X	LOG-X	Y=X+B	LOG-Y	(LOG-Y)**2	(%)	(%)	X**2	R.P.
1	1977	1144.50	3.05862	2867.010	3.45743	11.95381	95.65	97.73	1309880.00	29.8
2	1979	1152.40	3.06160	2874.910	3.45862	11.96206	91.30	93.18	1328026.00	27.6
3	1973	1291.70	3.11116	3014.210	3.47917	12.10465	86.96	88.64	1668489.00	8.9
4	1974	1329.90	3.12382	3052.410	3.48464	12.14274	82.61	84.09	1768634.00	6.9
5	1972	1381.70	3.14041	3104.210	3.49195	12.19372	78.26	79.55	1909095.00	5.1
6	1983	1440.30	3.15845	3162.810	3.50007	12.25031	73.91	75.00	2074464.00	3.8
7	1976	1480.90	3.17053	3203.410	3.50561	12.28932	69.57	70.45	2193065.00	3.1
8	1969	1528.40	3.18418	3250.710	3.51198	12.33399	65.22	65.91	2335395.00	2.7
9	1966	1558.80	3.19279	3281.310	3.51605	12.36259	60.87	61.36	2429858.00	2.4
10	1965	1562.60	3.19937	3305.110	3.51919	12.38467	56.52	56.82	2504623.00	2.2
11	1967	1615.60	3.20839	3338.310	3.52353	12.41524	52.17	52.27	2610810.00	*******
12	1964	1635.60	3.21373	3358.310	3.52612	12.43353	47.83	47.73	2675842.00	*******
13	1982	1651.20	3.21780	3373.710	3.52811	12.44754	43.48	43.18	2726462.00	*******
14	1968	1655.00	3.21880	3377.510	3.52860	12.45100	39.13	38.64	2739025.00	*******
15	1963	1657.80	3.21953	3380.310	3.52896	12.45353	34.78	34.09	2748301.00	*******
16	1984	1770.70	3.24815	3493.210	3.54322	12.55444	30.43	29.55	3135379.00	*******
17	1978	1807.90	3.25708	3530.010	3.54778	12.58672	26.09	25.00	3267057.00	*******
18	1981	1808.50	3.25732	3531.010	3.54790	12.58759	21.74	20.45	3270672.00	*******
19	1971	1824.20	3.26107	3546.710	3.54983	12.60126	17.39	15.91	3327706.00	*******
20	1980	1968.70	3.29418	3691.210	3.56717	12.72470	13.04	11.36	3875780.00	*******
21	1970	2103.90	3.32302	3826.410	3.58279	12.83639	8.70	6.82	4426395.00	*******
22	1975	2105.00	3.32325	3827.510	3.58292	12.83729	4.35	2.27	4431025.00	*******
		35495.07	70.44312		77.48151	272.90698			58755888.0	
(1/N)		1613.41	3.20196		3.52189	12.40486			2670722.00	

Table A-3-22 Probability Analysis of Annual Rainfall at Nong Khai (2)

NONG KHAI

ORDER	XI	XS	XI*XS	XI+XS	XI*XS-X0**2	2X0-(XI+XS)	BI
1	1144.500	2105.000	**********	3249.500	-125484.000	-65.379	1919.334
2	1152.400	2103.900	**********	3256.300	-110122.000	-72.179	1525.685

3445.020
B= 1722.510

******* ANNUAL RAINFALL

R	MM/ANNUAL	R	MM/ANNUAL
2	1603.212	3	1489.140
4	1426.304	5	1383.929
6	1351.803	7	1327.623
8	1307.169	9	1289.862
10	1275.120	11	1262.089
12	1250.550	13	1240.207
14	1230.915	15	1222.267
16	1214.382	17	1207.084
18	1200.446	19	1194.015
20	1188.174	21	1182.574
22	1177.354	23	1172.467
24	1167.697	25	1163.258
26	1158.996	27	1154.709
28	1151.079	29	1147.396
30	1143.913	35	1127.988
40	1114.724	50	1093.342
60	1076.383	70	1062.496
80	1050.773	90	1040.652
100	1031.734	150	998.819
200	976.579	300	946.766
400	926.469	500	911.331
700	888.968	1000	866.437

Note: R ... Return period

Figure A-3-2 Regression Line of Monthly Rainfall (1)

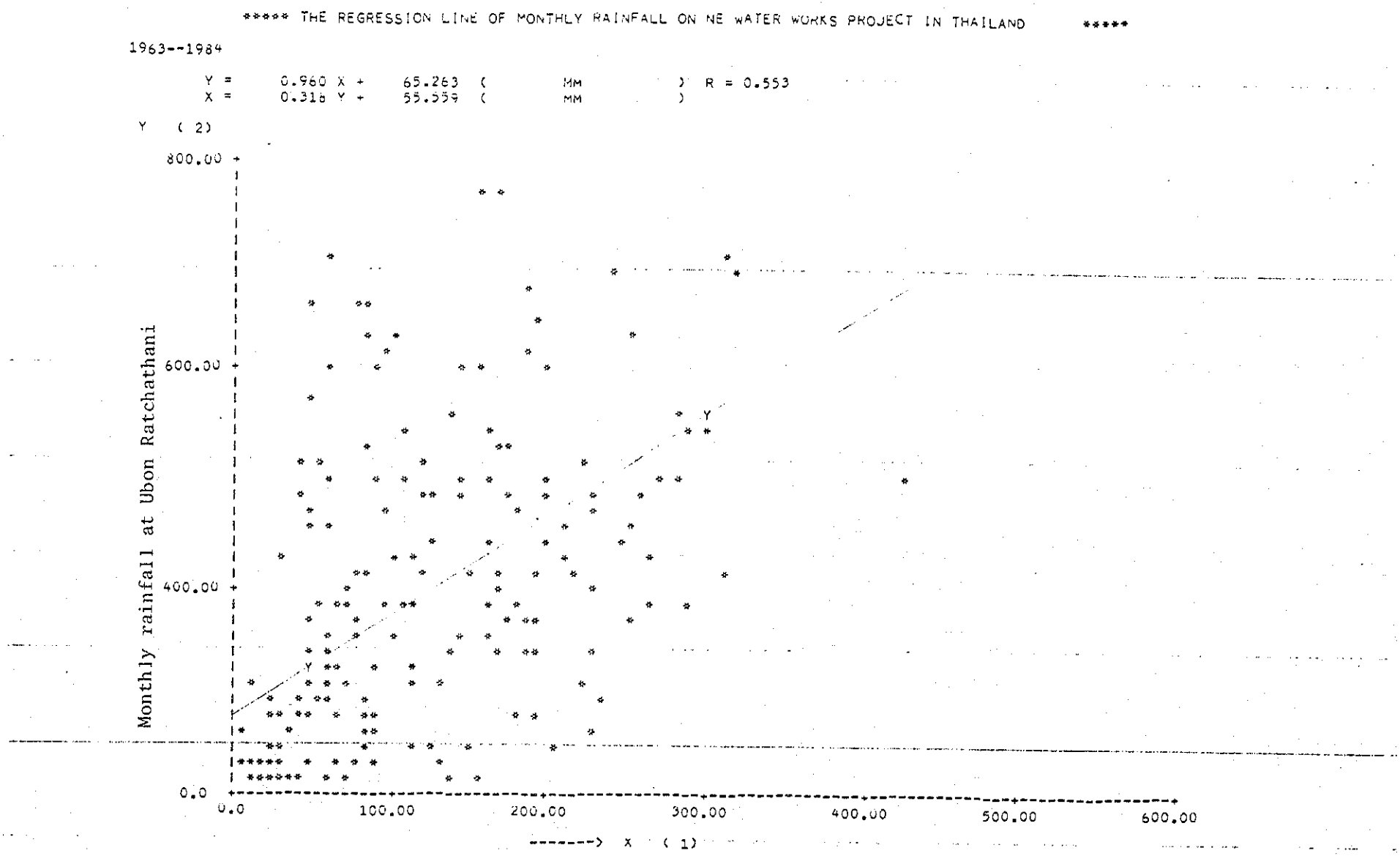


Figure A-3-3 Regression Line of Monthly Rainfall (2)

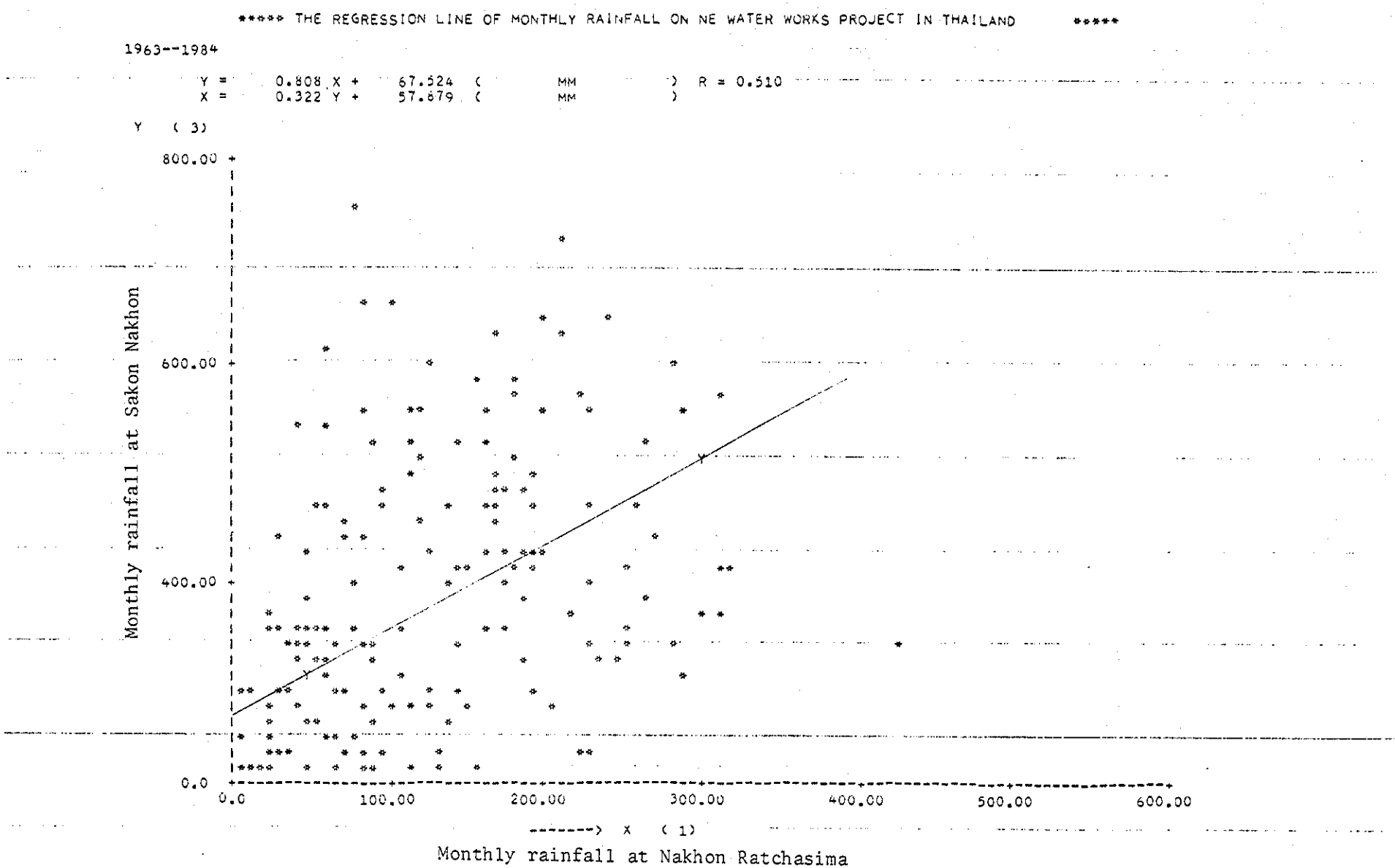


Figure A-3-4 Regression Line of Monthly Rainfall (3)

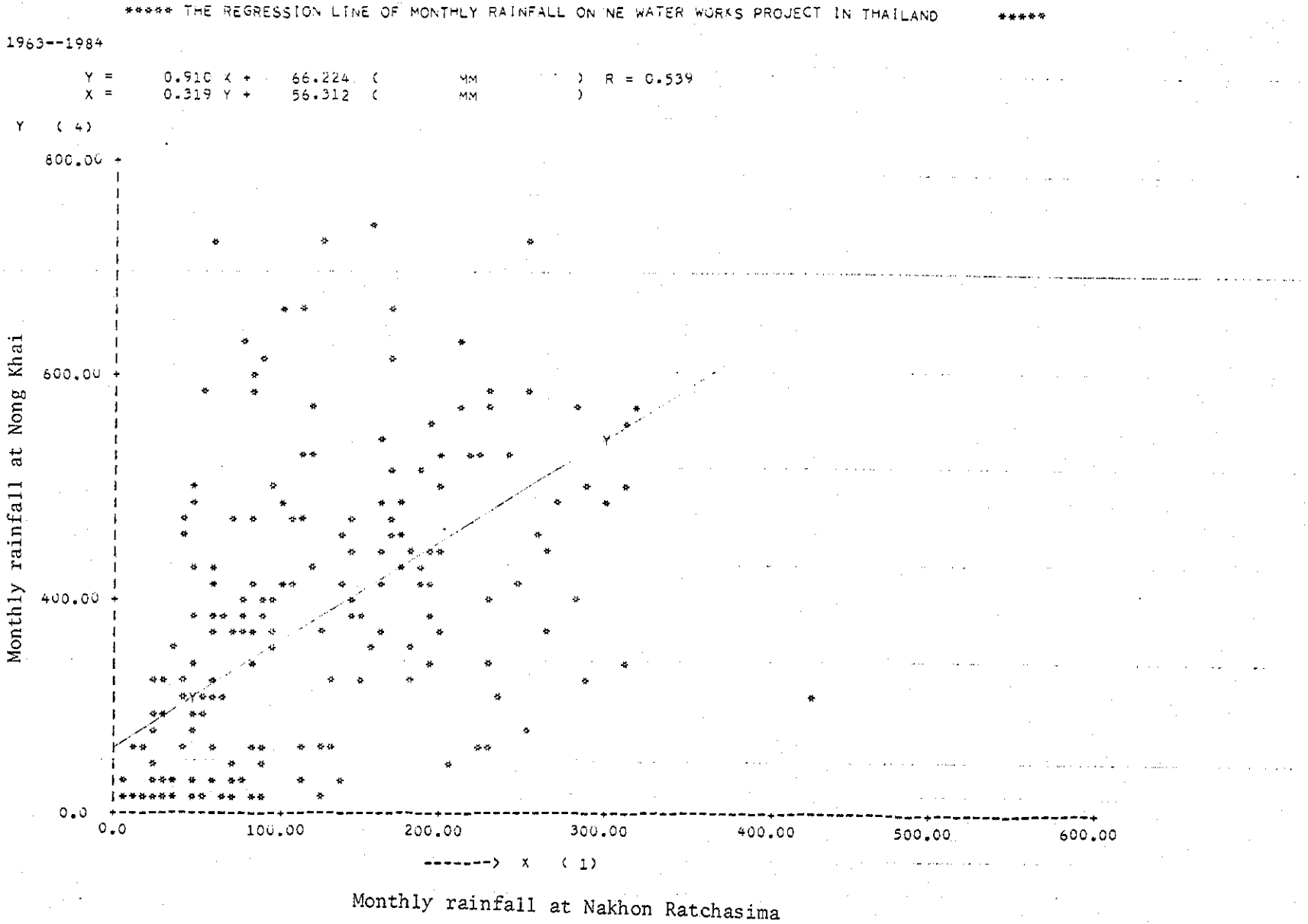


Figure A-3-5 Regression Line of Monthly Rainfall (4)

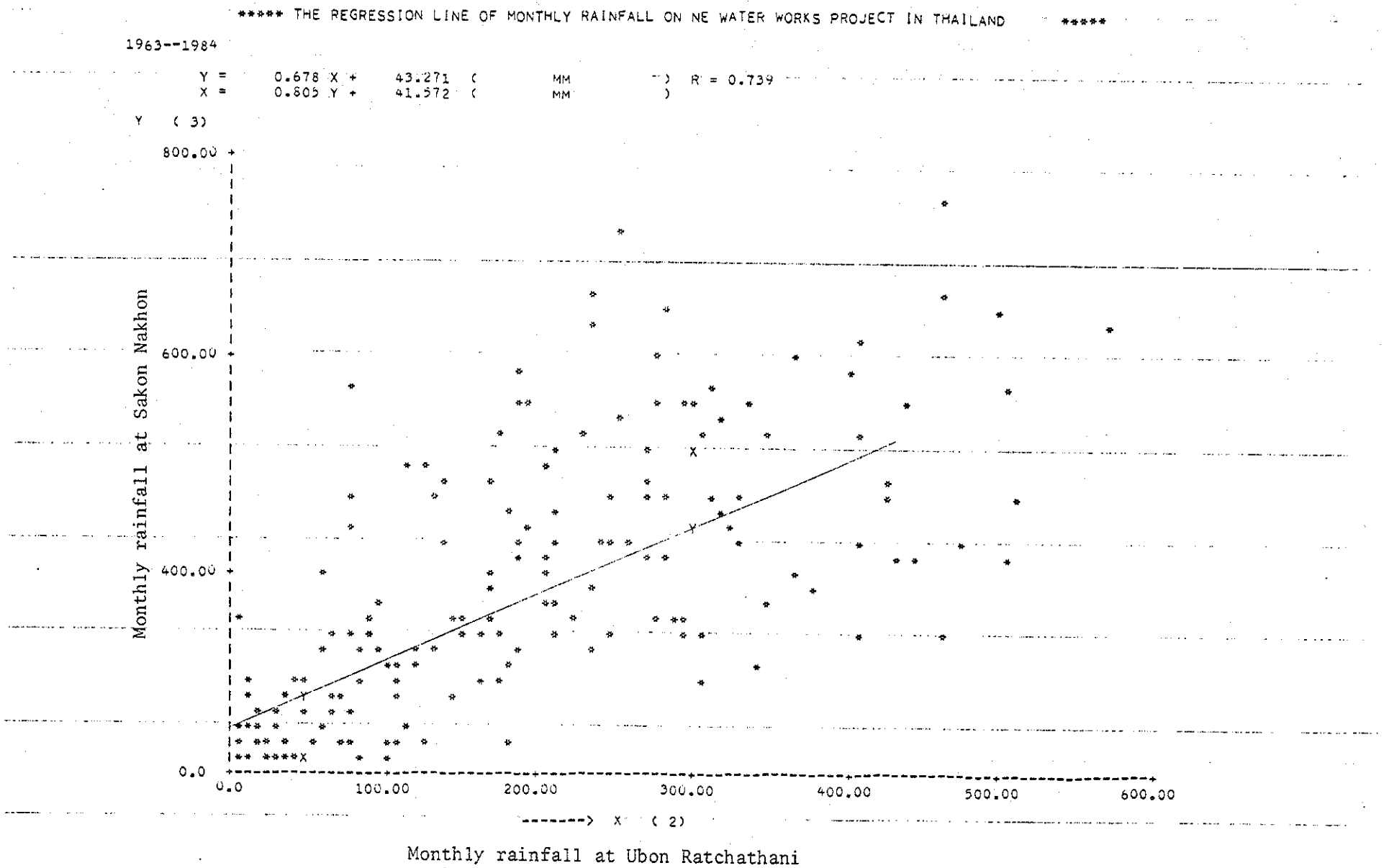


Figure A-3-6 Regression Line of Monthly Rainfall (5)

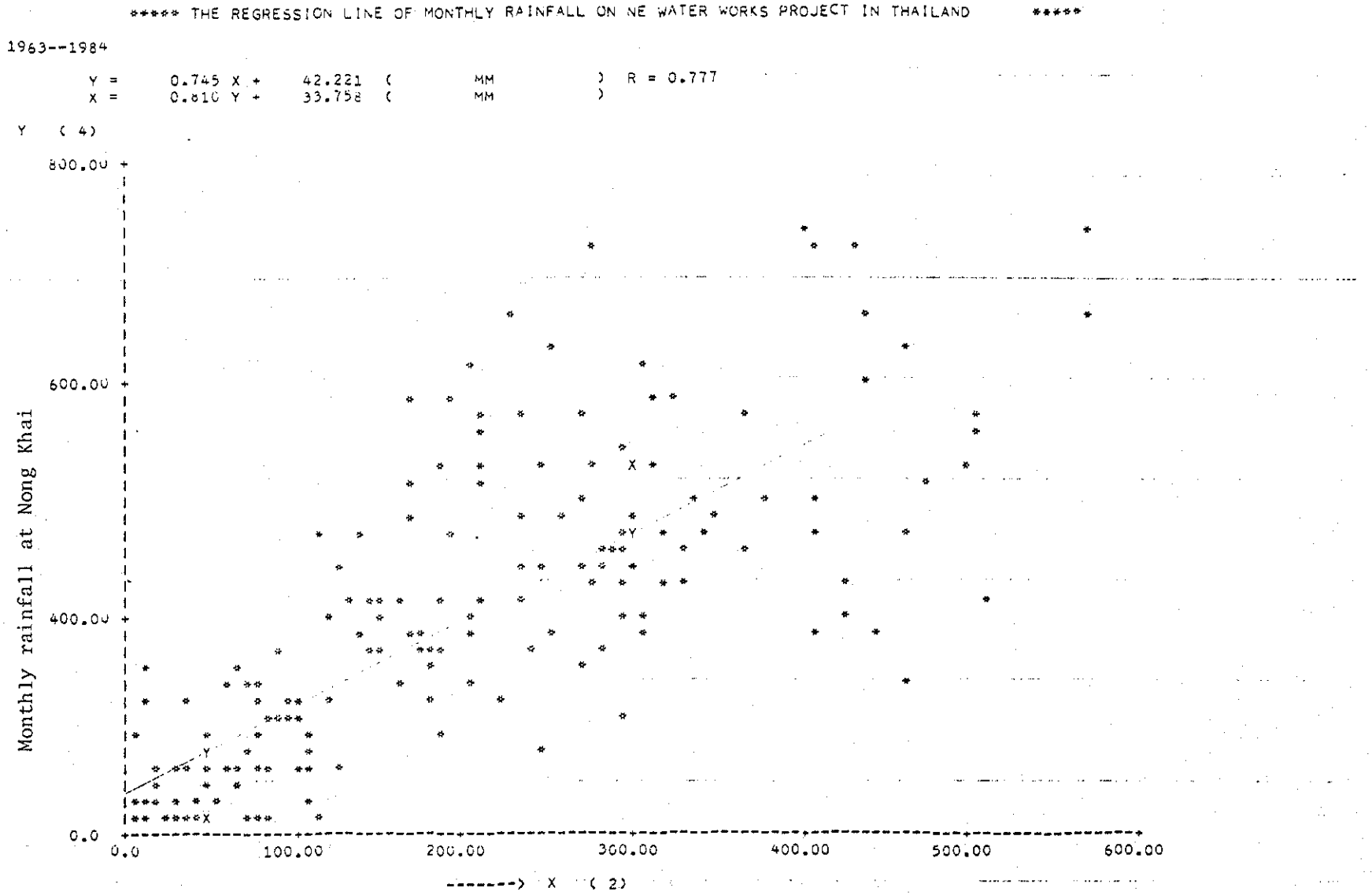


Figure A-3-7 Regression Line of Monthly Rainfall (6)

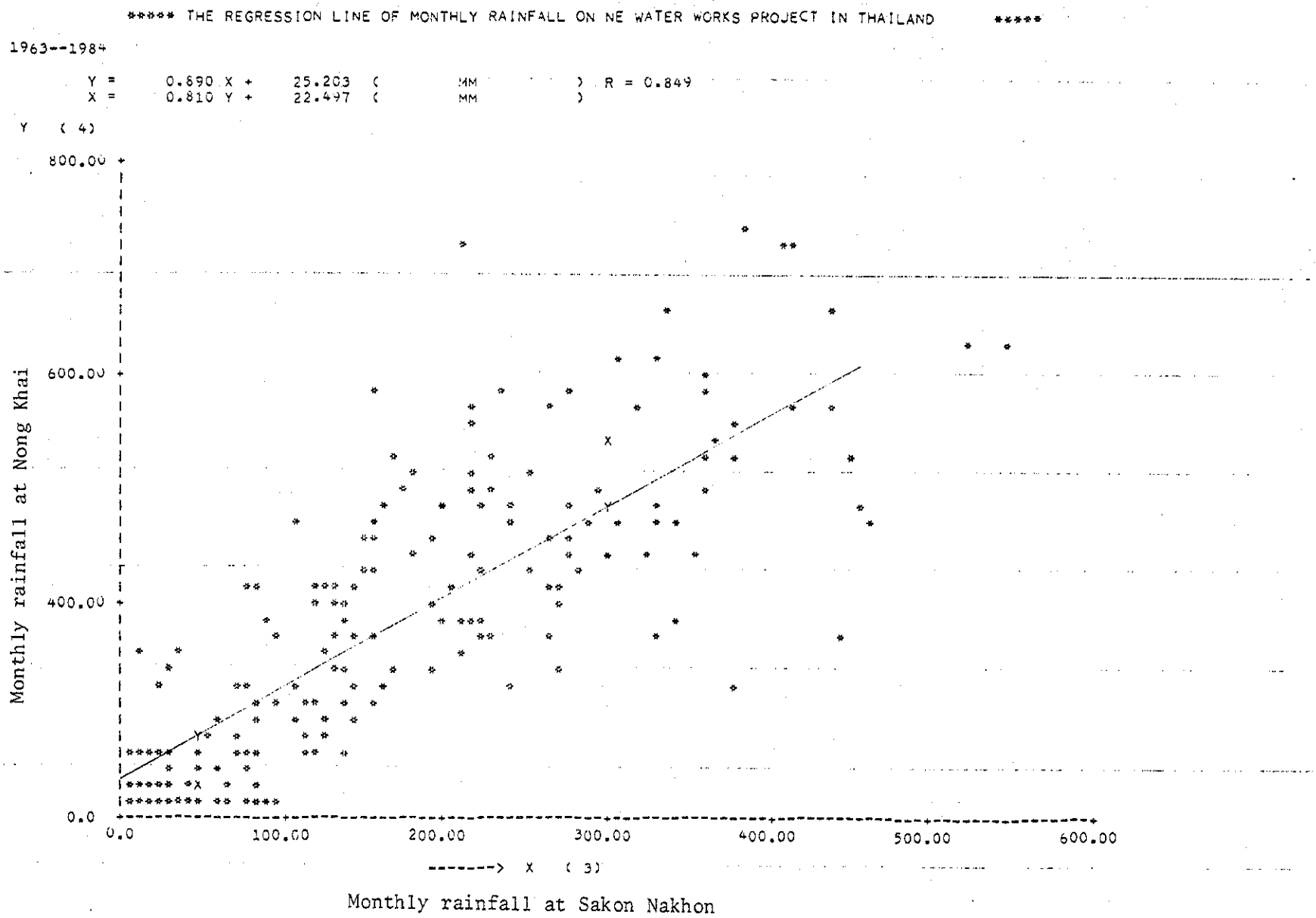


Table A-3-23 Estimated Monthly and Annual Inflow into Bun Chiwuk Reservoir

CA=1.0 sq.km (Unit: 1,000cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	8.2	0	0	0	0.1	-
1964	0.5	122.6	4.1	29.6	28.9	78.5	60.3	0.3	0	0	8.8	0.1	333.7
1965	8.6	44.9	1.3	7.2	42.9	74.8	4.6	0	0	0	2.5	2.7	189.5
1966	3.1	118.3	1.8	41.8	26.8	97.9	16.1	0	0	0	0	0	305.8
1967	9.0	37.1	19.8	7.1	12.6	37.7	3.0	3.5	0	0	0	0	129.9
1968	6.8	34.9	23.6	22.2	34.4	69.2	0.6	0	0	0	0	1.1	193.1
1969	0	23.8	58.5	6.5	2.8	108.6	46.5	0	0	0	0	1.8	248.4
1970	1.4	39.9	16.1	8.4	27.6	62.4	7.7	0	0.5	0	0	1.8	165.7
1971	7.4	13.4	52.0	8.4	15.8	81.5	3.2	0	0	0	0	5.0	186.6
1972	24.0	0.4	39.3	1.8	2.5	222.6	42.5	2.9	0	0	0	0.4	336.3
1973	17.6	5.9	29.4	23.4	1.5	86.0	5.6	0	0	0	2.2	21.0	192.5
1974	1.8	37.6	5.0	12.7	10.7	74.9	60.3	12.9	0	0	0	0	215.9
1975	0	41.9	15.5	45.7	3.2	60.8	18.0	1.9	0	0	0.3	3.2	190.4
1976	0	10.6	1.1	17.1	21.6	54.8	65.4	0	0	0	0	0	170.7
1977	6.9	5.4	3.5	3.7	100.3	39.5	6.6	0	0	0	1.3	0.2	167.4
1978	0.3	12.8	3.1	7.2	5.2	45.7	7.6	0.3	0	0	0	0	82.2
1979	1.9	9.9	7.1	2.6	3.2	61.6	1.6	0	0	0	0	6.4	94.2
1980	0.3	44.3	74.6	28.9	31.0	95.6	13.8	0	0	0	1.5	0	290.0
1981	1.2	33.1	0.9	30.9	3.0	38.6	6.5	18.9	0	0	0.8	0	133.8
1982	0.9	1.6	33.5	30.9	29.2	116.0	2.1	0	0	0	0	0	214.1
1983	0.1	1.6	9.2	43.1	51.6	96.1	116.8	2.2	0	0	0	0	320.7
1984	2.3	70.3	5.9	12.9	31.7	31.2	22.5	0	0	4.9	3.3	0	185.2
Mean	4.5	33.8	19.3	18.7	23.2	77.8	24.3	2.3	0	0.2	0.9	2.0	206.9

Table A-3-24 Estimated Monthly and Annual Inflow into Phai Luang Reservoir

CA=1.0 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	97.9	0	0	0	1.3	-
1964	6.0	1,470.7	49.8	355.8	346.4	941.7	724.2	3.2	0	0	105.8	1.3	4,004.9
1965	103.2	538.6	15.6	87.0	514.4	897.7	55.5	0	0	0	29.5	32.6	2,274.1
1966	37.2	1,419.4	21.6	501.5	322.1	1,174.8	193.1	0	0	0	0	0	3,669.7
1967	108.2	445.4	237.6	85.3	151.0	452.3	36.4	42.5	0	0	0	0	1,558.7
1968	82.1	419.4	283.3	266.7	413.2	830.8	7.5	0	0	0	0	13.7	2,316.7
1969	0.4	285.0	701.4	77.6	33.2	1,303.2	558.5	0	0	0	0	21.7	2,981.1
1970	16.6	478.7	193.1	100.7	331.2	749.3	92.0	0	5.7	0	0	21.2	1,988.5
1971	88.6	160.4	624.2	100.7	189.3	978.1	37.8	0	0	0	0	59.6	2,238.7
1972	288.0	4.2	472.2	21.5	29.5	2,671.2	509.9	35.2	0	0	0	4.6	4,036.2
1973	211.0	71.0	353.0	280.8	17.5	1,032.0	66.6	0	0	0	26.3	251.8	2,310.0
1974	21.8	451.2	59.6	151.9	127.9	899.2	723.5	155.1	0	0	0	0.6	2,590.7
1975	0	502.6	186.6	548.5	38.3	729.5	215.7	22.2	0	0	3.6	38.1	2,285.1
1976	0	127.0	13.8	204.8	259.4	657.8	785.3	0	0	0	0	0	2,048.0
1977	82.6	64.6	41.8	44.2	1,203.2	474.4	79.4	0	0	0	16.0	2.6	2,008.8
1978	3.0	154.1	37.6	85.8	62.9	547.9	91.8	3.5	0	0	0	0	986.7
1979	22.2	119.2	84.7	31.3	38.0	739.0	19.0	0	0	0	0	76.7	1,130.2
1980	3.1	532.2	895.4	346.9	372.0	1,146.7	165.2	0.2	0	0	18.2	0	3,480.0
1981	14.6	397.1	10.7	371.1	35.5	463.0	78.5	226.6	0	0	9.0	0.2	1,606.1
1982	10.2	19.4	401.6	370.6	350.1	1,392.2	25.4	0	0	0	0	0	2,569.5
1983	1.6	19.1	110.0	517.3	619.2	1,153.4	1,401.6	26.0	0	0	0	0	3,848.3
1984	27.5	843.1	71.3	155.4	380.8	374.9	270.4	0	0	58.8	39.6	0.1	2,221.8
Mean	53.7	405.8	231.7	224.1	277.9	933.8	292.3	27.8	0.3	2.7	11.3	23.9	2,483.5

Table A-3-25 Estimated Monthly and Annual Inflow into Nong Takai Reservoir

CA=9 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	73.4	0	0	0	1.0	-
1964	4.5	1,103.0	37.3	266.8	259.8	706.3	543.1	2.4	0	0	79.4	1.0	3,003.7
1965	77.4	403.9	11.7	65.2	385.8	673.3	41.6	0	0	0	22.1	24.5	1,705.6
1966	27.9	1,064.5	16.2	376.1	241.6	881.1	144.8	0	0	0	0	0	2,752.3
1967	81.1	334.0	178.2	64.0	113.3	339.2	27.3	31.9	0	0	0	0	1,169.0
1968	61.6	314.5	212.5	200.0	309.9	623.1	5.6	0	0	0	0	10.2	1,737.5
1969	0.3	213.8	526.1	58.2	24.9	977.4	418.9	0	0	0	0	16.3	2,235.8
1970	12.4	359.1	144.8	75.5	248.4	562.0	69.0	0	4.2	0	0	15.9	1,491.4
1971	66.5	120.3	468.1	75.5	142.0	733.6	28.4	0	0	0	0	44.7	1,679.0
1972	216.0	3.2	354.1	16.1	22.1	2,003.4	382.4	26.4	0	0	0	3.4	3,027.1
1073	158.2	53.3	264.7	210.6	13.2	774.0	50.0	0	0	0	19.7	188.8	1,732.5
1974	16.4	338.4	44.7	114.0	95.9	674.4	542.6	116.3	0	0	0	0.4	1,943.0
1975	0	376.9	139.9	411.4	28.7	547.2	161.8	16.7	0	0	2.7	28.6	1,713.8
1976	0	95.2	10.3	153.6	194.5	493.3	589.0	0	0	0	0	0	1,536.0
1977	61.9	48.4	31.4	33.1	902.4	355.8	59.5	0	0	0	12.0	2.0	1,506.6
1978	2.3	115.6	28.2	64.4	47.2	410.9	68.8	2.6	0	0	0	0	740.0
1979	16.7	89.4	63.5	23.5	28.5	554.3	14.3	0	0	0	0	57.5	847.6
1980	2.3	399.1	671.6	260.2	279.0	860.0	123.9	0.1	0	0	13.7	0	2,610.0
1981	10.9	297.8	8.1	278.3	26.6	347.2	58.9	169.9	0	0	6.8	0.1	1,204.6
1982	7.7	14.5	301.2	277.9	262.6	1,044.2	19.0	0	0	0	0	0	1,927.1
1983	1.2	14.3	82.5	388.0	464.4	865.1	1,051.2	19.5	0	0	0	0	2,886.2
1984	20.6	632.3	53.4	116.5	285.6	281.2	202.8	0	0	44.1	29.7	0.1	1,666.4
Mean	40.3	304.4	173.7	168.0	208.4	700.3	219.2	20.9	0.2	2.0	8.5	17.9	1,862.6

Table A-3-26 Estimated Monthly and Annual Inflow into Lam Chamuak Reservoir

CA=180 sq.km (Unit: MCM)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1962	-	-	-	-	-	-	-	3.320	0.830	0.680	0.420	0.350	-
1963	0.300	0.610	1.010	5.680	9.010	6.790	11.320	5.550	1.490	0.680	0.800	0.680	43.920
1964	0.430	1.170	1.050	6.070	9.630	9.310	12.320	5.710	1.350	0.680	0.770	0.630	49.120
1965	0.240	0.530	1.360	2.810	6.650	13.790	10.990	0.520	0.830	0.680	0.770	0.630	39.800
1966	0.540	0.930	1.290	7.030	11.090	4.100	10.380	1.720	0.990	0.680	0.370	0.370	39.490
1967	0.470	0.680	1.240	3.310	4.840	21.790	10.230	2.580	1.450	0.680	0.580	0.480	48.330
1968	0.350	0.610	1.310	5.760	7.350	11.980	10.220	0.400	0.830	0.680	0.370	0.360	40.220
1969	0.180	0.330	1.000	5.380	6.730	17.680	13.800	5.000	0.900	0.680	0.370	0.300	52.350
1970	0.220	0.400	1.050	7.790	10.220	9.390	10.490	0.460	0.770	0.640	0.370	0.340	42.140
1971	0.200	0.450	1.210	4.100	8.990	11.610	11.260	0.460	0.830	0.680	0.370	0.320	40.480
1972	0.440	0.600	1.030	2.430	3.550	29.760	14.540	6.670	1.290	0.680	0.370	0.290	61.650
1973	0.660	0.880	1.460	8.850	9.370	3.970	7.980	0	0.830	0.680	0.370	0.280	35.330
1974	0.480	0.840	1.210	5.250	7.270	8.790	11.140	5.190	1.380	0.680	0.610	0.490	43.330
1975	0.250	0.400	1.190	2.890	3.560	18.060	9.640	0	0.860	0.680	0.370	0.330	38.230
1976	0.490	0.710	1.430	3.310	8.180	6.000	12.560	3.470	0.830	0.680	0.370	0.350	38.380
1977	0.520	0.810	1.350	4.190	9.220	3.820	11.380	2.130	0.780	0.560	0.250	0.340	35.350
1978	0.540	0.720	1.230	7.040	9.200	20.770	10.420	0	0.830	0.680	0.370	0.380	52.180
1979	0.440	0.820	1.250	5.250	7.170	11.090	8.170	0	0.830	0.680	0.370	0.340	36.410
1980	0.530	0.930	1.050	4.900	7.190	14.340	13.980	5.230	0.860	0.680	0.720	0.630	51.040
Mean	0.404	0.690	1.207	5.113	7.734	12.391	11.157	2.548	0.987	0.672	0.473	0.415	43.764

Table A-3-27 Estimated Monthly and Annual Inflow into Tung Kraten Reservoir

CA=35 sq.km (Unit:1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	285.6	0	0	0	3.7	-
1964	17.5	4,289.6	145.2	1,037.7	1,010.4	2,746.6	2,112.1	9.4	0	0	308.6	3.9	11,681.0
1965	301.1	1,570.8	45.5	253.7	1,500.4	2,618.3	161.9	0	0	0	85.9	95.1	6,632.8
1966	108.4	4,139.9	63.0	1,462.6	939.5	3,426.4	563.3	0	0	0	0	0	10,703.2
1967	315.5	1,299.0	693.1	248.9	440.4	1,319.1	106.2	124.0	0	0	0	0	4,546.3
1968	239.5	1,223.1	826.4	777.9	1,205.2	2,423.2	21.8	0	0	0	0	39.8	6,756.9
1969	1.1	831.3	2,045.9	226.3	96.9	3,801.0	1,628.9	0	0	0	0	63.4	8,694.8
1970	48.3	1.396.3	563.3	293.7	966.0	2,185.4	268.4	0	16.5	0	0	62.0	5,799.7
1971	258.6	467.9	1,820.5	293.7	552.1	2,852.8	110.3	0	0	0	0	173.7	6,529.5
1972	840.0	12.3	1,377.2	62.7	85.9	7,791.0	1,487.2	102.6	0	0	0	13.4	11,772.2
1973	615.3	207.2	1,029.5	819.0	51.2	3,010.0	194.3	0	0	0	76.8	734.3	6,737.5
1974	63.7	1,316.0	173.7	443.2	372.9	2,622.6	2,110.1	452.2	0	0	0	1.7	7,556.3
1975	0	1,465.9	544.1	1,599.7	111.6	2,127.8	629.2	64.8	0	0	10.5	111.2	6,664.9
1976	0	370.4	40.1	597.4	756.5	1,918.4	2,290.5	0	0	0	0	0	5,973.3
1977	240.8	188.3	122.0	128.9	3,509.4	1,383.6	231.5	0	0	0	46.7	7.7	5,859.0
1978	8.8	449.5	109.8	250.3	183.6	1,598.0	267.7	10.3	0	0	0	0	2,878.0
1979	64.8	347.6	246.9	91.3	110.7	2,155.5	55.8	0	0	0	0	223.7	3,296.3
1980	9.1	1,552.2	2,611.7	1,011.7	1,085.1	3,344.4	481.9	0.6	0	0	53.1	0	10,149.9
1981	42.5	1,158.2	31.3	1,082.3	103.5	1,350.4	228.9	660.8	0	0	26.3	0.5	4,684.6
1982	29.8	56.4	1,171.3	1,080.9	1,021.3	4,060.6	74.1	0	0	0	0	0	7,494.4
1983	4.7	55.8	320.8	1,508.7	1,806.0	3,364.2	4,087.9	76.0	0	0	0	0	11,224.1
1984	80.3	2,459.0	207.8	453.2	1,110.6	1,093.6	788.7	0	0	171.5	115.4	0.3	6,480.4
Mean	156.7	1,183.7	675.7	653.5	810.4	2,723.5	852.4	81.2	0.8	7.8	32.9	69.7	7,243.6

Table A-3-28 Estimated Monthly and Annual Inflow into Huai Talat Reservoir

CA=153 sq.km (Unit: MCM)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	10.940	1.780	0.460	0.320	0.400	-
1964	0.520	4.420	7.230	2.050	5.070	15.340	10.460	6.000	1.130	0.430	0.330	0.490	53.470
1965	0.190	3.630	8.520	3.930	3.860	19.080	8.940	2.250	0.720	0.460	0.420	0.710	52.710
1966	0.470	10.220	16.090	0.980	11.100	35.430	13.370	7.110	1.290	0.430	0.280	0.240	97.010
1967	0.850	3.770	13.770	10.720	8.260	39.030	11.560	6.160	1.310	0.460	0.270	0.250	96.410
1968	0.310	3.370	18.230	7.610	8.230	44.160	18.880	2.600	0.590	0.460	0.320	0.430	105.190
1969	1.210	3.660	11.420	8.650	3.710	30.260	14.110	6.920	1.260	0.460	0.280	0.270	82.210
1970	0.810	4.220	13.420	12.930	15.380	19.900	6.600	0.930	0.510	0.370	0.280	0.270	75.620
1971	0.700	1.180	16.660	8.250	6.860	28.890	9.450	0.940	0.590	0.460	0.310	0.330	74.620
1972	0.280	0	5.640	7.120	8.360	31.970	14.000	7.550	1.320	0.430	0.260	0.220	77.150
1973	0.460	0.640	2.480	5.930	7.460	9.090	7.000	1.460	0.590	0.460	0.270	0.210	36.050
1974	1.070	0	0	3.790	7.300	15.830	10.130	13.130	2.100	0.390	0.190	0.210	54.140
1975	0.840	4.900	10.620	2.740	5.120	27.570	12.430	2.530	0.690	0.460	0.260	0.230	68.390
1976	0.880	2.630	7.680	11.310	6.760	36.630	17.350	4.320	0.840	0.460	0.260	0.190	89.310
1977	0.550	1.620	3.820	4.760	7.520	25.790	11.000	1.530	0.590	0.460	0.260	0.250	58.150
1978	1.370	1.080	0.790	8.010	11.690	41.700	11.800	1.870	0.720	0.410	0.220	0.180	79.840
1979	1.260	4.350	7.940	7.120	7.780	26.720	7.560	0.530	0.590	0.460	0.260	0.210	64.780
1980	0.180	2.330	10.300	3.900	6.370	28.700	10.690	3.680	0.910	0.460	0.280	0.290	68.090
1981	0.520	0	2.140	12.970	8.650	9.480	4.870	13.150	2.260	0.460	0.260	0.210	54.970
Mean	0.693	2.890	8.708	6.821	7.749	26.976	11.122	4.926	1.042	0.444	0.281	0.294	71.506

Table A-3-29 Estimated Monthly and Annual Inflow into Nong Si Reservior

CA = 32.4 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dev	Jan	Feb	May	Annual
1963	-	-	-	-	-	-	-	117.0	0	0	0	61.3	-
1964	112.1	10,147.1	1,369.1	768.4	2,305.9	3,132.7	98.7	191.8	0	0	0	0	18,125.8
1965	1,126.7	3,041.4	5,623.1	490.8	566.7	1,038.7	0	0	0	0	0	210.7	12,098.1
1966	517.7	17,941.6	2,946.9	7,930.2	6,363.5	1,175.6	54.8	0	0	0	0	0	36,930.3
1967	1,224.0	166.7	590.5	1,635.0	4,666.8	1,291.1	639.5	0.1	0	0	0	0	10,213.8
1968	144.8	1,005.8	3,084.6	832.5	3,239.3	10,015.2	0	0	0	0	0	0	18,322.3
1969	161.4	1,553.0	3,756.5	7,579.5	788.0	4,725.9	56.7	17.0	0	0	0	0	18,637.8
1970	191.2	1,044.0	2,996.2	6,574.9	13,220.3	1,326.8	9.5	0	0	0	0	0	25,363.0
1971	87.3	1,920.8	2,037.8	3,678.8	3,945.1	1,093.8	0	0	0	0	84.9	393.7	13,242.3
1972	26.2	169.4	9,115.9	8,651.6	3,814.6	3,343.0	176.5	0	0	0	0	0	25,297.3
1973	26.9	1,009.7	1,294.1	6,685.2	2,548.7	3,465.3	11.2	0	0	0	0	0	15,041.1
1974	375.8	2,854.0	1,222.6	3,350.2	7,683.5	2,355.5	562.7	30.0	0	0	0	0	18,434.2
1975	11.5	1,630.0	1,693.7	3,477.4	6,624.9	2,777.7	317.3	139.3	0	0	0	0	16,671.9
1976	280.1	754.8	3,300.4	2,241.2	5,295.4	1,658.4	282.2	19.0	0	0	0	0	13,831.5
1977	108.1	762.7	198.2	1,088.4	4,508.2	7,257.7	25.7	0	0	0	0	0.4	13,949.4
1978	1,874.3	434.9	3,338.3	4,146.2	8,450.4	6,691.9	201.1	0	0	0	0	0	25,137.1
1979	390.4	2,030.4	8,575.4	319.5	10,543.8	3,305.1	0	0	0	0	0	0	25,164.7
1980	51.6	2,278.3	7,547.3	4,845.2	687.3	5,218.0	409.4	10.3	0	0	0.4	0	21,047.9
1981	295.6	1,007.1	3,919.3	1,530.4	2,474.6	625.0	256.3	22.6	0	0	0	0	10,130.9
Mean	389.2	2,764.0	3,478.3	3,657.0	4,873.7	3,361.0	172.3	28.8	0	0	4.5	35.1	18,757.7

Table A-3-30 Estimated Monthly and Annual Inflow into Huai Daeng Reservoir

CA = 10.5 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	29.0	0	0	0	0.9	-
1964	182.4	569.9	711.9	248.3	963.7	859.3	429.5	0	0	0	0	2.4	3,967.4
1965	92.4	2,584.2	359.3	160.5	1,113.6	273.7	1.7	0	0	0	38.8	138.4	4,762.7
1966	127.0	562.7	252.7	539.6	1,882.7	126.0	59.8	0	0	0	0	0	3,550.5
1967	7.4	1,844.3	901.6	196.6	122.6	1,915.3	0	0	0	0	0	1.5	4,989.2
1968	4.4	482.0	567.1	188.4	251.3	2,635.6	2.7	0	0	15.6	0	44.8	4,191.9
1969	52.1	572.7	1,807.4	1,671.9	238.4	308.0	59.9	0	0	0	0	0	4,710.4
1970	32.7	398.5	2,153.5	211.7	4,921.4	1,635.7	27.8	0	0	0	89.9	0	9,471.1
1971	159.1	1,445.8	2,499.4	1,358.3	783.5	1,397.4	17.3	0	13.0	0	7.8	67.1	7,748.7
1972	57.2	700.1	584.0	188.1	934.9	211.0	897.4	0	0	0	0	0	3,572.7
1973	83.1	472.3	649.0	1,367.8	619.0	695.7	19.1	0	0	0	0	35.5	3,941.5
1974	133.5	529.3	854.5	279.9	13,367.4	183.6	2.3	0	0	0	0.7	0	15,351.2
1975	0	582.9	1,297.8	1,618.7	2,205.8	886.2	0.9	0	0	0	0	12.7	6,605.1
1976	311.7	59.4	281.9	613.8	448.6	331.9	149.7	0	0	0	0	0	2,197.0
1977	65.0	285.8	68.7	216.1	1,641.4	1,018.2	6.0	0	0	0	0	4.9	3,306.1
1978	241.3	1,192.2	279.5	679.2	3,932.4	640.1	0	0	0	0	0	0	6,964.7
1979	127.8	2,721.4	2,780.3	99.8	879.9	196.6	0	0	0	0	0	0	6,805.9
1980	74.7	627.8	520.2	1,381.7	1,052.1	2,177.4	44.5	0	0	0	0	76.5	5,954.8
1981	152.9	967.4	1,491.5	1,162.5	1,485.2	178.9	202.6	0	0	0	72.9	236.2	5,950.1
1982	218.6	619.6	589.7	791.4	1,706.4	1,841.3	273.7	0	0	0	0	0	6,040.6
1983	24.1	209.0	909.3	67.9	3,532.7	215.4	331.5	0	0	0	0	0	5,289.9
1984	178.9	163.2	435.8	1,655.6	2,483.0	932.0	77.6	3.6	0	0	13.8	56.1	5,999.8
Mean	110.8	837.6	952.1	699.9	2,122.2	888.5	124.0	1.5	0.6	0.7	10.2	30.8	5,779.6

Table A-3-31 Estimated Monthly and Annual Inflow into Nong Loeng Reservoir

CA = 8.4 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	13.0	0	0	2.8	2.6	-
1964	206.4	1,419.0	697.9	402.2	586.1	628.4	176.0	0	0	0	0	0	4,115.9
1965	248.7	240.9	882.8	391.4	587.6	1,621.9	13.7	0	0	0	0	28.3	4,015.2
1966	121.6	894.0	525.9	328.6	3,041.3	123.5	19.5	0	0	0	0	0	5,054.4
1967	198.3	141.6	451.5	432.6	698.4	4,048.1	0	0	0	0	0	0	5,970.5
1968	160.2	856.9	603.5	396.3	632.1	1,144.6	5.4	0	0	6.1	0	122.8	3,927.9
1969	43.1	318.5	1,081.1	1,686.5	263.1	831.4	6.4	0	0	0	0	1.0	4,231.1
1970	61.7	979.8	2,923.7	336.3	3,131.9	1,570.1	0	0	0	0	0	0	9,003.4
1971	17.4	2,243.0	1,476.3	1,865.3	526.9	276.2	17.5	0	0	0	0	3.8	6,426.4
1972	137.6	144.6	992.9	154.1	1,567.6	92.3	174.3	4.3	0	0	0	0	3,267.8
1973	0	308.4	261.4	756.5	831.4	853.8	4.7	0	0	0	0	4.6	3,020.9
1974	40.7	191.9	243.5	711.7	2,223.2	37.3	22.6	0.2	0	0	1.7	0	3,472.9
1975	18.4	1,271.0	1,488.3	606.0	2,812.8	1,384.5	128.4	0	0	0	0.3	1.7	7,711.6
1976	116.3	424.8	658.6	251.4	635.2	1,111.6	88.7	0	0	0	0	2.6	3,289.2
1977	21.5	277.3	97.0	299.0	953.1	470.4	0	0	2.1	0	0.1	0	2,120.5
1978	119.5	763.4	519.2	1,592.5	1,936.4	869.2	0	0	0	0	0.8	0	5,801.2
1979	55.3	776.8	746.2	90.1	410.6	355.7	0	0	0	0	0	0	2,434.7
1980	72.8	1,113.0	2,940.7	803.3	764.6	1,469.8	26.1	0	0	0	0	0	7,190.3
1981	98.7	831.4	753.7	1,885.2	322.2	413.6	237.0	23.9	0	0	0	65.8	4,631.4
1982	28.7	319.6	471.7	1,007.5	1,223.0	1,332.1	102.3	1.1	0	0	0	0	4,486.0
1983	39.4	148.4	389.3	410.2	1,892.5	384.8	169.3	0	0	0	0	17.6	3,451.5
1984	61.4	419.2	344.8	1,100.5	2,184.0	640.5	315.8	0	0	0	0	0	5,066.1
Mean	88.9	670.6	883.3	738.4	1,296.4	936.2	71.8	1.9	0.1	0.3	0.3	11.4	4,699.5

Table A-3-32 Estimated Monthly and Annual Inflow into Nong Song Hong Reservoir

CA = 3.8 sq.km (Unit: 1,000 cu.m)

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Annual
1963	-	-	-	-	-	-	-	5.9	0	0	1.3	1.2	-
1964	93.4	641.9	315.7	181.9	265.1	284.3	79.6	0	0	0	0	0	1,861.9
1965	112.5	109.0	399.4	177.0	265.8	733.7	6.2	0	0	0	0	12.8	1,816.4
1966	55.0	404.4	237.9	148.7	1,375.8	55.9	8.8	0	0	0	0	0	2,286.5
1967	89.7	64.1	204.2	195.7	316.0	1,831.3	0	0	0	0	0	0	2,700.9
1968	72.5	387.6	273.0	179.3	285.9	517.8	2.4	0	0	2.8	0	55.5	1,776.9
1969	19.5	144.1	489.1	762.9	119.0	376.1	2.9	0	0	0	0	0.5	1,914.1
1970	27.9	443.2	1,322.6	152.1	1,416.8	710.3	0	0	0	0	0	0	4,073.0
1971	7.9	1,014.7	667.8	843.8	238.4	125.0	7.9	0	0	0	0	1.7	2,907.2
1972	62.3	65.4	449.2	69.7	709.2	41.8	78.8	1.9	0	0	0	0	1,478.3
1973	0	139.5	118.3	342.2	376.1	386.3	2.1	0	0	0	0	2.1	1,366.6
1974	18.4	86.8	110.1	322.0	1,005.8	16.9	10.2	0.1	0	0	0.8	0	1,571.1
1975	8.3	575.0	673.3	274.2	1,272.5	626.3	58.1	0	0	0	0.1	0.8	3,488.6
1976	52.6	192.2	298.0	113.7	287.4	502.9	40.1	0	0	0	0	1.2	1,488.0
1977	9.7	125.4	43.9	135.2	431.2	212.8	0	0	1.0	0	0	0	959.3
1978	54.1	345.4	234.9	720.4	876.0	393.2	0	0	0	0	0.4	0	2,624.3
1979	25.0	351.4	337.6	40.8	185.8	160.9	0	0	0	0	0	0	1,101.4
1980	32.9	503.5	1,330.3	363.4	345.9	664.9	11.8	0	0	0	0	0	3,252.8
1981	44.6	376.1	340.9	852.8	145.8	187.1	107.2	10.8	0	0	0	29.8	2,095.1
1982	13.0	144.6	213.4	455.8	553.3	602.6	46.3	0.5	0	0	0	0	2,029.4
1983	17.8	67.2	176.1	185.6	856.1	174.1	76.6	0	0	0	0	8.0	1,561.4
1984	27.8	189.6	156.0	497.8	988.0	289.8	142.9	0	0	0	0	0	2,291.8
Mean	40.2	303.4	399.6	334.0	586.5	423.5	32.5	0.9	0	0.1	0.1	5.2	2,126.0

Table A-3-33 Droughty Discharge of Huai Kha Yang River at Intake Point

HUAI KHA YANG
DROUTY DISCHARGE

		X	LOG-X	Y=X+B	LOG-Y	(LOG-Y)**2	(%)	(%)	X**2	R.P.
1	1982	10.10	1.00432	10.100	1.00432	1.00866	88.89	93.75	102.010	43.0
2	1980	13.50	1.13033	13.500	1.13033	1.27765	77.78	81.25	182.250	3.7
3	1979	14.40	1.15836	14.400	1.15836	1.34180	66.67	68.75	207.360	2.7
4	1983	15.60	1.19312	15.600	1.19312	1.42355	55.56	56.25	243.360	*******
5	1981	15.80	1.19866	15.800	1.19866	1.43678	44.44	43.75	249.640	*******
6	1977	17.50	1.24304	17.500	1.24304	1.54514	33.33	31.25	306.250	*******
7	1975	18.60	1.26951	18.600	1.26951	1.61166	22.22	18.75	345.960	*******
8	1976	19.60	1.29226	19.600	1.29226	1.66993	11.11	6.25	384.160	*******
		125.10	9.48961		9.48961	11.31517			2020.990	
(1/N)		15.64	1.18620		1.18620	1.41440			252.624	

HUAI KHA YANG

******* B

ORDER	XI	XS	XI*XS	XI+XS	XI*XS-X0**2	2X0-(XI+XS)	SI
1	10.100	19.600	197.960	29.700	-37.762	1.006	-37.519

-37.519
B= 0.0

******* DROUTY DISCHARGE

	CUM/SEC		CUM/SEC
2	15.353	3	14.022
4	13.319	5	12.859
6	12.516	7	12.261
8	12.049	9	11.871
10	11.720	11	11.588
12	11.472	13	11.369
14	11.275	15	11.191
16	11.113	17	11.041
18	10.976	19	10.914
20	10.857	21	10.803
22	10.752	23	10.705
24	10.659	25	10.617
26	10.576	27	10.535
28	10.501	29	10.466
30	10.433	35	10.283
40	10.159	50	9.981
60	9.806	70	9.680
80	9.574	90	9.484
100	9.404	150	9.115
200	8.923	300	8.669
400	8.498	500	8.373
700	8.189	1000	8.007

A.3.3. Water Balance Study

(1) Hydrological Study

(a) Selection of Standard Drought Year

The water supply project is generally designed based on hydrological condition of a standard drought year which has a reoccurence interval of once in ten years. The reservoir case will be studied based on water balance simulation for 10 years at least, in case of the river, the drought discharge with 10 year return period will be computed by using the observed data.

(b) River Runoff

The storage water of reservoir is supplied by runoff discharge from catchment area, which is affected by many factors such as topographic condition, vegetation of catchment area and rainfall intensity. Monthly total runoff coefficient from catchment area is computed by using the RUNOFF ESTIMATION CHART prepared by Project Planning Section, RID due to lack of measured data for subject water sources. In using this chart, as the catchment area is of moderately low runoff potential, type "D" was adopted.

(c) Water Losses from Reservoir

The water losses from reservoir have been estimated on a monthly basis taking into consideration the seepage and evaporation losses. Evaporation losses from reservoir is estimated by multiplying 70 % by the observed figures from Class A pan through the years. 2 mm/day seepage loss is applied to new reservoir.

(d) Raw Water Demand for Water Works

Raw water demand computed at 110 % of production capacity of water treatment plant.

(e) Irrigation Water Requirement

Typical water consumption pattern for rainy and dry season of paddy rice irrigation under the RID project are summarized as follows;

	rainy season	dry season
- Cropping calendar		
Nursery bed, land soaking	: 15 Jun.to 31 Jul.	15 Dec.to 31 Jan.
and preparation	: 1 Aug.to 30 Oct.	1 Feb.to 30 Apr.
- Water requirement at field		
Land soaking and preparation	: 200 mm	230 mm
Evaporation and percolation during land preparation	: 200 mm	230 mm
Field irrigation	: 810 mm	1,036 mm
Total	: 1,210 mm	1,496 mm

In the computation of irrigation water requirement, effective rainfall which is estimated from rainfall amount was considered. Hence, gross irrigation water requirement is estimated by the following formula.

$$WR = \frac{\text{Field water requirement} - \text{Effective rainfall}}{\text{Irrigation efficiency (*)}}$$

(*) 0.68 : in rainy season
0.60 : in dry season

(f) Water Balance Simulation

The water balance computation of reservoir is expressed by the following equation.

$$V = I - W - IR - L$$

V : Storage volume of the reservoir
I : Inflow into reservoir
W : Water demand for the water supply
IR : Irrigation water requirement (if any)
L : Water losses from reservoir

The water balance simulation was conducted for the period of 22 years from 1963 to 1984, only selected case in each SD is shown in A.3.3 Water Balance Simulation.

(2) Water Balance Simulation in Each NSD

(a) Kham Sakae Sang (NSD-5)

(i) Proposed Water Source

The Bun Chiwuk reservoir, which was constructed by RID in 1980, is located at 5 km west of SD area. The effective storage capacity is about 336,000 cu.m, but there are no storage water confirmed during second phase field survey due to less rainfall and small catchment area comparing with the storage capacity. For supplying stable water to NSD, diversion dam from Huai Yang shall be proposed.

Huai Ruam with the catchment area of about 14 sq.km is flowing near SD. The construction of the new reservoir will be able to supply water to NSD throughout a year.

(ii) Case Study (Refer to Table A-3-34 to 36)

In case of using the Bun Chiwuk reservoir, diversion canal will be needed from Huai Yang to the reservoir. The result of water balance simulation is shown as follows;

Water Balance Simulation at Bun Chwuk Reservoir

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	V=336,000 cu.m (1963 - 1984) Remark
1	0	300,000	21	Original catchment area 1 sq.km
2	0	300,000	0	Transfer basin 35 sq.km

(b) Nong Bua Lai (NSD-6)

(i) Proposed Water Source

The Nong Sanp reservoir with the storage capacity of 300,000 cu.m is located in SD. Phai Luang reservoir, which was constructed by RID in 1980, is located at 2 km upstream of the said pond. The storage capacity is 368,000 cu.m. It is possible to divert water from the Phai Luang reservoir to the Nong Sanp Pond effectively.

(ii) Case Study (Refer to Table A-3-37 to 39)

Judging from the water balance simulation, the capacity of Phai Luang reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance Simulation at Phai Luang Reservoir

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	V=368,000 cu.m (1963 - 1984) Remark
1	0	200,000	0	

(c) Huai Thalaeng (NSD-7)

(i) Proposed Water Source

The Lam Chamuak reservoir with storage capacity of 23.5 MCM which was constructed by RID is located at 20 km northwest of SD.

The Nong Takai reservoir which was constructed by RID in 1980 is located at 5 km north of SD. The storage capacity is 155,000 cu.m. The heightening of the dam embankment will be required to meet the proposed water demand.

(ii) Case Study (Refer to Table A-3-40 to 42)

In case of using the Nong Takai reservoir, 1.5 m heightening of the dam embankment will be required. The result of water balance simulation is shown as follows;

Water Balance Simulation at Nong Takai Reservoir

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	V=155,500 cu.m (1963 - 1984) Remark
1	32	0	2	Existing
2	0	630,000	2	1.5 m heightening of Dam
3	32	630,000	2	2.2 m heightening of Dam

Judging from the water balance simulation, the capacity Lam Chamuak reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance Simulation at Lam Chamuak Reservoir

V=23,450,000 cu.m
(196 - 1981)

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	Remark
1	(Wet) 1,920 (Dry) 960	0	3	Existing
2	(Wet) 1,920 (Dry) 960	630,000	3	

(d) Nong Ki (NSD-8)

(i) Proposed Water Source

The Tung Kraten reservoir with storage capacity of 1.6 MCM which was constructed by ARD in 1969 is located at 2 km north of SD.

(ii) Case Study (Refer to Table A-3-43 to 45)

Judging from the water balance simulation, the capacity of Tung Kraten reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance simulation at Tung Kraten Reservoir

V=1,600,000 cu.m
(1963 - 1984)

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	Remark
1	0	810,000	3	

(e) Huai Rat (NSD-10)

(i) Proposed Water Source

The Huai Talet is flowing at 1 km west of SD. Huai Talet reservoir, which was constructed by RID, is located on the Huai Talet. The storage capacity is 19.2 MCM. This reservoir water are being released to irrigation area through left and right main canal which will be improved with concrete lining. Therefore, raw water of subject project could be diverted from terminal point of right main canal.

(ii) Case Study (Refer to Table A-3-46 to 48)

Judging from the water balance simulation, the capacity of Huai Talat reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance Simulation at Huai Talat Reservoir

V=19,200,000 cu.m
(1963 - 1981)

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	Remark
1	(Wet) 2,240 (Dry) 1,120	0	2	Existing
2	(Wet) 2,240 (Dry) 1,120	240,000	2	

(f) Khum Han (NSD-12)

(i) Proposed Water Source

The Nong Si reservoir which was constructed by RID is located near SD. The storage capacity is 3.8 MCM.

(ii) Case Study (Refer to Table A-3-49 to 51)

Judging from the water balance simulation, the capacity of Nong Si reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance Simulation at Nong Si Reservoir

V=3,800,000 cu.m
(1963 - 1981)

Case No.	Agriculture (ha)		Water Works (cu.m)	Deficit Year (Years)	Remark
1	(Wet)	320	0	0	Existing
	(Dry)	96			
2	(Wet)	320	220,000	0	Original plan
	(Dry)	96			
3	(Wet)	320	480,000	0	Expansion plan
	(Dry)	96			

(g) Kusuman (NSD-13)

(i) Proposed Water Source

The Huai Daeng reservoir constructed by RID is located at 5 km east of SD. The storage capacity is 1.15 MCM.

Huai Saphoe river of which the catchment area is about 20 sq.km is flowing near SD. The construction of the new reservoir will be considered.

Judging from the result of pumping test, safe yield is 18 cu.m/hr and three wells will be able to construct in and around SD.

(ii) Case Study (Refer to Table A-3-52 to 54)

Judging from the water balance simulation, the capacity of Huai Daeng reservoir is sufficient for water works. The result of water balance simulation is shown as follows;

Water Balance Simulation at Huai Daeng Reservoir

V=1,150,000 cu.m
(1963 - 1984)

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	Remark
1	160	0	0	Existing
2	160	300,000	0	

(h) Phon Charoeng (NSD-17)

(i) Proposed Water Source

The Non Loeng reservoir which was constructed by RID is located at 12.5 km west of SD. The storage capacity is 2.0 MCM.

Huai Som Hong with the catchment area of about 24 sq.km is flowing near SD. The construction of the new reservoir will be considered.

Judging from the result of pumping test, safe yield is 7.0 cu.m/hr and four wells will be able to construct in and around SD.

(ii) Case Study (Refer to Table A-3-55 to 57)

Judging from the water balance simulation, in case that water supply is withdrawn prior to irrigation, about 50 ha of irrigable area will be reduced from the existing condition. The result of water balance simulation is shown as follows;

Water Balance Simulation at Nong Loeng Reservoir

V=2,000,000 cu.m
(1963 - 1984)

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (years)	Remark
1	300	0	1	Existing
2	0	510,000	0	
3	250	510,000	2	
4	300	510,000	3	Well (7.0 cu.m/hr x 4)
5	300	510,000	2	0.5m heightening of dam

(i) Nong Song Hong (NSD-18)

(i) Proposed Water Source

The Nong Song Hong reservoir which was constructed by RID is located at 2 km south of SD. The storage capacity is 380,000 cu.m. The heightening of the dam embankment will be required to meet the proposed water demand.

The Nong Kom Ko pond is located at 10 km north of SD. The storage capacity is approximately 10.0 MCM.

Judging from the result of pumping test, safe yield is 7.5 cu.m/hr and three wells will be able to construct in and around.

(ii) Case Study (Refer to Table A-3-58 to 60)

Judging from the water balance simulation, in case of using Nong Song Hong reservoir for water works, 1.3 m heightening of the dam embankment will be required. The result of water balance simulation is shown as follows;

Case No.	Agriculture (ha)	Water Works (cu.m)	Deficit Year (Years)
1	99.2	0	Existing
2	99.2	420,000	1.3 km heightening of dam
3	99.2	420,000	Well (7.5 cu.m/hr x 3) 1.1 m heightening of dam

(j) Huai Kha Yung (NSD-20)

(i) Proposed Water Source

Huai Kha Yung which is one of the main tributaries of Mun river is flowing near SD. The catchment area at intake point is 3,344 sq.km. The width of the river is about 50 m and a fluctuation of water level at intake point is about 10 m between dry and rainy season.

(ii) Droughty Discharge

The droughty discharge at 10 year return period was computed based on the observed data at intake point. As the design capacity is only 9.2 l/sec, there are no difficulties to intake a water for water works even in dry season. The result of droughty analysis is shown as follows;

Droughty Discharge

Return Period (year)	Discharge (cu.m/sec)
2	15.4
4	13.3
6	12.5
8	12.0
10	11.7
30	10.4
50	10.0
100	9.4

Table A-3-34 Water Balance Simulation at Bun Chiwuk Reservoir (1963-1970)

(Unit : 1000 cu.m)

	Volume	Inflow (1)	Inflow (2)	Water Works	Losses	Spill
1963						
NOV	336.0	8.2	15.8	24.0	0.0	269.7
DEC	336.0	0.0	0.0	25.0	36.3	0.0
JAN	274.7	0.0	0.0	23.0	35.7	0.0
FEB	216.0	0.0	0.0	27.0	28.3	0.0
MAR	160.7	0.1	3.7	28.0	25.5	0.0
		8.3	19.6	127.0	125.8	269.7
1964						
APR	111.1	0.5	17.5	31.0	20.5	0.0
MAY	77.6	122.6	178.0	27.0	15.1	4111.6
JUN	336.0	4.1	43.7	29.0	16.8	101.6
JUL	336.0	29.6	8.4	22.0	16.1	1029.3
AUG	336.0	28.9	11.2	23.0	17.1	999.1
SEP	336.0	78.5	0.0	21.0	12.5	2791.6
OCT	336.0	60.3	0.0	20.0	13.3	2139.2
NOV	336.0	0.3	9.4	24.0	35.1	0.0
DEC	286.7	0.0	0.0	25.0	31.3	0.0
JAN	230.3	0.0	0.0	23.0	26.0	0.0
FEB	181.3	8.8	196.5	27.0	23.6	112.1
MAR	336.0	0.1	3.9	28.0	48.7	0.0
		333.7	468.5	300.0	278.1	11284.5
1965						
APR	263.2	8.6	150.1	31.0	54.9	151.0
MAY	336.0	44.9	30.6	27.0	48.4	1540.2
JUN	336.0	1.3	45.5	29.0	47.6	0.0
JUL	306.2	7.2	96.5	22.0	52.0	157.3
AUG	336.0	42.9	25.6	23.0	45.5	1474.8
SEP	336.0	74.8	0.0	21.0	42.0	2630.1
OCT	336.0	4.6	58.2	20.0	42.9	103.7
NOV	336.0	0.0	0.0	24.0	43.7	0.0
DEC	268.3	0.0	0.0	25.0	36.7	0.0
JAN	206.6	0.0	0.0	23.0	27.2	0.0
FEB	156.4	2.5	85.9	27.0	30.2	0.0
MAR	187.5	2.7	95.1	28.0	53.1	0.0
		189.5	587.5	300.0	524.1	6057.2
1966						
APR	204.3	3.1	108.4	31.0	47.6	0.0
MAY	237.2	118.3	52.7	27.0	45.2	4087.2
JUN	336.0	1.8	63.0	29.0	52.1	0.0
JUL	319.8	41.8	42.2	22.0	45.7	1420.4
AUG	336.0	26.8	34.5	23.0	38.3	905.1
SEP	336.0	97.9	0.0	21.0	37.6	3465.7
OCT	336.0	16.1	40.6	20.0	36.7	522.6
NOV	336.0	0.0	0.0	24.0	37.4	0.0
DEC	274.6	0.0	0.0	25.0	30.1	0.0
JAN	219.5	0.0	0.0	23.0	29.7	0.0
FEB	166.7	0.0	0.0	27.0	20.5	0.0
MAR	119.2	0.0	0.0	28.0	20.3	0.0
		305.8	341.4	300.0	441.4	10401.0
1967						
APR	70.9	9.0	306.0	31.0	18.9	9.5
MAY	336.0	37.1	8.1	27.0	18.2	1291.0
JUN	336.0	19.8	26.5	29.0	17.4	666.6
JUL	336.0	7.1	32.1	22.0	17.2	216.8
AUG	336.0	12.6	27.4	23.0	16.9	413.1
SEP	336.0	37.7	0.0	21.0	13.0	1322.8
OCT	336.0	3.0	30.5	20.0	13.6	75.6
NOV	336.0	3.5	33.3	24.0	12.9	90.7
DEC	336.0	0.0	0.0	25.0	42.7	0.0
JAN	268.3	0.0	0.0	23.0	36.6	0.0
FEB	208.7	0.0	0.0	27.0	29.0	0.0
MAR	152.7	0.0	0.0	28.0	25.0	0.0
		129.9	463.9	300.0	261.3	4086.0
1968						
APR	99.7	6.8	239.5	31.0	55.7	0.0
MAY	259.4	34.9	123.2	27.0	54.5	1099.9
JUN	336.0	23.6	59.3	29.0	53.9	767.1
JUL	336.0	22.2	51.5	22.0	51.7	726.4
AUG	336.0	34.4	44.8	23.0	56.3	1160.4
SEP	336.0	69.2	0.0	21.0	44.3	2427.1
OCT	336.0	0.6	21.8	20.0	44.3	0.0
NOV	294.2	0.0	0.0	24.0	42.6	0.0
DEC	227.6	0.0	0.0	25.0	32.1	0.0
JAN	170.5	0.0	0.0	23.0	22.6	0.0
FEB	124.9	0.0	0.0	27.0	20.4	0.0
MAR	77.5	1.1	39.8	28.0	21.2	0.0
		193.1	580.0	300.0	499.6	6180.9
1969						
APR	69.2	0.0	1.1	31.0	9.4	0.0
MAY	30.0	23.8	317.1	27.0	7.9	514.2
JUN	336.0	58.5	0.0	29.0	7.4	2067.9
JUL	336.0	6.5	22.0	22.0	6.5	204.3
AUG	336.0	2.8	27.3	23.0	7.1	69.6
SEP	336.0	108.6	0.0	21.0	6.2	3882.4
OCT	336.0	46.5	0.0	20.0	6.2	1649.3
NOV	336.0	0.0	0.0	24.0	39.7	0.0
DEC	272.3	0.0	0.0	25.0	35.1	0.0
JAN	212.2	0.0	0.0	23.0	27.1	0.0
FEB	162.1	0.0	0.0	27.0	14.3	0.0
MAR	120.8	1.8	63.4	28.0	32.7	0.0
		248.4	431.0	300.0	199.6	8387.6
1970						
APR	125.2	1.4	48.3	31.0	24.9	0.0
MAY	119.0	39.9	229.7	27.0	25.6	1166.6
JUN	336.0	16.1	34.1	29.0	21.2	529.2
JUL	336.0	8.4	37.1	22.0	23.5	256.5
AUG	336.0	27.6	15.2	23.0	19.8	950.8
SEP	336.0	62.4	0.0	21.0	20.2	2206.6
OCT	336.0	7.7	32.3	20.0	20.0	236.0
NOV	336.0	0.0	0.0	24.0	39.1	0.0
DEC	272.9	0.5	16.5	25.0	30.9	0.0
JAN	234.0	0.0	0.0	23.0	30.0	0.0
FEB	181.0	0.0	0.0	27.0	21.4	0.0
MAR	132.6	1.8	62.0	28.0	31.9	0.0
		165.7	475.2	300.0	308.5	5345.7

Table A-3-35 Water Balance Simulation at Bun Chiwuk Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow (1)	Inflow (2)	Water Works	Losses	Spill
1971						
APR	136.4	7.4	253.5	31.0	30.3	5.1
MAY	336.0	13.4	40.2	27.0	26.6	427.7
JUN	336.0	52.0	2.9	29.0	25.9	1817.6
JUL	336.0	8.4	37.2	22.0	23.6	256.4
AUG	336.0	15.8	32.4	23.0	25.1	519.8
SEP	336.0	81.5	0.0	21.0	22.8	2890.4
OCT	336.0	3.2	30.7	20.0	13.8	79.6
NOV	336.0	0.0	0.0	24.0	42.5	0.0
DEC	269.5	0.0	0.0	25.0	33.4	0.0
JAN	211.1	0.0	0.0	23.0	28.4	0.0
FEB	159.7	0.0	0.0	27.0	23.3	0.0
MAR	109.5	5.0	173.7	28.0	44.8	0.0
		186.6	570.6	300.0	340.6	5996.6
1972						
APR	215.4	24.0	171.1	31.0	43.5	668.9
MAY	336.0	0.4	12.3	27.0	78.7	0.0
JUN	242.9	39.3	134.2	29.0	51.5	1243.0
JUL	336.0	1.8	62.7	22.0	60.8	0.0
AUG	317.7	2.5	85.9	23.0	60.3	0.0
SEP	322.8	222.6	0.0	21.0	38.2	7941.2
OCT	336.0	42.5	19.8	20.0	42.3	1467.4
NOV	336.0	2.9	57.4	24.0	36.3	45.2
DEC	336.0	0.0	0.0	25.0	37.7	0.0
JAN	273.3	0.0	0.0	23.0	36.5	0.0
FEB	213.8	0.0	0.0	27.0	30.7	0.0
MAR	156.1	0.4	13.4	28.0	26.4	0.0
		336.3	556.8	300.0	542.9	11365.7
1973						
APR	115.4	17.6	263.3	31.0	29.2	352.0
MAY	336.0	5.9	48.5	27.0	27.4	158.7
JUN	336.0	29.4	25.3	29.0	25.7	1004.2
JUL	336.0	23.4	20.6	22.0	22.0	798.5
AUG	336.0	1.5	44.1	23.0	22.6	7.0
SEP	336.0	86.0	0.0	21.0	19.6	3055.4
OCT	336.0	5.6	34.3	20.0	19.8	160.0
NOV	336.0	0.0	0.0	24.0	39.8	0.0
DEC	272.2	0.0	0.0	25.0	34.5	0.0
JAN	212.7	0.0	0.0	23.0	25.1	0.0
FEB	164.5	2.2	76.8	27.0	31.4	0.0
MAR	185.1	21.0	189.2	28.0	31.2	545.1
		192.5	701.9	300.0	326.4	6081.0
1974						
APR	336.0	1.8	63.7	31.0	36.4	0.0
MAY	334.2	37.6	27.5	27.0	36.3	1288.5
JUN	336.0	5.0	60.6	29.0	36.5	113.2
JUL	336.0	12.7	47.9	22.0	36.5	395.3
AUG	336.0	10.7	41.5	23.0	29.2	331.4
SEP	336.0	74.9	0.0	21.0	31.1	2645.5
OCT	336.0	60.3	0.0	20.0	28.3	2122.1
NOV	336.0	12.9	35.8	24.0	24.7	416.5
DEC	336.0	0.0	0.0	25.0	41.2	0.0
JAN	269.8	0.0	0.0	23.0	27.6	0.0
FEB	219.3	0.0	0.0	27.0	27.9	0.0
MAR	164.3	0.0	1.7	28.0	23.7	0.0
		215.9	278.6	300.0	381.3	7312.4
1975						
APR	114.4	0.0	0.0	31.0	19.3	0.0
MAY	64.1	41.9	272.4	27.0	15.4	1193.4
JUN	336.0	15.5	28.2	29.0	14.8	515.9
JUL	336.0	45.7	0.0	22.0	15.0	1608.5
AUG	336.0	3.2	33.3	23.0	13.5	78.4
SEP	336.0	60.8	0.0	21.0	11.2	2156.5
OCT	336.0	18.0	13.0	20.0	11.0	616.2
NOV	336.0	1.9	33.3	24.0	11.2	31.5
DEC	336.0	0.0	0.0	25.0	40.8	0.0
JAN	270.2	0.0	0.0	23.0	35.1	0.0
FEB	212.1	0.3	10.5	27.0	26.8	0.0
MAR	169.1	3.2	111.2	28.0	43.8	0.0
		190.4	501.9	300.0	257.7	6200.3
1976						
APR	211.7	0.0	0.0	31.0	35.3	0.0
MAY	145.4	10.6	237.7	27.0	30.7	132.7
JUN	336.0	1.1	40.1	29.0	38.6	0.0
JUL	309.7	17.1	64.0	22.0	32.8	533.4
AUG	336.0	21.6	25.8	23.0	24.4	730.8
SEP	336.0	54.8	0.0	21.0	24.3	1928.0
OCT	336.0	65.4	0.0	20.0	27.7	2308.2
NOV	336.0	0.0	0.0	24.0	41.2	0.0
DEC	270.8	0.0	0.0	25.0	31.2	0.0
JAN	214.6	0.0	0.0	23.0	25.1	0.0
FEB	166.5	0.0	0.0	27.0	20.1	0.0
MAR	119.4	0.0	0.0	28.0	18.2	0.0
		170.7	367.6	300.0	349.6	5633.0
1977						
APR	73.1	6.9	240.8	31.0	52.1	0.0
MAY	237.7	5.4	171.0	27.0	51.1	17.4
JUN	336.0	3.5	84.2	29.0	58.7	37.9
JUL	336.0	3.7	65.5	22.0	47.2	63.4
AUG	336.0	100.3	0.0	23.0	39.8	3546.9
SEP	336.0	39.5	11.7	21.0	30.3	1371.8
OCT	336.0	6.6	51.3	20.0	37.9	180.2
NOV	336.0	0.0	0.0	24.0	37.1	0.0
DEC	274.9	0.0	0.0	25.0	36.5	0.0
JAN	213.4	0.0	0.0	23.0	26.9	0.0
FEB	163.5	1.3	46.7	27.0	23.6	0.0
MAR	161.0	0.2	7.7	28.0	28.0	0.0
		167.4	679.0	300.0	469.3	5217.5
1978						
APR	112.6	0.3	8.8	31.0	18.8	0.0
MAY	72.0	12.8	294.6	27.0	16.7	154.7
JUN	336.0	3.1	43.2	29.0	17.3	66.6
JUL	336.0	7.2	27.1	22.0	12.3	223.2
AUG	336.0	5.2	32.2	23.0	14.4	151.4
SEP	336.0	45.7	0.0	21.0	11.4	1611.3
OCT	336.0	7.6	26.2	20.0	13.9	241.4
NOV	336.0	0.3	10.3	24.0	40.7	0.0
DEC	281.9	0.0	0.0	25.0	35.6	0.0
JAN	221.2	0.0	0.0	23.0	30.1	0.0
FEB	168.1	0.0	0.0	27.0	24.5	0.0
MAR	116.7	0.0	0.0	28.0	23.5	0.0
		82.2	442.6	300.0	259.2	2448.6

Table A-3-36 Water Balance Simulation at Bun Chiwuk Reservoir (1979-1984)

(Unit : 1000 cu.m)

	Volume	Inflow (1)	Inflow (2)	Water Works	Losses	Spill
1979						
APR	65.2	1.9	64.8	31.0	22.4	0.0
MAY	78.4	9.9	296.1	27.0	21.4	51.5
JUN	336.0	7.1	35.9	29.0	13.9	211.0
JUL	336.0	2.6	38.1	22.0	18.7	53.2
AUG	336.0	3.2	37.2	23.0	17.4	73.5
SEP	336.0	61.6	0.0	21.0	12.2	2183.9
OCT	336.0	1.6	35.4	20.0	17.0	20.3
NOV	336.0	0.0	0.0	24.0	50.5	0.0
DEC	261.5	0.0	0.0	25.0	33.0	0.0
JAN	203.5	0.0	0.0	23.0	25.4	0.0
FEB	155.1	0.0	0.0	27.0	20.6	0.0
MAR	107.5	6.4	223.7	28.0	54.8	0.0
		94.2	731.2	300.0	307.5	2593.5
1980						
APR	254.8	0.3	9.1	31.0	42.3	0.0
MAY	190.8	44.3	171.2	27.0	43.3	1381.0
JUN	336.0	74.6	0.0	29.0	29.4	2627.9
JUL	336.0	28.9	33.4	22.0	40.3	978.3
AUG	336.0	31.0	29.6	23.0	37.6	1055.5
SEP	336.0	95.6	0.0	21.0	24.7	3394.3
OCT	336.0	13.8	31.6	20.0	25.3	450.3
NOV	336.0	0.0	0.6	24.0	36.5	0.0
DEC	276.1	0.0	0.0	25.0	31.7	0.0
JAN	219.4	0.0	0.0	23.0	26.8	0.0
FEB	169.7	1.5	53.1	27.0	30.1	0.0
MAR	167.2	0.0	0.0	28.0	27.4	0.0
		290.0	328.6	300.0	395.4	9887.4
1981						
APR	111.8	1.2	42.5	31.0	22.1	0.0
MAY	102.4	33.1	247.4	27.0	19.9	910.8
JUN	336.0	0.9	31.3	29.0	20.4	0.0
JUL	318.9	30.9	26.2	22.0	18.0	1056.1
AUG	336.0	3.0	40.9	23.0	20.8	62.6
SEP	336.0	38.6	1.0	21.0	18.6	1349.4
OCT	336.0	6.5	30.6	20.0	17.2	198.3
NOV	336.0	18.9	18.7	24.0	13.6	642.1
DEC	336.0	0.0	0.0	25.0	37.2	0.0
JAN	273.8	0.0	0.0	23.0	30.8	0.0
FEB	220.0	0.8	26.3	27.0	30.0	0.0
MAR	190.1	0.0	0.5	28.0	27.0	0.0
		133.8	465.3	300.0	275.4	4219.3
1982						
APR	135.5	0.9	29.8	31.0	23.0	0.0
MAY	112.2	1.6	56.4	27.0	27.9	0.0
JUN	115.4	33.5	244.4	29.0	28.3	926.9
JUL	336.0	30.9	19.5	22.0	28.4	1061.4
AUG	336.0	29.2	16.6	23.0	22.8	1004.6
SEP	336.0	116.0	0.0	21.0	16.0	4139.7
OCT	336.0	2.1	35.9	20.0	18.0	38.2
NOV	336.0	0.0	0.0	24.0	37.6	0.0
DEC	274.4	0.0	0.0	25.0	28.5	0.0
JAN	221.0	0.0	0.0	23.0	23.6	0.0
FEB	174.4	0.0	0.0	27.0	19.9	0.0
MAR	127.5	0.0	0.0	28.0	19.9	0.0
		214.1	402.7	300.0	293.7	7170.7
1983						
APR	79.5	0.1	4.7	31.0	12.8	0.0
MAY	40.6	1.6	55.8	27.0	14.7	0.0
JUN	56.2	9.2	311.5	29.0	11.9	9.3
JUL	336.0	43.1	0.0	22.0	12.4	1517.4
AUG	336.0	51.6	0.0	23.0	10.3	1824.3
SEP	336.0	96.1	0.0	21.0	8.6	3430.7
OCT	336.0	116.8	0.0	20.0	8.4	4176.3
NOV	336.0	2.2	30.9	24.0	9.0	45.1
DEC	336.0	0.0	0.0	25.0	34.4	0.0
JAN	276.6	0.0	0.0	23.0	29.3	0.0
FEB	224.3	0.0	0.0	27.0	28.6	0.0
MAR	166.5	0.0	0.0	28.0	25.2	0.0
		320.7	402.9	300.0	205.9	11003.1
1984						
APR	115.3	2.3	80.3	31.0	31.3	0.0
MAY	135.7	70.3	184.7	27.0	27.6	2274.4
JUN	336.0	5.9	50.2	29.0	27.1	157.6
JUL	336.0	12.9	36.1	22.0	27.1	417.0
AUG	336.0	31.7	16.6	23.0	25.4	1094.0
SEP	336.0	31.2	11.6	21.0	21.8	1082.0
OCT	336.0	22.5	17.5	20.0	20.0	771.2
NOV	336.0	0.0	0.0	24.0	38.3	0.0
DEC	273.7	0.0	0.0	25.0	33.1	0.0
JAN	215.7	4.9	168.7	23.0	30.3	2.8
FEB	336.0	3.3	56.2	27.0	32.5	59.2
MAR	336.0	0.0	0.3	28.0	50.9	0.0
		185.2	622.2	300.0	365.3	5858.2

Remarks : Inflow(1) ; Inflow from own basin
Inflow(2) ; Intake capacity at diversion dam for transfer basin
Spill ; Spill water at diversion dam

Table A-3-37 Water Balance Simulation at Phai Luang Reservoir (1963-1970)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1963						
NOV	668.0	97.9	0.0	16.0	24.2	57.7
DEC	668.0	0.0	0.0	17.0	25.5	0.0
JAN	625.5	0.0	0.0	15.0	29.1	0.0
FEB	581.4	0.0	0.0	18.0	28.2	0.0
MAR	535.2	1.3	0.0	19.0	31.9	0.0
		99.2	0.0	85.0	138.9	57.7
1964						
APR	485.6	6.0	0.0	21.0	32.1	0.0
MAY	438.5	1470.7	0.0	18.0	31.1	1192.1
JUN	668.0	49.8	0.0	19.0	38.7	0.0
JUL	660.1	355.8	0.0	15.0	33.0	299.8
AUG	668.0	346.4	0.0	15.0	35.1	296.3
SEP	668.0	941.7	0.0	14.0	25.7	902.0
OCT	668.0	724.2	0.0	13.0	27.4	683.8
NOV	668.0	3.2	0.0	16.0	24.0	0.0
DEC	631.2	0.0	0.0	17.0	24.7	0.0
JAN	589.5	0.0	0.0	15.0	24.1	0.0
FEB	550.4	105.8	0.0	18.0	23.9	0.0
MAR	614.3	1.3	0.0	19.0	31.8	0.0
		4004.9	0.0	200.0	351.7	3374.0
1965						
APR	564.8	103.2	0.0	21.0	38.3	0.0
MAY	606.8	538.6	0.0	18.0	34.7	426.6
JUN	668.0	15.6	0.0	19.0	33.9	0.0
JUL	630.7	87.0	0.0	15.0	37.2	0.0
AUG	665.4	514.4	0.0	15.0	32.6	464.2
SEP	668.0	897.7	0.0	14.0	30.1	853.6
OCT	668.0	55.5	0.0	13.0	30.7	11.8
NOV	668.0	0.0	0.0	16.0	30.7	0.0
DEC	621.3	0.0	0.0	17.0	30.6	0.0
JAN	573.7	0.0	0.0	15.0	27.6	0.0
FEB	531.1	29.5	0.0	18.0	25.7	0.0
MAR	516.9	32.6	0.0	19.0	37.9	0.0
		2274.1	0.0	200.0	390.2	1756.2
1966						
APR	492.6	37.2	0.0	21.0	30.0	0.0
MAY	478.8	1419.4	0.0	18.0	35.3	1176.9
JUN	668.0	21.6	0.0	19.0	40.7	0.0
JUL	629.9	501.5	0.0	15.0	35.7	412.7
AUG	668.0	322.1	0.0	15.0	29.9	277.2
SEP	668.0	1174.8	0.0	14.0	29.4	1131.4
OCT	668.0	193.1	0.0	13.0	28.7	151.4
NOV	668.0	0.0	0.0	16.0	26.3	0.0
DEC	625.7	0.0	0.0	17.0	24.6	0.0
JAN	584.1	0.0	0.0	15.0	28.8	0.0
FEB	540.3	0.0	0.0	18.0	25.4	0.0
MAR	496.9	0.0	0.0	19.0	34.3	0.0
		3669.7	0.0	200.0	369.1	3149.5
1967						
APR	443.6	108.2	0.0	21.0	34.4	0.0
MAY	496.4	445.4	0.0	18.0	39.8	216.0
JUN	668.0	237.6	0.0	19.0	38.0	180.6
JUL	668.0	85.3	0.0	15.0	37.7	32.7
AUG	668.0	151.0	0.0	15.0	37.1	98.9
SEP	668.0	452.3	0.0	14.0	28.6	409.7
OCT	668.0	36.4	0.0	13.0	29.7	0.0
NOV	661.7	42.5	0.0	16.0	28.2	0.0
DEC	660.0	0.0	0.0	17.0	29.8	0.0
JAN	613.3	0.0	0.0	15.0	30.0	0.0
FEB	568.3	0.0	0.0	18.0	29.4	0.0
MAR	520.9	0.0	0.0	19.0	33.2	0.0
		1558.7	0.0	200.0	395.8	937.8
1968						
APR	468.7	82.1	0.0	21.0	32.8	0.0
MAY	496.9	419.4	0.0	18.0	38.7	191.6
JUN	668.0	283.3	0.0	19.0	38.3	226.0
JUL	668.0	266.7	0.0	15.0	36.7	215.0
AUG	668.0	413.2	0.0	15.0	40.0	358.3
SEP	668.0	830.8	0.0	14.0	31.4	785.4
OCT	668.0	7.5	0.0	13.0	31.2	0.0
NOV	631.2	0.0	0.0	16.0	32.6	0.0
DEC	582.6	0.0	0.0	17.0	30.1	0.0
JAN	535.6	0.0	0.0	15.0	26.6	0.0
FEB	494.0	0.0	0.0	18.0	32.3	0.0
MAR	443.7	13.7	0.0	19.0	34.0	0.0
		2316.7	0.0	200.0	404.8	1776.2
1969						
APR	404.4	0.4	0.0	21.0	19.1	0.0
MAY	364.7	285.0	0.0	18.0	36.5	0.0
JUN	595.1	701.4	0.0	19.0	36.2	573.4
JUL	668.0	77.6	0.0	15.0	31.6	31.0
AUG	668.0	33.2	0.0	15.0	34.3	0.0
SEP	651.9	1303.2	0.0	14.0	30.1	1243.0
OCT	668.0	558.5	0.0	13.0	30.1	515.4
NOV	668.0	0.0	0.0	16.0	27.9	0.0
DEC	624.1	0.0	0.0	17.0	28.9	0.0
JAN	578.2	0.0	0.0	15.0	27.0	0.0
FEB	536.3	0.0	0.0	18.0	18.2	0.0
MAR	500.1	21.7	0.0	19.0	35.3	0.0
		2981.1	0.0	200.0	355.1	2362.8
1970						
APR	467.6	16.6	0.0	21.0	27.5	0.0
MAY	435.6	478.7	0.0	18.0	37.6	190.7
JUN	668.0	193.1	0.0	19.0	31.1	143.0
JUL	668.0	100.7	0.0	15.0	34.5	51.2
AUG	668.0	331.2	0.0	15.0	29.0	287.2
SEP	668.0	749.3	0.0	14.0	29.6	705.6
OCT	668.0	92.0	0.0	13.0	29.3	49.7
NOV	668.0	0.0	0.0	16.0	27.5	0.0
DEC	624.5	5.7	0.0	17.0	24.0	0.0
JAN	589.1	0.0	0.0	15.0	27.4	0.0
FEB	546.8	0.0	0.0	18.0	24.4	0.0
MAR	504.3	21.2	0.0	19.0	32.6	0.0
		1988.5	0.0	200.0	354.6	1427.5

Table A-3-38 Water Balance Simulation at Phai Luang Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	473.9	88.6	0.0	21.0	32.6	0.0
MAY	509.0	160.4	0.0	18.0	33.1	0.0
JUN	618.3	624.2	0.0	19.0	33.0	522.5
JUL	668.0	100.7	0.0	15.0	30.0	55.6
AUG	668.0	189.3	0.0	15.0	32.0	142.3
SEP	668.0	978.1	0.0	14.0	29.1	935.0
OCT	668.0	37.8	0.0	13.0	17.6	7.2
NOV	668.0	0.0	0.0	16.0	29.9	0.0
DEC	622.1	0.0	0.0	17.0	27.7	0.0
JAN	577.4	0.0	0.0	15.0	28.3	0.0
FEB	534.1	0.0	0.0	18.0	29.9	0.0
MAR	486.2	59.6	0.0	19.0	31.5	0.0
		2238.7	0.0	200.0	354.8	1662.6
1972						
APR	495.3	286.0	0.0	21.0	37.0	57.2
MAY	668.0	4.2	0.0	18.0	53.9	0.0
JUN	600.3	472.2	0.0	19.0	35.8	349.7
JUL	668.0	21.5	0.0	15.0	42.3	0.0
AUG	632.2	29.5	0.0	15.0	40.8	0.0
SEP	605.8	2671.2	0.0	14.0	26.6	2568.4
OCT	668.0	509.9	0.0	13.0	29.5	467.4
NOV	668.0	35.2	0.0	16.0	25.3	0.0
DEC	661.9	0.0	0.0	17.0	26.3	0.0
JAN	618.6	0.0	0.0	15.0	29.6	0.0
FEB	574.0	0.0	0.0	18.0	30.6	0.0
MAR	525.4	4.6	0.0	19.0	31.7	0.0
		4036.2	0.0	200.0	409.5	3442.8
1973						
APR	479.2	211.0	0.0	21.0	43.5	0.0
MAY	629.7	71.0	0.0	18.0	40.7	0.0
JUN	638.0	353.0	0.0	19.0	38.2	265.8
JUL	668.0	280.8	0.0	15.0	32.6	233.2
AUG	668.0	17.5	0.0	15.0	33.5	0.0
SEP	637.0	1032.0	0.0	14.0	29.1	957.8
OCT	668.0	66.6	0.0	13.0	29.5	24.2
NOV	668.0	0.0	0.0	16.0	28.0	0.0
DEC	624.0	0.0	0.0	17.0	26.4	0.0
JAN	578.6	0.0	0.0	15.0	24.9	0.0
FEB	538.7	26.3	0.0	18.0	27.0	0.0
MAR	520.0	251.8	0.0	19.0	31.5	53.2
		2310.0	0.0	200.0	387.0	1534.2
1974						
APR	668.0	21.8	0.0	21.0	36.7	0.0
MAY	632.1	451.2	0.0	18.0	36.7	360.7
JUN	668.0	59.6	0.0	19.0	36.9	3.7
JUL	668.0	151.9	0.0	15.0	38.9	98.0
AUG	668.0	127.9	0.0	15.0	29.5	83.4
SEP	668.0	899.2	0.0	14.0	31.4	853.8
OCT	668.0	723.5	0.0	13.0	28.6	681.8
NOV	668.0	155.1	0.0	16.0	24.9	114.1
DEC	668.0	0.0	0.0	17.0	29.0	0.0
JAN	622.0	0.0	0.0	15.0	22.7	0.0
FEB	584.3	0.0	0.0	18.0	27.5	0.0
MAR	538.8	0.6	0.0	19.0	29.6	0.0
		2590.7	0.0	200.0	372.4	2195.5
1975						
APR	490.9	0.0	0.0	21.0	34.7	0.0
MAY	435.1	502.6	0.0	18.0	36.4	215.4
JUN	668.0	186.6	0.0	19.0	35.0	132.6
JUL	668.0	548.5	0.0	15.0	35.4	498.1
AUG	668.0	38.3	0.0	15.0	31.8	0.0
SEP	659.4	729.5	0.0	14.0	26.4	680.6
OCT	668.0	215.7	0.0	13.0	25.9	176.8
NOV	668.0	22.2	0.0	16.0	26.4	0.0
DEC	647.8	0.0	0.0	17.0	27.9	0.0
JAN	602.9	0.0	0.0	15.0	28.2	0.0
FEB	559.8	3.6	0.0	18.0	25.2	0.0
MAR	520.2	38.1	0.0	19.0	31.9	0.0
		2285.1	0.0	200.0	365.1	1703.4
1976						
APR	507.4	0.0	0.0	21.0	32.8	0.0
MAY	453.5	127.0	0.0	18.0	31.8	0.0
JUN	530.7	13.8	0.0	19.0	38.0	0.0
JUL	487.5	204.8	0.0	15.0	39.1	0.0
AUG	638.2	259.4	0.0	15.0	29.1	185.5
SEP	668.0	657.8	0.0	14.0	29.0	614.8
OCT	668.0	785.3	0.0	13.0	33.1	739.2
NOV	668.0	0.0	0.0	16.0	29.0	0.0
DEC	623.0	0.0	0.0	17.0	25.8	0.0
JAN	580.2	0.0	0.0	15.0	24.7	0.0
FEB	540.5	0.0	0.0	18.0	24.9	0.0
MAR	497.6	0.0	0.0	19.0	30.7	0.0
		2048.0	0.0	200.0	368.1	1539.5
1977						
APR	447.8	82.6	0.0	21.0	32.3	0.0
MAY	477.1	64.6	0.0	18.0	32.3	0.0
JUN	491.3	41.8	0.0	19.0	36.6	0.0
JUL	477.6	44.2	0.0	15.0	29.2	0.0
AUG	477.6	1203.2	0.0	15.0	30.6	967.2
SEP	668.0	474.4	0.0	14.0	23.3	437.1
OCT	668.0	79.4	0.0	13.0	29.2	37.2
NOV	668.0	0.0	0.0	16.0	26.1	0.0
DEC	625.9	0.0	0.0	17.0	29.8	0.0
JAN	579.1	0.0	0.0	15.0	26.6	0.0
FEB	537.5	16.0	0.0	18.0	23.1	0.0
MAR	512.4	2.6	0.0	19.0	33.2	0.0
		2008.8	0.0	200.0	352.3	1441.5
1978						
APR	462.8	3.0	0.0	21.0	30.2	0.0
MAY	414.6	154.1	0.0	18.0	31.3	0.0
JUN	519.4	37.6	0.0	19.0	32.0	0.0
JUL	506.1	85.8	0.0	15.0	23.9	0.0
AUG	553.0	62.9	0.0	15.0	29.0	0.0
SEP	571.9	547.9	0.0	14.0	25.1	412.7
OCT	668.0	91.8	0.0	13.0	30.5	48.3
NOV	668.0	3.5	0.0	16.0	27.8	0.0
DEC	627.7	0.0	0.0	17.0	28.5	0.0
JAN	582.2	0.0	0.0	15.0	28.8	0.0
FEB	538.4	0.0	0.0	18.0	29.9	0.0
MAR	490.5	0.0	0.0	19.0	40.1	0.0
		986.7	0.0	200.0	357.2	461.0

Table A-3-39 Water Balance Simulation at Phai Luang Reservoir (1979-1984)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1979						
APR	431.3	22.2	0.0	21.0	31.6	0.0
MAY	400.9	119.2	0.0	18.0	34.3	0.0
JUN	467.8	84.7	0.0	19.0	23.3	0.0
JUL	510.1	31.3	0.0	15.0	31.1	0.0
AUG	495.3	38.0	0.0	15.0	28.5	0.0
SEP	489.7	739.0	0.0	14.0	24.5	522.3
OCT	668.0	19.1	0.0	13.0	34.2	0.0
NOV	639.9	0.0	0.0	16.0	34.2	0.0
DEC	589.7	0.0	0.0	17.0	27.0	0.0
JAN	545.7	0.0	0.0	15.0	25.2	0.0
FEB	505.5	0.0	0.0	18.0	26.2	0.0
MAR	461.3	76.7	0.0	19.0	32.4	0.0
		1130.2	0.0	200.0	352.6	522.3
1980						
APR	486.6	3.1	0.0	21.0	30.3	0.0
MAY	436.4	532.2	0.0	18.0	40.9	243.7
JUN	668.0	895.4	0.0	19.0	27.8	848.7
JUL	668.0	346.9	0.0	15.0	38.0	293.8
AUG	668.0	372.0	0.0	15.0	35.5	321.6
SEP	668.0	1146.7	0.0	14.0	23.3	1109.4
OCT	668.0	165.2	0.0	13.0	23.9	128.3
NOV	668.0	0.2	0.0	16.0	25.6	0.0
DEC	626.6	0.0	0.0	17.0	25.8	0.0
JAN	583.8	0.0	0.0	15.0	25.9	0.0
FEB	542.9	18.2	0.0	18.0	28.0	0.0
MAR	515.1	0.0	0.0	19.0	32.7	0.0
		3480.0	0.0	200.0	357.6	2945.6
1981						
APR	463.4	14.6	0.0	21.0	27.5	0.0
MAY	429.5	397.1	0.0	18.0	33.2	107.3
JUN	668.0	10.7	0.0	19.0	33.6	0.0
JUL	626.1	371.1	0.0	15.0	30.0	284.2
AUG	668.0	35.5	0.0	15.0	34.8	0.0
SEP	653.7	463.0	0.0	14.0	31.1	403.6
OCT	668.0	78.5	0.0	13.0	28.6	36.8
NOV	668.0	226.6	0.0	16.0	22.6	187.9
DEC	668.0	0.0	0.0	17.0	26.2	0.0
JAN	624.8	0.0	0.0	15.0	25.1	0.0
FEB	584.7	9.0	0.0	18.0	26.3	0.0
MAR	549.4	0.2	0.0	19.0	29.5	0.0
		1606.1	0.0	200.0	348.5	1020.0
1982						
APR	501.0	10.2	0.0	21.0	28.0	0.0
MAY	462.3	19.4	0.0	18.0	30.9	0.0
JUN	432.7	401.6	0.0	19.0	41.6	105.7
JUL	668.0	370.6	0.0	15.0	41.8	313.8
AUG	668.0	350.1	0.0	15.0	33.6	301.5
SEP	668.0	1392.2	0.0	14.0	23.6	1354.7
OCT	668.0	25.4	0.0	13.0	26.5	0.0
NOV	653.9	0.0	0.0	16.0	25.9	0.0
DEC	612.0	0.0	0.0	17.0	22.9	0.0
JAN	572.1	0.0	0.0	15.0	22.3	0.0
FEB	534.8	0.0	0.0	18.0	23.3	0.0
MAR	493.5	0.0	0.0	19.0	31.0	0.0
		2569.5	0.0	200.0	351.4	2075.7
1983						
APR	443.5	1.6	0.0	21.0	29.9	0.0
MAY	394.1	19.1	0.0	18.0	19.3	0.0
JUN	375.9	110.0	0.0	19.0	24.4	0.0
JUL	442.5	517.3	0.0	15.0	33.6	243.2
AUG	668.0	619.2	0.0	15.0	27.7	576.5
SEP	668.0	1153.4	0.0	14.0	23.4	1116.1
OCT	668.0	1401.6	0.0	13.0	22.7	1365.9
NOV	668.0	26.0	0.0	16.0	24.5	0.0
DEC	653.6	0.0	0.0	17.0	23.7	0.0
JAN	612.9	0.0	0.0	15.0	23.2	0.0
FEB	574.6	0.0	0.0	18.0	27.3	0.0
MAR	529.3	0.0	0.0	19.0	30.5	0.0
		3848.3	0.0	200.0	310.3	3301.6
1984						
APR	479.8	27.5	0.0	21.0	31.3	0.0
MAY	455.1	843.1	0.0	18.0	35.4	576.8
JUN	668.0	71.3	0.0	19.0	34.8	17.5
JUL	668.0	155.4	0.0	15.0	34.7	105.6
AUG	668.0	380.8	0.0	15.0	32.6	333.2
SEP	668.0	374.9	0.0	14.0	28.0	332.9
OCT	668.0	270.4	0.0	13.0	25.7	231.7
NOV	668.0	0.0	0.0	16.0	26.9	0.0
DEC	625.1	0.0	0.0	17.0	27.1	0.0
JAN	581.0	58.8	0.0	15.0	25.4	0.0
FEB	594.4	39.6	0.0	18.0	27.1	0.0
MAR	593.8	0.1	0.0	19.0	32.6	0.0
		2221.8	0.0	200.0	361.5	1597.7

Table A-3-40 Water Balance Simulation at Nong Takai Reservoir (1963-1970)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1963						
NOV	491.0	73.4	0.0	51.0	22.4	0.1
DEC	491.0	0.0	0.0	53.0	22.6	0.0
JAN	415.4	0.0	0.0	49.0	24.8	0.0
FEB	341.6	0.0	0.0	47.0	23.1	0.0
MAR	271.5	1.0	0.0	60.0	24.5	0.0
		74.4	0.0	260.0	117.4	0.1
1964						
APR	187.9	4.5	0.0	67.0	19.1	0.0
MAY	106.3	1103.0	0.0	57.0	28.8	632.6
JUN	491.0	37.3	0.0	63.0	34.7	0.0
JUL	430.6	266.8	0.0	47.0	30.5	129.0
AUG	491.0	259.8	0.0	48.0	32.5	179.3
SEP	491.0	706.3	0.0	45.0	23.7	637.5
OCT	491.0	543.1	0.0	43.0	25.3	474.8
NOV	491.0	2.4	0.0	51.0	21.3	0.0
DEC	421.2	0.0	0.0	53.0	21.0	0.0
JAN	347.1	0.0	0.0	49.0	19.6	0.0
FEB	278.5	79.4	0.0	47.0	18.2	0.0
MAR	292.7	1.0	0.0	60.0	22.7	0.0
		3003.7	0.0	630.0	297.3	2053.3
1965						
APR	211.1	77.4	0.0	67.0	25.0	0.0
MAY	196.5	403.9	0.0	57.0	32.1	20.3
JUN	491.0	11.7	0.0	63.0	29.6	0.0
JUL	410.1	65.2	0.0	47.0	31.9	0.0
AUG	396.4	385.8	0.0	48.0	30.1	213.1
SEP	491.0	673.3	0.0	45.0	27.8	600.5
OCT	491.0	41.6	0.0	43.0	28.3	0.0
NOV	461.3	0.0	0.0	51.0	26.3	0.0
DEC	384.0	0.0	0.0	53.0	25.0	0.0
JAN	306.0	0.0	0.0	49.0	21.5	0.0
FEB	235.5	22.1	0.0	47.0	18.9	0.0
MAR	191.6	24.5	0.0	60.0	25.8	0.0
		1705.6	0.0	630.0	322.4	833.9
1966						
APR	130.3	27.9	0.0	67.0	12.3	0.0
MAY	78.9	1064.5	0.0	57.0	32.6	562.8
JUN	491.0	16.2	0.0	63.0	35.5	0.0
JUL	408.7	376.1	0.0	47.0	33.0	213.8
AUG	491.0	241.6	0.0	48.0	27.6	166.0
SEP	491.0	881.1	0.0	45.0	27.2	808.9
OCT	491.0	144.8	0.0	43.0	26.5	75.3
NOV	491.0	0.0	0.0	51.0	23.3	0.0
DEC	416.7	0.0	0.0	53.0	21.0	0.0
JAN	342.7	0.0	0.0	49.0	23.4	0.0
FEB	270.3	0.0	0.0	47.0	19.7	0.0
MAR	203.6	0.0	0.0	60.0	23.2	0.0
		2752.3	0.0	630.0	305.4	1826.8
1967						
APR	120.4	81.1	0.0	67.0	20.2	0.0
MAY	114.3	334.0	0.0	57.0	32.5	0.0
JUN	358.9	178.2	0.0	63.0	34.4	0.0
JUL	439.7	64.0	0.0	47.0	33.4	0.0
AUG	423.3	113.3	0.0	48.0	34.2	0.0
SEP	454.3	339.2	0.0	45.0	26.4	231.1
OCT	491.0	27.3	0.0	43.0	26.9	0.0
NOV	448.4	31.9	0.0	51.0	24.2	0.0
DEC	405.1	0.0	0.0	53.0	23.8	0.0
JAN	328.3	0.0	0.0	49.0	22.9	0.0
FEB	256.3	0.0	0.0	47.0	21.4	0.0
MAR	187.9	0.0	0.0	60.0	19.3	0.0
		1169.0	0.0	630.0	319.7	231.1
1968						
APR	108.6	61.6	0.0	67.0	14.8	0.0
MAY	88.4	314.5	0.0	57.0	29.8	0.0
JUN	316.1	212.5	0.0	63.0	34.3	0.0
JUL	431.3	200.0	0.0	47.0	33.9	59.4
AUG	491.0	309.9	0.0	48.0	36.9	225.0
SEP	491.0	623.1	0.0	45.0	29.0	549.1
OCT	491.0	5.6	0.0	43.0	27.8	0.0
NOV	425.8	0.0	0.0	51.0	27.9	0.0
DEC	346.9	0.0	0.0	53.0	24.6	0.0
JAN	269.3	0.0	0.0	49.0	20.6	0.0
FEB	199.7	0.0	0.0	47.0	23.3	0.0
MAR	129.4	10.2	0.0	60.0	13.4	0.0
		1737.5	0.0	630.0	316.3	833.5
1969						
APR	66.3	0.3	0.0	67.0	0.0	-0.4
MAY	0.0	213.8	0.0	57.0	21.7	0.0
JUN	135.1	526.1	0.0	63.0	33.4	73.7
JUL	491.0	58.2	0.0	47.0	29.2	0.0
AUG	473.0	24.9	0.0	48.0	30.2	0.0
SEP	419.7	977.4	0.0	45.0	27.8	833.3
OCT	491.0	418.9	0.0	43.0	27.8	348.1
NOV	491.0	0.0	0.0	51.0	24.7	0.0
DEC	415.3	0.0	0.0	53.0	24.6	0.0
JAN	337.7	0.0	0.0	49.0	21.9	0.0
FEB	266.7	0.0	0.0	47.0	14.1	0.0
MAR	205.6	16.3	0.0	60.0	25.2	0.0
		2235.8	0.0	630.0	280.7	1254.8
1970						
APR	136.7	12.4	0.0	67.0	10.8	0.0
MAY	71.3	359.1	0.0	57.0	30.0	0.0
JUN	343.4	144.8	0.0	63.0	26.5	0.0
JUL	398.7	75.5	0.0	47.0	29.5	0.0
AUG	397.7	248.4	0.0	48.0	26.8	80.3
SEP	491.0	562.0	0.0	45.0	27.4	489.6
OCT	491.0	69.0	0.0	43.0	27.1	0.0
NOV	489.9	0.0	0.0	51.0	24.3	0.0
DEC	414.6	4.2	0.0	53.0	20.4	0.0
JAN	345.4	0.0	0.0	49.0	22.2	0.0
FEB	274.2	0.0	0.0	47.0	18.9	0.0
MAR	208.3	15.9	0.0	60.0	23.3	0.0
		1491.4	0.0	630.0	287.2	569.9

Table A-3-41 Water Balance Simulation at Nong Takai Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	140.9	66.5	0.0	67.0	19.7	0.0
MAY	120.7	120.3	0.0	57.0	20.1	0.0
JUN	163.9	468.1	0.0	63.0	30.5	47.6
JUL	491.0	75.5	0.0	47.0	27.8	0.8
AUG	491.0	142.0	0.0	48.0	29.6	64.4
SEP	491.0	733.6	0.0	45.0	26.9	661.7
OCT	491.0	28.4	0.0	43.0	16.0	0.0
NOV	460.4	0.0	0.0	51.0	25.5	0.0
DEC	383.9	0.0	0.0	53.0	22.7	0.0
JAN	308.2	0.0	0.0	49.0	22.0	0.0
FEB	237.2	0.0	0.0	47.0	22.1	0.0
MAR	168.1	44.7	0.0	60.0	21.1	0.0
		1679.0	0.0	630.0	283.9	774.4
1972						
APR	131.6	216.0	0.0	67.0	25.9	0.0
MAY	254.8	3.2	0.0	57.0	33.6	0.0
JUN	167.3	354.1	0.0	63.0	31.9	0.0
JUL	426.6	16.1	0.0	47.0	34.8	0.0
AUG	360.9	22.1	0.0	48.0	31.8	0.0
SEP	303.2	2003.4	0.0	45.0	24.6	1746.1
OCT	491.0	382.4	0.0	43.0	27.2	312.2
NOV	491.0	26.4	0.0	51.0	22.7	0.0
DEC	443.7	0.0	0.0	53.0	22.1	0.0
JAN	368.5	0.0	0.0	49.0	23.9	0.0
FEB	295.7	0.0	0.0	47.0	23.6	0.0
MAR	225.0	3.4	0.0	60.0	22.7	0.0
		3027.1	0.0	630.0	324.7	2058.3
1973						
APR	145.8	156.2	0.0	67.0	28.3	0.0
MAY	208.6	53.3	0.0	57.0	25.1	0.0
JUN	179.8	264.7	0.0	63.0	30.8	0.0
JUL	350.7	210.6	0.0	47.0	30.1	0.0
AUG	484.1	13.2	0.0	48.0	29.5	0.0
SEP	419.8	774.0	0.0	45.0	26.9	630.9
OCT	491.0	50.0	0.0	43.0	27.2	0.0
NOV	470.8	0.0	0.0	51.0	24.2	0.0
DEC	395.6	0.0	0.0	53.0	23.6	0.0
JAN	319.0	0.0	0.0	49.0	19.7	0.0
FEB	250.3	19.7	0.0	47.0	20.2	0.0
MAR	202.8	188.8	0.0	60.0	23.8	0.0
		1732.5	0.0	630.0	309.5	630.9
1974						
APR	307.9	16.4	0.0	67.0	24.8	0.0
MAY	232.5	338.4	0.0	57.0	33.9	0.0
JUN	480.0	44.7	0.0	63.0	32.9	0.0
JUL	428.8	114.0	0.0	47.0	36.0	0.0
AUG	459.8	95.9	0.0	48.0	27.2	0.0
SEP	480.4	674.4	0.0	45.0	29.0	589.8
OCT	491.0	542.6	0.0	43.0	26.5	473.2
NOV	491.0	116.3	0.0	51.0	23.0	42.3
DEC	491.0	0.0	0.0	53.0	25.7	0.0
JAN	412.3	0.0	0.0	49.0	19.4	0.0
FEB	343.9	0.0	0.0	47.0	22.5	0.0
MAR	274.4	0.4	0.0	60.0	22.7	0.0
		1943.0	0.0	630.0	323.5	1105.2

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1975						
APR	192.2	0.0	0.0	67.0	20.7	0.0
MAY	104.5	376.9	0.0	57.0	31.0	0.0
JUN	393.4	139.9	0.0	63.0	31.5	0.0
JUL	438.8	411.4	0.0	47.0	32.7	279.5
AUG	491.0	28.7	0.0	48.0	28.8	0.0
SEP	443.0	547.2	0.0	45.0	24.4	429.7
OCT	491.0	161.8	0.0	43.0	24.0	94.8
NOV	491.0	16.7	0.0	51.0	23.4	0.0
DEC	433.3	0.0	0.0	53.0	23.6	0.0
JAN	356.7	0.0	0.0	49.0	22.8	0.0
FEB	284.9	2.7	0.0	47.0	19.5	0.0
MAR	221.1	28.6	0.0	60.0	22.8	0.0
		1713.8	0.0	630.0	305.1	804.1
1976						
APR	166.9	0.0	0.0	67.0	15.2	0.0
MAY	84.6	95.2	0.0	57.0	16.3	0.0
JUN	106.6	10.3	0.0	63.0	8.3	0.0
JUL	45.6	153.6	0.0	47.0	21.6	0.0
AUG	130.6	194.5	0.0	48.0	20.2	0.0
SEP	256.9	493.3	0.0	45.0	26.8	187.5
OCT	491.0	589.0	0.0	43.0	30.6	515.4
NOV	491.0	0.0	0.0	51.0	25.7	0.0
DEC	414.3	0.0	0.0	53.0	22.0	0.0
JAN	339.3	0.0	0.0	49.0	20.1	0.0
FEB	270.2	0.0	0.0	47.0	19.3	0.0
MAR	203.9	0.0	0.0	60.0	20.8	0.0
		1536.0	0.0	630.0	246.9	702.9
1977						
APR	123.1	61.9	0.0	67.0	17.1	0.0
MAY	100.9	48.4	0.0	57.0	13.1	0.0
JUN	79.2	31.4	0.0	63.0	7.1	0.0
JUL	40.4	33.1	0.0	47.0	3.2	0.0
AUG	23.3	902.4	0.0	48.0	28.3	358.5
SEP	491.0	355.8	0.0	45.0	21.5	289.3
OCT	491.0	59.5	0.0	43.0	26.9	0.0
NOV	480.6	0.0	0.0	51.0	22.8	0.0
DEC	406.8	0.0	0.0	53.0	25.1	0.0
JAN	328.7	0.0	0.0	49.0	21.3	0.0
FEB	256.4	12.0	0.0	47.0	17.6	0.0
MAR	205.8	2.0	0.0	60.0	22.5	0.0
		1506.6	0.0	630.0	226.6	647.8
1978						
APR	125.3	2.3	0.0	67.0	8.6	0.0
MAY	52.0	115.6	0.0	57.0	14.7	0.0
JUN	95.9	28.2	0.0	63.0	8.0	0.0
JUL	53.1	64.4	0.0	47.0	6.7	0.0
AUG	63.8	47.2	0.0	48.0	6.9	0.0
SEP	56.1	410.9	0.0	45.0	21.3	0.0
OCT	400.7	68.8	0.0	43.0	26.1	0.0
NOV	400.4	2.6	0.0	51.0	21.9	0.0
DEC	330.2	0.0	0.0	53.0	21.3	0.0
JAN	255.8	0.0	0.0	49.0	20.5	0.0
FEB	186.4	0.0	0.0	47.0	18.4	0.0
MAR	120.9	0.0	0.0	60.0	11.0	0.0
		740.0	0.0	630.0	185.4	0.0

Table A-3-42 Water Balance Simulation at Nong Takai Reservoir (1979-1984)

(Unit : 1000 cu.m)

1979	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	49.9	16.7	0.0	67.0	0.0	-0.4
MAY	0.0	89.4	0.0	57.0	4.6	0.0
JUN	27.7	63.5	0.0	63.0	2.6	0.0
JUL	25.6	23.5	0.0	47.0	0.3	0.0
AUG	1.8	28.5	0.0	48.0	0.0	-17.7
SEP	0.0	554.3	0.0	45.0	22.6	0.0
OCT	486.6	14.3	0.0	43.0	30.4	0.0
NOV	427.6	0.0	0.0	51.0	29.0	0.0
DEC	347.6	0.0	0.0	53.0	21.9	0.0
JAN	272.7	0.0	0.0	49.0	19.3	0.0
FEB	204.3	0.0	0.0	47.0	19.0	0.0
MAR	138.3	57.5	0.0	60.0	19.5	0.0
		847.6	0.0	630.0	169.3	-18.1
1980						
APR	116.3	2.3	0.0	67.0	6.9	0.0
MAY	44.8	399.1	0.0	57.0	33.2	0.0
JUN	353.8	671.6	0.0	63.0	25.6	445.7
JUL	491.0	260.2	0.0	47.0	35.1	178.0
AUG	491.0	279.0	0.0	48.0	32.8	198.3
SEP	491.0	860.0	0.0	45.0	21.5	793.5
OCT	491.0	123.9	0.0	43.0	22.1	58.8
NOV	491.0	0.1	0.0	51.0	22.7	0.0
DEC	417.5	0.0	0.0	53.0	22.0	0.0
JAN	342.5	0.0	0.0	49.0	21.1	0.0
FEB	272.4	13.7	0.0	47.0	21.7	0.0
MAR	217.4	0.0	0.0	60.0	23.4	0.0
		2610.0	0.0	630.0	288.0	1674.4
1981						
APR	134.0	10.9	0.0	67.0	10.2	0.0
MAY	67.6	297.8	0.0	57.0	24.2	0.0
JUN	284.3	8.1	0.0	63.0	21.9	0.0
JUL	207.4	278.3	0.0	47.0	26.0	0.0
AUG	412.7	26.6	0.0	48.0	28.4	0.0
SEP	362.9	347.2	0.0	45.0	28.7	145.5
OCT	491.0	58.9	0.0	43.0	26.5	0.0
NOV	480.4	169.9	0.0	51.0	20.9	87.4
DEC	491.0	0.0	0.0	53.0	23.2	0.0
JAN	414.8	0.0	0.0	49.0	21.4	0.0
FEB	344.4	6.8	0.0	47.0	21.6	0.0
MAR	282.6	0.1	0.0	60.0	22.6	0.0
		1204.6	0.0	630.0	275.6	232.9
1982						
APR	200.1	7.7	0.0	67.0	18.2	0.0
MAY	122.6	14.5	0.0	57.0	11.8	0.0
JUN	68.3	301.2	0.0	63.0	30.2	0.0
JUL	276.3	277.9	0.0	47.0	38.6	0.0
AUG	468.6	262.6	0.0	48.0	31.0	161.2
SEP	491.0	1044.2	0.0	45.0	21.8	977.4
OCT	491.0	19.0	0.0	43.0	23.8	0.0
NOV	443.2	0.0	0.0	51.0	22.0	0.0
DEC	370.2	0.0	0.0	53.0	18.6	0.0
JAN	298.6	0.0	0.0	49.0	17.2	0.0
FEB	232.4	0.0	0.0	47.0	17.1	0.0
MAR	168.3	0.0	0.0	60.0	15.9	0.0
		1927.1	0.0	630.0	266.2	1138.6

1983	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	92.4	1.2	0.0	67.0	4.1	0.0
MAY	22.6	14.3	0.0	57.0	0.0	-20.1
JUN	0.0	82.5	0.0	63.0	2.1	0.0
JUL	17.4	388.0	0.0	47.0	26.3	0.0
AUG	332.1	464.4	0.0	48.0	25.6	231.9
SEP	491.0	865.1	0.0	45.0	21.6	798.5
OCT	491.0	1051.2	0.0	43.0	21.0	987.2
NOV	491.0	19.5	0.0	51.0	21.8	0.0
DEC	437.8	0.0	0.0	53.0	20.0	0.0
JAN	364.7	0.0	0.0	49.0	18.8	0.0
FEB	297.0	0.0	0.0	47.0	21.1	0.0
MAR	228.8	0.0	0.0	60.0	21.8	0.0
		2886.2	0.0	630.0	204.1	1997.5
1984						
APR	147.0	20.6	0.0	67.0	14.6	0.0
MAY	86.0	632.3	0.0	57.0	32.7	137.6
JUN	491.0	53.4	0.0	63.0	31.8	0.0
JUL	449.7	116.5	0.0	47.0	32.1	0.0
AUG	487.1	265.6	0.0	48.0	30.1	203.6
SEP	491.0	281.2	0.0	45.0	25.9	210.3
OCT	491.0	202.8	0.0	43.0	23.7	136.1
NOV	491.0	0.0	0.0	51.0	23.8	0.0
DEC	416.2	0.0	0.0	53.0	23.1	0.0
JAN	340.1	44.1	0.0	49.0	20.3	0.0
FEB	314.8	29.7	0.0	47.0	20.7	0.0
MAR	276.8	0.1	0.0	60.0	23.3	0.0
		1666.4	0.0	630.0	302.1	687.7

Table A-3-43 Water Balance Simulation at Tung Kraten Reservoir (1963-1970)

(Unit : 1000 cu.m)

1963	Volume	Inflow	Irrigation	Water Works	Losses	Spill
NOV	1600.0	285.6	0.0	65.0	136.8	83.8
DEC	1600.0	0.0	0.0	68.0	142.2	0.0
JAN	1389.8	0.0	0.0	62.0	152.0	0.0
FEB	1175.8	0.0	0.0	72.0	135.6	0.0
MAR	968.2	3.7	0.0	76.0	139.7	0.0
		289.3	0.0	343.0	706.3	83.8
1964						
APR	756.2	17.5	0.0	84.0	119.9	0.0
MAY	569.9	4289.6	0.0	71.0	176.0	3012.4
JUN	1600.0	145.2	0.0	80.0	218.8	0.0
JUL	1446.4	1037.7	0.0	60.0	186.7	637.4
AUG	1600.0	1010.4	0.0	61.0	198.6	750.7
SEP	1600.0	2746.6	0.0	57.0	145.1	2544.4
OCT	1600.0	2112.1	0.0	54.0	154.6	1903.5
NOV	1600.0	9.4	0.0	65.0	134.0	0.0
DEC	1410.5	0.0	0.0	68.0	129.7	0.0
JAN	1212.8	0.0	0.0	62.0	118.3	0.0
FEB	1032.6	308.6	0.0	72.0	116.0	0.0
MAR	1153.1	3.9	0.0	76.0	143.8	0.0
		11681.0	0.0	810.0	1841.6	8848.4
1965						
APR	937.2	301.1	0.0	84.0	170.5	0.0
MAY	983.7	1570.8	0.0	71.0	196.2	687.3
JUN	1600.0	45.5	0.0	80.0	189.2	0.0
JUL	1376.3	253.7	0.0	60.0	207.2	0.0
AUG	1362.8	1500.4	0.0	61.0	184.4	1017.9
SEP	1600.0	2618.3	0.0	57.0	170.1	2391.2
OCT	1600.0	161.9	0.0	54.0	173.6	0.0
NOV	1534.3	0.0	0.0	65.0	165.1	0.0
DEC	1304.2	0.0	0.0	68.0	152.1	0.0
JAN	1084.0	0.0	0.0	62.0	126.1	0.0
FEB	895.9	85.9	0.0	72.0	109.6	0.0
MAR	800.2	95.1	0.0	76.0	152.6	0.0
		6632.8	0.0	810.0	1996.8	4096.4
1966						
APR	666.8	108.4	0.0	84.0	106.2	0.0
MAY	585.0	4139.9	0.0	71.0	199.6	2854.3
JUN	1600.0	63.0	0.0	80.0	227.9	0.0
JUL	1355.1	1462.6	0.0	60.0	202.0	955.8
AUG	1600.0	939.5	0.0	61.0	169.1	709.4
SEP	1600.0	3426.4	0.0	57.0	166.2	3203.3
OCT	1600.0	563.3	0.0	54.0	162.2	347.1
NOV	1600.0	0.0	0.0	65.0	146.5	0.0
DEC	1388.5	0.0	0.0	68.0	128.6	0.0
JAN	1192.0	0.0	0.0	62.0	140.1	0.0
FEB	989.9	0.0	0.0	72.0	112.3	0.0
MAR	805.6	0.0	0.0	76.0	134.3	0.0
		10703.2	0.0	810.0	1894.8	8069.9

1967	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	595.3	315.5	0.0	84.0	139.2	0.0
MAY	687.6	1299.0	0.0	71.0	224.9	90.7
JUN	1600.0	693.1	0.0	80.0	214.8	398.3
JUL	1600.0	248.9	0.0	60.0	213.0	0.0
AUG	1575.9	440.4	0.0	61.0	209.8	145.6
SEP	1600.0	1319.1	0.0	57.0	161.5	1100.6
OCT	1600.0	106.2	0.0	54.0	167.8	0.0
NOV	1484.3	124.0	0.0	65.0	154.5	0.0
DEC	1388.8	0.0	0.0	68.0	148.3	0.0
JAN	1172.5	0.0	0.0	62.0	138.4	0.0
FEB	972.1	0.0	0.0	72.0	123.3	0.0
MAR	776.8	0.0	0.0	76.0	120.5	0.0
		4546.3	0.0	810.0	2016.1	1735.2
1968						
APR	580.3	239.5	0.0	84.0	120.3	0.0
MAY	615.6	1223.1	0.0	71.0	218.8	0.0
JUN	1548.8	826.4	0.0	80.0	216.5	478.8
JUL	1600.0	777.9	0.0	60.0	207.7	510.2
AUG	1600.0	1205.2	0.0	61.0	225.9	918.4
SEP	1600.0	2423.2	0.0	57.0	177.7	2188.5
OCT	1600.0	21.8	0.0	54.0	174.8	0.0
NOV	1393.0	0.0	0.0	65.0	169.4	0.0
DEC	1158.6	0.0	0.0	68.0	143.0	0.0
JAN	947.6	0.0	0.0	62.0	114.8	0.0
FEB	770.8	0.0	0.0	72.0	121.3	0.0
MAR	577.4	39.8	0.0	76.0	104.3	0.0
		6756.9	0.0	810.0	1994.5	4095.8
1969						
APR	437.0	1.1	0.0	84.0	65.7	0.0
MAY	288.4	831.3	0.0	71.0	154.0	0.0
JUN	894.7	2045.9	0.0	80.0	204.6	1056.0
JUL	1600.0	226.3	0.0	60.0	178.6	0.0
AUG	1587.7	96.9	0.0	61.0	193.7	0.0
SEP	1429.8	3801.0	0.0	57.0	170.2	3403.6
OCT	1600.0	1628.9	0.0	54.0	170.0	1405.0
NOV	1600.0	0.0	0.0	65.0	153.3	0.0
DEC	1379.7	0.0	0.0	68.0	150.2	0.0
JAN	1161.5	0.0	0.0	62.0	129.4	0.0
FEB	970.1	0.0	0.0	72.0	79.6	0.0
MAR	818.5	63.4	0.0	76.0	145.8	0.0
		8694.8	0.0	810.0	1797.1	5864.6
1970						
APR	660.1	48.3	0.0	84.0	94.0	0.0
MAY	530.3	1396.3	0.0	71.0	212.5	43.1
JUN	1600.0	563.3	0.0	80.0	175.8	307.5
JUL	1600.0	293.7	0.0	60.0	194.9	38.7
AUG	1600.0	966.0	0.0	61.0	163.9	741.1
SEP	1600.0	2185.4	0.0	57.0	167.5	1960.9
OCT	1600.0	268.4	0.0	54.0	165.7	48.7
NOV	1600.0	0.0	0.0	65.0	153.0	0.0
DEC	1382.0	16.5	0.0	68.0	125.5	0.0
JAN	1205.0	0.0	0.0	62.0	133.5	0.0
FEB	1009.5	0.0	0.0	72.0	108.9	0.0
MAR	828.7	62.0	0.0	76.0	135.2	0.0
		5799.7	0.0	810.0	1830.4	3140.0

Table A-3-44 Water Balance Simulation at Tung Kraten Reservoir (1971-1978)

(Unit : 1000 cu.m)

1971	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	679.4	258.6	0.0	84.0	133.0	0.0
MAY	720.9	467.9	0.0	71.0	142.9	0.0
JUN	974.9	1820.5	0.0	80.0	186.6	928.8
JUL	1600.0	293.7	0.0	60.0	169.8	63.8
AUG	1600.0	552.1	0.0	61.0	180.9	310.2
SEP	1600.0	2852.8	0.0	57.0	164.4	2631.4
OCT	1600.0	110.3	0.0	54.0	99.6	0.0
NOV	1556.7	0.0	0.0	65.0	162.5	0.0
DEC	1329.2	0.0	0.0	68.0	140.0	0.0
JAN	1121.2	0.0	0.0	62.0	132.2	0.0
FEB	927.0	0.0	0.0	72.0	126.6	0.0
MAR	728.4	173.7	0.0	76.0	128.2	0.0
		6529.5	0.0	810.0	1766.7	3934.3
1972						
APR	698.0	840.0	0.0	84.0	193.2	0.0
MAY	1260.7	12.3	0.0	71.0	245.3	0.0
JUN	956.7	1377.2	0.0	80.0	202.6	451.4
JUL	1600.0	62.7	0.0	60.0	239.2	0.0
AUG	1363.5	85.9	0.0	61.0	211.0	0.0
SEP	1177.4	7791.0	0.0	57.0	150.3	7161.1
OCT	1600.0	1487.2	0.0	54.0	166.5	1266.7
NOV	1600.0	102.6	0.0	65.0	143.1	0.0
DEC	1494.5	0.0	0.0	68.0	139.2	0.0
JAN	1287.3	0.0	0.0	62.0	146.5	0.0
FEB	1078.8	0.0	0.0	72.0	138.6	0.0
MAR	868.2	13.4	0.0	76.0	129.7	0.0
		11772.2	0.0	810.0	2105.1	8879.2
1973						
APR	675.9	615.3	0.0	84.0	195.1	0.0
MAY	1012.1	207.2	0.0	71.0	175.7	0.0
JUN	972.7	1029.5	0.0	80.0	216.1	106.0
JUL	1600.0	819.0	0.0	60.0	184.4	574.7
AUG	1600.0	51.2	0.0	61.0	188.6	0.0
SEP	1401.5	3010.0	0.0	57.0	164.7	2589.8
OCT	1600.0	194.3	0.0	54.0	166.5	0.0
NOV	1573.8	0.0	0.0	65.0	153.7	0.0
DEC	1355.1	0.0	0.0	68.0	145.6	0.0
JAN	1141.5	0.0	0.0	62.0	118.0	0.0
FEB	961.5	76.8	0.0	72.0	119.9	0.0
MAR	846.4	734.3	0.0	76.0	169.4	0.0
		6737.5	0.0	810.0	1997.6	3270.5
1974						
APR	1335.3	63.7	0.0	84.0	176.7	0.0
MAY	1138.4	1316.0	0.0	71.0	207.2	576.2
JUN	1600.0	173.7	0.0	80.0	208.6	0.0
JUL	1465.1	443.2	0.0	60.0	220.0	48.2
AUG	1600.0	372.9	0.0	61.0	166.5	145.4
SEP	1600.0	2622.6	0.0	57.0	177.5	2388.2
OCT	1600.0	2110.1	0.0	54.0	161.9	1894.3
NOV	1600.0	452.2	0.0	65.0	140.9	246.3
DEC	1600.0	0.0	0.0	68.0	161.4	0.0
JAN	1370.6	0.0	0.0	62.0	118.0	0.0
FEB	1190.6	0.0	0.0	72.0	133.1	0.0
MAR	985.5	1.7	0.0	76.0	130.4	0.0
		7556.3	0.0	810.0	2002.2	5298.6

1975	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	780.8	0.0	0.0	84.0	131.3	0.0
MAY	565.5	1465.9	0.0	71.0	205.5	154.9
JUN	1600.0	544.1	0.0	80.0	197.6	266.6
JUL	1600.0	1599.7	0.0	60.0	199.9	1339.8
AUG	1600.0	111.6	0.0	61.0	180.0	0.0
SEP	1470.7	2127.8	0.0	57.0	149.1	1792.4
OCT	1600.0	629.2	0.0	54.0	146.7	428.6
NOV	1600.0	64.8	0.0	65.0	149.0	0.0
DEC	1450.8	0.0	0.0	68.0	146.8	0.0
JAN	1235.9	0.0	0.0	62.0	137.6	0.0
FEB	1036.3	10.5	0.0	72.0	112.8	0.0
MAR	862.0	111.2	0.0	76.0	135.6	0.0
		6664.9	0.0	810.0	1891.9	3982.2
1976						
APR	761.6	0.0	0.0	84.0	117.8	0.0
MAY	559.8	370.4	0.0	71.0	126.8	0.0
JUN	732.4	40.1	0.0	80.0	131.7	0.0
JUL	560.9	597.4	0.0	60.0	163.0	0.0
AUG	935.3	756.5	0.0	61.0	164.5	0.0
SEP	1466.3	1918.4	0.0	57.0	163.8	1564.0
OCT	1600.0	2290.5	0.0	54.0	187.1	2049.4
NOV	1600.0	0.0	0.0	65.0	161.4	0.0
DEC	1373.6	0.0	0.0	68.0	133.8	0.0
JAN	1171.8	0.0	0.0	62.0	119.3	0.0
FEB	990.5	0.0	0.0	72.0	110.3	0.0
MAR	808.1	0.0	0.0	76.0	120.6	0.0
		5973.3	0.0	810.0	1700.0	3613.3
1977						
APR	611.5	240.8	0.0	84.0	127.3	0.0
MAY	641.0	188.3	0.0	71.0	123.1	0.0
JUN	635.3	122.0	0.0	80.0	126.1	0.0
JUL	551.2	128.9	0.0	60.0	92.8	0.0
AUG	527.3	3509.4	0.0	61.0	172.9	2202.8
SEP	1600.0	1383.6	0.0	57.0	131.5	1195.0
OCT	1600.0	231.5	0.0	54.0	164.8	12.7
NOV	1600.0	0.0	0.0	65.0	145.2	0.0
DEC	1389.8	0.0	0.0	68.0	155.8	0.0
JAN	1166.0	0.0	0.0	62.0	128.0	0.0
FEB	975.9	46.7	0.0	72.0	103.1	0.0
MAR	847.6	7.7	0.0	76.0	135.2	0.0
		5859.0	0.0	810.0	1606.0	3410.5
1978						
APR	644.0	8.8	0.0	84.0	96.6	0.0
MAY	472.2	449.5	0.0	71.0	125.8	0.0
JUN	724.9	109.8	0.0	80.0	118.9	0.0
JUL	635.8	250.3	0.0	60.0	90.9	0.0
AUG	735.2	183.6	0.0	61.0	109.7	0.0
SEP	748.1	1598.0	0.0	57.0	141.9	547.2
OCT	1600.0	267.7	0.0	54.0	172.3	41.3
NOV	1600.0	10.3	0.0	65.0	155.3	0.0
DEC	1390.0	0.0	0.0	68.0	148.2	0.0
JAN	1173.8	0.0	0.0	62.0	138.9	0.0
FEB	973.0	0.0	0.0	72.0	130.9	0.0
MAR	770.1	0.0	0.0	76.0	150.9	0.0
		2878.0	0.0	810.0	1580.2	588.6

Table A-3-45 Water Balance Simulation at Tung Kraten Reservoir (1979-1984)

(Unit : 1000 cu.m)

1979	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	543.3	64.8	0.0	84.0	97.0	0.0
MAY	427.0	347.6	0.0	71.0	125.0	0.0
JUN	578.6	246.9	0.0	80.0	86.2	0.0
JUL	659.3	91.3	0.0	60.0	107.4	0.0
AUG	583.3	110.7	0.0	61.0	91.1	0.0
SEP	541.9	2155.5	0.0	57.0	138.6	901.9
OCT	1600.0	55.8	0.0	54.0	193.2	0.0
NOV	1408.6	0.0	0.0	65.0	177.2	0.0
DEC	1166.4	0.0	0.0	68.0	128.1	0.0
JAN	970.3	0.0	0.0	62.0	109.3	0.0
FEB	799.0	0.0	0.0	72.0	100.9	0.0
MAR	626.1	223.7	0.0	76.0	126.7	0.0
		3296.3	0.0	810.0	1480.6	901.9
1980						
APR	647.1	9.1	0.0	84.0	94.0	0.0
MAY	478.2	1552.2	0.0	71.0	231.0	128.5
JUN	1600.0	2611.7	0.0	80.0	156.9	2374.8
JUL	1600.0	1011.7	0.0	60.0	214.9	736.8
AUG	1600.0	1085.1	0.0	61.0	200.4	823.7
SEP	1600.0	3344.4	0.0	57.0	131.5	3155.9
OCT	1600.0	481.9	0.0	54.0	135.1	292.8
NOV	1600.0	0.6	0.0	65.0	142.5	0.0
DEC	1393.1	0.0	0.0	68.0	134.8	0.0
JAN	1190.2	0.0	0.0	62.0	126.0	0.0
FEB	1002.2	53.1	0.0	72.0	126.8	0.0
MAR	856.5	0.0	0.0	76.0	133.4	0.0
		10149.9	0.0	810.0	1827.4	7512.5
1981						
APR	647.1	42.5	0.0	84.0	92.0	0.0
MAY	513.6	1158.2	0.0	71.0	187.7	0.0
JUN	1413.1	31.3	0.0	80.0	168.4	0.0
JUL	1196.0	1082.3	0.0	60.0	169.4	448.9
AUG	1600.0	103.5	0.0	61.0	196.5	0.0
SEP	1446.0	1350.4	0.0	57.0	175.6	963.8
OCT	1600.0	228.9	0.0	54.0	161.9	13.0
NOV	1600.0	660.8	0.0	65.0	127.9	467.9
DEC	1600.0	0.0	0.0	68.0	145.7	0.0
JAN	1386.3	0.0	0.0	62.0	131.3	0.0
FEB	1193.0	26.3	0.0	72.0	128.6	0.0
MAR	1018.7	0.5	0.0	76.0	131.7	0.0
		4684.6	0.0	810.0	1816.5	1893.7
1982						
APR	811.5	29.8	0.0	84.0	111.6	0.0
MAY	645.7	56.4	0.0	71.0	106.8	0.0
JUN	524.3	1171.3	0.0	80.0	235.3	0.0
JUL	1380.4	1080.9	0.0	60.0	236.2	565.1
AUG	1600.0	1021.3	0.0	61.0	189.9	770.3
SEP	1600.0	4060.6	0.0	57.0	133.2	3870.4
OCT	1600.0	74.1	0.0	54.0	149.9	0.0
NOV	1470.2	0.0	0.0	65.0	136.7	0.0
DEC	1268.5	0.0	0.0	68.0	112.6	0.0
JAN	1087.9	0.0	0.0	62.0	102.3	0.0
FEB	923.5	0.0	0.0	72.0	98.3	0.0
MAR	753.3	0.0	0.0	76.0	113.3	0.0
		7494.4	0.0	810.0	1726.0	5205.8

1983	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	564.0	4.7	0.0	84.0	91.1	0.0
MAY	393.6	55.8	0.0	71.0	61.4	0.0
JUN	316.9	320.8	0.0	80.0	74.0	0.0
JUL	483.8	1506.7	0.0	60.0	189.8	142.7
AUG	1600.0	1806.0	0.0	61.0	156.6	1588.3
SEP	1600.0	3364.2	0.0	57.0	132.0	3175.2
OCT	1600.0	4087.9	0.0	54.0	128.3	3905.6
NOV	1600.0	76.0	0.0	65.0	138.2	0.0
DEC	1472.8	0.0	0.0	68.0	125.5	0.0
JAN	1279.3	0.0	0.0	62.0	115.3	0.0
FEB	1102.0	0.0	0.0	72.0	125.9	0.0
MAR	904.2	0.0	0.0	76.0	127.0	0.0
		11224.1	0.0	810.0	1465.2	8811.7
1984						
APR	701.1	80.3	0.0	84.0	115.5	0.0
MAY	581.9	2459.0	0.0	71.0	200.1	1169.9
JUN	1600.0	207.8	0.0	80.0	196.6	0.0
JUL	1531.2	453.2	0.0	60.0	196.2	128.1
AUG	1600.0	1110.6	0.0	61.0	184.0	865.6
SEP	1600.0	1093.6	0.0	57.0	158.4	878.2
OCT	1600.0	788.7	0.0	54.0	145.2	589.5
NOV	1600.0	0.0	0.0	65.0	149.7	0.0
DEC	1385.3	0.0	0.0	68.0	141.4	0.0
JAN	1175.9	171.5	0.0	62.0	126.9	0.0
FEB	1158.5	115.4	0.0	72.0	129.0	0.0
MAR	1072.9	0.3	0.0	76.0	142.8	0.0
		6480.4	0.0	810.0	1885.8	3631.2

Table A-3-46 Water Balance Simulation at Huai Talat Reservoir (1963-1970)

Unit : 1000 MCM

1963	Volume	Inflow	Irrigation	Water Works	Losses	Spill
NOV	19.200	10.940	0.0	0.019	0.642	10.279
DEC	19.200	1.780	1.669	0.020	0.642	0.0
JAN	18.649	0.460	3.094	0.018	0.803	0.0
FEB	15.194	0.320	3.116	0.021	0.803	0.0
MAR	11.574	0.400	1.122	0.023	0.966	0.0
		13.900	9.001	0.101	3.856	10.279
1964						
APR	9.863	0.520	0.0	0.025	0.642	0.0
MAY	9.716	4.420	0.0	0.021	0.562	0.0
JUN	13.553	7.230	9.160	0.024	0.562	0.0
JUL	11.037	2.050	5.785	0.018	0.562	0.0
AUG	6.722	5.070	4.278	0.018	0.562	0.0
SEP	6.934	15.340	1.146	0.017	0.642	1.269
OCT	19.200	10.460	3.362	0.016	0.642	6.440
NOV	19.200	6.000	0.0	0.019	0.642	5.339
DEC	19.200	1.130	1.669	0.020	0.642	0.0
JAN	17.999	0.430	3.094	0.018	0.803	0.0
FEB	14.514	0.330	2.611	0.021	0.803	0.0
MAR	11.409	0.490	1.616	0.023	0.966	0.0
		53.470	32.721	0.240	8.030	13.048
1965						
APR	9.294	0.190	0.0	0.025	0.642	0.0
MAY	8.847	3.630	0.0	0.021	0.562	0.0
JUN	11.864	6.520	6.896	0.024	0.562	0.0
JUL	10.900	3.930	5.103	0.018	0.562	0.0
AUG	9.147	3.860	4.390	0.018	0.562	0.0
SEP	8.037	19.080	0.892	0.017	0.642	6.366
OCT	19.200	8.940	5.077	0.016	0.642	3.205
NOV	19.200	2.250	0.0	0.019	0.642	1.589
DEC	19.200	0.720	1.669	0.020	0.642	0.0
JAN	17.589	0.460	3.094	0.018	0.803	0.0
FEB	14.134	0.420	1.952	0.021	0.803	0.0
MAR	11.778	0.710	0.929	0.023	0.966	0.0
		52.710	32.004	0.240	8.030	11.160
1966						
APR	10.570	0.470	0.0	0.025	0.642	0.0
MAY	10.373	10.220	0.0	0.021	0.562	0.810
JUN	19.200	16.090	6.925	0.024	0.562	6.579
JUL	19.200	0.980	7.111	0.018	0.562	0.0
AUG	12.469	11.100	0.279	0.018	0.562	3.530
SEP	19.200	35.430	4.097	0.017	0.642	30.674
OCT	19.200	13.370	3.682	0.016	0.642	9.030
NOV	19.200	7.110	0.0	0.019	0.642	6.449
DEC	19.200	1.290	1.560	0.020	0.642	0.0
JAN	18.268	0.430	3.094	0.018	0.803	0.0
FEB	14.783	0.280	3.651	0.021	0.803	0.0
MAR	10.966	0.240	1.626	0.023	0.966	0.0
		97.010	34.027	0.240	8.030	57.072

1967	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	8.211	0.850	0.0	0.025	0.642	0.0
MAY	8.394	3.770	0.0	0.021	0.562	0.0
JUN	11.581	13.770	9.314	0.024	0.562	0.0
JUL	15.451	10.720	5.042	0.018	0.562	3.349
AUG	19.200	9.260	3.442	0.018	0.562	4.238
SEP	19.200	39.030	1.306	0.017	0.642	37.063
OCT	19.200	11.560	7.130	0.016	0.642	3.772
NOV	19.200	6.160	0.0	0.019	0.642	5.499
DEC	19.200	1.310	1.669	0.020	0.642	0.0
JAN	18.179	0.460	3.094	0.018	0.803	0.0
FEB	14.724	0.270	3.679	0.021	0.803	0.0
MAR	10.491	0.250	1.473	0.023	0.966	0.0
		96.410	34.151	0.240	8.030	53.921
1968						
APR	8.279	0.310	0.0	0.025	0.642	0.0
MAY	7.922	3.370	0.0	0.021	0.562	0.0
JUN	10.709	18.230	7.690	0.024	0.562	1.463
JUL	19.200	7.610	6.117	0.018	0.562	0.913
AUG	19.200	8.230	1.358	0.018	0.562	6.292
SEP	19.200	44.160	1.312	0.017	0.642	42.189
OCT	19.200	18.860	4.217	0.016	0.642	14.005
NOV	19.200	2.600	0.0	0.019	0.642	1.939
DEC	19.200	0.590	1.669	0.020	0.642	0.0
JAN	17.459	0.460	3.094	0.018	0.803	0.0
FEB	14.004	0.320	3.084	0.021	0.803	0.0
MAR	10.416	0.430	0.806	0.023	0.966	0.0
		105.190	29.347	0.240	8.030	66.801
1969						
APR	9.051	1.210	0.0	0.025	0.642	0.0
MAY	9.594	3.660	0.0	0.021	0.562	0.0
JUN	12.671	11.420	8.014	0.024	0.562	0.0
JUL	15.491	8.650	3.776	0.018	0.562	0.583
AUG	19.200	3.710	5.846	0.018	0.562	0.0
SEP	16.484	30.260	0.391	0.017	0.642	26.494
OCT	19.200	14.110	4.368	0.016	0.642	9.084
NOV	19.200	6.920	0.0	0.019	0.642	6.259
DEC	19.200	1.260	1.669	0.020	0.642	0.0
JAN	16.129	0.460	3.094	0.018	0.803	0.0
FEB	14.674	0.280	3.653	0.021	0.803	0.0
MAR	10.477	0.270	1.144	0.023	0.966	0.0
		82.210	31.957	0.240	8.030	42.420
1970						
APR	8.614	0.810	0.0	0.025	0.642	0.0
MAY	8.757	4.220	0.0	0.021	0.562	0.0
JUN	12.394	13.420	7.365	0.024	0.562	0.0
JUL	17.863	12.930	2.846	0.018	0.562	8.167
AUG	19.200	15.360	1.188	0.018	0.562	13.612
SEP	19.200	19.900	2.024	0.017	0.642	17.217
OCT	19.200	6.600	6.698	0.016	0.642	0.0
NOV	18.444	0.930	0.0	0.019	0.642	0.0
DEC	18.713	0.510	1.270	0.020	0.642	0.0
JAN	17.291	0.370	3.094	0.018	0.803	0.0
FEB	13.746	0.280	3.534	0.021	0.803	0.0
MAR	9.668	0.270	1.705	0.023	0.966	0.0
		75.620	29.724	0.240	8.030	38.996

Table A-3-47 Water Balance Simulation at Huai Talat Reservoir (1971-1978)

Unit : 1000 MCM

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	7.244	0.700	0.0	0.025	0.642	0.0
MAY	7.277	1.180	0.0	0.021	0.562	0.0
JUN	7.674	16.660	6.846	0.024	0.562	0.0
JUL	17.102	8.250	5.878	0.018	0.562	0.0
AUG	18.994	6.860	1.897	0.018	0.562	4.077
SEP	19.200	28.890	1.312	0.017	0.642	26.919
OCT	19.200	9.450	6.849	0.016	0.642	1.943
NOV	19.200	0.940	0.0	0.019	0.642	0.279
DEC	19.200	0.590	1.669	0.020	0.642	0.0
JAN	17.459	0.460	3.094	0.018	0.803	0.0
FEB	14.004	0.310	3.251	0.021	0.803	0.0
MAR	10.239	0.330	1.796	0.023	0.966	0.0
		74.620	32.592	0.240	8.030	33.218
1972						
APR	7.784	0.260	0.0	0.025	0.642	0.0
MAY	7.397	0.0	0.0	0.021	0.562	0.0
JUN	6.814	5.640	6.746	0.024	0.562	0.0
JUL	5.122	7.120	4.009	0.018	0.562	0.0
AUG	7.653	8.360	1.670	0.018	0.562	0.0
SEP	13.763	31.970	0.317	0.017	0.642	25.557
OCT	19.200	14.000	5.373	0.016	0.642	7.969
NOV	19.200	7.550	0.0	0.019	0.642	6.889
DEC	19.200	1.320	1.669	0.020	0.642	0.0
JAN	18.189	0.430	3.094	0.018	0.803	0.0
FEB	14.704	0.260	3.866	0.021	0.803	0.0
MAR	10.274	0.220	1.180	0.023	0.966	0.0
		77.150	27.924	0.240	8.030	40.415
1973						
APR	8.325	0.460	0.0	0.025	0.642	0.0
MAY	8.116	0.640	0.0	0.021	0.562	0.0
JUN	8.175	2.480	8.528	0.024	0.562	0.0
JUL	1.941	5.930	3.042	0.018	0.562	0.0
AUG	3.849	7.460	3.153	0.018	0.562	0.0
SEP	7.576	9.090	2.583	0.017	0.642	0.0
OCT	13.424	7.000	4.140	0.016	0.642	0.0
NOV	15.626	1.460	0.0	0.019	0.642	0.0
DEC	16.425	0.590	1.669	0.020	0.642	0.0
JAN	14.684	0.460	3.094	0.018	0.803	0.0
FEB	11.229	0.270	3.746	0.021	0.803	0.0
MAR	6.929	0.210	1.796	0.023	0.966	0.0
		36.050	31.751	0.240	8.030	0.0
1974						
APR	4.354	1.070	0.0	0.025	0.642	0.0
MAY	4.757	0.0	0.0	0.021	0.562	0.0
JUN	4.174	0.0	9.080	0.024	0.0	-5.580
JUL	0.650	3.790	4.233	0.018	0.0	-0.461
AUG	0.650	7.300	2.448	0.018	0.562	0.0
SEP	4.922	15.830	1.785	0.017	0.642	0.0
OCT	18.308	10.130	4.017	0.016	0.642	4.563
NOV	19.200	13.130	0.0	0.019	0.642	12.469
DEC	19.200	2.100	1.669	0.020	0.642	0.0
JAN	18.969	0.390	2.880	0.018	0.803	0.0
FEB	15.658	0.190	3.866	0.021	0.803	0.0
MAR	11.156	0.210	1.332	0.023	0.966	0.0
		54.140	31.310	0.240	6.906	10.991

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1975						
APR	9.047	0.840	0.0	0.025	0.642	0.0
MAY	9.220	4.900	0.0	0.021	0.562	0.0
JUN	13.537	10.620	6.559	0.024	0.562	0.0
JUL	15.012	2.740	6.548	0.018	0.562	0.0
AUG	10.624	5.120	4.151	0.018	0.562	0.0
SEP	11.013	27.570	0.0	0.017	0.642	18.724
OCT	19.200	12.430	5.277	0.016	0.642	6.495
NOV	19.200	2.530	0.0	0.019	0.642	1.869
DEC	19.200	0.690	1.669	0.020	0.642	0.0
JAN	17.559	0.460	3.094	0.018	0.803	0.0
FEB	14.104	0.260	3.866	0.021	0.803	0.0
MAR	9.674	0.230	1.142	0.023	0.966	0.0
		68.390	34.306	0.240	8.030	27.088
1976						
APR	7.773	0.880	0.0	0.025	0.642	0.0
MAY	7.986	2.630	0.0	0.021	0.562	0.0
JUN	10.033	7.680	7.923	0.024	0.562	0.0
JUL	9.204	11.310	3.655	0.018	0.562	0.0
AUG	16.279	6.760	4.413	0.018	0.562	0.0
SEP	18.046	36.630	0.098	0.017	0.642	34.719
OCT	19.200	17.350	3.381	0.016	0.642	13.311
NOV	19.200	4.320	0.0	0.019	0.642	3.659
DEC	19.200	0.840	1.669	0.020	0.642	0.0
JAN	17.709	0.460	3.094	0.018	0.803	0.0
FEB	14.254	0.260	3.866	0.021	0.803	0.0
MAR	9.824	0.190	1.796	0.023	0.966	0.0
		89.310	29.895	0.240	8.030	51.689
1977						
APR	7.229	0.550	0.0	0.025	0.642	0.0
MAY	7.112	1.620	0.0	0.021	0.562	0.0
JUN	8.149	3.820	8.479	0.024	0.562	0.0
JUL	2.904	4.760	5.111	0.018	0.562	0.0
AUG	1.973	7.520	2.856	0.018	0.562	0.0
SEP	6.057	25.790	0.849	0.017	0.642	11.139
OCT	19.200	11.000	4.433	0.016	0.642	5.909
NOV	19.200	1.530	0.0	0.019	0.642	0.869
DEC	19.200	0.590	1.669	0.020	0.642	0.0
JAN	17.459	0.460	3.094	0.018	0.803	0.0
FEB	14.004	0.260	3.826	0.021	0.803	0.0
MAR	9.614	0.250	0.956	0.023	0.966	0.0
		58.150	31.273	0.240	8.030	17.917
1978						
APR	7.919	1.370	0.0	0.025	0.642	0.0
MAY	8.622	1.080	0.0	0.021	0.562	0.0
JUN	9.119	0.790	9.534	0.024	0.0	-0.299
JUL	0.650	8.010	2.185	0.018	0.562	0.0
AUG	5.897	11.690	0.926	0.018	0.562	0.0
SEP	16.081	41.700	1.543	0.017	0.642	36.379
OCT	19.200	11.800	7.149	0.016	0.642	3.993
NOV	19.200	1.870	0.0	0.019	0.642	1.209
DEC	19.200	0.720	1.669	0.020	0.642	0.0
JAN	17.589	0.410	2.962	0.018	0.803	0.0
FEB	14.216	0.220	3.866	0.021	0.803	0.0
MAR	9.746	0.180	1.796	0.023	0.966	0.0
		79.640	31.628	0.240	7.468	41.282

Table A-3-48 Water Balance Simulation at Huai Talat Reservoir (1979-1981)

Unit: 1000 MCM

1979	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	7.141	1.260	0.0	0.025	0.642	0.0
MAY	7.734	4.350	0.0	0.021	0.562	0.0
JUN	11.501	7.940	8.528	0.024	0.562	0.0
JUL	10.327	7.120	2.225	0.018	0.562	0.0
AUG	14.642	7.780	2.922	0.018	0.562	0.0
SEP	18.920	26.720	2.044	0.017	0.642	23.737
OCT	19.200	7.560	8.841	0.016	0.642	0.0
NOV	17.261	0.530	0.0	0.019	0.642	0.0
DEC	17.130	0.590	1.669	0.020	0.642	0.0
JAN	15.389	0.460	3.094	0.018	0.803	0.0
FEB	11.934	0.260	3.866	0.021	0.803	0.0
MAR	7.504	0.210	1.796	0.023	0.966	0.0
		64.780	34.985	0.240	8.030	23.737
1980						
APR	4.929	0.180	0.0	0.025	0.642	0.0
MAY	4.442	2.330	0.0	0.021	0.562	0.0
JUN	6.189	10.300	7.999	0.024	0.562	0.0
JUL	7.904	3.900	6.687	0.018	0.562	0.0
AUG	4.537	6.370	1.643	0.018	0.562	0.0
SEP	8.664	28.700	1.543	0.017	0.642	15.982
OCT	19.200	10.690	7.612	0.016	0.642	2.420
NOV	19.200	3.680	0.0	0.019	0.642	3.019
DEC	19.200	0.910	1.669	0.020	0.642	0.0
JAN	17.779	0.460	3.094	0.018	0.803	0.0
FEB	14.324	0.280	3.575	0.021	0.803	0.0
MAR	10.205	0.290	1.166	0.023	0.966	0.0
		68.090	34.988	0.240	8.030	21.421
1981						
APR	8.340	0.520	0.0	0.025	0.642	0.0
MAY	8.193	0.0	0.0	0.021	0.562	0.0
JUN	7.610	2.140	8.694	0.024	0.382	0.0
JUL	0.650	12.970	1.347	0.018	0.562	0.0
AUG	11.693	8.650	3.357	0.018	0.562	0.0
SEP	16.406	9.480	1.859	0.017	0.642	4.168
OCT	19.200	4.870	7.677	0.016	0.642	0.0
NOV	15.735	13.150	0.0	0.019	0.642	9.024
DEC	19.200	2.260	1.669	0.020	0.642	0.0
JAN	19.129	0.460	3.094	0.018	0.803	0.0
FEB	15.674	0.260	3.793	0.021	0.803	0.0
MAR	11.317	0.210	1.678	0.023	0.966	0.0
		54.970	33.168	0.240	7.850	13.192

Table A-3-49 Water Balance Simulation at Nong Si Reservoir (1963-1970)

(Unit : 1000 cu.m)

1963	Volume	Inflow	Irrigation	Water Works	Losses	Spill
NOV	3800.0	117.0	0.0	18.0	244.1	0.0
DEC	3654.9	0.0	143.0	18.0	246.1	0.0
JAN	3247.8	0.0	265.2	17.0	254.3	0.0
FEB	2711.3	0.0	267.1	19.0	233.2	0.0
MAR	2192.0	61.3	96.2	21.0	246.6	0.0
		178.4	771.5	93.0	1224.3	0.0
1964						
APR	1889.5	112.1	0.0	23.0	259.4	0.0
MAY	1719.3	10147.1	0.0	19.0	267.7	7779.7
JUN	3800.0	1369.1	1308.5	22.0	311.6	0.0
JUL	3527.0	768.4	826.5	16.0	323.4	0.0
AUG	3129.5	2305.9	611.2	16.0	275.2	733.0
SEP	3800.0	3132.7	163.7	16.0	270.7	2682.3
OCT	3800.0	98.7	480.3	15.0	267.2	0.0
NOV	3116.2	191.8	0.0	18.0	284.3	0.0
DEC	3005.8	0.0	143.0	18.0	277.8	0.0
JAN	2567.0	0.0	265.2	17.0	246.1	0.0
FEB	2038.6	0.0	223.8	19.0	215.8	0.0
MAR	1579.9	0.0	138.5	21.0	249.6	0.0
		18125.8	4160.8	220.0	3268.8	11195.0
1965						
APR	1170.8	1126.7	0.0	23.0	312.9	0.0
MAY	1961.6	3041.4	0.0	19.0	349.9	834.0
JUN	3800.0	5023.1	1271.1	22.0	286.2	4043.8
JUL	3800.0	490.8	729.1	16.0	311.3	0.0
AUG	3234.4	566.7	627.1	16.0	301.4	0.0
SEP	2856.5	1038.7	127.4	16.0	286.1	0.0
OCT	3465.8	0.0	725.2	15.0	337.8	0.0
NOV	2387.8	0.0	0.0	18.0	269.9	0.0
DEC	2099.9	0.0	143.0	18.0	263.9	0.0
JAN	1675.0	0.0	265.2	17.0	207.8	0.0
FEB	1185.0	0.0	167.3	19.0	147.7	0.0
MAR	850.9	210.7	79.7	21.0	169.2	0.0
		12098.1	4135.1	220.0	3244.1	4877.9
1966						
APR	791.7	517.7	0.0	23.0	211.4	0.0
MAY	1075.1	17941.6	0.0	19.0	262.3	14935.4
JUN	3800.0	2946.9	1275.0	22.0	344.7	1305.2
JUL	3800.0	7930.2	1015.8	16.0	298.0	6600.4
AUG	3800.0	6363.5	39.8	16.0	267.0	6040.6
SEP	3800.0	1175.6	583.6	16.0	278.6	297.3
OCT	3800.0	54.8	526.0	15.0	320.1	0.0
NOV	2993.7	0.0	0.0	18.0	368.4	0.0
DEC	2607.3	0.0	133.7	18.0	257.8	0.0
JAN	2197.8	0.0	265.2	17.0	247.9	0.0
FEB	1667.6	0.0	313.0	19.0	209.9	0.0
MAR	1125.7	0.0	139.6	21.0	185.5	0.0
		36930.3	4291.7	220.0	3251.6	29179.0

1967	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	779.6	1224.0	0.0	23.0	264.8	0.0
MAY	1715.9	166.7	0.0	19.0	256.2	0.0
JUN	1607.4	590.5	1330.6	22.0	126.6	0.0
JUL	716.7	1635.0	434.6	16.0	221.1	0.0
AUG	1682.0	4666.8	491.7	16.0	329.9	1711.1
SEP	3800.0	1291.1	186.8	16.0	224.6	863.7
OCT	3800.0	639.5	1018.6	15.0	332.8	0.0
NOV	3073.2	0.1	0.0	18.0	298.6	0.0
DEC	2756.7	0.0	143.0	18.0	295.6	0.0
JAN	2300.0	0.0	265.2	17.0	228.0	0.0
FEB	1789.8	0.0	315.3	19.0	196.8	0.0
MAR	1256.7	0.0	126.3	21.0	184.4	0.0
		10213.8	4312.2	220.0	2959.3	2574.8
1968						
APR	927.1	144.8	0.0	23.0	172.7	0.0
MAY	870.2	1005.8	0.0	19.0	257.7	0.0
JUN	1605.3	3084.6	1098.6	22.0	291.2	0.0
JUL	3276.0	832.5	873.8	16.0	323.5	0.0
AUG	2897.2	3239.3	194.0	16.0	325.9	1800.7
SEP	3800.0	10015.2	187.4	16.0	218.4	9593.5
OCT	3800.0	0.0	602.5	15.0	357.2	0.0
NOV	2825.3	0.0	0.0	18.0	321.4	0.0
DEC	2485.9	0.0	143.0	18.0	268.3	0.0
JAN	2056.7	0.0	265.2	17.0	258.6	0.0
FEB	1515.8	0.0	264.4	19.0	200.4	0.0
MAR	1032.1	0.0	69.1	21.0	166.2	0.0
		18322.3	3697.9	220.0	3161.3	11394.2
1969						
APR	775.9	161.4	0.0	23.0	168.0	0.0
MAY	746.3	1553.0	0.0	19.0	296.0	0.0
JUN	1984.2	3756.5	1144.9	22.0	295.1	478.7
JUL	3800.0	7579.5	539.7	16.0	307.7	6716.0
AUG	3800.0	786.0	835.2	16.0	298.8	0.0
SEP	3438.0	4725.9	55.8	16.0	272.0	4020.0
OCT	3800.0	56.7	623.9	15.0	256.7	0.0
NOV	2961.1	17.0	0.0	18.0	294.8	0.0
DEC	2665.3	0.0	143.0	18.0	277.7	0.0
JAN	2226.5	0.0	265.2	17.0	212.4	0.0
FEB	1731.8	0.0	313.2	19.0	185.9	0.0
MAR	1213.8	0.0	98.1	21.0	209.6	0.0
		18637.8	4019.0	220.0	3074.8	11214.7
1970						
APR	885.1	191.2	0.0	23.0	166.8	0.0
MAY	886.5	1044.0	0.0	19.0	218.0	0.0
JUN	1693.5	2996.2	1052.2	22.0	226.0	0.0
JUL	3389.6	6574.9	406.5	16.0	286.3	5455.5
AUG	3800.0	13220.3	169.7	16.0	230.3	12804.2
SEP	3800.0	1326.8	289.2	16.0	211.0	810.7
OCT	3800.0	9.5	956.9	15.0	259.6	0.0
NOV	2578.0	0.0	0.0	18.0	285.9	0.0
DEC	2274.0	0.0	108.9	18.0	221.4	0.0
JAN	1925.7	0.0	265.2	17.0	223.9	0.0
FEB	1419.6	0.0	302.9	19.0	145.5	0.0
MAR	952.2	0.0	146.1	21.0	141.7	0.0
		25363.0	3697.7	220.0	2616.5	19070.4

Table A-3-50 Water Balance Simulation at Nong Si Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	643.5	87.3	0.0	23.0	111.2	0.0
MAY	596.5	1920.8	0.0	19.0	244.1	0.0
JUN	2254.3	2037.8	978.0	22.0	196.4	0.0
JUL	3095.7	3678.8	839.7	16.0	264.6	1854.2
AUG	3800.0	3945.1	271.0	16.0	231.0	3427.1
SEP	3800.0	1093.8	187.4	16.0	218.9	671.6
OCT	3800.0	0.0	978.4	15.0	253.6	0.0
NOV	2553.1	0.0	0.0	18.0	306.1	0.0
DEC	2229.0	0.0	143.0	18.0	263.4	0.0
JAN	1804.5	0.0	265.2	17.0	229.9	0.0
FEB	1292.4	84.9	278.7	19.0	147.8	0.0
MAR	931.9	393.7	153.9	21.0	175.3	0.0
		13242.3	4095.3	220.0	2642.2	5952.8
1972						
APR	975.3	26.2	0.0	23.0	139.9	0.0
MAY	838.6	169.4	0.0	19.0	188.2	0.0
JUN	800.8	9115.9	963.6	22.0	257.2	4873.8
JUL	3800.0	8651.6	572.7	16.0	306.9	7756.0
AUG	3800.0	3814.6	238.5	16.0	252.9	3307.2
SEP	3800.0	3343.0	45.3	16.0	266.7	3015.0
OCT	3800.0	176.5	767.6	15.0	224.2	0.0
NOV	2969.8	0.0	0.0	18.0	235.7	0.0
DEC	2716.1	0.0	143.0	18.0	239.6	0.0
JAN	2315.4	0.0	265.2	17.0	232.9	0.0
FEB	1800.3	0.0	331.4	19.0	199.4	0.0
MAR	1250.5	0.0	101.1	21.0	190.4	0.0
		25297.3	3428.6	220.0	2733.9	18952.0
1973						
APR	938.0	26.9	0.0	23.0	211.2	0.0
MAY	730.7	1009.7	0.0	19.0	217.2	0.0
JUN	1504.2	1294.1	1218.2	22.0	190.8	0.0
JUL	1367.2	6685.2	434.6	16.0	253.5	3548.3
AUG	3800.0	2546.7	450.4	16.0	241.8	1840.5
SEP	3800.0	3465.3	369.0	16.0	242.4	2837.8
OCT	3800.0	11.2	591.5	15.0	264.2	0.0
NOV	2940.5	0.0	0.0	16.0	281.7	0.0
DEC	2640.7	0.0	143.0	18.0	266.0	0.0
JAN	2213.7	0.0	265.2	17.0	209.9	0.0
FEB	1721.5	0.0	321.1	19.0	207.6	0.0
MAR	1173.8	0.0	153.9	21.0	158.1	0.0
		15041.1	3947.0	220.0	2744.6	8226.6
1974						
APR	840.8	375.8	0.0	23.0	200.9	0.0
MAY	992.8	2854.0	0.0	19.0	329.1	0.0
JUN	3498.7	1222.6	1297.1	22.0	286.7	0.0
JUL	3115.6	3350.2	604.7	16.0	212.6	1832.2
AUG	3800.0	7683.5	349.7	16.0	227.5	7090.3
SEP	3800.0	2355.5	255.0	16.0	263.0	1821.5
OCT	3800.0	562.7	573.9	15.0	237.4	0.0
NOV	3536.5	30.0	0.0	18.0	249.2	0.0
DEC	3299.3	0.0	143.0	18.0	256.4	0.0
JAN	2881.9	0.0	246.9	17.0	238.4	0.0
FEB	2379.6	0.0	331.4	19.0	199.7	0.0
MAR	1829.6	0.0	114.2	21.0	230.9	0.0
		18434.2	3915.8	220.0	2931.9	10744.0

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1975						
APR	1463.4	11.5	0.0	23.0	263.7	0.0
MAY	1188.2	1630.0	0.0	19.0	265.2	0.0
JUN	2534.0	1693.7	1222.7	22.0	214.2	0.0
JUL	2768.8	3477.4	935.5	16.0	248.7	1246.1
AUG	3800.0	6624.9	593.0	16.0	249.5	5766.4
SEP	3800.0	2777.7	0.0	16.0	208.1	2553.6
OCT	3800.0	317.3	753.8	15.0	179.4	0.0
NOV	3169.1	139.3	0.0	18.0	220.3	0.0
DEC	3070.2	0.0	143.0	18.0	237.6	0.0
JAN	2671.6	0.0	265.2	17.0	207.4	0.0
FEB	2182.0	0.0	331.4	19.0	180.7	0.0
MAR	1650.9	0.0	97.9	21.0	212.2	0.0
		16671.9	4342.4	220.0	2687.0	9566.1
1976						
APR	1319.8	280.1	0.0	23.0	220.6	0.0
MAY	1356.3	754.8	0.0	19.0	221.9	0.0
JUN	1870.2	3300.4	1131.9	22.0	289.2	0.0
JUL	3727.5	2241.2	522.1	16.0	236.9	1393.7
AUG	3800.0	5295.4	630.4	16.0	214.5	4434.5
SEP	3800.0	1658.4	14.0	16.0	201.9	1426.5
OCT	3800.0	282.2	483.0	15.0	234.7	0.0
NOV	3349.5	19.0	0.0	18.0	247.7	0.0
DEC	3102.8	0.0	143.0	18.0	218.9	0.0
JAN	2722.8	0.0	265.2	17.0	209.2	0.0
FEB	2231.4	0.0	331.4	19.0	205.0	0.0
MAR	1676.1	0.0	153.9	21.0	224.7	0.0
		13831.5	3675.0	220.0	2725.1	7254.7
1977						
APR	1276.5	106.1	0.0	23.0	210.6	0.0
MAY	1151.0	762.7	0.0	19.0	252.3	0.0
JUN	1642.4	198.2	1211.5	22.0	96.0	0.0
JUL	511.3	1088.4	730.1	16.0	105.7	0.0
AUG	747.8	4506.2	408.1	16.0	246.0	786.0
SEP	3800.0	7257.7	121.3	16.0	213.5	6906.8
OCT	3800.0	25.7	633.3	15.0	257.3	0.0
NOV	2920.1	0.0	0.0	18.0	242.6	0.0
DEC	2659.5	0.0	143.0	18.0	204.4	0.0
JAN	2294.1	0.0	265.2	17.0	183.6	0.0
FEB	1828.3	0.0	328.0	19.0	169.5	0.0
MAR	1311.9	0.4	81.9	21.0	179.1	0.0
		13949.4	3922.3	220.0	2360.5	7692.8
1978						
APR	1030.2	1874.3	0.0	23.0	249.1	0.0
MAY	2632.3	434.9	0.0	19.0	247.3	0.0
JUN	2800.9	3338.3	1362.0	22.0	261.4	693.7
JUL	3800.0	4146.2	311.8	16.0	224.8	3593.6
AUG	3800.0	8450.4	132.3	16.0	219.6	8082.5
SEP	3800.0	6691.9	219.7	16.0	172.8	6283.4
OCT	3800.0	201.1	1021.5	15.0	249.7	0.0
NOV	2715.1	0.0	0.0	18.0	211.6	0.0
DEC	2485.4	0.0	143.0	18.0	194.4	0.0
JAN	2130.0	0.0	253.9	17.0	186.9	0.0
FEB	1672.1	0.0	331.4	19.0	155.6	0.0
MAR	1166.2	0.0	153.9	21.0	163.6	0.0
		25137.1	3929.5	220.0	2536.9	18653.2

Table A-3-51 Water Balance Simulation at Nong Si Reservoir (1979-1981)

(Unit: 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1979						
APR	827.7	390.4	0.0	23.0	193.4	0.0
MAY	1001.6	2030.4	0.0	19.0	246.6	0.0
JUN	2766.4	8575.4	1218.2	22.0	218.0	6083.5
JUL	3800.0	319.5	317.9	16.0	301.9	0.0
AUG	3483.7	10543.8	417.4	16.0	269.9	9524.3
SEP	3800.0	3305.1	291.9	16.0	235.9	2761.3
OCT	3800.0	0.0	1262.9	15.0	268.9	0.0
NOV	2253.2	0.0	0.0	18.0	251.9	0.0
DEC	1983.3	0.0	143.0	18.0	211.8	0.0
JAN	1610.4	0.0	265.2	17.0	168.7	0.0
FEB	1159.5	0.0	331.4	19.0	112.9	0.0
MAR	696.3	0.0	153.9	21.0	84.2	0.0
		25164.7	4402.0	220.0	2564.0	18369.1
1980						
APR	437.2	51.6	0.0	23.0	75.7	0.0
MAY	390.0	2278.3	0.0	19.0	293.1	0.0
JUN	2356.3	7547.3	1142.8	22.0	241.1	4697.7
JUL	3800.0	4845.2	955.3	16.0	289.7	3584.2
AUG	3800.0	687.3	234.7	16.0	267.3	169.3
SEP	3800.0	5218.0	220.4	16.0	215.7	4765.9
OCT	3800.0	409.4	1087.4	15.0	230.5	0.0
NOV	2876.5	10.3	0.0	18.0	235.7	0.0
DEC	2633.1	0.0	143.0	18.0	199.4	0.0
JAN	2272.7	0.0	265.2	17.0	211.6	0.0
FEB	1776.9	0.4	306.4	19.0	167.1	0.0
MAR	1286.6	0.0	100.0	21.0	180.8	0.0
		21047.9	4455.1	220.0	2607.9	13217.1
1981						
APR	985.0	295.6	0.0	23.0	186.6	0.0
MAY	1070.7	1007.1	0.0	19.0	237.9	0.0
JUN	1820.9	3919.3	1242.0	22.0	236.9	439.4
JUL	3800.0	1530.4	192.4	16.0	208.5	1113.5
AUG	3800.0	2474.6	479.9	16.0	251.5	1727.1
SEP	3800.0	625.0	265.5	16.0	244.0	99.6
OCT	3800.0	256.3	1096.7	15.0	217.6	0.0
NOV	2726.8	22.6	0.0	18.0	203.9	0.0
DEC	2527.4	0.0	143.0	18.0	191.0	0.0
JAN	2175.3	0.0	265.2	17.0	185.0	0.0
FEB	1708.1	0.0	325.1	19.0	161.1	0.0
MAR	1202.8	0.0	143.8	21.0	150.1	0.0
		10130.9	4153.7	220.0	2474.7	3379.6

Table A-3-52 Water Balance Simulation at Huai Daeng Reservoir (1963-1970)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1963						
NOV	1150.0	29.2	0.0	24.0	0.0	5.2
DEC	1150.0	0.0	0.0	25.0	71.7	0.0
JAN	1053.3	0.0	0.0	23.0	76.0	0.0
FEB	954.3	0.0	0.0	27.0	73.7	0.0
MAR	853.6	0.9	0.0	28.0	78.5	0.0
		30.1	0.0	127.0	299.9	5.2
1964						
APR	748.0	182.4	0.0	31.0	88.6	0.0
MAY	810.8	569.9	0.0	27.0	67.7	136.0
JUN	1150.0	711.9	58.6	29.0	78.5	545.8
JUL	1150.0	248.3	317.2	22.0	91.2	0.0
AUG	968.0	963.7	54.7	23.0	75.2	628.8
SEP	1150.0	859.3	64.9	21.0	73.9	699.4
OCT	1150.0	429.5	241.5	20.0	81.6	86.4
NOV	1150.0	0.0	0.0	24.0	84.3	0.0
DEC	1041.7	0.0	0.0	25.0	84.1	0.0
JAN	932.5	0.0	0.0	23.0	79.2	0.0
FEB	830.4	0.0	0.0	27.0	73.5	0.0
MAR	729.9	2.4	0.0	28.0	87.9	0.0
		3967.4	736.8	300.0	965.7	2096.5
1965						
APR	616.4	92.4	0.0	31.0	73.8	0.0
MAY	603.9	2584.2	0.0	27.0	60.5	1950.6
JUN	1150.0	359.3	128.5	29.0	41.5	160.3
JUL	1150.0	160.5	372.8	22.0	59.6	0.0
AUG	856.1	1113.6	12.6	23.0	62.4	721.8
SEP	1150.0	273.7	295.9	21.0	74.6	0.0
OCT	1032.1	1.7	583.7	20.0	90.5	0.0
NOV	339.6	0.0	0.0	24.0	53.4	0.0
DEC	264.2	0.0	0.0	25.0	44.2	0.0
JAN	193.1	0.0	0.0	23.0	21.5	0.0
FEB	148.6	38.8	0.0	27.0	21.9	0.0
MAR	138.5	138.4	0.0	28.0	40.7	0.0
		4762.7	1393.5	300.0	644.7	2832.7
1966						
APR	208.2	127.0	0.0	31.0	39.2	0.0
MAY	265.0	562.7	0.0	27.0	56.6	0.0
JUN	744.0	252.7	156.1	29.0	58.8	0.0
JUL	752.8	539.6	182.0	22.0	65.0	0.0
AUG	1023.4	1882.7	7.1	23.0	47.6	1678.4
SEP	1150.0	126.0	391.8	21.0	60.1	0.0
OCT	803.1	59.8	475.7	20.0	53.6	0.0
NOV	313.6	0.0	0.0	24.0	51.1	0.0
DEC	238.4	0.0	0.0	25.0	39.7	0.0
JAN	173.7	0.0	0.0	23.0	34.8	0.0
FEB	115.9	0.0	0.0	27.0	17.6	0.0
MAR	71.3	0.0	0.0	28.0	9.4	0.0
		3550.5	1212.8	300.0	533.6	1678.4
1967						
APR	33.9	7.4	0.0	31.0	1.7	0.0
MAY	8.6	1844.3	0.0	27.0	1.3	674.7
JUN	1150.0	901.6	28.3	29.0	1.3	843.0
JUL	1150.0	196.6	348.5	22.0	75.9	0.0
AUG	900.2	122.6	415.8	23.0	58.7	0.0
SEP	525.4	1915.3	0.0	21.0	43.7	1226.0
OCT	1150.0	0.0	638.1	20.0	60.6	0.0
NOV	431.3	0.0	0.0	24.0	67.3	0.0
DEC	340.0	0.0	0.0	25.0	53.6	0.0
JAN	261.4	0.0	0.0	23.0	39.0	0.0
FEB	199.4	0.0	0.0	27.0	33.6	0.0
MAR	138.8	1.5	0.0	28.0	27.7	0.0
		4989.2	1430.7	300.0	464.2	2743.6
1968						
APR	84.6	4.4	0.0	31.0	12.7	0.0
MAY	45.2	482.0	0.0	27.0	64.9	0.0
JUN	435.2	567.1	84.6	29.0	74.7	0.0
JUL	814.2	186.4	353.6	22.0	83.9	0.0
AUG	542.9	251.3	329.6	23.0	66.0	0.0
SEP	375.6	2635.6	0.0	21.0	52.9	1787.3
OCT	1150.0	2.7	579.2	20.0	66.1	0.0
NOV	487.4	0.0	0.0	24.0	74.1	0.0
DEC	389.3	0.0	0.0	25.0	53.7	0.0
JAN	310.6	15.6	0.0	23.0	41.8	0.0
FEB	261.4	0.0	0.0	27.0	41.9	0.0
MAR	192.5	44.8	0.0	28.0	43.4	0.0
		4191.9	1347.2	300.0	676.1	1787.3
1969						
APR	165.9	52.1	0.0	31.0	37.5	0.0
MAY	149.5	572.7	0.0	27.0	79.0	0.0
JUN	616.2	1807.4	0.0	29.0	54.1	1190.6
JUL	1150.0	1671.9	0.0	22.0	57.3	1592.5
AUG	1150.0	238.4	337.0	23.0	73.4	0.0
SEP	955.0	308.0	277.7	21.0	66.4	0.0
OCT	898.0	59.9	475.5	20.0	69.3	0.0
NOV	393.2	0.0	0.0	24.0	55.4	0.0
DEC	313.6	0.0	0.0	25.0	51.0	0.0
JAN	237.8	0.0	0.0	23.0	47.2	0.0
FEB	167.6	0.0	0.0	27.0	31.5	0.0
MAR	109.1	0.0	0.0	28.0	22.4	0.0
		4710.4	1090.2	300.0	644.5	2783.1
1970						
APR	56.7	32.7	0.0	31.0	11.4	0.0
MAY	49.0	398.5	0.0	27.0	54.6	0.0
JUN	365.9	2153.5	0.0	29.0	40.2	1300.2
JUL	1150.0	211.7	339.0	22.0	73.3	0.0
AUG	927.4	4921.4	7.1	23.0	56.3	4612.4
SEP	1150.0	1635.7	0.0	21.0	56.0	1558.7
OCT	1150.0	27.8	519.3	20.0	75.5	0.0
NOV	563.0	0.0	0.0	24.0	70.6	0.0
DEC	468.3	0.0	0.0	25.0	62.5	0.0
JAN	380.9	0.0	0.0	23.0	60.2	0.0
FEB	297.7	89.9	0.0	27.0	58.6	0.0
MAR	302.0	0.0	0.0	28.0	68.4	0.0
		9471.1	865.3	300.0	687.6	7471.4

Table A-3-53 Water Balance Simulation at Huai Daeng Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	205.5	159.1	0.0	31.0	65.8	0.0
MAY	267.8	1445.8	0.0	27.0	42.8	493.9
JUN	1150.0	2499.4	0.0	29.0	28.3	2442.1
JUL	1150.0	1358.3	0.0	22.0	38.2	1298.1
AUG	1150.0	783.5	110.0	23.0	29.3	621.3
SEP	1150.0	1397.4	0.0	21.0	30.3	1346.1
OCT	1150.0	17.3	538.6	20.0	68.7	0.0
NOV	540.0	0.0	0.0	24.0	73.9	0.0
DEC	442.2	13.0	0.0	25.0	57.6	0.0
JAN	372.4	0.0	0.0	23.0	52.5	0.0
FEB	296.8	7.8	0.0	27.0	47.5	0.0
MAR	230.2	67.1	0.0	28.0	49.5	0.0
		7748.7	648.6	300.0	584.4	6201.5
1972						
APR	219.8	57.2	0.0	31.0	36.7	0.0
MAY	209.3	700.1	0.0	27.0	71.2	0.0
JUN	811.2	584.0	81.4	29.0	55.3	79.5
JUL	1150.0	188.1	354.0	22.0	66.1	0.0
AUG	896.0	934.9	63.2	23.0	53.9	540.8
SEP	1150.0	211.0	332.3	21.0	63.2	0.0
OCT	944.5	897.4	74.4	20.0	62.4	535.1
NOV	1150.0	0.0	0.0	24.0	83.3	0.0
DEC	1042.7	0.0	0.0	25.0	82.4	0.0
JAN	935.3	0.0	0.0	23.0	96.9	0.0
FEB	815.4	0.0	0.0	27.0	102.6	0.0
MAR	685.8	0.0	0.0	28.0	112.3	0.0
		3572.7	905.3	300.0	886.3	1155.4
1973						
APR	545.5	83.1	0.0	31.0	98.0	0.0
MAY	499.6	472.3	0.0	27.0	71.5	0.0
JUN	873.3	649.0	69.5	29.0	56.7	217.2
JUL	1150.0	1367.8	0.0	22.0	53.7	1292.0
AUG	1150.0	619.0	166.3	23.0	56.1	373.6
SEP	1150.0	695.7	118.0	21.0	44.2	512.5
OCT	1150.0	19.1	535.0	20.0	59.6	0.0
NOV	554.5	0.0	0.0	24.0	61.9	0.0
DEC	468.6	0.0	0.0	25.0	65.3	0.0
JAN	378.3	0.0	0.0	23.0	47.8	0.0
FEB	307.5	0.0	0.0	27.0	42.4	0.0
MAR	238.1	35.5	0.0	28.0	40.3	0.0
		3941.5	888.8	300.0	697.6	2395.4
1974						
APR	205.2	133.5	0.0	31.0	48.2	0.0
MAY	259.5	529.3	0.0	27.0	67.1	0.0
JUN	694.7	854.5	35.5	29.0	59.8	274.9
JUL	1150.0	279.9	299.6	22.0	69.0	0.0
AUG	1039.3	13367.4	7.1	23.0	60.1	13166.5
SEP	1150.0	183.6	349.9	21.0	68.8	0.0
OCT	893.9	2.3	581.2	20.0	44.6	0.0
NOV	250.4	0.0	0.0	24.0	36.5	0.0
DEC	190.0	0.0	0.0	23.0	27.1	0.0
JAN	137.9	0.0	0.0	23.0	18.0	0.0
FEB	97.0	0.7	0.0	27.0	11.1	0.0
MAR	59.6	0.0	0.0	28.0	5.2	0.0
		15351.2	1273.2	300.0	515.5	13441.4

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1975						
APR	26.4	0.0	0.0	31.0	0.0	-4.6
MAY	0.0	582.9	0.0	27.0	57.6	0.0
JUN	498.3	1297.8	0.0	29.0	45.4	571.7
JUL	1150.0	1618.7	0.0	22.0	56.5	1540.2
AUG	1150.0	2205.8	7.1	23.0	39.7	2136.1
SEP	1150.0	886.2	56.6	21.0	52.9	755.6
OCT	1150.0	0.9	588.1	20.0	61.2	0.0
NOV	481.5	0.0	0.0	24.0	59.4	0.0
DEC	398.1	0.0	0.0	25.0	48.5	0.0
JAN	324.6	0.0	0.0	23.0	44.5	0.0
FEB	257.1	0.0	0.0	27.0	34.6	0.0
MAR	195.5	12.7	0.0	28.0	33.8	0.0
		6605.1	651.8	300.0	534.2	4999.0
1976						
APR	146.4	311.7	0.0	31.0	65.1	0.0
MAY	362.0	59.4	0.0	27.0	49.6	0.0
JUN	344.8	281.9	148.1	29.0	56.6	0.0
JUL	393.0	613.8	154.1	22.0	63.5	0.0
AUG	767.1	448.6	233.2	23.0	68.0	0.0
SEP	891.6	331.9	265.6	21.0	60.0	0.0
OCT	876.8	149.7	394.8	20.0	65.3	0.0
NOV	546.5	0.0	0.0	24.0	54.7	0.0
DEC	467.7	0.0	0.0	25.0	51.6	0.0
JAN	391.1	0.0	0.0	23.0	47.0	0.0
FEB	321.1	0.0	0.0	27.0	42.8	0.0
MAR	251.4	0.0	0.0	28.0	47.0	0.0
		2197.0	1195.8	300.0	671.2	0.0
1977						
APR	176.4	65.0	0.0	31.0	36.8	0.0
MAY	173.6	285.8	0.0	27.0	66.5	0.0
JUN	365.9	68.7	274.6	29.0	35.4	0.0
JUL	145.5	216.1	336.2	22.0	0.4	0.0
AUG	3.1	1641.4	7.1	23.0	0.4	464.0
SEP	1150.0	1018.2	17.9	21.0	0.3	979.0
OCT	1150.0	6.0	567.4	20.0	62.5	0.0
NOV	506.1	0.0	0.0	24.0	56.3	0.0
DEC	425.8	0.0	0.0	25.0	46.9	0.0
JAN	354.0	0.0	0.0	23.0	43.4	0.0
FEB	287.5	0.0	0.0	27.0	32.7	0.0
MAR	227.8	4.9	0.0	28.0	38.8	0.0
		3306.1	1153.2	300.0	420.4	1443.0
1978						
APR	166.0	241.3	0.0	31.0	52.5	0.0
MAY	323.8	1192.2	0.0	27.0	45.3	293.8
JUN	1150.0	279.5	146.7	29.0	43.7	58.1
JUL	1150.0	679.2	130.8	22.0	31.1	495.3
AUG	1150.0	3932.4	7.1	23.0	35.1	3867.2
SEP	1150.0	640.1	137.5	21.0	33.6	448.0
OCT	1150.0	0.0	603.2	20.0	60.0	0.0
NOV	466.8	0.0	0.0	24.0	55.7	0.0
DEC	387.1	0.0	0.0	25.0	48.0	0.0
JAN	314.1	0.0	0.0	23.0	35.5	0.0
FEB	255.6	0.0	0.0	27.0	36.5	0.0
MAR	192.1	0.0	0.0	28.0	37.3	0.0
		6964.7	1027.3	300.0	514.2	5162.4

Table A-3-54 Water Balance Simulation at Huai Daeng Reservoir (1979-1984)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1979						
APR	126.9	127.8	0.0	31.0	41.2	0.0
MAY	182.5	2721.4	0.0	27.0	33.5	1693.4
JUN	1150.0	2780.3	0.0	29.0	29.4	2721.8
JUL	1150.0	99.8	421.1	22.0	61.1	0.0
AUG	745.5	879.9	79.7	23.0	54.2	318.5
SEP	1150.0	196.6	341.4	21.0	70.5	0.0
OCT	913.7	0.0	642.4	20.0	40.5	0.0
NOV	210.8	0.0	0.0	24.0	34.6	0.0
DEC	152.2	0.0	0.0	25.0	19.4	0.0
JAN	107.8	0.0	0.0	23.0	15.6	0.0
FEB	69.2	0.0	0.0	27.0	6.9	0.0
MAR	35.3	0.0	0.0	28.0	1.1	0.0
		6805.9	1484.6	300.0	408.2	4733.8
1980						
APR	6.2	74.7	0.0	31.0	7.2	0.0
MAY	42.7	627.8	0.0	27.0	58.5	0.0
JUN	584.9	520.2	93.7	29.0	72.4	0.0
JUL	910.1	1381.7	0.0	22.0	55.9	1063.8
AUG	1150.0	1052.1	29.5	23.0	57.7	941.9
SEP	1150.0	2177.4	0.0	21.0	61.8	2094.6
OCT	1150.0	44.5	494.5	20.0	58.4	0.0
NOV	621.6	0.0	0.0	24.0	49.8	0.0
DEC	547.7	0.0	0.0	25.0	51.6	0.0
JAN	471.1	0.0	0.0	23.0	50.5	0.0
FEB	397.6	0.0	0.0	27.0	44.9	0.0
MAR	325.7	76.5	0.0	28.0	61.6	0.0
		5954.8	617.7	300.0	630.4	4100.3
1981						
APR	312.6	152.9	0.0	31.0	49.9	0.0
MAY	384.6	967.4	0.0	27.0	58.8	116.1
JUN	1150.0	1491.5	0.0	29.0	37.6	1424.9
JUL	1150.0	1162.5	0.0	22.0	35.6	1104.9
AUG	1150.0	1485.2	7.1	23.0	34.6	1420.6
SEP	1150.0	178.9	353.1	21.0	55.0	0.0
OCT	899.8	202.6	358.8	20.0	48.0	0.0
NOV	675.6	0.0	0.0	24.0	51.7	0.0
DEC	599.9	0.0	0.0	25.0	48.1	0.0
JAN	526.9	0.0	0.0	23.0	51.5	0.0
FEB	452.4	72.9	0.0	27.0	39.8	0.0
MAR	456.4	236.2	0.0	28.0	64.5	0.0
		5950.1	718.9	300.0	575.1	4066.5
1982						
APR	602.2	216.6	0.0	31.0	63.7	0.0
MAY	726.0	619.6	0.0	27.0	67.5	101.0
JUN	1150.0	589.7	80.3	29.0	67.3	413.0
JUL	1150.0	791.4	93.3	22.0	60.0	616.1
AUG	1150.0	1706.4	7.1	23.0	41.3	1635.1
SEP	1150.0	1841.3	0.0	21.0	46.7	1773.6
OCT	1150.0	273.7	317.1	20.0	62.4	0.0
NOV	1024.1	0.0	0.0	24.0	58.8	0.0
DEC	941.3	0.0	0.0	25.0	49.7	0.0
JAN	866.6	0.0	0.0	23.0	51.2	0.0
FEB	792.4	0.0	0.0	27.0	53.5	0.0
MAR	711.9	0.0	0.0	28.0	78.8	0.0
		6040.6	497.8	300.0	701.1	4538.8
1983						
APR	605.0	24.1	0.0	31.0	81.2	0.0
MAY	516.9	209.0	0.0	27.0	64.3	0.0
JUN	634.5	909.3	27.2	29.0	66.2	271.5
JUL	1150.0	67.9	452.5	22.0	61.4	0.0
AUG	682.1	3532.7	7.1	23.0	53.3	2981.4
SEP	1150.0	215.4	329.6	21.0	54.4	0.0
OCT	960.5	331.5	287.0	20.0	56.7	0.0
NOV	928.3	0.0	0.0	24.0	63.1	0.0
DEC	841.2	0.0	0.0	25.0	54.8	0.0
JAN	761.4	0.0	0.0	23.0	44.4	0.0
FEB	694.0	0.0	0.0	27.0	63.0	0.0
MAR	604.0	0.0	0.0	28.0	75.0	0.0
		5289.9	1103.3	300.0	737.7	3252.9
1984						
APR	501.0	178.9	0.0	31.0	63.7	0.0
MAY	585.3	163.2	0.0	27.0	52.1	0.0
JUN	669.4	435.8	111.1	29.0	52.8	0.0
JUL	912.3	1655.6	0.0	22.0	55.0	1340.9
AUG	1150.0	2483.0	7.1	23.0	50.2	2402.8
SEP	1150.0	932.0	42.8	21.0	50.4	817.8
OCT	1150.0	77.6	456.4	20.0	46.5	0.0
NOV	704.6	3.6	0.0	24.0	46.2	0.0
DEC	638.1	0.0	0.0	25.0	47.5	0.0
JAN	565.5	0.0	0.0	23.0	47.8	0.0
FEB	494.7	13.8	0.0	27.0	32.6	0.0
MAR	449.0	56.1	0.0	28.0	65.1	0.0
		5999.8	617.5	300.0	609.8	4561.5

Table A-3-55 Water Balance Simulation at Nong Loeng Reservoir (1963-1970)

(Unit : 1000 cu.m)

1963	Volume	Inflow	Irrigation	Water Works	Losses	Spill
NOV	2000.0	13.0	0.0	41.0	100.0	0.0
DEC	1672.0	0.0	0.0	43.0	98.7	0.0
JAN	1730.3	0.0	0.0	39.0	105.2	0.0
FEB	1586.2	2.8	0.0	45.0	99.9	0.0
MAR	1444.1	2.6	0.0	48.0	106.1	0.0
		18.4	0.0	216.0	509.8	0.0
1964						
APR	1292.5	206.4	0.0	53.0	115.3	0.0
MAY	1330.6	1419.0	0.0	45.0	120.5	584.1
JUN	2000.0	697.9	51.2	50.0	141.6	455.1
JUL	2000.0	402.2	307.3	36.0	125.7	0.0
AUG	1931.2	586.1	198.0	38.0	131.6	149.7
SEP	2000.0	628.4	137.8	36.0	105.3	349.3
OCT	2000.0	176.0	543.7	34.0	91.1	0.0
NOV	1507.1	0.0	0.0	41.0	78.6	0.0
DEC	1387.4	0.0	0.0	43.0	77.6	0.0
JAN	1266.9	0.0	0.0	39.0	73.6	0.0
FEB	1154.1	0.0	0.0	45.0	63.6	0.0
MAR	1045.3	0.0	0.0	48.0	75.0	0.0
		4115.9	1238.0	510.0	1200.0	1538.2
1965						
APR	922.3	246.7	0.0	53.0	89.4	0.0
MAY	1028.6	240.9	0.0	45.0	87.3	0.0
JUN	1137.1	882.8	0.0	50.0	127.0	0.0
JUL	1842.9	391.4	315.9	38.0	130.4	0.0
AUG	1750.0	587.6	197.0	36.0	124.6	0.0
SEP	1970.0	1621.9	0.0	36.0	117.6	1446.3
OCT	2000.0	13.7	842.2	34.0	75.4	0.0
NOV	1062.1	0.0	0.0	41.0	70.5	0.0
DEC	950.5	0.0	0.0	43.0	67.5	0.0
JAN	840.0	0.0	0.0	39.0	60.1	0.0
FEB	741.0	0.0	0.0	45.0	52.5	0.0
MAR	643.4	28.3	0.0	48.0	66.4	0.0
		4015.2	1355.1	510.0	1068.8	1446.3
1966						
APR	557.3	121.6	0.0	53.0	56.9	0.0
MAY	569.0	894.0	0.0	45.0	99.3	0.0
JUN	1318.7	525.9	106.3	50.0	127.4	0.0
JUL	1560.9	328.6	368.2	38.0	103.9	0.0
AUG	1379.5	3041.3	11.0	38.0	117.1	2254.6
SEP	2000.0	123.5	578.5	36.0	91.4	0.0
OCT	1417.6	19.5	820.7	34.0	45.0	0.0
NOV	537.4	0.0	0.0	41.0	38.9	0.0
DEC	457.4	0.0	0.0	43.0	35.0	0.0
JAN	379.4	0.0	0.0	39.0	36.1	0.0
FEB	304.3	0.0	0.0	45.0	26.3	0.0
MAR	233.0	0.0	0.0	48.0	24.7	0.0
		5054.4	1884.7	510.0	802.1	2254.6

1967	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	160.3	198.3	0.0	53.0	38.6	0.0
MAY	267.1	141.6	0.0	45.0	43.7	0.0
JUN	320.0	451.5	132.9	50.0	55.6	0.0
JUL	533.0	432.6	283.8	38.0	58.5	0.0
AUG	585.3	698.4	127.8	38.0	85.6	0.0
SEP	1032.3	4048.1	0.0	36.0	113.4	2931.0
OCT	2000.0	0.0	998.7	34.0	69.2	0.0
NOV	902.1	0.0	0.0	41.0	57.7	0.0
DEC	803.4	0.0	0.0	43.0	56.2	0.0
JAN	704.1	0.0	0.0	39.0	54.0	0.0
FEB	611.1	0.0	0.0	45.0	50.4	0.0
MAR	515.7	0.0	0.0	48.0	51.9	0.0
		5970.5	1543.3	510.0	730.6	2931.0
1968						
APR	415.9	160.2	0.0	53.0	53.3	0.0
MAY	469.8	856.9	0.0	45.0	98.2	0.0
JUN	1183.5	603.5	80.5	50.0	119.8	0.0
JUL	1536.6	396.3	311.9	36.0	111.8	0.0
AUG	1471.2	632.1	168.5	36.0	138.6	0.0
SEP	1756.1	1144.6	0.0	36.0	121.3	745.5
OCT	2000.0	5.4	882.6	34.0	74.2	0.0
NOV	1014.6	0.0	0.0	41.0	73.7	0.0
DEC	899.9	0.0	0.0	43.0	66.5	0.0
JAN	790.4	6.1	0.0	39.0	58.4	0.0
FEB	699.1	0.0	0.0	45.0	64.2	0.0
MAR	589.9	122.8	0.0	48.0	70.7	0.0
		3927.9	1443.5	510.0	1050.8	745.5
1969						
APR	594.0	43.1	0.0	53.0	63.6	0.0
MAY	520.4	318.5	0.0	45.0	68.2	0.0
JUN	725.7	1081.1	0.0	50.0	120.6	0.0
JUL	1636.3	1686.5	0.0	36.0	121.8	1163.0
AUG	2000.0	263.1	450.4	38.0	116.8	0.0
SEP	1657.9	831.4	18.6	36.0	117.6	317.0
OCT	2000.0	6.4	876.9	34.0	72.2	0.0
NOV	1023.2	0.0	0.0	41.0	64.0	0.0
DEC	918.2	0.0	0.0	43.0	62.9	0.0
JAN	812.3	0.0	0.0	39.0	57.3	0.0
FEB	716.0	0.0	0.0	45.0	41.5	0.0
MAR	629.5	1.0	0.0	48.0	62.0	0.0
		4231.1	1346.0	510.0	968.4	1480.1
1970						
APR	520.5	61.7	0.0	53.0	50.5	0.0
MAY	478.8	979.8	0.0	45.0	103.8	0.0
JUN	1309.7	2923.7	0.0	50.0	120.4	2062.9
JUL	2000.0	336.3	361.5	38.0	126.3	0.0
AUG	1810.4	3131.9	11.0	38.0	114.6	2778.7
SEP	2000.0	1570.1	0.0	36.0	116.3	1417.8
OCT	2000.0	0.0	938.8	34.0	67.5	0.0
NOV	959.6	0.0	0.0	41.0	60.3	0.0
DEC	858.4	0.0	0.0	43.0	52.4	0.0
JAN	763.0	0.0	0.0	39.0	54.8	0.0
FEB	669.2	0.0	0.0	45.0	47.9	0.0
MAR	576.3	0.0	0.0	48.0	54.7	0.0
		9003.4	1311.4	510.0	969.5	6259.4

Table A-3-56 Water Balance Simulation at Nong Loeng Reservoir (1971-1978)

(Unit : 1000 cu.m)

1971	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	473.6	17.4	0.0	53.0	64.8	0.0
MAY	373.3	2243.0	0.0	45.0	151.4	419.8
JUN	2000.0	1476.3	0.0	50.0	131.2	1295.1
JUL	2000.0	1865.3	0.0	38.0	125.4	1701.9
AUG	2000.0	526.9	237.7	38.0	98.3	152.9
SEP	2000.0	276.2	404.8	36.0	96.4	0.0
OCT	1739.0	17.5	827.6	34.0	59.7	0.0
NOV	835.1	0.0	0.0	41.0	54.9	0.0
DEC	739.2	0.0	0.0	43.0	45.0	0.0
JAN	651.2	0.0	0.0	39.0	43.2	0.0
FEB	569.0	0.0	0.0	45.0	47.5	0.0
MAR	476.5	3.8	0.0	48.0	49.4	0.0
		6426.4	1470.1	510.0	967.3	3569.7
1972						
APR	383.0	137.6	0.0	53.0	54.5	0.0
MAY	413.1	144.6	0.0	45.0	64.8	0.0
JUN	448.0	992.9	0.0	50.0	103.1	0.0
JUL	1287.8	154.1	548.5	38.0	62.9	0.0
AUG	792.6	1567.6	11.0	38.0	111.9	199.2
SEP	2000.0	92.3	625.8	36.0	100.2	0.0
OCT	1330.3	174.3	545.7	34.0	62.5	0.0
NOV	862.4	4.3	0.0	41.0	53.4	0.0
DEC	772.2	0.0	0.0	43.0	42.5	0.0
JAN	686.7	0.0	0.0	39.0	49.6	0.0
FEB	598.1	0.0	0.0	45.0	50.1	0.0
MAR	503.0	0.0	0.0	48.0	56.6	0.0
		3267.8	1731.1	510.0	812.0	199.2
1973						
APR	398.4	0.0	0.0	53.0	60.3	0.0
MAY	285.1	308.4	0.0	45.0	63.8	0.0
JUN	484.8	261.4	213.2	50.0	51.2	0.0
JUL	431.8	756.5	71.7	38.0	90.8	0.0
AUG	987.8	831.4	51.7	38.0	97.1	0.0
SEP	1632.4	853.8	6.4	36.0	110.3	333.5
OCT	2000.0	4.7	886.9	34.0	74.5	0.0
NOV	1009.3	0.0	0.0	41.0	65.1	0.0
DEC	903.2	0.0	0.0	43.0	58.5	0.0
JAN	801.8	0.0	0.0	39.0	51.2	0.0
FEB	711.6	0.0	0.0	45.0	51.4	0.0
MAR	615.2	4.6	0.0	48.0	56.2	0.0
		3020.9	1229.9	510.0	830.4	333.5
1974						
APR	515.5	40.7	0.0	53.0	55.9	0.0
MAY	447.4	191.9	0.0	45.0	56.1	0.0
JUN	538.2	243.5	222.1	50.0	51.3	0.0
JUL	458.2	711.7	97.8	38.0	79.9	0.0
AUG	954.2	2223.2	11.0	38.0	102.1	1026.3
SEP	2000.0	37.3	735.3	36.0	80.7	0.0
OCT	1185.3	22.6	810.1	34.0	44.9	0.0
NOV	318.9	0.2	0.0	41.0	31.4	0.0
DEC	246.7	0.0	0.0	43.0	19.9	0.0
JAN	183.8	0.0	0.0	39.0	11.7	0.0
FEB	133.1	1.7	0.0	45.0	10.0	0.0
MAR	79.9	0.0	0.0	48.0	4.2	0.0
		3472.9	1876.4	510.0	548.0	1026.3

1975	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	27.7	18.4	0.0	53.0	0.0	-6.9
MAY	0.0	1271.0	0.0	45.0	100.6	0.0
JUN	1125.5	1488.3	0.0	50.0	129.0	434.8
JUL	2000.0	606.0	163.0	38.0	140.6	264.4
AUG	2000.0	2812.8	11.0	38.0	113.7	2650.1
SEP	2000.0	1384.5	0.0	36.0	126.9	1221.7
OCT	2000.0	128.4	604.6	34.0	104.7	0.0
NOV	1385.1	0.0	0.0	41.0	81.0	0.0
DEC	1263.0	0.0	0.0	43.0	78.9	0.0
JAN	1141.1	0.0	0.0	39.0	75.6	0.0
FEB	1026.5	0.3	0.0	45.0	66.4	0.0
MAR	915.4	1.7	0.0	48.0	74.6	0.0
		7711.6	778.7	510.0	1092.1	4564.0
1976						
APR	794.5	116.3	0.0	53.0	79.3	0.0
MAY	778.6	424.8	0.0	45.0	81.6	0.0
JUN	1076.7	658.6	63.1	50.0	115.9	0.0
JUL	1506.3	251.4	440.0	38.0	80.6	0.0
AUG	1199.1	635.2	166.5	38.0	88.2	0.0
SEP	1541.5	1111.6	0.0	36.0	103.2	513.9
OCT	2000.0	68.7	664.9	34.0	88.3	0.0
NOV	1301.5	0.0	0.0	41.0	75.5	0.0
DEC	1185.0	0.0	0.0	43.0	63.1	0.0
JAN	1079.0	0.0	0.0	39.0	60.4	0.0
FEB	979.5	0.0	0.0	45.0	66.6	0.0
MAR	867.9	2.6	0.0	48.0	75.3	0.0
		3289.2	1334.5	510.0	978.2	513.9
1977						
APR	747.1	21.5	0.0	53.0	77.5	0.0
MAY	638.1	277.3	0.0	45.0	83.4	0.0
JUN	787.0	97.0	312.8	50.0	61.1	0.0
JUL	460.1	299.0	394.6	38.0	29.3	0.0
AUG	297.1	953.1	11.0	38.0	72.5	0.0
SEP	1128.7	470.4	244.6	36.0	85.3	0.0
OCT	1233.1	0.0	937.2	34.0	28.4	0.0
NOV	233.6	0.0	0.0	41.0	20.2	0.0
DEC	172.4	2.1	0.0	43.0	11.6	0.0
JAN	119.9	0.0	0.0	39.0	7.7	0.0
FEB	73.2	0.1	0.0	45.0	2.4	0.0
MAR	26.0	0.0	0.0	48.0	0.0	-22.0
		2120.5	1900.2	510.0	479.4	-22.0
1978						
APR	0.0	119.5	0.0	53.0	8.8	0.0
MAY	57.7	763.4	0.0	45.0	63.4	0.0
JUN	712.8	519.2	108.6	50.0	77.2	0.0
JUL	996.2	1592.5	0.0	38.0	109.8	440.9
AUG	2000.0	1936.4	11.0	38.0	96.5	1790.9
SEP	2000.0	869.2	0.0	36.0	94.7	738.4
OCT	2000.0	0.0	941.1	34.0	73.1	0.0
NOV	951.7	0.0	0.0	41.0	58.4	0.0
DEC	852.3	0.0	0.0	43.0	53.8	0.0
JAN	755.5	0.0	0.0	39.0	53.2	0.0
FEB	663.4	0.8	0.0	45.0	48.0	0.0
MAR	571.1	0.0	0.0	48.0	46.4	0.0
		5801.2	1060.8	510.0	783.4	2970.2

Table A-3-57 Water Balance Simulation at Nong Loeng Reservoir (1979-1984)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1979						
APR	476.7	55.3	0.0	53.0	58.1	0.0
MAY	420.9	776.8	0.0	45.0	89.6	0.0
JUN	1063.1	746.2	37.0	50.0	84.7	0.0
JUL	1637.7	90.1	640.5	38.0	81.5	0.0
AUG	967.8	410.6	322.7	38.0	53.0	0.0
SEP	964.7	355.7	334.0	36.0	59.1	0.0
OCT	891.4	0.0	996.7	34.0	0.0	-139.4
NOV	0.0	0.0	0.0	41.0	0.0	-41.0
DEC	0.0	0.0	0.0	43.0	0.0	-43.0
JAN	0.0	0.0	0.0	39.0	0.0	-39.0
FEB	0.0	0.0	0.0	45.0	0.0	-45.0
MAR	0.0	0.0	0.0	48.0	0.0	-48.0
		2434.7	2330.9	510.0	425.9	-355.4
1980						
APR	0.0	72.8	0.0	53.0	2.9	0.0
MAY	16.9	1113.0	0.0	45.0	68.3	0.0
JUN	1016.6	2940.7	0.0	50.0	89.7	1817.5
JUL	2000.0	803.3	45.2	38.0	100.6	619.4
AUG	2000.0	764.6	89.1	38.0	94.5	543.0
SEP	2000.0	1469.8	0.0	36.0	101.4	1332.5
OCT	2000.0	26.1	799.2	34.0	69.1	0.0
NOV	1123.8	0.0	0.0	41.0	62.4	0.0
DEC	1020.4	0.0	0.0	43.0	60.6	0.0
JAN	916.8	0.0	0.0	39.0	62.6	0.0
FEB	815.2	0.0	0.0	45.0	61.3	0.0
MAR	708.9	0.0	0.0	48.0	73.5	0.0
		7190.3	933.5	510.0	846.9	4312.5
1981						
APR	587.4	98.7	0.0	53.0	72.6	0.0
MAY	560.5	831.4	0.0	45.0	91.0	0.0
JUN	1255.8	753.7	34.8	50.0	124.2	0.0
JUL	1800.3	1885.2	0.0	38.0	117.2	1530.4
AUG	2000.0	322.2	395.8	38.0	124.3	0.0
SEP	1764.0	413.6	287.3	36.0	112.8	0.0
OCT	1741.6	237.0	476.6	34.0	87.6	0.0
NOV	1380.2	23.9	0.0	41.0	68.5	0.0
DEC	1294.6	0.0	0.0	43.0	61.9	0.0
JAN	1189.7	0.0	0.0	39.0	69.5	0.0
FEB	1081.2	0.0	0.0	45.0	64.4	0.0
MAR	971.8	65.8	0.0	48.0	84.3	0.0
		4631.4	1194.6	510.0	1078.7	1530.4
1982						
APR	905.2	28.7	0.0	53.0	79.1	0.0
MAY	801.8	319.6	0.0	45.0	98.3	0.0
JUN	978.2	471.7	125.5	50.0	90.6	0.0
JUL	1183.8	1007.5	0.0	38.0	150.1	3.2
AUG	2000.0	1223.0	11.0	38.0	90.6	1083.4
SEP	2000.0	1332.1	0.0	36.0	99.5	1196.7
OCT	2000.0	102.3	643.0	34.0	84.3	0.0
NOV	1341.0	1.1	0.0	41.0	72.7	0.0
DEC	1228.3	0.0	0.0	43.0	59.1	0.0
JAN	1126.2	0.0	0.0	39.0	53.5	0.0
FEB	1033.8	0.0	0.0	45.0	61.2	0.0
MAR	927.5	0.0	0.0	48.0	70.8	0.0
		4486.0	779.5	510.0	1009.7	2283.2

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1983						
APR	808.7	39.4	0.0	53.0	78.9	0.0
MAY	716.3	148.4	0.0	45.0	71.8	0.0
JUN	747.9	389.3	156.9	50.0	80.3	0.0
JUL	849.9	410.2	301.0	38.0	68.8	0.0
AUG	852.3	1892.5	11.0	38.0	111.0	584.8
SEP	2000.0	384.8	310.1	36.0	98.9	0.0
OCT	1939.7	169.3	551.7	34.0	77.4	0.0
NOV	1446.0	0.0	0.0	41.0	91.4	0.0
DEC	1313.6	0.0	0.0	43.0	70.5	0.0
JAN	1200.1	0.0	0.0	39.0	67.3	0.0
FEB	1093.7	0.0	0.0	45.0	72.6	0.0
MAR	976.1	17.6	0.0	48.0	92.9	0.0
		3451.5	1330.8	510.0	981.8	584.8
1984						
APR	852.8	61.4	0.0	53.0	90.5	0.0
MAY	770.7	419.2	0.0	45.0	84.6	0.0
JUN	1060.3	344.8	175.3	50.0	84.9	0.0
JUL	1094.8	1100.5	0.0	38.0	130.4	26.8
AUG	2000.0	2184.0	11.0	38.0	124.4	2010.6
SEP	2000.0	640.5	130.1	36.0	111.8	362.5
OCT	2000.0	315.8	401.5	34.0	99.9	0.0
NOV	1780.4	0.0	0.0	41.0	91.6	0.0
DEC	1647.8	0.0	0.0	43.0	82.4	0.0
JAN	1522.4	0.0	0.0	39.0	76.3	0.0
FEB	1407.1	0.0	0.0	45.0	71.3	0.0
MAR	1290.8	0.0	0.0	48.0	119.2	0.0
		5066.1	717.9	510.0	1167.5	2399.9

Table A-3-58 Water Balance Simulation at Nong Song Hong Reservoir (1963-1970)

(Unit : 1000 cu.m)

1963	Volume	Inflow	Irrigation	Water Works	Losses	Spill
NOV	1087.4	5.9	0.0	34.0	44.0	0.0
DEC	1014.0	0.0	0.0	35.0	46.0	0.0
JAN	933.6	0.0	0.0	32.0	51.2	0.0
FEB	850.4	1.3	0.0	37.0	51.2	0.0
MAR	763.5	1.2	0.0	40.0	57.4	0.0
1964						
APR	667.2	93.4	0.0	44.0	60.0	0.0
MAY	656.0	641.9	0.0	37.0	53.0	119.9
JUN	1087.4	315.7	20.3	40.0	62.9	192.4
JUL	1087.4	191.9	121.9	31.0	55.9	0.0
AUG	1060.5	265.1	78.6	32.0	58.5	69.2
SEP	1087.4	284.3	54.7	30.0	46.8	152.8
OCT	1087.4	79.6	215.8	28.0	46.8	0.0
NOV	876.5	0.0	0.0	34.0	42.4	0.0
DEC	800.1	0.0	0.0	35.0	43.6	0.0
JAN	721.2	0.0	0.0	32.0	43.6	0.0
FEB	645.5	0.0	0.0	37.0	40.0	0.0
MAR	568.4	0.0	0.0	40.0	49.7	0.0
1965						
APR	478.7	112.5	0.0	44.0	54.7	0.0
MAY	492.5	109.0	0.0	37.0	50.1	0.0
JUN	514.4	399.4	0.0	40.0	54.0	0.0
JUL	819.7	177.0	125.3	31.0	57.2	0.0
AUG	783.3	265.8	78.2	32.0	53.2	0.0
SEP	885.7	733.7	0.0	30.0	52.3	449.7
OCT	1087.4	6.2	334.2	28.0	48.1	0.0
NOV	683.3	0.0	0.0	34.0	47.7	0.0
DEC	601.6	0.0	0.0	35.0	48.5	0.0
JAN	518.1	0.0	0.0	32.0	46.0	0.0
FEB	440.1	0.0	0.0	37.0	43.2	0.0
MAR	359.9	12.8	0.0	40.0	52.5	0.0
1966						
APR	280.1	55.0	0.0	44.0	40.6	0.0
MAY	250.6	404.4	0.0	37.0	51.5	0.0
JUN	566.5	237.9	42.2	40.0	59.1	0.0
JUL	663.2	148.7	146.1	31.0	52.2	0.0
AUG	582.5	1375.8	4.4	32.0	52.1	782.5
SEP	1087.4	95.9	229.5	30.0	48.7	0.0
OCT	835.1	8.8	225.7	28.0	42.7	0.0
NOV	447.5	0.0	0.0	34.0	39.8	0.0
DEC	373.8	0.0	0.0	35.0	35.8	0.0
JAN	303.0	0.0	0.0	32.0	35.1	0.0
FEB	235.9	0.0	0.0	37.0	27.0	0.0
MAR	171.9	0.0	0.0	40.0	27.6	0.0

1967	Volume	Inflow	Irrigation	Water Works	Losses	Spill
APR	104.3	89.7	0.0	44.0	28.1	0.0
MAY	121.6	64.1	0.0	37.0	27.2	0.0
JUN	121.7	204.2	52.8	40.0	35.1	0.0
JUL	198.1	195.7	112.6	31.0	36.7	0.0
AUG	213.5	316.0	50.7	32.0	50.8	0.0
SEP	396.0	1831.3	0.0	30.0	50.4	1059.4
OCT	1087.4	0.0	396.3	28.0	46.0	0.0
NOV	817.1	0.0	0.0	34.0	43.3	0.0
DEC	539.8	0.0	0.0	35.0	45.0	0.0
JAN	459.8	0.0	0.0	32.0	46.2	0.0
FEB	381.7	0.0	0.0	37.0	43.5	0.0
MAR	301.2	0.0	0.0	40.0	40.8	0.0
1968						
APR	220.4	72.5	0.0	44.0	37.9	0.0
MAY	210.9	387.6	0.0	37.0	54.3	0.0
JUN	507.3	273.0	31.9	40.0	56.2	0.0
JUL	652.1	179.3	123.8	31.0	54.0	0.0
AUG	622.7	285.9	66.9	32.0	54.8	0.0
SEP	749.9	517.8	0.0	30.0	53.9	96.4
OCT	1087.4	2.4	350.2	28.0	48.7	0.0
NOV	663.0	0.0	0.0	34.0	51.3	0.0
DEC	577.7	0.0	0.0	35.0	49.5	0.0
JAN	493.2	2.8	0.0	32.0	46.2	0.0
FEB	417.8	0.0	0.0	37.0	54.6	0.0
MAR	326.1	55.5	0.0	40.0	54.7	0.0
1969						
APR	287.0	19.5	0.0	44.0	43.9	0.0
MAY	218.5	144.1	0.0	37.0	45.1	0.0
JUN	280.5	469.1	0.0	40.0	54.2	0.0
JUL	675.4	762.9	0.0	31.0	54.1	265.8
AUG	1087.4	119.0	178.7	32.0	56.1	0.0
SEP	939.6	376.1	7.4	30.0	52.3	138.6
OCT	1087.4	2.9	348.0	28.0	47.1	0.0
NOV	667.2	0.0	0.0	34.0	44.3	0.0
DEC	585.9	0.0	0.0	35.0	46.3	0.0
JAN	507.6	0.0	0.0	32.0	44.9	0.0
FEB	430.7	0.0	0.0	37.0	34.9	0.0
MAR	358.8	0.5	0.0	40.0	49.6	0.0
1970						
APR	269.7	27.9	0.0	44.0	36.2	0.0
MAY	217.5	443.2	0.0	37.0	54.1	0.0
JUN	569.6	1322.6	0.0	40.0	53.5	711.3
JUL	1087.4	152.1	143.5	31.0	57.4	0.0
AUG	1007.7	1416.8	4.4	32.0	50.9	1249.8
SEP	1087.4	710.3	0.0	30.0	51.7	628.6
OCT	1087.4	0.0	372.5	28.0	45.9	0.0
NOV	640.9	0.0	0.0	34.0	43.5	0.0
DEC	563.5	0.0	0.0	35.0	40.2	0.0
JAN	486.3	0.0	0.0	32.0	44.6	0.0
FEB	411.7	0.0	0.0	37.0	41.5	0.0
MAR	333.1	0.0	0.0	40.0	43.6	0.0

Table A-3-59 Water Balance Simulation at Nong Song Hong Reservoir (1971-1978)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1971						
APR	249.6	7.9	0.0	44.0	45.9	0.0
MAY	167.6	1014.7	0.0	37.0	67.3	0.0
JUN	1077.9	667.8	0.0	40.0	58.3	560.0
JUL	1087.4	843.8	0.0	31.0	55.6	757.1
AUG	1087.4	236.4	94.3	32.0	43.7	68.3
SEP	1087.4	125.0	160.6	30.0	45.3	0.0
OCT	976.4	7.9	326.4	28.0	44.2	0.0
NOV	583.7	0.0	0.0	34.0	43.2	0.0
DEC	506.6	0.0	0.0	35.0	37.6	0.0
JAN	433.7	0.0	0.0	32.0	38.6	0.0
FEB	363.1	0.0	0.0	37.0	41.2	0.0
MAR	284.9	1.7	0.0	40.0	39.0	0.0
1972						
APR	207.7	62.3	0.0	44.0	38.7	0.0
MAY	187.3	65.4	0.0	37.0	42.2	0.0
JUN	173.5	449.2	0.0	40.0	53.7	0.0
JUL	526.9	69.7	217.6	31.0	41.7	0.0
AUG	308.3	709.2	4.4	32.0	48.4	0.0
SEP	932.7	41.8	246.3	30.0	52.8	0.0
OCT	643.3	76.8	216.5	28.0	45.1	0.0
NOV	434.5	1.9	0.0	34.0	39.1	0.0
DEC	363.4	0.0	0.0	35.0	30.0	0.0
JAN	298.4	0.0	0.0	32.0	32.4	0.0
FEB	234.0	0.0	0.0	37.0	29.4	0.0
MAR	167.6	0.0	0.0	40.0	28.5	0.0
1973						
APR	99.1	0.0	0.0	44.0	17.6	0.0
MAY	37.5	139.5	0.0	37.0	30.3	0.0
JUN	109.7	118.3	84.6	40.0	22.3	0.0
JUL	81.1	342.2	28.4	31.0	52.4	0.0
AUG	311.5	376.1	20.5	32.0	43.0	0.0
SEP	592.0	366.3	2.5	30.0	47.2	0.0
OCT	896.5	2.1	351.9	28.0	46.3	0.0
NOV	474.4	0.0	0.0	34.0	42.9	0.0
DEC	397.5	0.0	0.0	35.0	39.7	0.0
JAN	322.8	0.0	0.0	32.0	32.0	0.0
FEB	258.8	0.0	0.0	37.0	29.0	0.0
MAR	192.9	2.1	0.0	40.0	27.7	0.0
1974						
APR	127.2	16.4	0.0	44.0	23.5	0.0
MAY	76.1	86.8	0.0	37.0	24.1	0.0
JUN	103.8	110.1	88.1	40.0	18.5	0.0
JUL	67.3	322.0	38.8	31.0	43.0	0.0
AUG	276.5	1005.8	4.4	32.0	45.4	113.0
SEP	1087.4	16.9	291.8	30.0	48.0	0.0
OCT	734.5	10.2	321.5	28.0	54.1	0.0
NOV	341.1	0.1	0.0	34.0	41.0	0.0
DEC	266.2	0.0	0.0	35.0	28.8	0.0
JAN	202.4	0.0	0.0	32.0	19.5	0.0
FEB	150.9	0.8	0.0	37.0	21.2	0.0
MAR	93.5	0.0	0.0	40.0	12.9	0.0
1975						
APR	40.5	8.3	0.0	44.0	2.2	0.0
MAY	2.6	575.0	0.0	37.0	57.2	0.0
JUN	483.4	673.3	0.0	40.0	57.4	0.0
JUL	1059.4	274.2	64.7	31.0	62.5	87.9
AUG	1087.4	1272.5	4.4	32.0	50.6	1185.5
SEP	1087.4	626.3	0.0	30.0	56.4	539.9
OCT	1087.4	58.1	239.9	28.0	56.2	0.0
NOV	621.3	0.0	0.0	34.0	46.1	0.0
DEC	741.3	0.0	0.0	35.0	47.3	0.0
JAN	658.9	0.0	0.0	32.0	47.9	0.0
FEB	579.0	0.1	0.0	37.0	44.7	0.0
MAR	497.4	0.8	0.0	40.0	53.5	0.0
1976						
APR	404.7	52.6	0.0	44.0	56.6	0.0
MAY	356.7	192.2	0.0	37.0	48.1	0.0
JUN	463.5	298.0	25.0	40.0	55.2	0.0
JUL	641.5	113.7	174.6	31.0	44.5	0.0
AUG	505.2	287.4	66.1	32.0	41.8	0.0
SEP	652.7	502.9	0.0	30.0	45.9	0.0
OCT	1079.6	40.1	263.8	28.0	49.5	0.0
NOV	778.5	0.0	0.0	34.0	44.6	0.0
DEC	699.9	0.0	0.0	35.0	39.3	0.0
JAN	625.5	0.0	0.0	32.0	39.6	0.0
FEB	553.9	0.0	0.0	37.0	46.2	0.0
MAR	470.7	1.2	0.0	40.0	55.7	0.0
1977						
APR	376.1	9.7	0.0	44.0	57.2	0.0
MAY	284.7	125.4	0.0	37.0	57.4	0.0
JUN	315.7	43.9	124.1	40.0	36.9	0.0
JUL	158.6	135.2	156.6	31.0	16.5	0.0
AUG	89.7	431.2	4.4	32.0	41.2	0.0
SEP	443.3	212.8	97.1	30.0	45.7	0.0
OCT	485.3	0.0	371.9	28.0	16.4	0.0
NOV	67.1	0.0	0.0	34.0	6.5	0.0
DEC	26.6	1.0	0.0	35.0	0.0	-7.4
JAN	0.0	0.0	0.0	32.0	0.0	-32.0
FEB	0.0	0.0	0.0	37.0	0.0	-37.0
MAR	0.0	0.0	0.0	40.0	0.0	-40.0
1978						
APR	0.0	54.1	0.0	44.0	2.8	0.0
MAY	7.3	345.4	0.0	37.0	41.6	0.0
JUN	274.0	234.9	43.1	40.0	47.0	0.0
JUL	376.9	720.4	0.0	31.0	48.6	0.0
AUG	1019.8	876.0	4.4	32.0	42.9	729.1
SEP	1087.4	393.2	0.0	30.0	42.1	341.1
OCT	1087.4	0.0	373.4	28.0	49.8	0.0
NOV	636.2	0.0	0.0	34.0	42.3	0.0
DEC	559.8	0.0	0.0	35.0	41.4	0.0
JAN	483.4	0.0	0.0	32.0	43.5	0.0
FEB	407.8	0.4	0.0	37.0	41.6	0.0
MAR	329.7	0.0	0.0	40.0	36.9	0.0

Table A-3-60 Water Balance Simulation at Nong Song Hong Reservoir (1979-1984)

(Unit : 1000 cu.m)

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1979						
APR	252.6	25.0	0.0	44.0	41.6	0.0
MAY	192.2	351.4	0.0	37.0	52.9	0.0
JUN	453.7	337.6	14.7	40.0	38.8	0.0
JUL	697.8	40.8	254.1	31.0	50.8	0.0
AUG	402.6	165.8	128.1	32.0	33.5	0.0
SEP	394.7	160.9	132.5	30.0	38.9	0.0
OCT	354.2	0.0	395.5	28.0	0.0	-69.3
NOV	0.0	0.0	0.0	34.0	0.0	-34.0
DEC	0.0	0.0	0.0	35.0	0.0	-35.0
JAN	0.0	0.0	0.0	32.0	0.0	-32.0
FEB	0.0	0.0	0.0	37.0	0.0	-37.0
MAR	0.0	0.0	0.0	40.0	0.0	-40.0
1980						
APR	0.0	32.9	0.0	44.0	0.0	-11.1
MAY	0.0	503.5	0.0	37.0	41.7	0.0
JUN	424.8	1330.3	0.0	40.0	39.9	587.8
JUL	1087.4	363.4	17.9	31.0	44.7	269.7
AUG	1087.4	345.9	35.4	32.0	42.0	236.5
SEP	1087.4	664.9	0.0	30.0	45.1	589.9
OCT	1087.4	11.8	317.1	28.0	42.8	0.0
NOV	711.3	0.0	0.0	34.0	40.7	0.0
DEC	636.6	0.0	0.0	35.0	41.7	0.0
JAN	559.9	0.0	0.0	32.0	45.6	0.0
FEB	482.4	0.0	0.0	37.0	47.7	0.0
MAR	397.7	0.0	0.0	40.0	59.2	0.0
1981						
APR	296.5	44.6	0.0	44.0	52.5	0.0
MAY	240.7	376.1	0.0	37.0	48.7	0.0
JUN	537.0	340.9	13.8	40.0	53.1	0.0
JUL	771.0	852.8	0.0	31.0	52.1	453.3
AUG	1087.4	145.8	157.1	32.0	57.4	0.0
SEP	986.7	167.1	114.0	30.0	52.7	0.0
OCT	977.2	107.2	189.1	28.0	47.6	0.0
NOV	819.7	10.8	0.0	34.0	36.6	0.0
DEC	757.9	0.0	0.0	35.0	36.5	0.0
JAN	686.3	0.0	0.0	32.0	43.0	0.0
FEB	611.4	0.0	0.0	37.0	42.1	0.0
MAR	532.3	29.8	0.0	40.0	56.1	0.0
1982						
APR	465.9	13.0	0.0	44.0	55.8	0.0
MAY	379.1	144.6	0.0	37.0	60.7	0.0
JUN	425.9	213.4	49.8	40.0	50.1	0.0
JUL	499.4	455.8	0.0	31.0	63.9	0.0
AUG	860.3	553.3	4.4	32.0	40.3	249.5
SEP	1087.4	602.6	0.0	30.0	44.2	526.4
OCT	1087.4	46.3	255.1	28.0	46.6	0.0
NOV	804.0	0.5	0.0	34.0	42.2	0.0
DEC	728.2	0.0	0.0	35.0	36.1	0.0
JAN	657.1	0.0	0.0	32.0	34.2	0.0
FEB	590.9	0.0	0.0	37.0	41.2	0.0
MAR	512.7	0.0	0.0	40.0	50.6	0.0

	Volume	Inflow	Irrigation	Water Works	Losses	Spill
1983						
APR	422.1	17.8	0.0	44.0	59.1	0.0
MAY	336.9	67.2	0.0	37.0	51.0	0.0
JUN	316.0	176.1	62.3	40.0	53.7	0.0
JUL	336.2	169.6	119.4	31.0	45.3	0.0
AUG	326.0	656.1	4.4	32.0	49.3	9.0
SEP	1087.4	174.1	123.1	30.0	44.0	0.0
OCT	1064.4	76.6	218.9	28.0	41.0	0.0
NOV	853.1	0.0	0.0	34.0	50.6	0.0
DEC	766.5	0.0	0.0	35.0	41.3	0.0
JAN	692.2	0.0	0.0	32.0	41.4	0.0
FEB	616.6	0.0	0.0	37.0	47.1	0.0
MAR	534.7	0.0	0.0	40.0	63.6	0.0
1984						
APR	439.1	27.8	0.0	44.0	64.6	0.0
MAY	358.2	189.6	0.0	37.0	50.3	0.0
JUN	460.6	156.0	69.6	40.0	49.3	0.0
JUL	457.7	497.8	0.0	31.0	55.5	0.0
AUG	869.0	985.0	4.4	32.0	55.3	677.9
SEP	1087.4	289.8	51.6	30.0	49.7	158.4
OCT	1087.4	142.9	159.3	28.0	46.3	0.0
NOV	996.7	0.0	0.0	34.0	44.3	0.0
DEC	918.4	0.0	0.0	35.0	41.7	0.0
JAN	841.7	0.0	0.0	32.0	40.3	0.0
FEB	769.3	0.0	0.0	37.0	39.5	0.0
MAR	692.8	0.0	0.0	40.0	69.3	0.0

A.4. HYDROGEOLOGY

TABLE OF CONTENTS

LIST OF FIGURES

A.4. HYDROGEOLOGY

A.4.1. General

The hydrogeological investigations including geoelectric prospecting and test well drilling were carried out in order to examine groundwater source for specified five SDs, such as Kham Sakae Sang, Huai Thalaeng, Kusuman, Phon Charoen and Nong Song Hong. The investigation work is composed of mainly two stages; geoelectric prospecting by Study Team and test well drilling by PWD.

A.4.2. Geomorphologic Conditions

(1) Kham Sakae Sang:

SD Kham Sakae Sang is situated at about 40 km north of Nakhon Ratchasima, and belonging to King Amphoe Kham Sakae Sang, Changwat Nakhon Ratchasima jurisductionally.

The area including the SD is very flat topographically and cultivated as a paddy field except scattered town and villages. Although the area is mostly very flat, the land inclines totally toward south (or SSE) but extremely gentle, and the areas of scattered villages are a little higher than the surrounding paddy fields.

The vast and very flat area, mainly used as paddy fields is Alluvial Plain opened toward Nam Mun, and the slight high lands occupied by town or village zones are remnants of so-called Low Terrace geomorphologically.

In this aspect, the main part of the SD Kham Sakae Sang is on the Low Terrace; having only 5, 6 m of relative high from the surrounding plain. The ground elevation of the Alluvial Plain

is about 180 m or a little more, and the one of town ranges from 185 to 188 m (based on 1:50,000 topomap and new SD map).

(2) Huai Thaleang:

SD Huai Thaleang, Amphoe Huai Thaleang, Changwat Nakhon Ratchasima, is situated about 60 kilometers east of Nakhon Ratchasima city along the national railway - North East Line.

The service area Amphoe Huai Thaleang is almost flat but undulating very gently and inclined toward northeast as a total view. Inside of the town, the ground surface is flat and there is no or only slight difference in ground level between town zone and surrounding cultivated or uncultivated fields.

A gently undulated or rolling high land which extends vastly on west of the SD is a kind of Peneplain formed by bedrock, and the area near this SD is an eastern slope of the peneplain, still on the peneplain but transitive to an alluvial low land.

These geomorphological condition suggests that an overburden in and around the SD should be thin, while a weathered rock zone should be rather thick.

(3) Kusuman:

SD Kusuman is situated in Amphoe Kusuman, Changwat Sakon Nakhon, about 30 km northeast from Sakon Nakhon in direct distance. The SD developes along the one of major national road (route No.22) and forms a compact and rather intensive town feature.

The main part of SD and Amphoe Office are situated on a little high land comparing to surrounding paddy field, and the town area and Amphoe Office area are separated by a small stream.

The service area of the SD is a gently undulating land and the SD area is situated in the very gentle valley. This undulating land seems to be a dissected terrace (most probably a middle terrace), and the valley dissecting the terrace is already covered by some alluvial deposits.

Geomorphologically, a little high land on which the town developes, mentioned above, is a remain of terrace and the surrounding paddy field is an alluvial plain.

(4) Phon Charoen:

Sanitary District Phon Charoen locates along the national road route No.222, about 45 kilometers north from Amphoe Phang Khen, one of the major town along the route No.22 (from Ubon to Sakon Nakhon).

The service area of the SD is rather flat but has a small and gentle relief everywhere. This area is one of low portions of gently undulated land from a macromatic view.

The high lands among the undulated land are terraces, and the low portions are consisted of low terraces and alluvial plains as a general.

SD area is composed of dissected terrace and alluvial plain geomorphologically. The highest land in the SD locates at southwest boundary and the lowest land lies northwest end of the SD.

(5) Nong Song Hong:

SD Nong Song Hong is situated along major national road route No.2, about 45 kilometers north from Udon Thani city. The SD belongs to Amphoe Nong Khai, Changwat Nong Khai jurisductionally.

The serive area of the SD is gently undulated land, and the SD situates at one of high land.

Mostly the high portion of the vast undulation is a terrace and the low portions are dissecting alluvial plains and some low terraces (or old flood plain) geomorphologically. In this SD, the western half of the town stands on the terrace and eastern half stands on a dissecting slope and the low alluvial plain. At the terrace, a laterite developes considerably wide and thick.

A.4.3. Review of Existing Well Data

(1) Status of Groundwater Development

Now in Thailand, governmental activities on groundwater development can be classified into two categories. The first is the development for use under specific objectives of individual government agencies, and the second is the development program aimed for provision of clean water to rural communities throughout the country.

The first category includes, for example, the groundwater development as source of public water supply for Bangkok Metropolis, cities, towns, sanitary districts, etc. by MOI, and the groundwater development for agriculture use by RID.

The second category is under the national project established in 1964 (National Potable Water Project). The project is to produce sufficient sources of water, both surface and underground, for domestic consumption in all villages of the country. To comply with this objective, the following government agencies are responsible for development of groundwater in the villages where surface water resources is not available or insufficient;

- Department of Mineral Resources (DMR)
- Office of Accelerated Rural Development (ARD)
- Public Work Department (PWD)
- Department of Health (DH), and
- National Security Command (NSC)

To accomplish this goal, at least 50,000 water wells must be drilled. At present, only about 17,000 wells were completed in about 15,000 villages.

The Construction of Water Wells under National Potable Water Project (up to 1980)

Regions	No. of Wells Drilled by Responsible Agencies					Total No. of Wells
	DMR	ARD	PWD	DH	NSC	
Northern Highland and Upper Central Plain	1,212	373	638	2	87	2,313
Khorat Plateau	7,888	2,455	29	351	138	10,861
Lower Central Plain	585	8	840	224	27	1,684
Mae Klong Basin	314	124	404	19	40	901
Easten Provinces	351	56	257	6	19	689
Peninsula	1,050	233	9	0	54	1,346
Total	11,480	3,249	2,177	602	365	17,793

In this country, the early attempt to obtain potable groundwater was made by private sector in areas around Bangkok as early as 1914. However, the trend of activity was not remarkable prior to the last two decades. Since 1955, private sector, from farmers to industrialists, took a full share in utilization of groundwater resources. Now a total abstraction of groundwater by private sector became nearly half of whole groundwater abstruction in Thailand (about 326 MCM/year out from grand total of 703 MCM/year in 1980).