JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRY AND HANDICRAFT
LAO PEOPLE'S DEMOCRATIC REPUBLIC

MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT

APPENDIXES

MARCH, 1995

ELECTRIC POWER DEVELOPMENT CO., LTD., TOKYO
NEWJEC INC., OSAKA
PASCO INTERNATIONAL INC., TOKYO

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Data of Meteorology and Hydrology

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1.4 Present Situation of the Observation Stations (Memorandum February 12, 1994)

1.1 Hydrological Data at Attapu

The daily discharges at Attapu, which are the most fundamental data to estimate the monthly discharges of the Projects, are calculated using the rating curves. The curves are formulated by the following way and the calculated daily discharges, as well as the recorded data, are shown in the attached tables and figures.

1. Rating Curve

The three (3) different rating curves were derived by the least square method as shown in Figure 1.

The discharge data used in the formulation and the period of water level record to be converted to the discharge are tabulated below.

Rating Curve	Discharge Measurement Data	Water Level Record
A	-----	1988 and 1989
B	1988 - 1991	1991 and 1992
C	1992	1992 and 1993

Because the discharge in 1989 has been already published by the Mekong Committee as shown in their Year Book, the discharge data in this year were quoted from the Year Book. The rating curve A was derived from these discharges in the Year Book and the curve was applied to calculation of the discharge in 1988. The daily water level recorded between 1990 and 1991 were converted to the daily discharge by the rating curve B which had been derived from the discharge measurement data from 1988 to 1991.

The stage discharge relation in 1992 seems to change from the previous years as shown in Figure 1. Therefore, the rating curve C was calculated using only the discharge measurement data in 1992.

2. Conversion to Discharge

Calculated discharges by the above rating curves are shown in Table 2 to 7 and Figure 2.

3. Hydrological Data at Attapu

The following data were used in the above calculation and those have been recorded at the hydrometric station and the meteorological station in Attapu. The data are available at the Department of Hydrology and Meteorology in Vientiane.

a)	Water Level	:	May 21, 1988 - July 18, 1994 See Table 2 to 7
b)	Discharge Measurement	:	Oct. 7, 1988 - Dec. 18, 1993 Total 85 times range 1.3 - 10.7 m in depth See Table 1
c)	Rainfall	:	May 26, 1988 - July 18, 1994 See Table 8

Table 1 (1/2) Discharge Measurement at Attapu

1988

No.	DATA	L(m)	S(m2)	V(m/s)	Q(m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
1	07/10/88	189.2	952	0.883	840.5	5.22		
2	10/10/88	186.8	789	0.693	546.5	4.11		
3	14/10/88	190.4	1078	1.130	1217.5	5.88		
4	18/10/88	190.5	1168	1.251	1461.3	6.50		
5	22/10/88	186.9	848	0.852	722.6	4.67		
6	14/11/88	186.0	551	0.617	340.0	3.05		
7	26/12/88	185.5	409	0.396	161.9	2.25		
Max.						6.5		
Min.						2.3		

1989

No.	DATA	L (m)	S (m2)	V (m/s)	Q (m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
1	04/01/89	185.7	451	0.470	211.8	2.44	2.43	2.44
2	02/02/89	184.9	341	0.259	88.5	1.83	1.83	1.83
3	28/03/89	183.1	276	0.183	50.5	1.56	1.56	1.56
4	20/04/89	183.2	296	0.192	56.9	1.66	1.66	1.66
5	20/05/89	185.0	350	0.277	96.8	1.95	1.95	1.95
6	17/06/89	186.2	578	0.610	352.8	3.17	3.18	3.18
7	20/06/89	186.1	515	0.563	289.9	2.81	2.82	2.82
8	17/07/89	186.2	517	0.571	295.3	2.98	2.97	2.98
9	19/07/89	186.9	698	0.813	566.8	3.78	3.78	3.78
10	14/08/89	190.3	1080	1.053	1137.0	5.90	5.90	5.90
11	18/08/89	190.0	911	0.910	828.6	4.95	4.95	4.95
12	30/08/89	190.0	860	0.863	742.0	4.68	4.68	4.68
13	14/09/89	198.0	1316	1.425	1875.0	7.24	7.24	7.24
14	20/09/89	190.0	985	0.984	969.7	5.30	5.31	5.31
15	30/09/89	187.0	683	0.776	535.7	3.69	3.68	3.69
16	07/10/89	186.5	630	0.753	463.0	3.41	3.41	3.41
17	15/10/89	190.2	1007	1.099	916.5	5.55	5.48	5.52
18	08/11/89	186.0	497	0.553	275.1	2.66	2.66	2.66
19	11/12/89	185.5	410	0.465	190.8	2.28	2.28	2.28
Max								7.24
Min								1.56

1990

No.	DATA	L (m)	S (m2)	V (m/s)	Q (m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
1	25/01/90	183.3	316	0.201	63.4	1.78	1.78	1.78
2	26/02/90	183.0	284	0.194	55.1	1.60	1.60	1.60
3	27/03/90	183.0	274	0.165	45.2	1.53	1.53	1.53
4	16/04/90	185.2	412	0.443	182.5	2.23	2.21	2.22
5	16/05/90	183.1	325	0.276	89.6	1.94	1.93	1.94
6	13/06/90	184.0	508	0.524	266.4	2.92	2.94	2.93
7	19/06/90	184.9	543	0.669	363.6	3.23	3.19	3.21
8	10/07/90	186.0	545	0.534	291.0	3.02	3.02	3.02
9	15/08/90	156.7	694	0.806	559.8	3.78	3.80	3.79
10	21/08/90	186.5	659	0.647	426.8	3.64	3.68	3.66
11	28/08/90	190.5	960	1.031	990.2	5.46	5.27	5.37
12	31/08/90	214.5	1759	2.101	3696.4	9.65	9.63	9.64
13	06/09/90	202.6	1199	1.264	1515.4	6.65	6.64	6.65
14	29/09/90	187.5	802	0.689	552.7	4.46	4.46	4.46
15	04/10/90	205.3	1701	1.622	2758.0	8.84	8.66	8.75
16	16/10/90	216.0	1887	2.108	3979.0	10.72	10.72	10.72
17	18/10/90	195.7	1334	1.367	1823.0	7.34	7.26	7.30
18	23/11/90	190.0	906	0.926	839.0	5.00	4.98	4.99
19	04/12/90	186.7	637	0.752	479.3	3.44	3.43	3.44
Max								10.72
Min								1.53

Table 1 (2/2) Discharge Measurement at Attapu

1991

No.	DATA	L (m)	S (m2)	V (m/s)	Q (m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
1	31/01/91	182.3	349	0.237	82.8	2.18	2.18	2.18
2	12/02/91	182.2	333	0.223	74.2	2.10	2.10	2.10
3	27/03/91	181.8	310	0.203	63.1	1.97	1.97	1.97
4	30/04/91	180.5	289	0.190	55.1	1.88	1.88	1.88
5	14/05/91	182.1	320	0.229	73.2	2.01	2.01	2.01
6	20/06/91	184.0	482	0.498	240.0	3.12	3.06	3.09
7	21/06/91	183.7	417	0.433	180.3	2.72	2.70	2.71
8	26/07/91	190.7	1093	1.082	1183.1	5.98	6.06	6.02
9	29/07/91	190.0	1037	0.880	912.4	5.41	5.29	5.35
10	31/07/91	190.4	1062	0.975	1035.5	5.54	5.62	5.58
11	29/08/91	203.6	1577	1.469	2316.3	8.19	8.21	8.20
12	31/08/91	201.3	1494	1.425	2128.6	7.80	7.80	7.80
13	04/09/91	198.5	1414	1.378	1954.4	7.37	7.39	7.38
14	08/09/91	205.1	1638	1.594	2610.8	8.53	8.53	8.53
15	11/09/91	194.4	1226	1.290	1581.3	6.86	6.84	6.85
16	27/09/91	191.3	1163	1.098	1277.1	6.15	6.17	6.16
17	28/11/91	184.7	773	0.824	636.5	4.48	4.36	4.42
18	29/11/91	184.0	631	0.633	399.3	3.58	3.52	3.55
19	10/12/91	182.8	445	0.516	229.2	2.52	2.51	2.52
20	13/12/91	183.5	585	0.614	359.4	3.30	3.26	3.28
Max								8.53
Min								1.88

1992

N/N	DATA	L (m)	S (m2)	V (m/s)	Q (m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
1	22/06/92	183.0	586	0.697	408.8	2.88	2.86	2.87
2	25/06/92	184.0	685	0.816	559.3	3.42	3.38	3.40
3	20/07/92	182.3	458	0.567	259.0	2.30	2.30	2.30
4	22/07/92	182.5	493	0.626	309.0	2.55	2.52	2.54
5	23/07/92	184.2	710	0.870	618.0	3.18	3.17	3.18
6	03/08/92	186.5	774	0.907	702.0	4.16	4.06	4.11
7	17/08/92	193.9	1172	1.330	1559.0	5.78	5.90	5.84
8	21/08/92	198.2	1419	1.733	2459.0	6.82	7.45	7.14
9	01/09/92	195.0	1214	1.184	1436.0	6.20	6.19	6.20
10	17/09/92	188.1	888	0.967	860.0	4.64	4.61	4.63
11	21/09/92	199.5	1485	1.767	2624.0	7.54	7.65	7.60
12	02/10/92	186.0	783	0.814	636.8	3.97	3.96	3.97
13	09/10/92	188.2	939	0.984	923.4	4.99	4.93	4.96
14	24/11/92	183.2	625	0.662	415.1	3.09	3.09	3.09
15	12/12/92	183.0	620	0.500	310.3	2.70	2.69	2.70
16	16/12/92	75.0	123	0.136	16.7	1.30	1.30	1.30
Max								7.60
Min								1.30

1993

N/N	DATA	L (m)	S (m2)	V (m/s)	Q (m3/s)	H1 (m)	H2 (m)	(H1+H2)/2
	26/10/93		641.7	0.615	394.9			3.30
	28/10/93		535.5	0.594	318.3			2.80
	24/11/93		505.8	0.594	300.6			2.50
	18/12/93		743.3	0.831	617.9			3.90
Max								3.90
Min								2.50

Table 2 Water Level Measurement and Calculated Discharge in 1988

1) Water Level Measurement [m]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1						3.45	2.36	5.06	2.81	2.81	3.43	2.70
2						3.78	2.23	5.80	2.77	3.05	3.34	2.70
3						3.59	2.40	6.02	2.67	2.96	3.29	2.65
4						3.80	2.19	6.05	2.62	2.82	3.23	2.59
5						4.61	2.17	6.06	2.55	4.04	3.16	2.53
6						4.03	2.17	4.75	2.50	4.20	3.13	2.50
7						2.93	2.18	4.09	2.61	5.30	3.07	2.58
8						2.42	2.21	4.32	2.80	5.24	3.11	2.46
9						2.18	2.10	4.50	2.74	4.14	4.28	2.40
10						2.11	2.18	4.12	2.91	3.18	3.51	2.35
11						2.00	2.17	4.69	3.01	6.88	3.23	2.64
12						1.84	2.16	4.80	2.88	7.81	3.10	3.43
13						2.33	2.29	4.47	2.72	5.74	3.08	2.93
14						2.71	2.44	4.22	2.88	5.95	3.06	2.72
15						2.57	3.30	4.09	3.11	6.22	3.01	2.57
16						3.48	3.79	3.80	3.14	6.70	2.91	2.48
17						4.07	4.13	3.68	2.81	10.12	2.79	2.42
18						3.78	4.37	3.49	2.78	6.72	2.75	2.42
19						3.16	4.95	3.40	3.16	5.68	2.91	3.16
20						2.94	3.86	3.22	3.10	5.23	3.26	2.74
21					1.89	2.74	3.77	3.07	3.19	5.59	3.14	2.54
22					1.75	2.56	3.24	2.97	2.84	4.86	3.02	2.42
23					1.60	2.49	3.11	2.91	2.80	4.43	2.84	2.37
24					1.65	2.37	2.84	2.95	2.80	4.09	2.77	2.34
25					1.77	2.34	2.43	3.07	2.79	4.35	2.70	2.29
26					1.91	2.34	3.32	2.97	2.79	4.52	2.68	2.26
27					2.06	2.35	3.42	2.99	2.87	4.10	2.60	2.22
28					1.96	2.28	3.50	3.10	3.57	4.00	2.59	2.19
29					1.98	2.25	3.36	3.34	3.35	3.70	2.88	2.18
30					1.93	2.39	3.43	3.32	2.88	3.58	2.83	2.15
31					2.30		3.97	2.94		3.49		2.16
MAX					2.30	4.61	4.95	6.06	3.57	10.12	4.28	3.43
MIN					1.60	1.84	2.10	2.91	2.50	2.81	2.59	2.15
MEAN					1.89	2.86	2.97	4.01	2.89	4.89	3.06	2.52

2) Calculated Discharge by Q=a+bH+cH^2 [m3/s]

a = (114.5)
b = 59.3
c = 26.9 (89)

Day	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1						411	175	875	265	265	406	242
2						494	152	1,135	256	317	384	242
3						445	183	1,218	236	297	372	232
4						500	144	1,230	226	267	358	220
5						731	141	1,234	212	565	342	208
6						562	141	775	202	610	335	202
7						290	143	578	265	956	321	218
8						187	148	644	263	936	330	194
9						143	129	698	250	592	633	183
10						130	143	587	286	346	425	174
11						112	141	756	308	1,568	358	230
12						86	139	791	260	1,991	328	406
13						170	162	689	246	1,113	324	290
14						244	190	615	280	1,192	319	246
15						216	374	578	330	1,296	308	216
16						418	497	500	337	1,492	286	198
17						573	590	468	265	3,244	261	187
18						494	659	420	258	1,500	252	187
19						342	839	398	342	1,091	286	346
20						293	516	356	328	932	365	250
21					94	250	492	321	349	1,058	337	210
22					72	214	360	299	271	816	310	187
23					49	200	330	286	263	677	271	177
24					57	177	271	295	263	578	256	172
25					75	172	189	321	261	653	242	162
26					97	172	379	299	261	704	238	157
27					122	174	403	304	277	581	222	150
28					105	161	423	328	440	554	220	144
29					108	155	389	384	386	474	280	143
30					100	181	406	379	280	443	269	137
31					164		545	293		420		139
MAX					164	731	839	1,234	440	3,244	633	406
MIN					49	86	129	286	202	265	220	137
MEAN					95	290	316	582	283	888	321	208
Day	0	0	0	0	13	31	31	31	31	31	31	31
Total	0	0	0	0	1,043	8,695	9,793	18,054	8,483	27,526	9,636	6,448
Monthly Runoff [x10^6m3]	0	0	0	0	90	751	846	1,560	733	2,378	833	557
[mm]	0	0	0	0	9	72	81	149	70	227	79	53

Annual Max. : 2260 [m3/s]
Min. : 95 [m3/s]
Ave. : 380 [m3/s]
Runoff : 7749 [x10^6 m3]
739 [mm]

Table 3 Water Level Measurement and Calculated Discharge in 1989

1) Water Level Measurement [m]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2.20	1.83	1.62	1.52	1.63	3.95	2.68	6.17	4.46	3.58	2.79	3.02
2	2.21	1.83	1.62	1.52	1.69	3.65	2.67	5.84	4.51	3.75	2.75	2.84
3	2.64	1.82	1.61	1.54	1.66	3.25	2.90	5.61	4.43	3.61	2.72	2.77
4	2.42	1.82	1.59	1.57	1.69	3.00	2.98	5.65	4.57	3.52	2.71	2.58
5	2.32	1.81	1.58	1.66	1.64	2.99	3.06	5.75	4.76	3.75	2.70	2.49
6	2.33	1.81	1.58	1.58	1.64	2.91	2.92	5.41	4.97	3.57	2.76	2.44
7	2.37	1.80	1.56	1.55	1.73	2.85	2.59	4.84	4.84	3.41	2.71	2.40
8	2.27	1.79	1.57	1.51	1.84	2.57	2.58	5.26	5.91	3.34	2.84	2.36
9	2.17	1.79	1.58	1.50	1.79	2.65	2.87	5.55	5.95	3.46	2.59	2.32
10	2.13	1.76	1.57	1.57	1.71	3.33	2.88	5.48	5.31	3.68	2.58	2.30
11	2.11	1.75	1.57	1.57	1.75	7.84	3.53	6.32	5.89	3.38	2.76	2.27
12	2.07	1.74	1.56	1.61	1.73	7.74	3.56	7.20	5.90	3.46	3.52	2.25
13	2.05	1.73	1.55	1.57	1.84	5.03	3.59	7.39	5.51	3.53	2.86	2.26
14	2.04	1.72	1.54	1.57	2.00	4.25	3.24	6.09	6.86	5.32	2.68	2.30
15	2.03	1.63	1.54	1.58	1.93	3.67	3.03	5.91	5.89	5.33	2.64	2.29
16	2.00	1.72	1.54	1.59	1.76	3.31	3.30	5.21	5.17	4.24	2.53	2.28
17	2.00	1.72	1.56	1.69	1.74	3.18	2.98	4.65	5.33	3.84	2.51	2.35
18	1.98	1.72	1.59	1.66	1.82	3.00	3.23	4.85	4.87	3.63	2.63	2.41
19	2.00	1.71	1.68	1.73	1.89	2.92	3.82	5.39	5.65	3.57	2.52	2.34
20	1.98	1.70	1.78	1.67	1.95	2.82	3.67	5.50	5.36	3.60	2.48	2.25
21	1.96	1.69	1.73	1.62	1.94	2.82	3.62	5.46	5.96	3.64	2.71	2.24
22	1.94	1.69	1.66	1.58	1.88	2.90	5.00	5.55	5.18	3.35	2.79	2.20
23	1.92	1.68	1.69	1.55	1.82	2.86	8.16	5.29	5.23	3.20	2.64	2.19
24	1.90	1.66	1.74	1.54	2.09	2.88	12.26	5.29	4.91	3.17	2.52	2.17
25	1.93	1.66	1.65	1.53	4.13	3.36	8.84	4.94	4.61	3.10	2.47	2.16
26	1.90	1.65	1.60	1.62	10.11	3.66	6.46	4.58	4.49	3.09	2.42	2.15
27	1.88	1.64	1.57	1.62	6.34	3.50	4.97	4.86	4.36	3.06	2.40	2.13
28	1.89	1.63	1.56	1.94	4.53	3.18	4.44	5.07	3.93	3.02	2.39	2.10
29	1.86		1.54	1.73	3.52	2.87	4.63	4.98	3.79	2.95	2.38	2.08
30	1.85		1.53	1.78	3.61	2.73	4.73	4.71	3.68	2.87	2.47	2.07
31	1.84		1.53		4.12		4.93	4.52		2.83		2.05
MEAN	2.07	1.73	1.60	1.62	2.57	3.52	4.20	5.46	5.08	3.54	2.64	2.32
MAX	2.64	1.83	1.78	1.94	10.11	7.84	12.26	7.39	6.86	5.33	3.52	3.02
MIN	1.84	1.63	1.53	1.50	1.63	2.57	2.58	4.52	3.68	2.83	2.38	2.05
Day	31	28	31	30	31	30	31	31	30	31	30	31

2) Discharge (m3/s) quoted from Year Book 1989

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	144.0	83.5	54.6	42.4	55.9	540.0	236.0	1,290.0	678.0	447.0	260.0	312.0
2	146.0	83.5	54.6	42.4	63.7	464.0	234.0	1,160.0	692.0	490.0	251.0	271.0
3	227.0	82.0	53.3	44.8	59.8	366.0	284.0	1,060.0	669.0	454.0	244.0	255.0
4	184.0	82.0	50.8	48.4	63.7	307.0	302.0	1,080.0	709.0	432.0	242.0	215.0
5	166.0	80.5	49.6	59.8	57.2	305.0	325.0	1,120.0	767.0	490.0	240.0	197.0
6	167.0	80.5	49.6	49.6	57.2	286.0	289.0	988.0	834.0	444.0	253.0	188.0
7	175.0	79.0	47.2	46.0	69.2	273.0	217.0	792.0	792.0	404.0	242.0	180.0
8	157.0	77.6	48.4	41.2	85.0	213.0	215.0	942.0	1,180.0	388.0	227.0	173.0
9	139.0	77.6	49.6	40.0	77.6	230.0	277.0	1,040.0	1,200.0	417.0	217.0	166.0
10	132.0	73.4	48.4	48.4	66.4	385.0	280.0	1,010.0	953.0	472.0	215.0	162.0
11	129.0	72.0	48.4	48.4	72.0	2,040.0	434.0	1,350.0	1,180.0	397.0	253.0	157.0
12	122.0	70.6	47.2	53.3	69.2	1,990.0	442.0	1,740.0	1,180.0	417.0	432.0	153.0
13	118.0	69.2	46.0	48.4	85.0	854.0	450.0	1,820.0	1,020.0	434.0	275.0	155.0
14	117.0	67.8	44.8	48.4	110.0	620.0	364.0	1,260.0	1,580.0	956.0	236.0	162.0
15	115.0	55.9	44.8	49.6	98.8	470.0	314.0	1,180.0	1,180.0	960.0	227.0	160.0
16	110.0	67.8	44.8	50.8	73.4	380.0	378.0	917.0	902.0	617.0	205.0	158.0
17	110.0	67.8	47.2	63.7	70.6	349.0	302.0	733.0	960.0	512.0	201.0	171.0
18	107.0	67.8	50.8	88.0	82.0	307.0	361.0	795.0	801.0	460.0	225.0	182.0
19	110.0	66.4	62.4	69.2	92.5	289.0	507.0	961.0	1,060.0	444.0	203.0	169.0
20	107.0	65.0	76.2	61.1	102.0	266.0	470.0	1,020.0	971.0	452.0	195.0	153.0
21	104.0	63.7	69.2	54.6	100.0	266.0	457.0	1,010.0	1,200.0	462.0	242.0	151.0
22	100.0	63.7	59.8	49.6	91.0	284.0	844.0	1,040.0	906.0	390.0	260.0	144.0
23	97.2	62.4	63.7	46.0	82.0	275.0	2,200.0	945.0	924.0	354.0	227.0	142.0
24	94.0	59.8	70.6	44.8	125.0	280.0	4,590.0	945.0	814.0	347.0	203.0	139.0
25	98.8	59.8	58.5	43.6	587.0	392.0	2,550.0	824.0	721.0	330.0	193.0	137.0
26	94.0	58.5	52.0	54.6	3,260.0	467.0	1,400.0	712.0	686.0	328.0	184.0	136.0
27	91.0	57.2	48.4	82.0	1,360.0	427.0	834.0	798.0	650.0	321.0	180.0	132.0
28	92.5	55.9	47.2	100.0	698.0	349.0	672.0	868.0	535.0	312.0	178.0	127.0
29	88.0		44.8	69.2	432.0	277.0	727.0	837.0	500.0	296.0	176.0	124.0
30	86.5		43.6	76.2	454.0	247.0	757.0	751.0	472.0	277.0	193.0	122.0
31	85.0		43.6		584.0		821.0	695.0		269.0		118.0
MEAN	123.0	69.7	52.3	55.5	299.5	473.3	726.9	1,022.7	891.2	444.3	229.3	168.1
MAX	227.0	83.5	76.2	100.0	3,260.0	2,040.0	4,590.0	1,820.0	1,580.0	960.0	432.0	312.0
MIN	85.0	55.9	43.6	40.0	55.9	213.0	215.0	695.0	472.0	269.0	176.0	118.0
Day	31	28	31	30	31	30	31	31	30	31	30	31
Total	3,813	1,951	1,620	1,665	9,284	14,198	22,533	31,703	26,736	13,773	6,879	5,211
Runoff [x10^6 m3]	329	169	140	144	802	1,227	1,947	2,739	2,310	1,190	594	450
Runoff [mm]	31	16	13	14	76	117	185	261	220	113	57	43

Annual

Maximum	:	**4680**	**[m3/s]**
Minimum	:	**40**	**[m3/s]**
Average	:	**382**	**[m3/s]**
Runoff	:	**12041**	**[x10^6 m3]**
		1147	**[mm]**

Table 4 Water Level Measurement and Calculated Discharge in 1990

1) Water Level Measurement (m)

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2.04	1.76	1.62	1.75	1.51	2.35	1.85	3.82	7.26	4.13	3.94	3.38
2	2.03	1.72	1.61	1.71	1.51	2.17	1.75	3.99	6.92	4.15	3.82	3.51
3	2.03	1.72	1.61	1.64	1.49	2.16	1.71	3.87	7.32	4.07	3.78	3.56
4	2.01	1.71	1.60	1.55	1.47	2.34	2.80	3.70	6.61	8.60	3.69	3.42
5	2.00	1.71	1.60	1.53	1.58	2.30	2.68	3.81	6.43	5.75	3.63	3.31
6	1.99	1.70	1.60	1.52	1.70	2.30	2.57	3.74	6.39	4.80	3.59	3.34
7	1.98	1.61	1.61	1.52	1.63	2.26	2.60	3.41	5.47	4.60	3.48	3.38
8	1.97	1.68	1.62	1.51	1.67	2.21	2.61	3.35	5.14	4.99	3.44	3.17
9	2.0	1.66	1.62	1.50	1.69	2.22	2.66	3.28	5.26	4.56	3.68	3.06
10	1.96	1.69	1.63	1.50	1.76	2.46	3.10	3.43	5.10	4.21	3.59	3.02
11	1.95	1.68	1.65	1.49	1.81	2.41	2.96	3.42	4.66	4.01	4.19	3.02
12	1.94	1.67	1.64	1.48	1.90	2.51	2.80	3.58	4.68	4.00	3.70	3.00
13	1.94	1.67	1.72	1.50	2.16	2.80	2.86	4.13	4.76	3.91	5.22	2.98
14	1.93	1.66	1.64	1.55	2.12	2.87	2.95	3.51	4.78	4.10	9.24	2.93
15	1.92	1.65	1.61	1.60	2.15	2.93	2.87	3.77	4.52	8.69	6.19	2.88
16	1.90	1.65	1.62	2.31	2.00	3.52	2.97	3.45	4.13	10.28	4.19	2.84
17	1.90	1.64	1.65	2.81	1.81	3.30	2.64	3.19	4.91	9.57	5.24	2.80
18	1.82	1.64	1.63	1.65	1.78	3.76	2.65	3.14	4.30	7.27	4.64	2.78
19	1.82	1.65	1.59	1.56	1.80	3.43	3.49	3.90	9.14	8.79	4.27	2.76
20	1.81	1.65	1.58	1.52	1.84	3.00	4.25	3.65	13.76	7.09	4.00	2.72
21	1.81	1.66	1.58	1.50	1.95	2.98	3.82	3.67	10.02	6.13	3.78	2.70
22	1.88	1.65	1.62	1.51	2.03	3.13	5.17	3.41	7.07	5.37	4.55	2.68
23	1.86	1.63	1.61	1.51	1.95	3.39	4.62	3.95	6.33	5.08	4.97	2.64
24	1.81	1.62	1.60	1.50	2.00	4.68	4.21	3.70	5.59	4.78	4.91	2.62
25	1.78	1.61	1.58	1.47	2.54	3.72	3.63	3.74	5.26	4.65	4.81	2.62
26	1.78	1.60	1.57	1.48	2.56	3.68	3.28	4.85	4.79	4.44	4.06	2.62
27	1.80	1.61	1.53	1.52	2.96	3.21	3.28	5.20	4.97	4.41	3.71	2.61
28	1.79	1.62	1.52	1.68	2.76	3.05	3.50	5.35	4.83	4.41	3.58	2.61
29	1.77		1.53	1.55	2.95	3.16	3.70	6.79	4.43	4.97	3.47	2.60
30	1.76		1.63	1.52	2.66	2.97	3.53	11.22	4.24	4.52	3.39	2.60
31.0	1.77		1.82		2.87		3.64	9.92		4.27		2.54
MAX	2.04	1.76	1.82	2.81	2.96	4.68	5.17	11.22	13.76	10.78	9.24	3.56
MIN	1.76	1.60	1.52	1.47	1.47	2.16	1.71	3.14	4.13	3.91	3.39	2.54
MEAN	1.89	1.66	1.61	1.62	2.02	2.91	3.13	4.31	5.96	5.52	4.29	2.93

2) Calculated Discharge (m3/s) by Q=a+bH+cH^2 a = 21.1 b = (30.3) c = 38.9 [86-91]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	121	88	74	87	64	165	98	473	1,850	559	505	363
2	120	84	73	83	64	138	87	519	1,673	565	473	394
3	120	84	73	76	62	137	83	486	1,882	542	462	406
4	117	83	72	68	61	163	241	441	1,519	2,636	439	372
5	116	83	72	66	70	157	219	470	1,433	1,132	423	347
6	115	82	72	65	82	157	200	452	1,415	771	413	354
7	114	73	73	65	75	151	205	370	1,018	704	386	363
8	112	80	74	64	79	144	207	356	892	838	377	316
9	111	80	74	63	81	145	216	340	937	691	436	292
10	111	81	75	63	88	182	301	375	878	583	413	284
11	110	80	77	62	94	174	272	372	731	525	577	284
12	109	79	76	61	104	190	241	411	731	522	441	280
13	109	79	84	63	137	241	252	559	758	497	922	276
14	107	78	76	68	132	254	270	394	764	550	3,060	266
15	106	77	73	93	136	266	254	459	678	2,693	1,323	256
16	104	77	74	159	116	396	274	379	559	4,212	577	249
17	104	76	77	243	94	344	212	320	809	3,291	930	241
18	95	76	75	77	90	457	214	309	610	1,855	717	237
19	95	77	71	68	93	375	389	494	2,992	2,758	601	234
20	94	77	70	65	97	280	594	428	6,964	1,760	522	226
21	94	78	70	63	110	276	473	434	3,620	1,296	462	223
22	102	77	74	64	120	307	903	370	1,750	979	688	219
23	99	75	73	64	110	365	711	508	1,387	870	831	212
24	94	74	72	63	116	731	583	441	1,066	764	809	209
25	90	73	70	61	195	446	423	452	937	721	775	209
26	90	72	69	61	198	436	340	721	768	653	539	209
27	93	73	66	65	272	324	340	915	831	644	444	207
28	91	74	65	80	234	290	391	972	714	644	411	207
29	89		66	68	270	314	441	1,608	650	831	384	205
30	88		75	65	216	274	399	4,575	591	678	365	205
31	89		95		254		426	3,546		601		195
MAX	121.1	88.2	94.8	242.9	272.0	730.7	903.5	4,574.7	6,964.1	4,211.7	3,059.9	405.9
MIN	88.2	72.2	64.9	60.6	60.6	137.1	83.0	309.3	559.0	496.9	365.1	195.0
MEAN	103.5	78.2	73.6	77.1	126.2	276.0	331.0	740.2	1,380.3	1,173.1	656.8	269.0
DAY	31	28	31	30	31	30	31	31	30	31	30	31
Total	3,208	2,190	2,282	2,312	3,912	8,281	10,260	22,946	41,409	36,365	19,705	8,338
Runoff (x10^6 m3	277	189	197	200	338	715	886	1,983	3,578	3,142	1,702	720
[mm]	26	18	19	19	32	68	84	189	341	299	162	69

Annual

Maximum	:	6964	(m3/s)
Minimum	:	61	(m3/s)
Average	:	442	(m3/s)
Runoff	:	13928	(x10^6 m3)
		1327	(mm)

Table 5 Water Level Measurement and Calculated Discharge in 1991

1) Water Level Measurement [m]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2.51	2.18	2.04	1.84	1.88	1.93	3.02	5.99	7.22	6.44	4.35	3.09
2	2.50	2.17	2.01	1.82	1.86	1.98	3.00	5.01	6.19	6.98	4.26	2.86
3	2.48	2.16	2.03	1.83	1.98	1.95	3.61	5.14	6.61	7.42	4.23	2.88
4	2.46	2.15	2.07	2.08	1.96	2.24	3.23	4.28	7.58	7.42	4.21	2.82
5	2.45	2.15	2.13	2.02	2.24	2.34	3.00	4.37	8.35	6.00	3.17	2.80
6	2.44	2.16	2.06	1.95	2.18	2.42	2.82	4.93	8.24	5.92	3.96	2.77
7	2.42	2.15	2.04	1.91	2.07	2.46	2.72	5.47	8.52	6.50	3.82	2.74
8	2.40	2.15	2.02	1.88	2.02	2.53	2.64	5.71	8.55	6.62	3.78	2.62
9	2.39	2.14	2.01	1.86	1.95	2.40	2.52	4.79	7.61	6.18	3.66	2.58
10	2.38	2.12	2.00	1.88	1.98	2.37	2.51	4.18	6.53	6.39	3.52	2.51
11	2.36	2.11	2.00	1.93	2.14	2.43	2.63	4.05	6.61	6.76	3.33	2.56
12	2.34	2.10	2.00	2.00	2.00	2.55	2.64	4.23	6.05	6.25	3.26	3.84
13	2.33	2.08	1.97	1.96	2.01	2.86	3.54	4.35	5.98	5.66	3.19	3.26
14	2.32	2.07	1.94	1.96	2.01	2.98	2.70	4.88	6.05	5.33	3.13	3.02
15	2.31	2.06	1.92	1.92	2.07	2.98	3.50	5.36	5.98	5.12	3.04	3.03
16	2.30	2.06	1.91	1.98	2.11	2.68	3.19	7.34	5.78	4.83	3.56	2.98
17	2.30	2.05	1.90	1.84	2.18	5.18	3.24	10.95	5.57	4.85	3.38	2.90
18	2.39	2.05	1.90	1.80	2.29	4.07	2.95	11.83	5.43	4.57	3.26	2.86
19	2.31	2.04	1.94	1.78	2.36	3.46	3.20	11.89	5.14	4.34	3.14	2.82
20	2.28	2.03	2.08	1.79	2.32	3.09	4.58	10.39	4.93	4.25	3.09	2.92
21	2.28	2.02	2.02	1.80	2.24	2.87	5.72	9.14	5.10	4.13	2.97	2.86
22	2.26	2.02	1.96	1.82	2.21	2.59	5.90	8.20	5.76	5.07	2.91	2.80
23	2.25	2.08	1.97	1.82	2.12	3.63	7.17	8.23	5.49	4.50	2.97	2.73
24	2.24	2.13	2.04	1.82	2.10	4.66	5.82	7.90	5.19	4.18	2.89	2.66
25	2.22	2.14	1.98	1.86	2.02	5.04	5.00	8.27	5.34	7.32	2.83	2.64
26	2.21	2.15	2.00	1.88	1.96	4.30	5.74	8.13	5.49	5.50	2.91	2.62
27	2.21	2.07	1.96	2.09	1.98	3.52	6.26	7.95	6.20	4.80	3.38	2.60
28	2.20	2.05	1.97	1.99	2.02	3.14	6.01	8.15	6.57	4.44	4.35	2.58
29	2.20		1.98	1.94	2.30	2.91	5.26	8.14	6.02	4.30	3.54	2.63
30	2.19		1.89	1.90	2.06	2.86	5.66	7.93	5.71	4.44	3.23	2.60
31	2.18		1.86		1.96		5.57	7.74		4.33		2.58
MAX	2.51	2.18	2.13	2.09	2.36	5.18	7.17	11.89	8.55	7.42	4.35	3.84
MIN	2.18	2.02	1.86	1.78	1.86	1.93	2.51	4.05	4.93	4.13	2.83	2.51
MEAN	2.33	2.10	1.99	1.90	2.08	3.01	4.04	6.93	6.33	5.51	3.44	2.81

2) Calculated Discharge by Q=a+bH+cH^2 [m3/s]

a = 21.1
b = (30.3)
c = 38.9 [88-91]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	190	140	121	97	102	107	264	1,234	1,829	1,436	625	299
2	188	138	117	95	99	114	260	845	1,323	1,703	597	256
3	185	137	120	96	114	110	418	892	1,519	1,936	589	256
4	182	136	125	126	111	148	329	604	2,025	1,936	583	245
5	180	136	133	119	148	163	280	631	2,478	1,239	316	241
6	179	137	124	110	140	175	245	817	2,411	1,204	511	235
7	175	136	121	105	125	182	226	1,018	2,585	1,467	473	230
8	172	136	119	102	119	193	212	1,116	2,604	1,524	462	209
9	171	134	117	99	110	172	192	768	2,042	1,318	431	202
10	169	132	116	102	114	168	190	574	1,481	1,415	396	190
11	166	130	116	107	134	177	210	536	1,519	1,603	351	198
12	163	129	116	116	116	197	212	589	1,261	1,350	335	478
13	162	128	112	111	117	252	401	625	1,230	1,095	320	335
14	160	125	109	111	117	276	223	799	1,261	984	307	284
15	159	124	106	106	125	276	391	976	1,221	885	288	286
16	157	124	105	114	130	219	320	1,893	1,145	782	406	276
17	157	122	104	97	140	907	331	4,350	1,058	789	363	260
18	171	122	104	93	156	542	270	5,103	1,003	695	335	252
19	159	121	109	90	166	382	322	5,156	892	622	309	245
20	154	120	126	91	160	299	698	3,903	817	594	299	264
21	154	119	119	93	148	217	1,120	2,992	878	559	274	252
22	151	119	111	95	144	203	1,195	2,386	1,136	867	262	241
23	150	126	112	95	132	423	1,802	2,405	1,026	672	274	228
24	148	133	121	95	129	724	1,161	2,208	911	574	258	216
25	145	134	114	102	119	856	841	2,429	968	1,882	247	212
26	144	136	116	102	111	610	1,128	2,344	1,026	1,030	262	209
27	144	125	111	128	114	396	1,355	2,237	1,328	771	363	205
28	143	122	112	115	119	309	1,243	2,356	1,500	653	625	202
29	143		114	109	157	262	937	2,350	1,247	610	401	210
30	141		103	104	124	252	1,095	2,225	1,116	653	329	205
31	140		99		111		1,058	2,115		619		202
MAX	190.0	139.8	133.0	127.6	166.1	907.2	1,802.2	5,156.2	2,603.7	1,936.5	624.9	478.0
MIN	139.8	118.5	99.3	90.4	99.3	107.5	190.0	536.0	816.5	559.0	246.7	190.0
MEAN	161.4	129.2	114.6	104.0	127.4	310.4	612.0	1,886.3	1,427.9	1,079.0	386.4	245.9
DAY	31	28	31	30	31	30	31	31	30	31	30	31
Total	5,002	3,618	3,551	3,121	3,949	9,313	18,971	58,475	42,838	33,448	11,591	7,624
Runoff [x10^6 m3	432	313	307	270	341	805	1,639	5,052	3,701	2,890	1,001	659
[mm]	41	30	29	26	32	77	156	481	352	275	95	63

Annual Maximum : 5196 [m3/s]
Minimum : 90 [m3/s]
Average : 662 [m3/s]
Runoff : 17410 [x10^6 m3]
1658 [mm]

Table 6 Water Level Measurement and Calculated Discharge in 1992

1) Water Level Measurement (m)

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2.58	2.18	2.00	1.71	1.71	2.33	5.53	4.40	6.10	4.08	4.62	2.88
2	2.54	2.18	1.99	1.78	1.76	2.29	4.51	4.01	6.11	3.94	4.00	2.86
3	2.50	2.16	1.99	1.75	1.78	2.23	4.12	4.03	5.72	3.80	3.80	2.84
4	2.46	2.15	1.98	1.72	1.84	2.05	3.82	4.37	5.70	3.78	3.65	2.82
5	2.44	2.14	1.98	1.71	1.85	2.27	3.52	4.32	5.20	3.72	3.52	2.80
6	2.42	2.12	1.98	1.70	1.94	2.79	3.25	3.82	5.14	3.72	3.54	2.86
7	2.40	2.11	1.96	1.71	1.89	2.72	3.09	3.90	4.96	3.89	3.46	2.84
8	2.46	2.10	1.94	1.72	1.66	2.65	3.50	3.34	4.90	6.50	3.34	2.82
9	2.41	2.10	1.93	1.70	1.90	2.23	3.94	3.60	4.92	4.90	3.28	2.80
10	2.40	2.09	1.92	1.69	1.91	2.18	3.62	4.10	4.78	4.45	3.45	2.76
11	2.40	2.08	1.90	1.67	1.86	2.51	3.37	3.89	4.28	4.20	4.28	2.74
12	2.38	2.08	1.88	1.65	1.69	2.79	3.06	3.64	4.50	4.02	3.65	2.69
13	2.37	2.08	1.86	1.71	1.99	2.91	2.82	4.49	4.16	3.96	3.56	2.66
14	2.36	2.06	1.91	1.72	1.90	2.69	2.55	4.38	4.10	3.79	3.48	2.63
15	2.36	2.05	1.89	1.75	1.99	2.53	2.39	4.72	4.10	3.71	3.39	2.64
16	2.36	2.04	1.88	1.78	2.10	2.43	2.37	5.63	4.12	3.90	3.44	2.62
17	2.35	2.08	1.87	1.84	2.03	2.59	2.61	5.78	4.64	3.78	3.38	2.58
18	2.34	2.09	1.84	1.86	1.99	2.50	2.52	6.34	3.85	3.72	3.29	2.54
19	2.34	2.08	1.84	1.89	2.04	2.51	2.39	7.13	3.55	3.65	3.18	2.63
20	2.34	2.05	1.83	1.85	1.98	2.78	2.30	7.13	4.24	3.60	3.10	2.60
21	2.32	2.04	1.82	1.82	1.93	3.05	2.27	7.03	7.22	3.52	3.26	2.56
22	2.32	2.04	1.80	1.80	1.94	2.85	2.53	7.28	5.68	3.46	3.19	2.54
23	2.30	2.02	1.79	1.77	1.98	2.91	3.89	6.65	6.46	3.42	3.12	2.50
24	2.30	2.04	1.78	1.76	2.10	2.84	5.01	6.93	6.43	3.44	3.08	2.48
25	2.28	2.03	1.76	1.73	2.55	3.31	5.12	6.76	5.93	7.81	3.06	3.00
26	2.26	2.02	1.75	1.77	2.40	2.99	5.01	7.54	5.56	5.91	3.05	2.55
27	2.26	2.01	1.74	1.86	2.34	5.75	4.60	8.03	5.24	5.52	3.04	2.48
28	2.24	2.00	1.80	1.83	2.32	7.29	4.52	8.17	4.96	4.79	3.01	2.44
29	2.23	2.00	1.77	1.77	2.28	7.15	4.56	8.14	4.68	4.16	2.97	2.66
30	2.22		1.75	1.73	2.26	6.16	4.48	7.85	4.19	6.55	2.92	2.64
31.0	2.20		1.72		2.31		4.36	7.01		5.96		2.55
MAX	2.58	2.18	2.00	1.89	2.55	7.29	5.53	8.17	7.22	7.81	4.62	3.00
MIN	2.20	2.00	1.72	1.65	1.71	2.05	2.27	3.34	3.55	3.42	2.92	2.44
MEAN	2.36	2.08	1.87	1.76	2.02	3.14	3.60	5.63	5.05	4.38	3.40	2.68

2) Calculated Discharge by Q = a + bH + cH^2

a = 173.8
b = (93.9)
c = 54.7 [92]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	296	229	205	173	173	252	1,327	820	1,637	701	908	357
2	288	229	204	180	178	246	863	677	1,642	653	673	353
3	281	226	204	177	180	236	715	684	1,427	607	607	348
4	274	225	202	174	186	211	613	808	1,416	600	560	344
5	270	223	200	173	187	242	521	789	1,165	581	521	340
6	267	221	202	172	197	338	446	613	1,135	581	527	353
7	263	219	200	173	192	323	406	640	1,054	636	504	348
8	274	218	197	174	188	309	515	470	1,027	1,875	470	344
9	265	218	196	172	193	236	653	545	1,036	1,027	454	340
10	263	216	195	171	194	229	551	708	975	839	501	331
11	263	215	193	170	188	283	479	636	774	744	774	327
12	260	215	191	168	192	338	403	557	859	680	560	317
13	256	215	186	173	204	364	344	855	730	660	533	311
14	257	212	194	174	193	317	290	812	708	604	509	305
15	257	211	192	177	204	286	262	949	708	578	484	307
16	257	210	191	180	218	269	258	1,379	715	640	498	303
17	255	215	189	186	209	298	301	1,448	916	600	481	296
18	254	216	186	188	204	281	285	1,777	623	581	457	288
19	254	215	186	192	210	283	262	2,285	530	560	428	305
20	254	211	185	187	202	335	247	2,285	759	545	408	299
21	250	210	184	184	196	396	242	2,217	2,348	521	449	292
22	250	210	182	182	197	350	286	2,390	1,405	504	431	288
23	247	207	181	179	202	364	636	1,969	1,850	492	413	281
24	247	210	180	178	218	348	1,076	2,150	1,832	498	403	277
25	244	209	178	175	290	462	1,127	2,039	1,541	2,777	403	384
26	241	207	177	179	263	382	1,076	2,576	1,343	1,530	396	290
27	241	206	176	188	254	1,443	899	2,947	1,184	1,322	394	277
28	238	205	182	185	250	2,397	887	3,058	1,054	979	387	270
29	236	205	179	179	244	2,299	883	3,034	933	730	377	311
30	235		177	175	241	1,671	851	2,808	741	1,906	366	307
31	232		174		249		804	2,204		1,557		290
	MAX	295.6	229.0	204.8	191.7	290.0	2,396.6	1,327.5	3,058.3	2,347.6	2,777.4	907.6	384.4
	MIN	232.0	204.8	174.1	167.8	173.2	211.2	242.5	470.4	529.8	492.5	366.0	270.3
	MEAN	257.2	214.6	189.4	178.0	209.6	526.3	596.5	1,520.4	1,135.6	874.6	496.0	315.7
	Day	31	29	31	30	31	30	31	31	30	31	30	31
	Total	7,973	6,229	5,870	5,340	6,496	15,788	18,493	47,132	34,067	27,112	14,879	9,786
Monthly Runoff	(x10^6 m3	689	538	507	461	561	1,364	1,598	4,072	2,943	2,342	1,286	845
	(mm)	66	51	48	44	53	130	152	388	280	223	122	81

Annual

Maximum	:	**3060**	**(m3/s)**
Minimum	:	**168**	**(m3/s)**
Average	:	**544**	**(m3/s)**
Runoff	:	**17208**	**(x10^6 m3)**
		1638	**(mm)**

Table 7 Water Level Measurement and Calculated Discharge in 1993

1) Water Level Measurement [m]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2.54	2.24	1.96	1.54	1.74	1.63	3.78	4.92	4.00	3.92	3.11	3.22
2	2.52	2.22	1.95	1.52	1.69	1.90	3.58	4.06	3.89	4.00	3.16	2.65
3	2.52	2.21	1.92	1.50	1.58	1.70	3.53	6.35	3.93	3.68	2.95	2.47
4	2.54	2.20	1.90	1.49	1.60	1.62	3.50	4.51	3.90	3.52	2.74	2.34
5	2.52	2.18	1.88	1.48	1.56	1.60	3.32	4.54	4.11	4.61	2.54	2.29
6	2.50	2.18	1.84	1.46	1.50	1.59	3.43	4.28	5.25	3.63	2.39	2.38
7	2.50	2.17	1.80	1.45	1.58	1.61	3.30	3.92	8.00	3.29	2.34	2.60
8	2.50	2.16	1.78	1.43	1.65	1.82	2.94	5.08	9.79	3.03	2.29	2.49
9	2.48	2.13	1.75	1.45	1.65	1.80	2.66	6.16	7.98	2.90	2.26	2.36
10	2.46	2.12	1.72	1.43	1.65	1.86	2.59	4.40	6.99	2.91	2.21	2.39
11	2.48	2.11	1.70	1.42	1.69	1.76	2.84	4.19	6.55	2.87	2.17	2.35
12	2.48	2.10	1.66	1.49	1.77	1.70	3.55	4.28	6.47	2.81	2.11	2.30
13	2.48	2.08	1.66	1.49	1.67	1.65	3.65	4.59	6.07	2.81	2.09	2.25
14	2.46	2.07	1.64	1.46	1.58	1.63	3.51	4.57	5.21	2.78	2.06	2.31
15	2.46	2.06	1.63	1.50	1.57	1.72	3.48	4.49	5.34	2.88	2.02	2.55
16	2.44	2.05	1.62	1.53	1.58	1.79	3.28	4.65	5.31	2.85	1.99	3.18
17	2.42	2.04	1.59	1.52	1.54	1.78	3.12	5.78	4.99	2.81	1.98	4.02
18	2.40	2.04	1.58	1.51	1.50	1.74	2.90	5.01	4.89	2.78	1.96	3.82
19	2.39	2.02	1.72	1.50	1.56	1.81	2.90	4.63	4.78	2.80	1.93	3.46
20	2.38	2.09	1.85	1.60	1.73	1.77	2.78	6.92	4.49	2.77	1.88	3.18
21	2.36	2.07	1.89	1.80	1.63	1.72	2.63	7.96	4.38	2.80	1.86	3.28
22	2.36	2.04	1.88	1.98	1.57	1.70	2.43	6.92	4.31	3.72	2.06	3.17
23	2.34	2.01	1.83	1.95	1.61	1.70	2.48	6.20	4.19	3.87	2.55	2.99
24	2.32	2.01	1.82	1.92	1.69	1.77	2.65	5.29	4.04	3.54	2.54	2.66
25	2.33	2.04	1.77	1.86	2.02	1.91	2.64	4.99	3.97	3.54	2.68	2.64
26	2.32	2.01	1.69	1.82	1.90	2.09	2.77	4.92	4.27	3.33	2.90	2.36
27	2.30	1.99	1.65	1.79	1.78	2.54	2.92	4.90	4.15	3.05	2.49	2.25
28	2.32	1.98	1.64	1.79	1.69	2.59	2.66	4.76	4.08	2.74	2.45	2.20
29	2.30		1.62	1.78	1.65	3.20	2.56	4.61	4.02	2.59	2.60	2.16
30	2.28		1.59	1.75	1.57	3.45	3.09	4.58	3.97	2.50	3.47	2.09
31	2.27		1.56		1.55		3.79	4.41		2.74		2.01
MAX	2.5	2.2	2.0	2.0	2.0	3.5	3.8	8.0	9.8	4.6	3.5	4.0
MIN	2.3	2.0	1.6	1.4	1.5	1.6	2.4	3.9	3.9	2.5	1.9	2.0
MEAN	2.4	2.1	1.7	1.6	1.7	1.9	3.1	5.1	5.1	3.2	2.4	2.7

2) Calculated Discharge by $Q = a + bH + cH'$

a = 173.8
b = -93.9
c = 54.7 (92)

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	268	238	200	159	176	166	600	1,036	673	646	411	439
2	285	235	199	157	171	193	539	701	636	673	423	309
3	285	233	195	156	162	172	524	1,783	650	569	373	276
4	288	232	193	155	164	165	515	863	640	521	327	254
5	285	229	191	155	160	164	465	875	712	904	288	246
6	281	229	186	153	156	163	495	774	1,189	554	262	260
7	281	228	182	153	162	164	460	646	2,924	457	254	299
8	281	226	180	151	168	184	371	1,109	4,498	391	246	279
9	277	222	177	153	168	182	311	1,671	2,908	362	241	257
10	274	221	174	151	169	188	298	820	2,190	364	233	262
11	277	219	172	151	171	178	348	741	1,906	355	228	255
12	277	218	169	155	179	172	530	774	1,856	342	219	247
13	277	215	169	155	170	168	560	895	1,619	342	216	239
14	274	214	167	153	162	166	518	887	1,170	335	212	249
15	274	212	166	156	161	174	509	855	1,232	357	207	290
16	270	211	165	158	162	181	454	920	1,218	350	204	428
17	267	210	163	157	159	180	413	1,459	1,067	342	202	680
18	263	210	162	157	156	176	362	1,076	1,023	335	200	613
19	262	207	174	156	160	183	362	912	975	340	196	504
20	260	216	187	164	175	179	335	2,144	855	333	191	428
21	257	214	192	182	166	174	305	2,893	812	340	188	454
22	257	210	191	202	161	172	269	2,144	785	581	212	426
23	254	206	185	199	164	172	277	1,695	741	630	290	382
24	250	206	184	195	192	179	309	1,208	687	527	288	311
25	252	210	179	188	207	194	307	1,067	663	527	315	307
26	250	206	171	184	193	216	333	1,036	770	468	362	257
27	247	204	168	181	180	288	366	1,027	726	396	279	239
28	250	202	167	181	171	298	311	966	701	327	272	232
29	247		165	180	168	433	292	904	680	298	299	226
30	244		163	177	161	501	406	891	663	281	507	216
31	242		160		160		604	824		327		206
MAX	288.2	237.9	199.9	202.3	207.3	500.9	603.7	2,892.7	4,498.0	903.5	506.6	680.3
MIN	242.5	202.3	160.4	150.7	156.0	162.8	268.6	646.3	636.3	280.9	188.4	206.0
MEAN	267.0	217.3	177.3	165.8	168.8	204.2	411.2	1,148.2	1,239.0	437.9	271.5	324.9
DAY	31	28	31	30	31	30	31	31	30	31	30	31
Total	8,277	6,083	5,495	4,975	5,233	6,127	12,749	35,596	37,171	13,574	8,146	10,072
Runoff [x10^6 m3]	715	526	475	430	452	529	1,101	3,075	3,212	1,173	704	870
[mm]	68	50	45	41	43	50	105	293	306	112	67	83

Annual

Maximum	:	**4,498**	**[m3/s]**
Minimum	:	**151**	**[m3/s]**
Average	:	**421**	**[m3/s]**
Runoff	:	**13,262**	**[x10^6 m3]**
		1,263	**[mm]**

Table 8 Water Level Measurement and Calculated Discharge in 1994

1) Water Level Measurement [m]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	1.99	1.66		1.46	1.97	2.33	2.37					
2	1.96	1.65		1.44	1.71	2.31	2.43					
3	1.94	1.64		1.45	1.66	2.38	2.48					
4	1.89	1.63		1.50	1.64	2.37	2.43					
5	1.83	1.63		1.72	1.74	2.27	2.41					
6	1.82	1.67		1.71	1.75	2.16	2.41					
7	1.86	1.66		1.65	1.70	2.09	2.60					
8	1.86	1.64		1.66	1.77	2.42	2.95					
9	1.84	1.63		1.62	1.77	2.47	3.11					
10	1.83	1.62		1.58	1.95	2.41	4.22					
11	1.82	1.61		1.57	1.89	2.59	5.32					
12	1.81	1.61		1.57	1.81	2.55	7.06					
13	1.80	1.60		1.54	1.76	2.51	7.71					
14	1.79	1.59		1.51	1.93	2.55	6.78					
15	1.78	1.58		1.54	1.93	2.74	6.73					
16	1.77	1.58		1.62	1.84	2.61	6.58					
17	1.76	1.57		1.59	2.08	2.54	5.67					
18	1.76	1.57		1.69	1.58	2.51	5.44					
19	1.75	1.56		1.69	1.78	2.67						
20	1.74	1.54		1.68	2.33	2.71						
21	1.74	1.54		1.76	2.05	2.90						
22	1.73	1.54		1.86	1.93	2.98						
23	1.72	1.53		1.81	2.25	2.86						
24	1.71	1.52		1.90	2.15	3.03						
25	1.71	1.52		1.80	2.08	3.95						
26	1.70	1.51		1.69	2.11	3.46						
27	1.69	1.51		1.63	2.02	3.13						
28	1.69	1.50		1.60	2.24	2.66						
29	1.68			1.67	2.21	2.52						
30	1.67			1.65	2.27	2.43						
31	1.67				2.30	0.00						
MAX	2.0	1.7		1.9	2.3	4.0	7.7					
MIN	1.7	1.5		1.4	1.6	0.0	2.4					
MEAN	1.8	1.6		1.6	1.9	2.6	4.4					

2) Calculated Discharge by Q = a + bH + cH^2

a = 173.8
b = -93.9
c = 54.7 [92]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	204	169		153	201	252	258					
2	200	168		152	173	249	269					
3	197	167		153	169	260	277					
4	192	166		156	167	258	269					
5	185	166		174	176	242	265					
6	184	170		173	177	226	265					
7	188	169		168	172	216	299					
8	188	167		169	179	267	373					
9	186	166		165	179	276	411					
10	185	165		162	199	265	752					
11	184	164		161	192	298	1,223					
12	183	164		161	183	290	2,238					
13	182	164		159	178	283	2,702					
14	181	163		157	196	290	2,052					
15	180	162		159	196	327	2,020					
16	179	162		165	186	301	1,925					
17	178	161		163	215	288	1,400					
18	178	161		171	162	283	1,282					
19	177	160		171	180	313						
20	176	159		170	252	321						
21	176	159		178	211	362						
22	175	159		188	196	380						
23	174	158		183	239	353						
24	173	157		193	225	391						
25	173	157		182	215	656						
26	172	157		171	219	504						
27	171	157		166	207	416						
28	171	156		164	238	311						
29	170			170	233	285						
30	170			168	242	269						
31	170				247							
MAX	203.5	169.5		192.8	252.0	656.4	2,701.9					
MIN	169.5	156.0		152.0	162.0	216.5	258.5					
MEAN	180.8	162.6		167.5	200.2	314.4	1,015.5					
DAY	31	28		30	31	30	18					
Total	5,603	4,553		5,025	6,206	9,431	18,278					
Runoff [x10^6 m3]	484	393		434	536	815	1,579					
[mm]	46	37		41	51	78	150					

Annual
Maximum : 2,702 [m3/s]
Minimum : 152 [m3/s]
Average : 292 [m3/s]
Runoff : 4,242 [x10^6 m3]
404 [mm]

Table 9 (1/4) Rainfall Record

1988 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1					5.4	38.7	6.5	25.0		0.2		
2					17.2	11.3		39.0				
3						17.8	2.5	35.0	0.4			
4						6.1	9.7			10.5		
5						37.0		0.6		32.7		
6						16.4				22.0		
7									31.8	24.4		
8								6.8		12.8		
9					5.2			10.3		2.4		
10							3.1	2.7	8.4	14.4		
11					53.5			10.5	0.3	10.3		
12					6.8	65.9	18.7	1.1		10.0		
13					59.3	6.1		0.6	0.3	3.8		
14					26.4				13.4	8.0		
15			10.90				45.4		16.6	39.5	0.1	
16						54.8	0.6	2.3		12.0		
17						12.8	15.0	2.4		4.0		
18						3.1	3.2		2.7	0.2		
19				1.50	2.6		1.0		7.4	22.2		
20							4.1					
21												
22				10.10								
23				12.00				0.5				
24				2.80								
25						22.5	4.2	4.2	3.2	30.3		
26					10.2		10.0	0.3		22.0		
27					51.0	2.5	2.1		33.2	2.4		
28				8.00			25.0	33.2	5.0			
29				28.00	3.1		2.5		33.6			
30				10.00	19.0		49.0					
31					31.1		27.5					
Total			10.9	72.4	290.8	295.0	230.1	174.5	156.3	284.1	0.1	0.0

Annual Total 1,514 [mm/year]

1989 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1					3.4	3.1		92.4				
2						18.8		5.8				
3				3.5				25.2	5.2	3.8		
4						3.0	22.2	12.7	25.3	3.4		
5	35.5					1.2	8.4	25.3	29.0	9.2	0.3	
6	1.2					2.0	2.6	2.0		1.1		
7								1.2	51.8			
8								40.8				
9								6.8	30.2			
10						31.0		1.4	4.2		0.3	
11					4.0	15.0	24.8	6.1	17.6		1.1	
12				6.8		5.2	2.2	22.8	4.7			
13				0.2	80.0	1.2	37.4	15.3	13.2	13.0		
14	0.2						3.8		6.1	33.3		
15					27.0	6.2		7.4	40.6	1.0		
16							2.0		0.8			
17									0.3			
18			14.2				90.5	6.0	10.2			
19							29.6	15.4	3.8	36.7		
20			1.8			1.4	0.2	16.2	22.5			
21			6.8			0.5	44.3	45.2	5.7			
22					2.8	3.7	28.3	37.0				
23			2.0			26.5	41.2	1.0	0.4			
24			87.0		14.0	9.4	31.2	3.5				
25					21.0	5.6	28.4	3.4				
26					15.4	9.0	1.2	8.6				
27				16.5	13.6	2.4	18.4	2.0	10.2			
28					28.7	0.2	0.2	22.2				
29					5.2		0.4	7.8				
30							1.1	3.2				
31					38.2		3.6	1.2				
Total	36.9	0.0	111.8	27.0	253.3	145.4	422.0	437.9	281.8	101.5	1.7	0.0

Annual Total 1,819 [mm/year]

Table 9 (2/4) Rainfall Record

1990 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1						0.3	4.0	5.1	26.8	1.2		
2						10.1	18.3	29.0	1.6			
3						3.6	0.4	4.5	17.5	10.0		
4					14.3	13.0		20.4	16.4	26.8		
5					6.1	1.0	4.8	1.3	14.8		13.4	
6							3.2	16.0		1.4	12.0	
7								5.4	4.0	14.0		
8							0.4		9.2	2.0		
9			0.4			48.0	49.8	6.6	28.4		42.8	
10					12.6	7.2	2.3	14.0	3.4		1.4	
11							14.2		2.7			
12						32.0	5.8	72.2	10.3		0.6	
13			42.0	19.0	84.0	23.1	14.4	15.2	5.1		12.8	
14					3.2	3.3	6.2		6.3	10.0		
15						20.5	20.0	13.0		89.8		
16				17.6		67.4		0.8	28.4	8.1	6.2	
17			5.8			0.2			30.1		1.6	
18					1.2	1.2			6.4	2.1		
19					10.2	10.1	32.0	48.2	14.0	40.0		
20					12.9	1.0	28.6	6.2	53.2	0.2		
21				4.0	2.0		12.0	3.1	13.8			
22			13.8		4.8	20.0	36.6	2.8	1.7			
23					0.6	4.1	5.6		4.6	1.2		
24				24.4	0.2	10.6		10.2		4.1		
25				0.2		42.0	11.2	20.4	1.0			
26					4.6	43.4	1.4	15.6				
27			1.1	3.0	2.2		10.4	3.5	5.0			
28					14.4	10.8	6.6	33.1	2.8			
29				1.6	37.3	2.2	1.4	18.4	5.8			
30					18.9	2.8		24.5				
31.0					15.0		2.0	31.5				
TOTAL	0.0	0.0	63.1	69.8	244.5	377.9	291.6	421.0	313.3	210.9	90.8	0.0

Annual Total **2,083** **[mm/year]**

1991 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1				8.0	3.0	41.6	21.6	16.6		5.5		
2						28.5	6.0	0.8		1.1		
3							5.2		16.4	11.2		
4					7.3	1.6	5.8	4.2	88.7	5.9		
5						1.8		2.4	92.2	0.4		
6						16.0		10.1	22.7	0.8		
7						8.2		1.8	31.2	39.1		
8				1.2		0.6		15.6	26.6	23.0		
9					0.2	4.0	8.8	1.0	0.2	14.8		
10						5.2				16.0		
11						13.3		4.0	4.8	59.8		
12						21.0	13.8	6.2	18.2			
13						4.9	6.8	36.0	60.2	10.6		
14					3.2	7.8	43.8	15.4		17.8		
15						8.2	14.6	22.0	0.6	14.1		
16						1.4		41.6				
17			11.4			129.0	2.1	63.8	12.0	1.8		
18						19.6		131.8	4.4	4.4		
19			32.4			0.6	11.3	22.0				
20				2.4	4.2	7.2	60.4	70.2	31.4			
21				12.0	4.4	24.4	45.1	46.6	2.8	0.6		
22					1.1	14.6	16.3	0.2	38.0			
23				0.4	2.2	15.0	83.8	2.0	4.0	0.6		
24						35.6	11.1	13.4	0.6	4.9		
25						3.3	12.0	38.3				
26						10.1	42.4	29.8	19.2		1.2	
27						1.2	43.2	9.3	45.4			
28					1.0		30.4	31.2	67.0			
29					0.8	1.6	35.4	47.8	81.2		6.4	
30				1.0		21.6	1.4	1.6				
31							52.2	51.6				
Total	0.0	0.0	43.8	25.0	27.4	447.9	573.5	737.3	667.8	232.4	7.6	0.0

Annual Total **2,763** **[mm/year]**

Table 9 (3/4) Rainfall Record

1992 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1			0.1			14.4	16.0		1.4	0.6		
2	3.6		0.5				47.5	2.2	17.8	1.2		
3			10.0	1.0		4.1			4.0	81.4		
4					24.6	1.6		26.2	11.2	5.8		
5								0.2	11.4	8.8		
6	9.2				1.2			10.0	7.8			
7							25.2	4.2	9.6			
8						2.1		10.2	7.2			
9							48.2		15.0	0.6		
10						65.6	0.5	1.1		16.4		
11			0.6			31.0				1.7		
12					68.1	4.1		2.2				
13						15.0		3.4	12.1			
14					9.2	1.0	19.7	2.0	0.6			
15						7.8		5.6				
16					39.0		4.8	16.2				
17		0.3			9.0	20.6		10.0				0.2
18					2.7	0.2	0.4	33.4	1.4			
19						10.2		49.6	1.2			
20						16.0	7.8	12.2	13.4			
21						8.2	4.4	0.4	15.6			
22					0.6	8.6	2.4	2.2	15.4			
23						41.0	64.0	1.2	12.0			
24						20.4	25.8	27.2	25.0	10.8		
25				14.2	15.8	1.3		9.9		0.4		
26					81.0	1.1	7.8	19.0	5.6			
27						57.6	9.4	10.4				
28						10.7	11.8	43.7				
29						1.3	15.6	60.0	20.0	38.2		
30						38.2	9.8	37.0	1.0	8.0		
31.0							15.4	1.7		5.0		
Total	12.8	0.3	11.2	15.2	251.2	382.1	336.5	401.4	208.7	178.9	0.0	0.2

Annual Total 1,799 [mm/year]

1993 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1							0.2					
2										0.5		
3										0.5		
4						0.2						
5							0.6					
6							9.5					
7							4.5					
8						0.6						
9							4.5					
10					4.6	6.3	0.6					5.5
11					1.2	18.6	5.7					
12					6.2		25.4					
13				12.0			11.0			27.0		
14							4.8					
15							1.3					
16			49.0		23.2					28.5		
17					4.4	5.3	7.0			4.5		
18			43.8		50.4	13.8	0.3				3.5	
19		1.2	42.2		6.4		2.7			1.5		
20			4.4	26.2	36.0		2.7					
21			0.8				28.0					
22			33.0	41.4			11.2					
23				10.2		70.5	0.1					
24						8.5	25.2					
25	0.8				2.2	24.7	4.5			12.0		
26					6.4	0.1	12.2					
27					0.6	1.2	6.0					
28					9.6	12.5	2.4					
29			1.6		9.6	4.5	6.8					
30					1.8	20.6	14.0					
31					0.8		116.6					
Total	0.8	1.2	174.8	89.8	163.4	187.4	307.8			74.5	3.5	5.5

Annual Total 1,009 [mm/year]

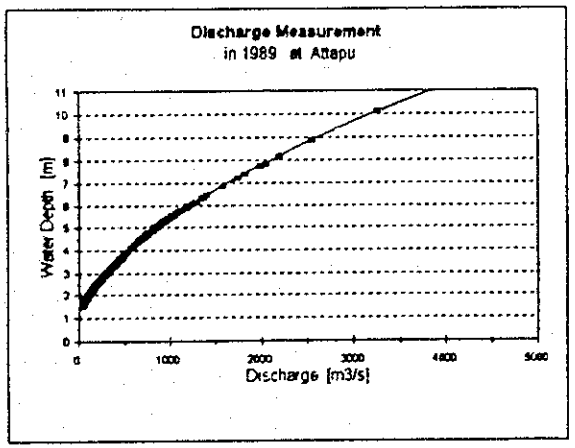
Table 9 (4/4) Rainfall Record

1994 [mm]

DAYS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1						30.1	8.6					
2				1.0		12.0	4.3					
3		31.5				13.7	1.7					
4						4.7	13.8					
5						0.0	26.6					
6						11.8	1.8					
7				0.5		49.6	84.1					
8		1.0				4.7	15.6					
9				0.5	5.0	0.0	3.5					
10						0.0	30.6					
11						16.0	141.7					
12						0.0	81.8					
13				34.0		1.0	8.5					
14			39.5			0.0	75.5					
15			0.5			0.2	14.2					
16						33.4	53.2					
17			1.0			67.8	20.2					
18						7.4	0.0					
19						75.8						
20						11.6						
21						13.8						
22						7.0						
23				1.0		1.1						
24						1.1						
25						8.6						
26						1.0						
27						2.0						
28						1.0						
29				2.0		0.5						
30				1.0		0.0						
31.0					4.2							
Total	0.0	32.5	41.0	40.0	9.2	375.9	585.7	0.0	0.0	0.0	0.0	0.0

Annual Total 1,084 [mm/year]

A



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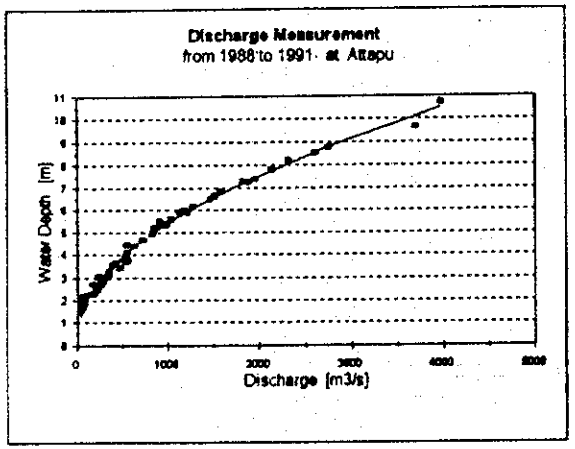

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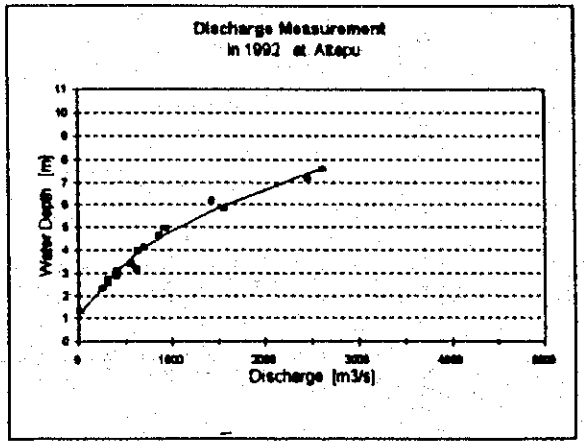


Q = -114.472 +59.265H +26.933H^2

Q = 21.133 -30.296H +38.871H^2

Q =173.809 -93.939H +54.712H^2

Figure 1 Rating Curve at Attapu

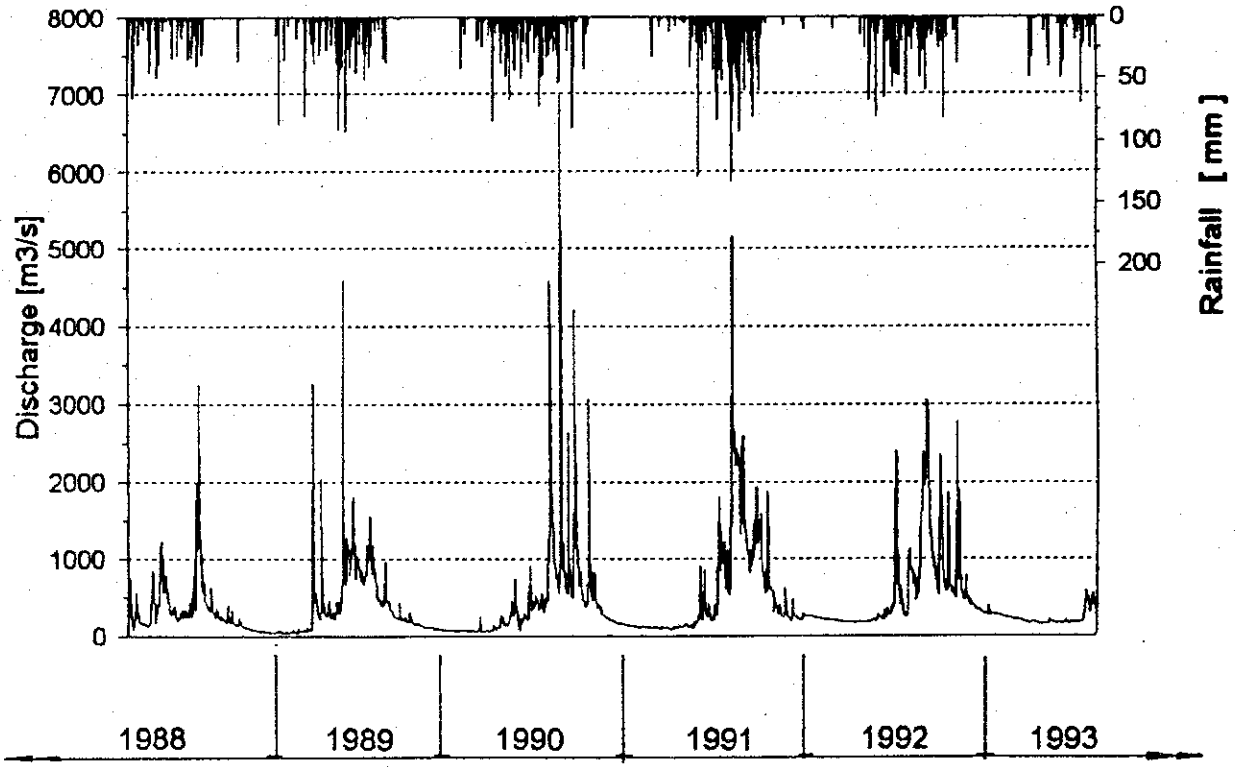


Figure 2 Discharge of Se Kong River at Attapu
from Jun 1988 to July 1993

1.2 Hydrological Data in the Se Kong Basin

Table A-1 Water Level of Se Kong River at Sekong Town (1/3)

1989

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1.70	1.96	1.72	1.62	1.71	2.77	2.50	3.94	2.59	2.85	2.09		
2	2.63	1.91	1.70	1.62	1.69	2.61	2.40	3.88	3.25	2.60	2.05		
3	2.33	1.90	1.68	1.64	1.67	2.39	2.75	2.82	3.55	2.70	2.09		
4	2.50	1.93	1.66	1.70	1.83	2.34	2.85	4.82	3.50	2.60	2.12		
5	2.35	1.86	1.65	1.63	1.85	2.16	2.75	3.88	3.45	3.65	2.20		
6	2.30	1.80	1.67	1.63	1.71	2.45	2.90	3.88	3.70	3.12	2.15		
7	2.35	1.40	1.67	1.59	1.83	2.17	2.85	3.50	3.75	3.11	2.08		
8	2.26	1.90	1.68	1.58	1.77	2.67	2.88	2.80	3.85	3.18	2.18		
9	2.00	1.80	1.66	1.59	1.96	2.83	2.78	4.85	4.88	3.05	1.85		
10	2.18	1.79	1.69	1.74	1.88	2.89	2.84	4.85	4.88	3.60	1.94		
11	2.22	1.80	1.69	1.71	1.73	2.77	2.70	4.85	4.87	3.60	3.15		
12	2.23	1.92	1.67	1.64	1.85	2.76	2.94	5.58	5.58	3.60	2.45		
13	2.49	1.90	1.65	1.60	2.53	2.79	2.87	3.65	5.68	5.10	2.19		
14	2.04	1.86	1.65	1.63	3.55	2.89	2.72	3.85	5.88	6.15	2.03		
15	1.94	1.83	1.64	1.67	2.56	2.85	2.92	2.74	5.88	4.40			
16	1.93	1.80	1.63	1.76	2.36	2.88	2.86	2.90	5.75	3.80			
17	1.92	1.60	1.65	2.00	2.95	2.57	4.75	2.56	5.60	3.55			
18	1.99	1.60	1.70	1.92	5.93	2.60	4.60	3.85	5.78	3.32			
19	1.98	1.70	1.79	1.87	3.33	2.83	4.66	3.45	3.75	3.32			
20	1.91	1.90	1.81	1.73	2.84	2.48	3.56	3.88	3.78	3.09			
21	1.89	1.80	1.79	1.70	2.85	2.68	3.90	2.90	3.86	2.88			
22	1.86	1.80	1.78	1.72	2.87	2.35	3.78	3.80	3.52	2.41			
23	1.81	1.86	1.83	1.70	2.94	2.34	3.84	3.57	2.78	2.22			
24	1.81	1.97	1.84	1.63	2.91	2.58	5.70	2.83	2.48	2.12			
25	1.84	1.90	1.75	1.71	2.67	2.83	5.80	3.80	2.53	2.09			
26	1.85	1.90	1.67	1.81	2.59	2.61	2.88	3.50	2.65	2.04			
27	1.85	1.99	1.67	1.87	2.66	2.73	2.84	2.56	2.58	2.10			
28	1.83	1.98	1.65	1.88	6.55	2.82	2.72	3.62	2.78	2.25			
29	1.91		1.61	1.90	5.58	2.87	2.94	2.94	2.38	2.16			
30	1.87		1.61	1.67	2.41	2.31	3.70	3.26	2.84	2.03			
31	1.87		1.66		2.21		3.88	3.34		2.09			
Day	31	28	31	30	31	30	31	31	30	31	14	0	318
Average	2.05	1.83	1.69	1.72	2.70	2.63	3.36	3.63	3.95	3.06	2.18		2.65
St. Dev.	0.25	0.14	0.06	0.11	1.23	0.22	0.90	0.75	1.21	0.94	0.31		1.06
Max	2.63	1.99	1.84	2.00	6.55	2.89	5.80	5.58	5.88	6.15	3.15		6.55
Min	1.70	1.40	1.61	1.58	1.67	2.16	2.40	2.56	2.38	2.03	1.85		1.40

1990

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1.43	1.23	1.30	1.53	1.25	2.65	2.55	2.55	4.30	4.33	5.67	2.88	
2	1.62	1.20	1.35	1.39	1.27	2.68	2.45	2.48	4.70	3.95	5.61	2.80	
3	1.61	1.25	1.30	1.26	1.28	2.45	2.40	2.28	4.91	6.27	5.57	2.73	
4	1.54	1.22	1.25	1.30	1.27	2.58	2.45	2.43	4.00	7.50	5.53	2.66	
5	1.56	1.32	1.26	1.30	1.16	2.75	2.35	2.25	3.73	6.82	5.43	2.59	
6	1.56	1.41	1.28	1.27	1.40	2.61	2.58	2.11	3.61	6.85	4.24	2.50	
7	1.50	1.37	1.22	1.23	1.40	2.60	2.45	2.03	3.25	5.94	4.19	2.43	
8	1.55	1.51	1.21	1.25	1.35	2.81	2.55	2.11	3.11	5.85	4.14	2.37	
9	1.41	1.51	1.22	1.21	1.43	2.63	2.45	2.05	2.30	5.13	4.95	2.30	
10	1.60	1.47	1.40	1.20	1.33	2.76	2.65	2.04	2.33	4.92	5.45	2.83	
11	1.51	1.35	1.24	1.19	1.29	2.55	2.61	1.84	2.16	4.78	3.93	2.74	
12	1.50	1.29	1.21	1.25	1.40	1.68	2.45	2.48	2.21	4.70	4.90	2.65	
13	1.45	1.28	1.21	1.59	1.54	1.30	2.35	2.58	2.93	4.63	6.89	2.56	
14	1.37	1.28	1.24	1.61	1.45	1.68	2.30	2.10	2.84	5.79	6.78	2.54	
15	1.30	1.32	1.37	1.30	1.27	1.71	2.60	2.64	2.79	8.33	6.68	2.46	
16	1.27	1.24	1.34	1.27	1.48	1.75	2.65	2.22	2.92	10.54	6.59	2.39	
17	1.35	1.14	1.34	1.30	1.68	1.83	2.63	2.05	2.54	10.45	6.83	2.30	
18	1.40	1.22	1.28	1.31	1.79	1.75	2.68	2.13	2.59	7.85	6.74	2.23	
19	1.48	1.27	1.28	1.30	2.07	1.48	2.70	2.09	14.48	7.98	6.63	2.17	
20	1.39	1.29	1.25	1.32	2.28	2.11	3.35	2.24	7.63	6.88	6.53	2.10	
21	1.42	1.34	1.23	1.24	2.50	2.25	3.30	2.26	4.89	6.78	6.63	2.03	
22	1.43	1.26	1.40	1.50	2.65	2.20	4.65	2.21	4.80	6.67	6.38	2.03	
23	1.50	1.22	1.30	1.22	2.61	2.21	3.97	2.33	4.85		6.28	2.13	
24	1.51	1.22	1.27	1.25	2.35	2.30	2.95	2.20	4.75		6.18	2.10	
25	1.46	1.20	1.25	1.27	2.31	3.25	2.20	2.35	4.63		6.05	2.83	
26	1.51	1.21	1.25	1.24	2.63	3.35	2.05	4.03	4.56		5.97	2.78	
27	1.43	1.19	1.26	1.25	2.67	2.75	2.55	3.08	4.73		4.58	2.68	
28	1.28	1.17	1.24	1.42	2.55	2.81	2.15	3.03	4.65		4.46	2.59	
29	1.35		1.45	1.39	2.63	2.70	2.85	6.47	4.53		3.35	2.49	
30	1.50		1.70	1.27	2.52	1.58	2.85	8.46	4.45		3.30	2.41	
31	1.45		1.30		2.59		2.41	6.09				2.27	
Day	31	28	31	30	31	30	31	31	30	22	30	31	356
Average	1.46	1.29	1.30	1.31	1.85	2.33	2.68	2.81	4.21	6.50	5.55	2.47	2.73
St. Dev.	0.09	0.10	0.10	0.11	0.58	0.53	0.53	1.49	2.28	1.79	1.10	0.26	1.86
Max	1.62	1.51	1.70	1.61	2.67	3.35	4.65	8.46	14.48	10.54	6.89	2.88	14.48
Min	1.27	1.14	1.21	1.19	1.16	1.30	2.05	1.84	2.16	3.95	3.30	2.03	1.14

Table A-1 Water Level of Se Kong River at Sekong Town (2/3)

1991

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	2.18	1.53	1.40	1.25	1.31	1.44	1.91	2.92	3.65	4.37	2.54	2.06	
2	2.15	1.42	1.39	1.24	1.45	1.50	2.05	2.80	3.43	3.94	2.52	2.02	
3	2.18	1.24	1.51	1.63	1.43	1.56	1.94	2.51	3.43	4.19	2.48	1.99	
4	2.28	1.52	1.38	1.55	1.47	2.23	1.80	2.39	3.75	3.55	2.46	1.94	
5	2.37	1.15	1.44	1.44	1.47	1.88	1.68	2.61	4.00	3.22	2.34	1.85	
6	2.34	1.18	1.43	1.38	1.57	1.62	1.60	2.93	6.53	3.77	2.32	1.74	
7	2.26	1.30	1.41	1.32	1.47	1.73	1.55	2.64	5.74	3.78	2.27	1.64	
8	2.18	1.34	1.42	1.35	1.48	1.78	1.70	2.58	4.62	3.58	2.25	1.58	
9	2.15	1.46	1.41	1.38	1.59	1.70	1.85	2.43	3.87	3.15	2.24	1.54	
10	2.15	1.46	1.40	1.42	1.76	3.12	1.86	2.25	4.38	3.29	2.21	1.52	
11	2.14	1.45	1.39	1.40	1.52	2.36	1.78	2.28	4.46	3.05	2.24	3.43	
12	2.05	1.46	1.39	1.37	1.54	2.24	1.88	2.33	3.56	3.01	2.16	2.56	
13	2.05	1.44	1.38	1.38	1.46	2.14	1.74	2.35	3.33	3.00	2.12	2.41	
14	2.05	1.46	1.32	1.42	1.46	2.68	1.86	2.81	3.04	3.13	2.10	2.38	
15	2.15	1.46	1.31	1.38	1.46	2.05	1.75	2.32	2.95	3.11	2.08	2.28	
16	2.16	1.45	1.31	1.28	1.81	1.74	1.74	7.42	2.84	2.81	2.08	2.12	
17	1.12	1.44	1.31	1.25	1.83	1.76	1.73	6.64	2.78	3.13	2.04	2.15	
18	1.57	1.44	1.27	1.23	1.84	1.92	1.66	6.88	2.70	2.61	2.03	2.09	
19	1.55	1.43	1.52	1.20	1.79	2.19	1.81	5.76	2.57	2.66	2.17	2.20	
20	1.52	1.41	1.42	1.26	1.68	1.88	2.33	5.04	3.18	2.54	2.14	2.15	
21	1.56	1.40	1.46	1.39	1.64	1.66	3.76	4.75	2.82	3.33	2.12	2.12	
22	1.53	1.37	1.46	1.34	1.53	1.60	3.36	5.69	2.85	4.62	2.06	2.14	
23	1.54	1.37	1.48	1.22	1.57	1.78	3.06	5.26	3.00	4.14	2.00	1.95	
24	1.56	1.36	1.46	1.32	1.52	3.16	2.60	4.94	2.58	3.95	1.94	1.87	
25	1.53	1.64	1.35	1.28	1.46	4.92	2.66	4.81	3.40	5.32	1.87	1.75	
26	1.52	1.59	1.39	1.25	1.44	2.68	2.66	4.69	2.90	3.67	1.64	1.67	
27	1.51	1.42	1.34	1.32	1.57	2.28	2.69	4.46	3.70	3.41	4.84	1.60	
28	1.51	1.40	1.42	1.34	1.74	2.04	2.80	4.65	3.23	3.21	2.78	1.50	
29	1.51		1.41	1.34	1.59	2.04	2.98	4.54	3.42	2.83	2.38	1.45	
30	1.50		1.39	1.34	1.54	1.94	2.64	4.62	3.86	2.71	2.13	1.35	
31	1.52		1.38		1.51		3.22	3.58		2.60		1.34	
Day	31	28	31	30	31	30	31	31	30	31	30	31	365
Average	1.85	1.41	1.40	1.34	1.56	2.12	2.21	3.93	3.55	3.41	2.28	1.95	2.26
St. Dev.	0.36	0.11	0.06	0.09	0.14	0.68	0.61	1.55	0.90	0.65	0.53	0.42	1.08
Max	2.37	1.64	1.52	1.63	1.84	4.92	3.76	7.42	6.53	5.32	4.84	3.43	7.42
Min	1.12	1.15	1.27	1.20	1.31	1.44	1.55	2.25	2.57	2.54	1.64	1.34	1.12

1992

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1.37	1.53	1.46	1.26	1.27	1.34	2.33	2.53	4.86	2.86	3.91	2.19	
2	1.32	1.26	1.53	1.24	1.17	1.30	2.29	2.34	4.61	2.77	3.68	2.19	
3	1.56	1.12	1.66	1.21	1.24	1.32	2.31	2.35	3.68	2.83	3.31	2.16	
4	1.50	1.21	1.56	1.29	1.21	1.31	2.31	2.48	3.62	2.82	3.91	1.36	
5	1.77	1.20	1.52	1.27	1.23	1.50	2.36	3.50	3.29	2.82	3.30	1.42	
6	1.85	1.18	1.40	1.27	1.20	1.30	2.36	3.76	3.25	5.47	2.97	1.42	
7	2.06	1.14	1.38	1.21	1.27	1.33	2.35	2.86	3.49	5.34	2.71	1.39	
8	1.78	1.08	1.66	1.24	1.28	1.30	2.90	2.86	3.57	4.74	2.76	1.38	
9	1.50	1.06	1.41	1.26	1.21	1.38	2.76	2.83	4.71	4.80	2.94		
10	1.86	1.04	1.34	1.20	1.21	1.54	2.64	2.80	3.92	3.87	3.83		
11	1.70	1.03	1.42	1.27	1.29	1.69	2.72	2.34	2.83	3.49	3.31		
12	1.74	1.04	1.45	1.25	1.29	1.35	2.75	2.30	2.84	2.78	2.87		
13	1.62	1.04	1.64	1.20	1.29	1.38	2.44	2.77	2.76	2.73	2.78		
14	2.06	1.06	1.58	1.20	1.22	1.35	2.54	2.87	2.49	2.67	2.60		
15	2.03	1.06	1.56	1.19	1.28	1.30	2.55	2.87	2.76	2.65	2.50		
16	1.94	1.06	1.50	1.21	1.28	1.34	2.42	3.10	2.67	2.65	2.53		
17	1.71	1.06	1.56	1.29	1.26	1.36	2.35	3.69	2.66	2.59	2.99		
18	2.02	1.34	1.46	1.17	1.28	1.35	2.20	3.90	2.77	2.65	3.16		
19	1.82	1.33	1.30	1.20	1.30	1.37	2.17	3.98	2.77	2.54	2.27		
20	1.54	1.53	1.37	1.21	1.32	1.53	2.25	4.83	2.77	2.44	2.26		
21	1.26	1.28	1.30	1.24	1.60	1.35	2.31	4.61	2.30	2.32	2.31		
22	1.26	1.41	1.27	1.20	1.33	2.23	2.34	3.98	3.83	3.84	2.30		
23	1.28	1.40	1.26	1.20	1.28	2.46	2.96	3.71	3.87	4.87	2.26		
24	1.29	1.42	1.28	1.19	1.32	3.67	3.51	3.66	3.86	4.82	2.23		
25	1.21	1.42	1.28	1.22	1.30	3.32	3.53	5.21	2.92	5.78	2.16		
26	1.17	1.44	1.27	1.20	1.33	3.34	3.16	6.73	2.87	5.66	2.13		
27	1.18	1.40	1.26	1.20	1.32	3.71	2.86	6.87	2.77	4.79	2.34		
28	1.28	1.44	1.26	1.21	1.36	3.56	2.85	6.79	2.71	6.84	2.32		
29	1.22	1.49	1.31	1.22	1.41	3.55	2.83	5.94	2.70	6.97	2.28		
30	1.23		1.38	1.18	1.32	3.55	2.69	5.87	2.71	6.83	2.27		
31	1.31		1.28		1.36		2.75	5.60		5.00			
Day	31	29	31	30	31	30	31	31	30	31	30	8	343
Average	1.56	1.25	1.42	1.22	1.29	1.95	2.61	3.87	3.25	3.96	2.78	1.69	2.28
St. Dev.	0.30	0.17	0.13	0.03	0.08	0.93	0.35	1.44	0.71	1.49	0.57	0.41	1.25
Max	2.06	1.53	1.66	1.29	1.60	3.71	3.53	6.87	4.86	6.97	3.91	2.19	6.97
Min	1.17	1.03	1.26	1.17	1.17	1.30	2.17	2.30	2.30	2.32	2.13	1.36	1.03

Table A-1 Water Level of Se Kong River at Sekong Town (3/3)

1993

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1.35	1.38	1.35	1.26	1.41	1.30	1.45	3.33	2.57	2.65	3.32	2.77	
2	1.34	1.34	1.34	1.28	1.34	1.30	1.35	3.39	2.40	2.84	2.90	2.46	
3	1.4	1.4	1.36	1.3	1.39	1.50	1.34	3.56	2.55	2.68	2.48	2.30	
4	1.39	1.33	1.35	1.35	1.34	1.48	1.42	2.33	2.32	2.87	2.58	2.31	
5	1.39	1.37	1.35	1.51	1.65	1.47	1.47	2.32	2.60	2.61	2.34	2.28	
6	1.35	1.32	1.35	1.29	1.76	1.48	1.32	2.98	2.78	2.55	2.35	3.64	
7	1.33	1.32	1.35	1.37	1.88	1.36	1.29	2.94	3.26	2.55	1.43	3.33	
8	1.38	1.33	1.33	1.38	1.38	1.33	1.86	3.64	3.51	2.13	1.34	2.92	
9	1.37	1.33	1.37	1.42	1.38	1.35	2.32	3.54	3.24	2.09	1.29	2.84	
10	1.36	1.3	1.35	1.37	1.33	1.24	2.33	3.34	2.90	2.17	1.34	2.36	
11	1.32	1.4	1.38	1.4	1.39	1.30	2.94	3.37	2.77	2.10	1.22	3.57	
12	1.38	1.32	1.38	1.4	1.22	1.42	2.91	2.93	2.90	2.11	1.17	3.32	
13	1.3	1.3	1.31	1.37	1.22	1.38	2.41	2.76	2.87	2.12	1.16	2.95	
14	1.36	1.32	1.32	1.37	1.20	1.53	2.32	3.37	2.51	2.18	1.15	2.52	
15	1.31	1.28	1.42	1.59	1.28	1.43	2.26	4.83	3.03	2.19	1.17	3.46	
16	1.35	1.27	1.43	1.74	1.35	1.40	1.32	4.78	2.77	2.22	1.13	4.90	
17	1.32	1.35	1.41	1.74	1.37	1.45	2.21	4.83	3.62	2.12	1.12	4.26	
18	1.43	1.39	1.34	1.83	1.62	1.40	1.64	3.62	3.48	2.34	1.13	3.31	
19	1.38	1.37	1.32	1.86	1.19	1.56	1.42	3.89	2.65	2.62	1.15	3.31	
20	1.33	1.32	1.33	1.77	1.36	1.38	2.14	4.51	2.73	2.37	1.17	2.56	
21	1.25	1.33	1.36	2.6	1.28	1.35	2.32	5.64	2.62	2.42	1.22	2.46	
22	1.3	1.4	1.38	2.53	1.30	1.39	2.44	4.52	2.55	3.00	2.62	2.44	
23	1.33	1.28	1.34	2.42	1.31	1.32	2.31	4.64	2.38	3.32	2.67	2.46	
24	1.34	1.28	1.35	2.5	1.35	1.40	2.51	3.56	2.30	2.63	2.25	2.33	
25	1.33	1.26	1.38	2.54	1.44	1.52	2.31	2.86	2.41	2.57	3.27	2.30	
26	1.33	1.26	1.33	2.39	1.51	2.36	2.21	3.72	2.42	2.63	2.76	2.21	
27	1.37	1.32	1.34	2.39	1.60	2.24	2.27	4.69	2.33	2.62	2.63	2.12	
28	1.42	1.32	1.35	2.48	1.51	2.23	2.27	4.31	2.34	2.56	2.47	2.02	
29	1.38		1.35	2.11	1.39	2.22	2.35	4.82	2.29	2.34	3.63	1.91	
30	1.38		1.37	1.74			2.29	3.55	2.87	2.72	3.23	1.86	
31	1.44			1.39			2.13			3.32		1.80	
Day	31	28	30	31	29	29	31	30	30	31	30	31	361
Average	1.36	1.33	1.36	1.76	1.41	1.52	2.04	3.75	2.73	2.50	1.99	2.75	2.05
St. Dev.	0.04	0.04	0.03	0.48	0.16	0.31	0.49	0.83	0.38	0.34	0.84	0.72	0.87
Max	1.44	1.40	1.43	2.60	1.88	2.36	2.94	5.64	3.62	3.32	3.63	4.90	5.64
Min	1.25	1.26	1.31	1.26	1.19	1.24	1.29	2.32	2.29	2.09	1.12	1.80	1.12

1994

[staff gauge reading : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	1.77	1.32	1.14	1.20	1.24	2.03							
2	1.77	1.30	1.13	1.19	1.25	1.82							
3	1.70	1.30	1.12	1.25	1.20	1.94							
4	1.70	1.33	1.12	1.26	1.12	1.76							
5	1.68	1.41	1.15	1.23	1.10	1.64							
6	1.65	1.37	1.16	1.31	1.08	1.55							
7	1.58	1.31	1.14	1.27	1.09	1.46							
8	1.60	1.30	1.13	1.21	1.13	1.64							
9	1.60	1.28	1.11	1.24	1.14	1.89							
10	1.54	1.28	1.14	1.27	1.10	1.75							
11	1.53	1.30	1.20	1.16	1.09	1.66							
12	1.52	1.28	1.20	1.12	1.07	1.51							
13	1.51	1.29	1.20	1.10	1.08	1.43							
14	1.50	1.29	1.19	1.10	1.14	1.40							
15	1.48	1.34	1.24	1.09	1.52	1.54							
16	1.47	1.32	1.23	1.07	1.37	1.54							
17	1.46	1.31	1.15	0.94	1.30	1.41							
18	1.43	1.34	1.13	0.88	1.60	3.54							
19	1.43	1.31	1.12	1.14	1.69	3.21							
20	1.42	1.26	1.12	1.19	2.19	3.11							
21	1.41	1.22	1.11	1.49	1.64	2.84							
22	1.40	1.21	1.10	1.33	1.51	2.47							
23	1.45	1.20	1.10	1.28	1.76	2.47							
24	1.41	1.19	1.15	1.28	1.71	2.62							
25	1.44	1.18	1.14	1.33	1.63	2.72							
26	1.41	1.18	1.17	1.42	1.76	2.40							
27	1.39	1.16	1.21	1.32	1.49	2.25							
28	1.38	1.16	1.23	1.30	1.51	2.27							
29	1.36		1.26	1.25	1.87	2.21							
30	1.34		1.26	1.75	1.72	2.20							
31	1.32		1.20		1.78								
Day	31	28	31	30	31	30	0	0	0	0	0	0	181
Average	1.50	1.28	1.16	1.23	1.42	2.08							1.45
St. Dev.	0.13	0.07	0.05	0.16	0.31	0.59							0.41
Max	1.77	1.41	1.26	1.75	2.19	3.54							3.54
Min	1.32	1.16	1.10	0.88	1.07	1.40							0.88

Table A - 2 Water Level of Xe Kaman River at B. Fangden (1/2)

1991

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1											1.26	0.92	
2											1.22	0.92	
3											1.41	0.93	
4											1.31	0.94	
5											1.23	0.96	
6											1.25	0.95	
7											0.96	0.83	
8											0.87	0.83	
9											0.78	0.84	
10											0.88	0.85	
11											0.59	0.87	
12											0.58	0.88	
13											0.57	0.84	
14											0.57	0.82	
15											0.52	0.83	
16											0.51	0.85	
17											0.49	0.75	
18											0.48	0.77	
19											0.47	0.78	
20											0.49	0.79	
21											0.49	0.80	
22											0.56	0.81	
23											0.56	0.77	
24											0.56	0.68	
25											0.69	0.64	
26											0.91	0.59	
27											0.71	0.55	
28											1.11	0.53	
29											1.11	0.54	
30											0.92	0.56	
31												0.55	
Day	0	0	0	0	0	0	0	0	0	0	30	31	61
Average											0.80	0.78	**0.79**
St. Dev.											0.31	0.13	**0.23**
Max											1.41	0.96	**1.41**
Min											0.47	0.53	**0.47**

1992

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.51	0.54	0.46		0.34	0.55	3.12	1.78	3.96	1.70	2.86	0.70	
2	0.55	0.55	0.49		0.34	0.56	2.51	1.62	3.86	1.66	2.00	0.66	
3	0.53	0.55	0.50		0.59	0.57	2.64	1.22	3.79	1.96	1.76	0.66	
4	0.56	0.54	0.52		0.56	0.57	1.89	1.46	3.68	1.64	1.46	0.67	
5	0.58	0.52	0.51		0.56	0.68	1.79	1.28	2.78	1.66	1.36	0.67	
6	0.56	0.52	0.54		0.56	0.96	1.72	1.18	2.50	1.64	1.38	0.67	
7	0.59	0.51	0.57		0.56	0.78	1.68	1.36	2.28	1.78	1.22	0.68	
8	0.61	0.51	0.57		0.54	0.64	1.58	1.64	1.92	2.83	1.26	0.68	
9	0.60	0.50	0.57		0.50	0.66	1.53	1.49	1.84	2.26	1.28	0.67	
10	0.62	0.49	0.56		0.48	0.65	1.50	1.34	1.78	2.16	1.26	0.66	
11	0.63	0.49	0.56		0.48	0.74	1.42	1.38	1.66	2.00	1.29	0.61	
12	0.59	0.48	0.56		0.48	0.74	1.34	1.26	1.55	2.06	1.27	0.58	
13	0.58	0.47	0.56		0.47	0.76	1.40	1.14	1.51	2.06	1.19	0.54	
14	0.57	0.49	0.56		0.48	0.77	1.36	1.56	1.57	2.04	1.18	0.54	
15	0.57	0.49	0.55		0.48	0.88	1.29	1.61	1.56	2.00	1.17	0.54	
16	0.57	0.48	0.55		0.50	0.82	1.21	1.94	1.54	1.99	1.16	0.55	
17	0.50	0.48	0.55		0.66	0.75	1.19	2.42	1.54	1.96	1.16	0.56	
18	0.49	0.46	0.55		0.66	0.70	0.96	2.91	1.52	1.90	1.15	0.54	
19	0.48	0.49	0.54		0.67	0.82	0.96	2.77	1.48	1.88	1.14	0.56	
20	0.48	0.48	0.54		0.66	0.74	1.20	2.78	1.46	1.78	1.14	0.54	
21	0.46	0.48	0.54		0.66	0.92	1.19	2.62	1.46	1.78	1.04	0.53	
22	0.46	0.48	0.54		0.79	0.92	1.21	2.84	1.48	1.76	0.99	0.54	
23	0.45	0.47	0.54		0.78	0.92	1.31	2.86	2.72	1.74	0.94	0.54	
24	0.47	0.47	0.53		0.76	0.90	1.48	2.87	2.83	1.70	0.94	0.55	
25	0.51	0.47	0.53		0.75	0.99	1.78	3.35	2.46	3.39	0.90	0.55	
26	0.56	0.46	0.53		0.70	0.88	1.54	3.01	1.92	2.95	0.84	0.56	
27	0.56	0.46	0.53		0.65	0.99	1.88	4.93	1.76	2.73	0.76	0.56	
28	0.56	0.45	0.52		0.60	1.89	1.88	6.22	1.49	2.34	0.72	0.54	
29	0.55		0.50		0.59	3.13	1.82	4.60	1.76	2.26	0.74	0.52	
30	0.52		0.48		0.58	3.00	1.84	3.86	1.79	2.88	0.72	0.53	
31	0.52		0.45		0.56		1.80	3.84		2.86		0.54	
Day	31	28	31	0	31	30	31	31	30	31	30	31	336
Average	0.54	0.49	0.53		0.58	0.96	1.61	2.43	2.12	2.10	1.21	0.59	**1.20**
St. Dev.	0.05	0.03	0.03		0.12	0.62	0.47	1.26	0.80	0.47	0.43	0.08	**0.89**
Max	0.63	0.55	0.57		0.79	3.13	3.12	6.22	3.96	3.39	2.86	0.70	**6.22**
Min	0.45	0.45	0.45		0.34	0.55	0.96	1.14	1.46	1.64	0.72	0.52	**0.34**

Table A - 2 Water Level of Xe Kaman River at B. Fangden (2/2)

1993

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.55	0.56	0.46		0.36	0.32	0.75	4.47	3.42	1.41	0.78	0.79	
2	0.56	0.56	0.45		0.36	0.31	0.76	4.49	3.07	1.33	0.77	0.70	
3	0.56	0.55	0.44		0.35	0.31	0.76	4.34	3.08	1.24	0.73	0.65	
4	0.56	0.52	0.44		0.35	0.30	0.78	3.13	3.06	1.19	0.72	0.64	
5	0.57	0.51	0.44		0.35	0.32	0.78	3.24	3.01	1.09	0.70	0.62	
6	0.57	0.50	0.45		0.34	0.32	0.75	3.38	3.84	1.08	0.68	0.78	
7	0.57	0.49	0.45		0.36	0.35	0.70	5.25	5.88	1.05	0.67	0.83	
8	0.58	0.49	0.44		0.36	0.36	0.67	5.13	4.96	1.01	0.67	0.78	
9	0.58	0.48	0.43		0.36	0.36	0.62	4.34	4.47	1.02	0.66	0.69	
10	0.58	0.46	0.42		0.35	0.38	0.56	3.92	4.42	1.00	0.65	0.68	
11	0.59	0.46	0.42		0.35	0.43	0.64	3.77	3.96	0.96	0.64	0.84	
12	0.58	0.47	0.41		0.34	0.44	0.78	3.78	3.63	0.94	0.64	0.80	
13	0.56	0.47	0.40		0.34	0.46	2.39	3.75	3.47	0.92	0.64	0.76	
14	0.52	0.47	0.39		0.33	0.49	2.87	3.65	3.27	0.89	0.63	0.71	
15	0.50	0.46	0.40		0.33	0.57	2.62	3.42	3.35	0.85	0.62	0.67	
16	0.49	0.48	0.41		0.33	0.67	2.66	3.89	3.17	0.79	0.62	0.86	
17	0.48	0.48	0.50		0.33	0.75	2.74	4.33	3.10	0.72	0.61	1.05	
18	0.47	0.49	0.48		0.32	0.67	2.69	4.83	3.03	0.67	0.61	0.93	
19	0.46	0.49	0.46		0.32	0.66	2.85	4.63	2.91	0.63	0.60	0.82	
20	0.46	0.48	0.46		0.32	0.82	2.95	4.88	2.98	0.60	0.60	0.78	
21	0.44	0.48	0.44		0.31	0.83	2.82	5.64	2.89	0.73	0.60	0.74	
22	0.44	0.46	0.43		0.31	0.84	3.34	5.47	2.79	0.90	0.61	0.70	
23	0.45	0.45	0.45		0.30	0.91	3.51	4.91	2.83	0.88	0.66	0.66	
24	0.45	0.45	0.46		0.30	0.93	3.42	4.52	2.77	0.73	0.61	0.63	
25	0.45	0.44	0.48		0.34	0.94	3.48	4.36	2.65	0.76	0.72	0.60	
26	0.46	0.44	0.49		0.36	0.96	3.47	4.26	2.49	0.74	0.63	0.58	
27	0.46	0.45	0.48		0.35	0.86	3.35	4.01	2.22	0.73	0.64	0.56	
28	0.56	0.46	0.48		0.34	0.82	3.49	4.12	1.89	0.72	0.70	0.56	
29	0.67		0.48		0.34	0.80	4.54	4.01	1.77	0.79	0.89	0.54	
30	0.60		0.47		0.33	0.77	4.41	3.87	1.60	0.81	0.75	0.54	
31	0.56		0.46		0.33		4.37	3.59		0.79		0.53	
Day	31	28	31	0	31	30	31	31	30	31	30	31	335
Average	0.53	0.48	0.45		0.34	0.60	2.27	4.24	3.20	0.90	0.67	0.71	1.31
St. Dev.	0.06	0.03	0.03		0.02	0.24	1.35	0.64	0.90	0.20	0.07	0.12	1.37
Max	0.67	0.56	0.50		0.36	0.96	4.54	5.64	5.88	1.41	0.89	1.05	5.88
Min	0.44	0.44	0.39		0.30	0.30	0.56	3.13	1.60	0.60	0.60	0.53	0.30

1994

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.53	0.44	0.39	0.39	0.41								
2	0.52	0.47	0.38	0.40	0.42								
3	0.60	0.46	0.38	0.41	0.40								
4	0.59	0.47	0.38	0.40	0.39								
5	0.58	0.49	0.38	0.40	0.37								
6	0.56	0.46	0.38	0.42	0.37								
7	0.55	0.46	0.37	0.47	0.39								
8	0.56	0.45	0.37	0.51	0.46								
9	0.55	0.45	0.38	0.48	0.48								
10	0.54	0.45	0.38	0.47	0.52								
11	0.53	0.44	0.40	0.44	0.48								
12	0.52	0.44	0.40	0.40	0.49								
13	0.51	0.45	0.39	0.39	0.50								
14	0.50	0.46	0.38	0.39	0.54								
15	0.51	0.44	0.37	0.38	0.47								
16	0.50	0.44	0.39	0.37	0.44								
17	0.52	0.42	0.38	0.38	0.50								
18	0.51	0.42	0.38	0.43	0.51								
19	0.49	0.42	0.37	0.44	0.51								
20	0.48	0.43	0.39	0.44	0.70								
21	0.48	0.42	0.39	0.42	0.75								
22	0.47	0.42	0.37	0.42	0.72								
23	0.47	0.41	0.37	0.41	0.68								
24	0.47	0.41	0.38	0.49	0.60								
25	0.46	0.40	0.37	0.47	0.75								
26	0.46	0.40	0.38	0.46	0.69								
27	0.46	0.39	0.35	0.45	0.66								
28	0.45	0.39	0.34	0.44	0.75								
29	0.46		0.35	0.41	0.72								
30	0.46		0.38	0.40	0.69								
31	0.45		0.38		0.66								
Day	31	28	31	30	31	0	0	0	0	0	0	0	151
Average	0.51	0.44	0.38	0.43	0.55								0.46
St. Dev.	0.04	0.03	0.01	0.04	0.13								0.09
Max	0.60	0.49	0.40	0.51	0.75								0.75
Min	0.45	0.39	0.34	0.37	0.37								0.34

Table A - 3 Water Level of Xe Kaman River at B. Hatsaykhao

1993

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1											0.47	0.49	
2											0.47	0.39	
3											0.44	0.35	
4											0.41	0.34	
5											0.40	0.32	
6											0.38	0.49	
7											0.37	0.53	
8											0.37	0.48	
9											0.36	0.40	
10											0.35	0.38	
11											0.34	0.54	
12											0.34	0.50	
13											0.34	0.46	
14											0.33	0.41	
15											0.33	0.37	
16											0.32	0.55	
17											0.31	0.73	
18											0.31	0.62	
19											0.30	0.52	
20											0.30	0.45	
21											0.30	0.41	
22											0.30	0.38	
23											0.40	0.35	
24											0.31	0.31	
25											0.37	0.26	
26											0.32	0.26	
27											0.34	0.25	
28											0.39	0.26	
29											0.58	0.24	
30											0.44	0.23	
31												0.22	
Day	0	0	0	0	0	0	0	0	0	0	30	31	61
Average											0.37	0.40	0.38
St. Dev.											0.06	0.12	0.10
Max											0.58	0.73	0.73
Min											0.30	0.22	0.22

1994

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.32	0.15	0.08	0.09	0.13								
2	0.30	0.17	0.08	0.12	0.12								
3	0.29	0.16	0.08	0.10	0.10								
4	0.26	0.16	0.08	0.09	0.08								
5	0.25	0.17	0.07	0.10	0.08								
6	0.25	0.15	0.07	0.12	0.08								
7	0.26	0.15	0.07	0.20	0.10								
8	0.24	0.15	0.07	0.16	0.14								
9	0.23	0.16	0.08	0.16	0.19								
10	0.22	0.16	0.09	0.16	0.21								
11	0.22	0.16	0.10	0.10	0.14								
12	0.21	0.15	0.08	0.08	0.15								
13	0.20	0.14	0.07	0.09	0.17								
14	0.19	0.14	0.07	0.10	0.24								
15	0.19	0.14	0.11	0.07	0.16								
16	0.20	0.12	0.09	0.07	0.12								
17	0.20	0.12	0.09	0.10	0.20								
18	0.19	0.12	0.09	0.18	0.21								
19	0.20	0.12	0.09	0.17	0.22								
20	0.19	0.14	0.09	0.17	0.49								
21	0.19	0.11	0.08	0.17	0.37								
22	0.19	0.10	0.09	0.16	0.26								
23	0.18	0.11	0.09	0.11	0.36								
24	0.17	0.10	0.09	0.22	0.31								
25	0.16	0.10	0.09	0.19	0.52								
26	0.16	0.10	0.08	0.17	0.41								
27	0.16	0.09	0.07	0.13	0.32								
28	0.16	0.09	0.08	0.15	0.50								
29	0.16		0.07	0.12	0.43								
30	0.16		0.12	0.11	0.41								
31	0.15		0.12		0.43								
Day	31	28	31	30	31	0	0	0	0	0	0	0	151
Average	0.21	0.13	0.08	0.13	0.25								0.16
St. Dev.	0.04	0.03	0.01	0.04	0.14								0.09
Max	0.32	0.18	0.12	0.22	0.52								0.52
Min	0.15	0.09	0.08	0.07	0.08								0.08

Table A-4 Water Level of Xe Namnoy River at B.Latsasin (1/2)

1991

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1		0.83	0.69	0.56	0.53	0.92	2.04	2.80	2.85	2.48	1.65	1.16	
2		0.82	0.69	0.55	1.31	0.96	2.79	2.29	2.43	2.43	1.61	1.14	
3		0.81	0.69	0.54	1.12	0.98	2.37	2.28	3.42	2.46	1.59	1.13	
4		0.81	0.74	0.53	1.00	1.04	2.24	2.68	3.28	2.39	1.56	1.12	
5		0.80	0.79	0.53	0.93	1.05	2.15	2.54	2.92	2.32	1.54	1.11	
6		0.80	0.79	0.53	1.10	1.20	2.09	2.59	3.18	2.31	1.52	1.10	
7		0.79	0.77	0.54	0.93	1.27	2.05	2.53	3.50	2.50	1.50	1.09	
8		0.79	0.75	0.55	0.89	1.14	2.01	2.55	3.68	2.47	1.47	1.08	
9		0.78	0.69	0.55	0.86	1.16	1.99	2.49	3.26	2.47	1.46	1.06	
10		0.78	0.68	0.54	0.83	1.17	1.91	2.43	3.92	2.45	1.45	1.06	
11		0.77	0.68	0.54	0.86	1.16	1.92	2.42	3.85	2.77	1.43	1.06	
12		0.77	0.67	0.54	0.81	1.35	2.04	2.38	2.81	2.45	1.39	1.05	
13		0.77	0.67	0.53	0.78	1.46	2.75	2.41	2.82	2.43	1.37	1.04	
14		0.77	0.66	0.53	0.81	1.46	2.67	2.56	2.48	2.40	1.35	1.03	
15		0.76	0.65	0.51	0.94	1.48	2.65	2.70	2.47	2.35	1.33	1.02	
16		0.76	0.65	0.50	0.95	1.44	2.55	3.36	2.63	2.28	1.31	1.01	
17		0.76	0.64	0.49	1.00	3.11	2.43	3.38	2.43	2.23	1.30	1.01	
18		0.75	0.63	0.48	0.96	2.23	2.33	4.38	2.48	2.18	1.30	1.00	
19		0.75	0.62	0.46	0.94	2.04	2.31	4.14	2.20	2.12	1.29	0.99	
20		0.75	0.62	0.46	0.99	2.03	2.61	2.83	2.40	2.07	1.28	0.99	
21		0.74	0.63	0.46	0.96	2.22	3.13	3.50	2.65	2.03	1.27	0.98	
22		0.73	0.63	0.46	0.91	2.31	2.91	3.24	2.58	2.00	1.25	0.98	
23		0.73	0.63	0.48	1.04	2.49	3.26	3.21	2.39	1.96	1.24	0.97	
24		0.72	0.63	0.59	1.01	2.41	3.28	3.11	2.56	1.96	1.23	0.97	
25		0.71	0.62	0.59	0.95	2.21	3.15	3.35	2.45	1.87	1.22	0.96	
26		0.70	0.61	0.59	0.93	2.22	3.50	3.65	2.41	1.84	1.20	0.95	
27		0.70	0.60	0.58	0.91	2.06	3.48	3.89	2.43	1.81	1.19	0.95	
28		0.70	0.59	0.56	0.90	2.04	3.26	3.96	2.40	1.76	1.19	0.95	
29			0.58	0.55	0.88	2.02	3.28	3.28	2.34	1.72	1.18	0.95	
30			0.56	0.54	0.96	2.04	3.15	3.49	2.43	1.70	1.17	0.94	
31			0.56		0.93		3.16	3.03		1.67		0.94	
Day	0	28	31	30	31	30	31	31	30	31	30	31	**334**
Average		0.76	0.66	0.53	0.93	1.69	2.63	3.01	2.79	2.19	1.36	1.02	**1.60**
St. Dev.		0.04	0.06	0.04	0.13	0.58	0.52	0.59	0.49	0.30	0.14	0.07	**0.94**
Max		0.83	0.79	0.59	1.31	3.11	3.50	4.38	3.92	2.77	1.65	1.16	**4.38**
Min		0.70	0.56	0.46	0.53	0.92	1.91	2.28	2.20	1.67	1.17	0.94	**0.46**

1992

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.93	0.78	0.67	0.54	0.45	0.85	2.75	2.27	2.70	2.16	1.44	1.04	
2	0.94	0.77	0.68	0.53	0.46	0.81	2.05	2.21	2.27	2.12	1.41	1.04	
3	0.93	0.77	0.69	0.53	0.46	1.13	2.06	2.32	2.54	2.43	1.39	1.04	
4	0.92	0.77	0.70	0.53	0.48	0.99	1.88	2.21	2.56	2.29	1.36	1.03	
5	0.91	0.76	0.70	0.55	0.53	0.94	1.98	2.21	2.56	2.26	1.36	1.02	
6	0.92	0.76	0.69	0.57	0.53	0.90	1.88	2.20	2.50	2.24	1.32	1.01	
7	0.93	0.75	0.69	0.58	0.57	0.88	1.99	2.19	2.46	2.18	1.32	1.01	
8	0.94	0.75	0.68	0.58	0.55	0.92	2.04	2.11	2.41	2.11	1.31	1.01	
9	0.92	0.75	0.66	0.56	0.53	0.94	1.98	2.14	2.44	2.07	1.30	1.00	
10	0.91	0.74	0.65	0.55	0.55	1.08	1.92	2.17	2.34	2.02	1.28	1.00	
11	0.90	0.74	0.64	0.51	0.57	1.24	1.86	2.29	2.28	1.94	1.27	1.00	
12	0.89	0.74	0.63	0.52	0.58	1.12	1.86	2.28	2.25	1.93	1.27	1.00	
13	0.88	0.73	0.63	0.51	0.60	1.09	1.83	2.28	2.41	1.88	1.23	1.00	
14	0.87	0.73	0.63	0.50	0.68	1.16	1.82	2.28	2.27	1.84	1.23	0.99	
15	0.86	0.73	0.62	0.50	0.72	1.30	1.77	2.32	2.22	1.81	1.23	0.99	
16	0.86	0.73	0.61	0.50	0.72	1.44	1.74	2.47	2.19	1.81	1.20	0.98	
17	0.85	0.73	0.61	0.52	0.71	1.37	1.73	2.47	2.19	1.75	1.20	0.97	
18	0.84	0.72	0.61	0.52	0.75	1.37	1.69	2.79	2.17	1.71	1.19	0.97	
19	0.84	0.72	0.60	0.53	0.75	1.48	1.66	3.34	2.15	1.68	1.19	0.96	
20	0.84	0.72	0.59	0.53	0.77	1.53	1.66	3.20	2.22	1.64	1.19	0.95	
21	0.83	0.70	0.59	0.53	0.75	1.46	1.80	3.01	2.30	1.63	1.18	0.95	
22	0.83	0.69	0.58	0.52	0.71	1.54	1.72	2.83	2.21	1.61	1.18	0.94	
23	0.82	0.69	0.58	0.51	0.70	1.69	2.24	3.07	2.23	1.57	1.14	0.93	
24	0.82	0.67	0.57	0.50	0.74	1.67	2.51	2.86	2.32	1.56	1.13	0.93	
25	0.82	0.66	0.57	0.49	0.80	1.59	2.45	2.90	2.28	1.53	1.12	0.93	
26	0.81	0.66	0.56	0.48	0.91	1.63	2.41	2.97	2.26	1.51	1.11	0.93	
27	0.80	0.66	0.56	0.47	0.88	1.93	2.49	2.92	2.26	1.49	1.10	0.93	
28	0.80	0.65	0.55	0.47	0.94	2.10	2.43	3.16	2.18	1.47	1.08	0.93	
29	0.80	0.65	0.55	0.48	0.84	2.02	2.34	3.04	2.27	1.61	1.08	0.93	
30	0.79		0.54	0.46	0.82	2.05	2.31	3.01	2.19	1.53	1.08	0.92	
31	0.78		0.56		0.83		2.33	2.83		1.49		0.92	
Day	31	29	31	30	31	30	31	31	30	31	30	31	**366**
Average	0.86	0.72	0.62	0.52	0.67	1.34	2.04	2.59	2.32	1.83	1.23	0.98	**1.31**
St. Dev.	0.05	0.04	0.05	0.03	0.14	0.38	0.30	0.39	0.14	0.29	0.10	0.04	**0.72**
Max	0.94	0.78	0.70	0.58	0.94	2.10	2.75	3.34	2.70	2.43	1.44	1.04	**3.34**
Min	0.78	0.65	0.54	0.46	0.45	0.81	1.66	2.11	2.15	1.47	1.08	0.92	**0.45**

Table A - 4 Water Level of Xe Namnoy River at B.Latsasin (2/2)

1993

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.93	0.74	0.63	0.61	0.60	1.14	1.75	3.03	2.32	2.03	1.54	1.27	
2	0.91	0.74	0.64	0.60	0.59	1.09	1.68	2.87	2.34	2.02	1.51	1.25	
3	0.90	0.73	0.69	0.59	0.58	1.06	1.64	2.88	2.37	1.95	1.49	1.25	
4	0.89	0.73	0.68	0.58	0.57	1.37	1.65	2.79	2.55	1.92	1.48	1.22	
5	0.88	0.73	0.65	0.58	0.55	1.20	1.63	2.68	2.39	1.88	1.46	1.20	
6	0.88	0.72	0.64	0.57	0.55	1.13	1.60	2.57	2.41	1.84	1.44	1.17	
7	0.88	0.72	0.62	0.56	0.55	1.14	1.63	2.58	2.35	1.82	1.42	1.15	
8	0.87	0.71	0.61	0.55	0.55	1.20	1.56	2.78	2.48	1.80	1.41	1.14	
9	0.86	0.71	0.60	0.54	0.55	1.18	1.74	3.00	2.39	1.83	1.38	1.13	
10	0.85	0.70	0.59	0.64	0.55	1.12	1.86	2.87	2.42	1.81	1.37	1.12	
11	0.85	0.69	0.58	0.64	0.59	1.18	1.78	2.64	2.34	1.73	1.35	1.15	
12	0.84	0.69	0.57	0.65	0.58	1.14	2.12	2.70	2.31	1.74	1.34	1.16	
13	0.83	0.68	0.56	0.67	0.57	1.11	2.18	3.04	2.27	1.73	1.32	1.15	
14	0.83	0.68	0.56	0.62	0.56	1.12	2.10	3.10	2.24	1.39	1.30	1.13	
15	0.83	0.68	0.56	0.66	0.63	1.11	2.02	2.59	2.27	1.67	1.29	1.10	
16	0.82	0.68	0.57	0.69	0.62	1.02	1.96	2.16	2.35	1.64	1.28	1.07	
17	0.81	0.68	0.62	0.67	0.65	1.01	1.91	2.10	2.68	1.72	1.27	1.04	
18	0.81	0.67	0.60	0.64	0.79	1.22	1.89	3.09	2.49	1.85	1.25	1.02	
19	0.80	0.66	0.62	0.62	0.89	1.13	1.86	2.98	2.62	1.78	1.25	1.01	
20	0.80	0.65	0.68	0.79	1.06	1.11	1.83	3.00	2.53	1.83	1.25	1.00	
21	0.78	0.65	0.82	0.73	1.21	1.17	1.90	2.91	2.45	1.76	1.23	0.98	
22	0.77	0.65	0.86	0.85	1.03	1.12	1.83	2.89	2.42	1.74	1.21	0.96	
23	0.77	0.65	0.89	0.85	1.21	1.46	1.78	2.83	2.36	1.73	1.20	0.99	
24	0.77	0.65	0.82	0.81	1.21	1.52	1.76	2.70	2.30	1.71	1.20	0.98	
25	0.77	0.64	0.77	0.76	1.10	1.53	1.83	2.60	2.27	1.69	1.18	0.97	
26	0.77	0.64	0.73	0.75	1.16	1.50	1.83	2.55	2.21	1.70	1.17	0.96	
27	0.77	0.64	0.69	0.69	1.20	1.39	1.88	2.48	2.17	1.68	1.16	0.96	
28	0.76	0.63	0.66	0.66	1.25	1.52	1.96	2.40	2.14	1.64	1.17	0.95	
29	0.76		0.66	0.64	1.31	1.60	1.77	2.40	2.12	1.63	1.26	0.95	
30	0.75		0.67	0.62	1.22	1.80	2.21	2.35	2.06	1.59	1.28	0.95	
31	0.75		0.64		1.17		2.75	2.23		1.55		0.94	
Day	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Average	0.82	0.68	0.66	0.66	0.83	1.25	1.87	2.70	2.35	1.75	1.32	1.07	**1.34**
St. Dev.	0.05	0.03	0.09	0.09	0.30	0.20	0.23	0.28	0.14	0.13	0.11	0.11	**0.69**
Max	0.93	0.74	0.89	0.85	1.31	1.80	2.75	3.10	2.68	2.03	1.54	1.27	**3.10**
Min	0.75	0.63	0.56	0.54	0.55	1.01	1.56	2.10	2.06	1.39	1.16	0.94	**0.54**

1994

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.93	0.73	0.76	1.16	1.09	1.85	2.30						
2	0.92	0.73	0.76	1.18	1.09	1.69	2.23						
3	0.93	0.73	0.76	1.21	1.09	2.28	2.22						
4	0.92	0.78	0.75	1.22	1.08	2.22	2.17						
5	0.92	0.77	0.75	1.21	1.06	2.14	2.13						
6	0.91	0.75	0.73	1.21	1.05	2.03	2.24						
7	0.90	0.73	0.72	1.23	1.06	1.99	2.35						
8	0.89	0.74	0.72	1.24	1.21	2.77	3.13						
9	0.88	0.81	0.75	1.23	1.28	2.61	2.97						
10	0.88	0.85	0.77	1.20	1.27	2.47	2.87						
11	0.87	0.81	0.79	1.18	1.25	2.31	3.34						
12	0.86	0.79	0.89	1.16	1.24	2.21	4.46						
13	0.86	0.76	0.90	1.15	1.21	2.18	5.12						
14	0.85	0.75	0.93	1.15	1.24	2.13	4.01						
15	0.85	0.73	0.86	1.22	1.53	2.17							
16	0.85	0.72	0.85	1.25	1.41	2.03							
17	0.84	0.70	0.84	1.26	1.34	2.31							
18	0.84	0.70	0.83	1.46	1.38	3.65							
19	0.84	0.76	0.82	1.33	1.53	2.47							
20	0.82	0.76	0.81	1.21	1.94	3.01							
21	0.81	0.75	0.83	1.19	1.64	2.82							
22	0.80	0.75	0.83	1.17	1.57	2.81							
23	0.79	0.75	0.80	1.24	1.48	2.68							
24	0.77	0.75	0.84	1.28	2.04	2.61							
25	0.76	0.78	0.89	1.24	1.76	2.65							
26	0.76	0.78	0.93	1.19	1.63	2.65							
27	0.75	0.78	0.97	1.19	1.65	2.52							
28	0.75	0.78	0.97	1.16	1.57	2.52							
29	0.75		1.00	1.15	1.67	2.42							
30	0.74		1.15	1.11	1.66	2.36							
31	0.73		1.16		1.95								
Day	31	28	31	30	31	30	14	0	0	0	0	0	**195**
Average	0.84	0.76	0.85	1.21	1.42	2.42	2.97						**1.37**
St. Dev.	0.06	0.03	0.11	0.06	0.29	0.39	0.96						**0.77**
Max	0.93	0.85	1.16	1.46	2.04	3.65	5.12						**5.12**
Min	0.73	0.70	0.72	1.11	1.05	1.69	2.13						**0.70**

1 The water level more than 0.8 m may be affected by the back water of the temporary bridge which was constructed at the 50 m downstream from the WL. station this dry season.

2 The temporary bridge was replace to the permanent bridge this year.

Table A - 5 Water Level of Xe Katam River at B.Nonghin (1/2)

1991

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1		0.32	0.28	0.27	0.39	0.38	0.73	1.03	1.02	1.14	0.64	0.48	
2		0.32	0.29	0.28	0.42	0.39	0.81	0.97	0.99	1.42	0.62	0.47	
3		0.32	0.30	0.27	0.35	0.40	0.81	0.92	0.97	1.31	0.62	0.47	
4		0.32	0.32	0.28	0.35	0.40	0.77	0.90	1.07	1.12	0.62	0.46	
5		0.32	0.32	0.26	0.34	0.40	0.71	0.88	1.19	1.03	0.61	0.46	
6		0.32	0.35	0.27	0.34	0.47	0.68	0.91	1.18	1.04	0.60	0.46	
7		0.32	0.31	0.29	0.32	0.46	0.69	0.95	1.10	1.04	0.60	0.45	
8		0.31	0.30	0.35	0.36	0.45	0.65	0.94	1.07	1.08	0.59	0.45	
9		0.31	0.34	0.33	0.32	0.45	0.68	0.89	1.16	1.01	0.58	0.45	
10		0.30	0.28	0.31	0.33	0.46	0.65	0.87	1.17	0.97	0.58	0.44	
11		0.30	0.28	0.29	0.32	0.47	0.61	0.85	1.17	0.95	0.57	0.44	
12		0.30	0.28	0.29	0.33	0.47	0.75	0.82	1.06	1.10	0.56	0.44	
13		0.30	0.28	0.29	0.36	0.54	0.72	0.79	1.06	0.96	0.56	0.43	
14		0.30	0.27	0.27	0.44	0.55	0.94	0.80	0.98	0.94	0.56	0.43	
15		0.30	0.27	0.27	0.44	0.51	0.93	0.84	0.93	0.95	0.55	0.43	
16		0.30	0.26	0.26	0.46	0.48	0.85	1.00	0.90	0.90	0.54	0.42	
17		0.29	0.26	0.26	0.52	0.47	0.81	1.23	0.88	0.88	0.54	0.42	
18		0.28	0.27	0.26	0.51	0.48	0.76	1.36	0.85	0.85	0.54	0.42	
19		0.28	0.28	0.27	0.53	0.47	0.79	1.34	0.83	0.82	0.53	0.41	
20		0.28	0.30	0.28	0.57	0.46	0.87	1.26	1.10	0.80	0.53	0.41	
21		0.27	0.28	0.30	0.54	0.45	1.15	1.18	0.94	0.78	0.52	0.41	
22		0.27	0.28	0.28	0.50	0.47	1.29	1.11	0.91	0.78	0.52	0.41	
23		0.27	0.30	0.27	0.48	0.60	1.14	1.14	0.93	0.76	0.51	0.40	
24	0.33	0.27	0.29	0.27	0.45	0.63	1.13	1.20	0.95	0.75	0.50	0.39	
25	0.33	0.26	0.27	0.27	0.44	0.72	1.15	1.20	0.92	0.74	0.50	0.39	
26	0.33	0.25	0.27	0.29	0.44	0.67	1.11	1.19	1.02	0.72	0.50	0.39	
27	0.32	0.28	0.27	0.31	0.43	0.62	1.07	1.16	0.96	0.70	0.50	0.39	
28	0.32	0.28	0.27	0.29	0.42	0.54	1.08	1.17	0.99	0.69	0.49	0.39	
29	0.32		0.26	0.30	0.42	0.53	1.02	1.16	1.00	0.67	0.49	0.39	
30	0.32		0.26	0.29	0.42	0.59	0.97	1.10	0.98	0.66	0.48	0.39	
31	0.33		0.26		0.40		0.94	1.09		0.66		0.39	
Day	8	28	31	30	31	30	31	31	30	31	30	31	342
Average	0.33	0.29	0.29	0.28	0.42	0.50	0.90	1.04	1.01	0.91	0.55	0.43	0.60
St. Dev.	0.01	0.02	0.02	0.02	0.07	0.08	0.17	0.17	0.10	0.19	0.05	0.03	0.31
Max	0.33	0.32	0.35	0.35	0.57	0.72	1.29	1.36	1.19	1.42	0.64	0.48	1.42
Min	0.32	0.25	0.26	0.26	0.32	0.38	0.65	0.79	0.83	0.66	0.48	0.39	0.25

1992

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.39	0.33	0.31	0.34	0.40	0.63	1.04	1.18	1.22	0.89	0.59	0.43	
2	0.38	0.33	0.31	0.36	0.40	0.62	0.95	1.18	1.18	0.86	0.58	0.43	
3	0.40	0.32	0.30	0.37	0.42	0.75	0.92	1.07	1.12	0.81	0.57	0.42	
4	0.40	0.32	0.30	0.33	0.44	0.74	0.86	1.07	1.16	0.82	0.57	0.42	
5	0.40	0.32	0.29	0.32	0.42	0.81	0.84	1.07	1.12	0.80	0.56	0.42	
6	0.40	0.32	0.29	0.31	0.48	0.76	0.80	0.97	1.12	0.78	0.55	0.42	
7	0.39	0.31	0.28	0.30	0.50	0.69	0.79	0.93	1.12	0.76	0.54	0.42	
8	0.38	0.31	0.28	0.30	0.45	0.68	0.87	0.89	1.06	0.75	0.53	0.42	
9	0.38	0.31	0.28	0.30	0.44	0.80	0.82	0.95	1.05	0.73	0.52	0.42	
10	0.38	0.30	0.28	0.29	0.44	0.75	0.78	0.92	1.05	0.72	0.52	0.41	
11	0.37	0.31	0.28	0.29	0.47	1.01	0.77	0.90	0.96	0.70	0.51	0.41	
12	0.37	0.30	0.28	0.32	0.49	0.94	0.76	0.95	0.96	0.69	0.51	0.41	
13	0.37	0.30	0.28	0.36	0.47	0.91	0.73	0.96	1.00	0.68	0.50	0.40	
14	0.36	0.30	0.28	0.56	0.48	0.83	0.77	0.94	1.00	0.64	0.50	0.40	
15	0.36	0.29	0.27	0.46	0.48	0.85	0.74	0.96	1.51	0.64	0.54	0.40	
16	0.36	0.29	0.28	0.46	0.47	0.93	0.75	1.01	0.91	0.64	0.49	0.40	
17	0.36	0.29	0.28	0.52	0.33	0.95	0.77	0.40	0.90	0.64	0.48	0.39	
18	0.36	0.29	0.30	0.46	0.50	0.92	0.77	1.43	0.94	0.62	0.48	0.39	
19	0.36	0.29	0.30	0.44	0.50	0.91	0.80	1.29	0.95	0.61	0.48	0.39	
20	0.36	0.29	0.32	0.43	0.47	0.96	0.78	1.22	0.95	0.61	0.48	0.39	
21	0.36	0.28	0.32	0.41	0.51	0.93	0.78	1.35	0.90	0.61	0.48	0.38	
22	0.36	0.28	0.31	0.39	0.43	1.04	0.76	1.40	0.90	0.59	0.47	0.38	
23	0.35	0.28	0.29	0.40	0.47	0.95	0.96	1.41	0.92	0.59	0.47	0.38	
24	0.35	0.28	0.31	0.39	0.72	0.86	1.09	1.33	0.90	0.58	0.47	0.38	
25	0.34	0.27	0.36	0.38	0.77	0.85	1.07	1.35	0.95	0.60	0.46	0.38	
26	0.34	0.29	0.38	0.36	0.82	0.82	1.21	1.32	0.92	0.59	0.46	0.38	
27	0.34	0.28	0.42	0.35	0.76	1.34	1.20	1.36	0.90	0.58	0.45	0.38	
28	0.34	0.29	0.36	0.34	0.81	1.48	1.16	1.37	0.94	0.60	0.45	0.38	
29	0.34	0.31	0.33	0.34	0.72	1.46	1.24	1.42	0.92	0.68	0.44	0.38	
30	0.33		0.35	0.34	0.69	1.20	1.18	1.40	0.92	0.64	0.44	0.40	
31	0.33		0.34		0.63		1.14			0.60		0.38	
Day	31	29	31	30	31	30	31	30	30	31	30	31	365
Average	0.36	0.30	0.31	0.37	0.53	0.91	0.91	1.13	1.02	0.68	0.50	0.40	0.62
St. Dev.	0.02	0.02	0.04	0.07	0.14	0.22	0.17	0.24	0.13	0.09	0.04	0.02	0.31
Max	0.40	0.33	0.42	0.56	0.82	1.48	1.24	1.43	1.51	0.89	0.59	0.43	1.51
Min	0.33	0.27	0.27	0.29	0.33	0.62	0.73	0.40	0.90	0.58	0.44	0.38	0.27

Table A - 5 Water Level of Xe Katam River at B.Nonghin (2/2)

1993

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.38	0.32	0.28	0.28	0.38	0.58	1.00	0.86	0.83				
2	0.38	0.31	0.28	0.28	0.38	0.56	1.00	0.92	0.83				
3	0.38	0.31	0.28	0.26	0.34	0.55	0.94	0.90	0.91				
4	0.37	0.31	0.27	0.26	0.34	0.57	0.94	0.81	1.02				
5	0.37	0.31	0.27	0.26	0.32	0.57	0.96	0.78	0.94				
6	0.37	0.31	0.26	0.26	0.32	0.57	0.96	0.82	1.01				
7	0.37	0.31	0.26	0.26	0.32	0.56	1.00	0.76	1.12				
8	0.37	0.30	0.26	0.26	0.36	0.53	0.97	0.78	1.08				
9	0.36	0.30	0.26	0.28	0.33	0.61	0.94	0.80	1.07				
10	0.36	0.30	0.26	0.28	0.46	0.54	0.87	0.80	1.04				
11	0.36	0.30	0.26	0.28	0.46	0.51	1.08	0.76	1.01				
12	0.36	0.30	0.46	0.28	0.42	0.50	1.16	0.74	0.94				
13	0.36	0.30	0.34	0.28	0.42	0.50	1.08	0.73	0.92				
14	0.36	0.30	0.34	0.30	0.45	0.52	1.00	0.86	0.90				
15	0.36	0.30	0.34	0.30	0.45	0.54	0.97	0.79	0.89				
16	0.34	0.30	0.30	0.30	0.46	0.51	0.91	0.75	0.94				
17	0.34	0.30	0.30	0.32	0.50	0.51	0.91	0.81	0.84				
18	0.34	0.30	0.30	0.32	0.64	0.53	0.90	0.87	1.07				
19	0.34	0.30	0.36	0.32	0.64	0.53	0.96	0.88	1.08				
20	0.33	0.30	0.36	0.36	0.60	0.53	0.82	1.04	1.12				
21	0.33	0.29	0.38	0.36	0.60	0.74	0.78	1.12	1.04				
22	0.33	0.34	0.33	0.37	0.68	0.74	0.82	1.02	0.98				
23	0.33	0.30	0.33	0.38	0.68	0.84	0.78	0.97	0.95				
24	0.33	0.30	0.31	0.37	0.76	0.84	0.76	0.99	0.88				
25	0.33	0.29	0.31	0.38	0.56	0.80	0.80	0.94	0.84				
26	0.33	0.29	0.29	0.35	0.65	0.86	1.07	0.90	0.86				
27	0.33	0.28	0.29	0.35	0.72	0.82	0.99	0.90	0.85				
28	0.32	0.28	0.29	0.46	0.72	0.86	0.96	0.86	0.83				
29	0.32		0.20	0.42	0.68	0.86	0.94	0.83	0.78				
30	0.32		0.28	0.40	0.62	0.86	0.99	0.82	0.76				
31	0.32		0.20		0.60		0.93	0.80					
Day	31	28	31	30	31	30	31	31	30	0	0	0	273
Average	0.36	0.30	0.30	0.32	0.51	0.63	0.94	0.86	0.94				0.58
St. Dev.	0.02	0.01	0.05	0.05	0.14	0.14	0.09	0.10	0.10				0.28
Max	0.38	0.34	0.46	0.46	0.76	0.86	1.16	1.12	1.12				1.16
Min	0.32	0.28	0.20	0.26	0.32	0.50	0.76	0.73	0.76				0.20

1994

[staff gauge read : m]

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	0.37	0.32	0.27	0.37	0.47								
2	0.37	0.32	0.27	0.36	0.45								
3	0.37	0.32	0.27	0.37	0.43								
4	0.36	0.32	0.27	0.37	0.43								
5	0.36	0.32	0.27	0.37	0.44								
6	0.36	0.32	0.27	0.37	0.43								
7	0.36	0.32	0.27	0.50	0.44								
8	0.36	0.32	0.27	0.48	0.51								
9	0.36	0.32	0.28	0.51	0.57								
10	0.36	0.32	0.30	0.48	0.58								
11	0.35	0.32	0.31	0.43	0.58								
12	0.35	0.33	0.31	0.42	0.56								
13	0.35	0.34	0.37	0.38	0.53								
14	0.35	0.34	0.33	0.40	0.52								
15	0.35	0.34	0.31	0.37	0.51								
16	0.35	0.32	0.34	0.37	0.51								
17	0.34	0.32	0.34	0.37	0.53								
18	0.34	0.33	0.32	0.41	0.60								
19	0.34	0.32	0.34	0.53	0.65								
20	0.34	0.31	0.33	0.56	0.63								
21	0.33	0.31	0.33	0.66	0.59								
22	0.33	0.31	0.34	0.62	0.56								
23	0.33	0.29	0.50	0.65	0.56								
24	0.33	0.27	0.40	0.61	0.58								
25	0.33	0.27	0.36	0.57	0.58								
26	0.33	0.27	0.34	0.54	0.57								
27	0.33	0.27	0.34	0.53	0.61								
28	0.33	0.27	0.33	0.51	0.59								
29	0.33		0.34	0.49	0.73								
30	0.33		0.32	0.49	0.65								
31	0.32		0.36		0.66								
Day	31	28	31	30	31	0	0	0	0	0	0	0	151
Average	0.35	0.31	0.32	0.47	0.55								0.40
St. Dev.	0.01	0.02	0.05	0.09	0.08								0.11
Max	0.37	0.34	0.50	0.66	0.73								0.73
Min	0.32	0.27	0.27	0.36	0.43								0.27

Table A - 6 Monthly Discharge [m3/s] of Se Kong River at Sekong Town

Drainage Area : 6,200 km2

[m3/s]

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Standard Deviation	Max	Min	Annual Runoff Volume [x10^6m3]	Annual Runoff [mm]
1960	44.9	30.5	28.8	29.6	109.1	201.2	239.9	624.7	274.9	157.9	115.8	66.5	160.3	169.1	624.7	28.8	5,094	822
1961	50.3	40.3	35.5	50.5	152.5	573.6	579.1	1,061.1	750.3	330.8	200.6	124.3	329.1	337.1	1061.1	35.5	10,430	1,682
1962																		
1963																		
1964	47.6	33.4	24.8	32.4	123.8	123.4	169.7	298.9	768.9	216.9	147.8	94.7	173.5	204.8	768.9	24.8	5,479	884
1965	63.8	49.3	36.9	43.5	116.9	252.5	308.8	338.9	197.9	128.1	88.0	53.0	139.8	108.3	338.9	36.9	4,430	715
1966	42.3	32.9	22.1	28.2	231.1	306.5	423.3	338.6	317.3	124.4	93.6	62.4	168.6	145.6	423.3	22.1	5,344	862
1967	39.6	34.4	34.2	51.9	123.0	166.1	290.9	446.4	704.3	190.3	104.7	67.8	187.8	204.0	704.3	34.2	5,938	958
1968	46.3	31.9	28.8	26.8	105.6	127.0	152.5	394.9	905.5	133.0	121.4	92.0	180.5	248.8	905.5	26.8	5,693	918
1969	63.8	47.8	42.3	38.0	135.6	188.2	877.7	372.1	604.6	181.0	193.6	125.7	239.2	258.9	877.7	38.0	7,567	1,224
1970	90.7	68.6	57.1	72.7	120.4	255.0	246.1	415.8	460.0	186.8	151.9	98.8	185.3	135.4	460.0	57.1	5,857	945
1971	65.1	50.8	43.6	53.2	114.7	320.4	763.8	249.3	194.9	181.0	150.5	89.3	189.7	200.5	763.8	43.6	6,022	971
1972	65.1	59.2	51.7	94.9	108.0	378.3	413.1	799.4	322.0	234.6	252.0	152.6	244.3	216.1	799.4	51.7	7,750	1,250
1973	108.2	77.6	61.1	53.2	115.3	132.5	344.5	611.5	285.5	173.7	183.9	117.6	188.7	159.5	611.5	53.2	5,969	966
1974	85.3	68.6	57.1	103.3	141.5	434.5	147.7	1,157.1	310.1	201.9	228.4	136.4	256.0	304.0	1157.1	57.1	8,117	1,309
1975	89.3	67.1	53.0	57.4	127.6	274.7	305.1	947.4	575.0	196.2	227.0	125.7	253.8	263.6	947.4	53.0	8,042	1,297
1976																		
1977																		
1978	66.5	44.8	43.6	65.8	118.5	627.0	670.5	1,501.1	955.9	287.4	290.9	157.9	402.5	455.7	1501.1	43.6	12,757	2,058
1979	84.0	65.7	54.4	72.7	163.3	538.9	531.1	1,037.5	586.1	179.1	204.8	131.0	302.4	303.0	1037.5	54.4	9,582	1,545
1980	93.4	80.8	53.0	44.9	127.6	415.1	357.6	242.3	553.9	170.5	196.4	108.2	203.6	160.6	553.9	44.9	6,427	1,037
1981	79.9	64.2	66.5	81.0	141.3	930.4	338.9	785.2	227.3	257.4	324.3	157.9	287.9	284.8	930.4	64.2	9,100	1,468
1982																		
1983																		
1984																		
1985																		
1986								763.5	358.6	186.8	144.6	137.9	318.3	264.5	763.5	137.9	4,219	680
1987	82.6	61.2	49.0	43.5	108.6	167.4	737.3	703.2	363.0	175.6	222.8	133.7	237.3	242.5	737.3	43.5	7,543	1,217
1988	92.0	65.0	44.9	43.5	126.0	141.5	153.7	257.1	138.8	377.7	153.9	109.2	142.0	94.4	377.7	43.5	4,510	727
1989	75.7	54.6	47.7	49.0	145.4	255.5	421.9	509.7	529.7	320.7	169.3	93.5	222.7	181.7	529.7	47.7	7,058	1,138
1990	63.7	53.6	54.3	54.4	112.4	171.0	284.9	347.5	768.6	490.3	286.5	215.0	241.8	216.2	768.6	53.6	7,649	1,234
1991	102.4	61.0	60.1	56.8	72.0	132.0	182.4	629.2	493.6	449.3	171.1	132.7	211.9	196.9	629.2	56.8	6,721	1,084
1992	78.9	51.3	61.2	50.1	54.0	152.9	256.6	604.6	411.3	585.1	289.2	100.1	224.6	207.3	604.6	50.1	7,132	1,150
1993	57.7	56.1	57.7	72.3	61.6	77.2	154.4	543.5	284.2	228.6	162.7	231.6	165.6	143.9	543.5	56.1	5,258	848
1994	86.9	53.1	46.6	50.8	64.8	133.2	425.3						120.1	137.8	425.3	46.6	2,222	358
Average	71.0	54.0	46.8	54.6	120.0	267.5	376.0	614.6	473.9	244.0	187.5	119.8	221.7				6,739	1,086.9
St.Dev.	19.2	14.2	12.2	19.2	35.3	199.3	205.0	321.1	228.9	116.9	64.0	42.0		229.0				
Max	108.2	80.8	66.5	103.3	231.1	930.4	877.7	1,501.1	955.9	585.1	324.3	231.6			1,501.1		12,757.1	2,057.6
Min	39.6	30.5	22.1	26.8	54.0	77.2	147.7	242.3	138.8	124.4	88.0	53.0				22.1	2,222.5	358.5

Note ; Monthly Discharges based on regression analysis :

Jan.1960 - Dec.1961	from	B.Nanay in Xe Done River basin
Jan.1964 - Dec.1975		B.Nanay in Xe Done River basin
Jan.1978 - Dec.1981		B.Nanay in Xe Done River basin
Jan. 1987 - May 1988		B.Nanay in Xe Done River basin
Aug. 1986 - Dec. 1986		Savannakhili in Xe Done River basin
June 1988 - May 1989		Attapu in Se Kong River basin
Dec. 1989		Attapu in Se Kong River basin
Oct. & Nov. 1990		Attapu in Se Kong River basin
July 1994		Attapu in Se Kong River basin

Table A - 7 Monthly Discharge [m3/s] of Xe Kaman River at B.Fangden

Drainage Area 4,570 km2

[m3/s]

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Standard Deviation	Max	Min	Annual Runoff Vol [x10^6m3]	Annual Runoff [mm]
1984								397.5	380.9	352.3	385.9	197.9	342.9	82.7	397.5	197.9	4,526	990
1985	108.9	70.8	46.6	49.6	53.5	150.2	137.9	257.2	272.4	236.8	165.3	132.0	140.1	80.7	272.4	46.6	4,429	969
1986	75.6	43.7	22.1	19.2	156.8	73.7	116.8	354.7	340.5	387.3	204.7	295.0	174.2	137.8	387.3	19.2	5,532	1,211
1987	103.8	63.4	38.5	16.8	16.1	50.5	89.0	181.5	234.4	116.5	207.9	99.0	101.4	72.8	234.4	16.1	3,200	700
1988	45.2	29.0	18.3	15.0	47.2	90.5	103.1	210.6	87.6	336.0	94.6	58.4	94.6	92.6	336.0	15.0	3,011	659
1989	31.2	14.1	8.5	9.6	94.5	165.8	269.9	391.3	337.4	153.9	65.2	45.6	132.3	134.1	391.3	8.5	4,197	918
1990	24.9	16.9	15.4	16.5	23.3	84.8	107.4	275.4	536.1	453.1	202.0	77.9	153.0	180.3	536.1	15.4	4,840	1,059
1991	43.5	33.2	28.5	25.1	23.8	99.0	222.8	745.8	557.7	414.4	102.8	98.0	199.5	242.3	745.8	23.8	6,337	1,387
1992	63.2	56.5	61.8	48.8	69.0	138.3	253.5	483.7	377.9	360.8	174.5	69.7	179.8	152.5	483.7	48.8	5,706	1,249
1993	61.2	55.1	50.5	44.9	36.6	72.7	453.3	1,019.7	678.2	117.8	81.0	87.5	229.9	318.7	1019.7	36.6	7,298	1,597
1994	58.5	49.0	41.4	47.8	64.6	100.6	385.5						106.8	124.5	385.5	41.4	1,976	432
Average	61.6	43.2	33.2	29.3	58.5	102.6	213.9	431.8	380.5	292.9	168.4	116.1	161.8				4,641	1,117
St.Dev.	28.1	19.3	17.3	16.4	42.1	37.2	127.3	262.9	172.3	126.3	93.9	76.2		171.6				
Max	108.9	70.8	61.8	49.6	156.8	165.8	453.3	1,019.7	678.2	453.1	385.9	295.0			1,019.7		7,298	1,597
Min	24.9	14.1	8.5	9.6	16.1	50.5	89.0	181.5	87.6	116.5	65.2	45.6				8.5	1,976	432

Note ; Monthly Discharges based on regression analysis :

Aug. 1984 - May 1988	from	Kontum in Dak Bla River basin
June 1988 - Oct. 1991		Attapu in Se Kong River basin
Apr. 1992		Attapu in Se Kong River basin
Apr. 1993		Attapu in Se Kong River basin
June & July 1994		Attapu in Se Kong River basin

Table A - 8 Monthly Discharge [m3/s] of Xe Namnoy at B.Latsasin

Drainage Area 537 km2

[m3/s]

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Standard Deviation	Max	Min	Annual Runoff Vol [x10^6m3]	Annual Runoff [mm]
1984								45.6	43.8	40.6	44.3	16.2	38.1	12.4	45.6	16.2	503	936
1985	7.3	3.9	3.0	4.5	15.0	62.3	51.7	56.2	54.2	33.5	16.7	9.0	26.4	23.5	62.3	3.0	837	1,559
1986	4.9	2.7	1.3	3.3	15.7	19.7	24.1	67.3	61.1	41.4	30.5	11.4	23.6	22.6	67.3	1.3	749	1,394
1987	3.5	2.4	1.7	1.4	12.6	20.4	95.4	90.9	46.1	21.5	16.7	6.3	26.6	33.6	95.4	1.4	846	1,576
1988	4.0	2.6	1.5	1.4	14.9	30.2	22.8	45.9	17.4	28.6	15.0	4.8	15.8	14.1	45.9	1.4	501	932
1989	4.2	1.7	0.4	3.2	20.6	43.4	56.0	79.4	92.4	41.9	14.3	7.4	30.4	32.0	92.4	0.4	964	1,794
1990	3.4	0.0	1.6	1.7	9.5	12.0	27.0	37.9	55.0	76.2	38.9	24.4	24.0	24.2	76.2	0.0	761	1,418
1991	3.8	2.6	1.5	0.6	5.2	30.2	77.7	110.0	89.3	49.4	14.9	6.7	32.7	39.3	110.0	0.6	1,037	1,931
1992	3.9	2.1	1.2	0.6	1.9	16.1	41.9	73.8	55.8	32.6	11.3	5.7	20.6	24.7	73.8	0.6	654	1,217
1993	3.4	1.8	1.6	1.6	4.6	12.1	33.7	80.1	57.6	28.5	13.6	7.8	20.5	25.3	80.1	1.6	652	1,214
1994	3.5	1.0	1.1	1.8	8.7	12.7	44.3						10.4	15.6	44.3	1.0	194	362
Average	4.2	2.1	1.5	2.0	10.9	25.9	47.5	68.7	57.3	39.4	21.6	10.0	24.4				770	1,433
St.Dev.	1.2	1.0	0.6	1.3	5.9	16.3	23.8	22.7	21.6	15.3	11.8	6.1		26.2				
Max	7.3	3.9	3.0	4.5	20.6	62.3	95.4	110.0	92.4	76.2	44.3	24.4			110.0		1,037	1,931
Min	3.4	0.0	0.4	0.6	1.9	12.0	22.8	37.9	17.4	21.5	11.3	4.8				0.0	194	362

Note ; Monthly Discharges based on regression analysis : Aug. 1984 - Dec. 1984 from B.Fangden in Xe Katam River basin
May 1994 - Jul. 1994 B.Fangden in Xe Katam River basin
Jan. 1985 - Jan. 1991 Xe Set P/S in Xe Set River basin

Table A - 9 Monthly Discharge of Xe Done River at B.Nanay

(quoted from Sedone 2 F/S Report , Apr.,1991, by NK)

[m3/s]

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total [x10^6 m3]	Runoff [mm]
1960	11	7	7	7	18	147	200	736	249	86	31	17	4,025	652
1961	13	10	9	13	79	665	673	1,344	911	327	54	33	10,919	1,770
1964	12	8	6	8	39	38	103	283	937	168	40	25	4,372	709
1965	16	12	9	11	29	218	296	338	142	45	23	13	3,053	495
1966	10	8	5	7	188	293	456	338	308	40	25	16	4,479	726
1967	10	8	8	13	38	98	271	488	847	131	28	18	5,157	836
1968	12	8	7	6	13	43	79	416	1,127	52	32	24	4,767	773
1969	16	12	10	9	55	128	1,089	385	708	118	52	34	6,931	1,123
1970	24	18	15	19	34	221	209	445	507	127	41	26	4,442	720
1971	17	13	11	14	26	313	930	214	138	118	41	24	4,925	798
1972	17	15	13	25	17	393	442	980	315	193	69	41	6,675	1,082
1973	29	20	16	14	27	51	346	718	264	108	50	31	4,444	720
1974	22	18	15	27	63	471	72	1,478	298	147	62	37	7,183	1,164
1975	24	17	13	15	44	249	291	1,186	667	140	62	34	7,251	1,175
1978	17	11	11	17	31	740	800	1,957	1,198	267	79	43	13,669	2,215
1979	22	17	14	19	94	617	606	1,311	655	116	56	35	9,416	1,526
1980	25	21	13	11	44	444	364	204	638	104	53	29	5,122	830
1981	21	17	17	21	63	1,162	338	960	183	225	89	43	8,275	1,341
1987	22	16	12	11	18	100	893	846	372	111	61	36	6,633	1,075
1988	24	17	11	11	42	203	125	369	68	187	42	28	2,987	484
1989	20	10	7	14	113	152	445	671	395	102	49	37	5,344	866
Average	18	13	11	14	51	321	430	746	520	139	49	30	6,194	1,004
St. Dev.	6	4	4	6	41	283	297	482	337	71	17	9		
Max	29	21	17	27	188	1,162	1,089	1,957	1,198	327	89	43	13,669	2,215
Min	10	7	5	6	13	38	72	204	68	40	23	13	2,987	484

1.3 Present Situation of the Observation Stations

1. Document: Memorandum, November 23, 1993

2. Photographs: Meteorological/Hydrological Stations

M E M O

Attention ; Mr. Somsack
From ; k. Inoue (Hydrologist of JICA Study Team)
Date ; November 23, 1993
Ref. ; Trip Report of Hydrologist

Mr. Inoue, Hydrologist of JICA Study Team for Se Kong Hydropower Master Plan, visited the sites from 8th to 18th November, 1993. The purpose of the site visit is to check the newly installed equipment and cable ways for discharge measurement, and to collect latest data.

The results are presented hereinafter.

1. Actual Schedule

Nov. 8 (Mon)	VTE - PKS - SKT
Nov. 9 (Tue)	SKT - HKG
Nov.10 (Wed)	HKG - B.Latsasin - HKG
	Check : Cable Way for discharge measurement
	new Evaporation Pan
	existing Recording Rain Gauge
	Data collection
Nov.11 (Thu)	HKG - SKN
Nov.12 (Fri)	SKN - B.Pakayong - SKN
	Check : new Recording Rain Gauge
Nov.13 (Sat)	Se Kong Town (SKN)
	Check : Cable Way for discharge measurement
	new Evaporation Pan
	new Recording Rain Gauge
	Data Collection
Nov.14 (Sun)	SKN - Attapu (ATP)
	Check : new Evaporation Pan
	new Recording Rain Gauge
	Cable Way for discharge measurement
Nov.15 (Mon)	ATP - Xe Kaman No.1 Dam site
Nov.16 (Tue)	Dam site - ATP
Nov.17 (Wed)	ATP - PKS
Nov.18 (Thu)	PKS - VTE

2. Situation of Gauging Station

(1) B.Latsasin

i) Cable Way for Discharge Measurement (see Phot-1,2)

location : 300 m upstream from the existing water level station of the Xe Namnoy River
A steel wire crosses over the Xe Namnoy River at the 200 m downstream from the beginning of the straight stream of some 700 to 800 m long.

function : A gondola hung with the main steel wire can be controlled by a manual type winch from the left bank.
A current meter is supported by the observer through a small reel equipped in the gondola.

safety : The observer should put a life jacket when he rides on the gondola.

measure : 5 m pitch vertical
0.2 and 0.8 ratio depth
4 time measurement per month in dry season
8 time measurement per month in wet season

data collection system : Data are sent to MIH in Pakse every month.

observer : the same observer as that of the existing meteorological station

ii) Newly installed Evaporation Pan (Phot-3,4)

location : next to the Recording Rain Gauge which was installed in Xe Katam Project

workmanship : no problem

measurement : 7:00 AM daily

iii) Recording Rain Gauge

Although time delay was found in the last site reconnaissance, the clock is now well working after correction of paper position.

(2) B. Pakayong

i) Newly installed Rain Gauge (see Phot-5,6)

location : The station is located 10 m east from the village. A barbed wire fence surrounds the recording rain gauge to prevent animals.
Tall trees disturb the rain gauge. As Mr.Seng already ordered villagers, at least three trees should be cut.

data collection system : Data are sent to the Department of Industry and Commerce in Se Kong Town by boat every month.

observer : chief of the village

(3) Se Kong Town

i) Cable Way for Discharge Measurement (see Phot-7,8)

location : some 700 m downstream from the existing water level station of the Se Kong River
A steel wire crosses over the Se Kong River in the center of the straight stream of about 1000 m long.

function : A current meter can be moved horizontally by the main steel cable which is pulled by "Tirfor". Vertical movement of the current meter is controlled by a manual type winch installed at the right bank of the Se Kong River.

safety : Steady steps and platform for approach and observation should be made, because right bank is steep and it would be slippery in wet season.

measure : 5 m pitch vertical
0.2 and 0.8 ratio depth
4 times in dry season
8 times in wet season

data collection system : Data are sent to MIH in Pakse every month.

observer : Two engineers are dispatched from Service of Agriculture and Forest, and Department of

Industry and Commerce of Se Kong Province.

others : Additional 200 m long electric cable for the connection of the current meter was provided by JICA Study Team as the MIH counterpart's request.

ii) Newly installed Evaporation Pan (see Phot-9)

location : in the meteorological station belonging to the Service of Agriculture and Forest in Se Kong Town
The station is surrounded by trees. At least three of them should be cut as directed at the site.

workmanship : The evaporation pan is directly put on a concrete slab. The wooden installation platform which might be attached with the pan should be installed under the pan.

measurement : 7:00 AM daily

observer : An engineer is dispatched from the Service of Agriculture and Forest in Se Kong Town.

iii) Newly installed Recording Rain Gauge (see Phot-9)

location : in the same meteorological station as the evaporation pan

workmanship : The rain gauge is put on a thin wooden plate. To keep the level of the gauge, the plate should be replaced to thicker one.

observer : the same observer as the evaporation pan

(4) Attapu

i) Newly installed Evaporation Pan (see Phot-12)

location : in the meteorological station belonging to the Department of Hydrology and Meteorology in Attapu

workmanship : The evaporation pan is directly put on a concrete slab. The wooden installation platform which might be attached with the pan should be installed under the pan.

measurement : 7:00 AM daily

observer : An engineer is dispatched from the Department of Hydrology and Meteorology in Attapu.

ii) Newly installed Rain Gauge (see Phot-11)

location : in the same meteorological station as the evaporation pan

workmanship : The rain gauge is put on a thin wooden plate. To keep the level of the gauge, the plate should be replaced to thicker one.

observer : the same observer as the evaporation pan

(5) B. Fangden

i) Cable Way for Discharge Measurement (see Phot-13)

location : some 3 km upstream from the existing water level station at B.Fangden

function : A current meter is supported by the main steel cable and can be moved horizontally by the sub steel cable which is pulled by man power. Vertical movement of the current meter is controlled by a manual type winch installed at the left bank of the Xe Kaman River.

measure : 5 m pitch vertical
0.2 and 0.8 ratio depth
4 times in dry season
8 times in wet season

data collection system : Data are sent to MIH in Pakse every month.

observer : An observer is dispatched from the Department of Hydrology and Meteorology in Attapu.

ii) New staff gauge

location : Staff gauge is installed 10 m downstream from the cable way at the left bank.

3. Data Collection

Following data were collected by Mr.Seng during the site reconnaissance,

Se Kong Town	Daily Precipitation	May to October,1993
	Daily Water Level	May to October,1993
	Daily Evaporation	Oct. and Nov.,1993
B.Latsasin	Humidity	Oct. and Nov.,1993
	Temperature	Oct. and Nov.,1993
	Water Level	October,1993

The following discharge measurement record are brought from the site by Mr.Seng.

Location	Date
Xe Namnoy at B.Latsasin	Oct.14,1993
	Oct.22,1993
	Oct.27,1993
Xe Kaman at B.Hatsaykhao (new WL station at B.Fangden)	Oct. 1,1993
Se Kong at Se Kong Town	Nov. 6,1993
	Nov.11,1993
Se Kong at Attapu	Oct.26,1993
	Oct.28,1993

These data were presented to JICA Study Team.

4. Data to be collected

The following latest record are required for the study in the next Pre-F/S stage. Therefore, data should be collected till Mr.Inoue's next visit on January 18,1994, and presented to Mr.Inoue at that time.

(1) B.Latsasin

Daily rainfall	June,'93 to present
Daily water level	May ,'93 to present
Discharge measurement record	November,'93 to present
Daily Evaporation	November,'93 to present
Temperature	February,'93 to present
Humidity	February,'93 to present

(2) B.Namkong

Daily rainfall	June,'92 to January,'93
	May ,'93 to present

(3) B.Nonghin

Daily Water Level	May ,'93 to present
Discharge measurement record	
	March,'93 to present
Temperature	May,'93 to present
Humidity	May,'93 to present

(4) B.Huaykong

Daily Rainfall	May ,'93 to present

(5) B.Thongvay

Daily Rainfall	December,'92 to present

(6) B.Xekatam

Daily Rainfall	October ,'92 to present

(7) Se Kong Town

Daily Rainfall	October ,'93 to present
Daily Water Level	October ,'93 to present
Discharge Measurement	December,'93 to present
Daily Evaporatiion	November,'93 to present

(8) B.Pak Yon

Daily Rainfall	October ,'93 to present

(9) Attapu

Daily Rainfall	May ,'93 to present
Daily Water Level	May ,'93 to present
Discharge Measurement	January,'93 to present
Daily Evaporatiion	October,'93 to present
Temperature	May,'93 to present
Humidity	May,'93 to present

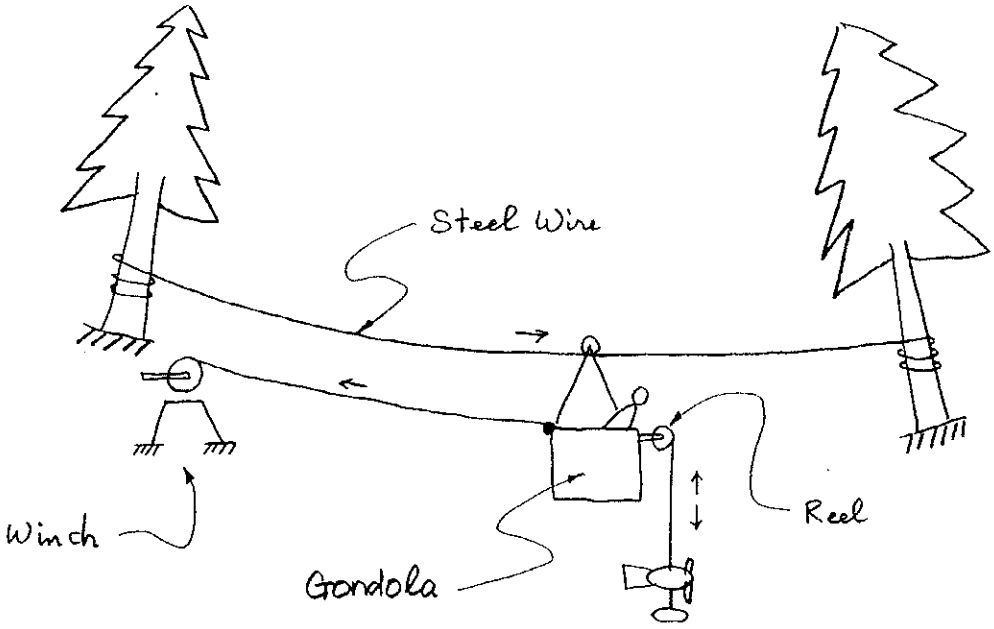
(10) B.Hatsaykhao (new station at B.Fangden)

Daily Water Level	October ,'93 to present
Discharge Measurement	October ,'93 to present

(11) B.Fangden

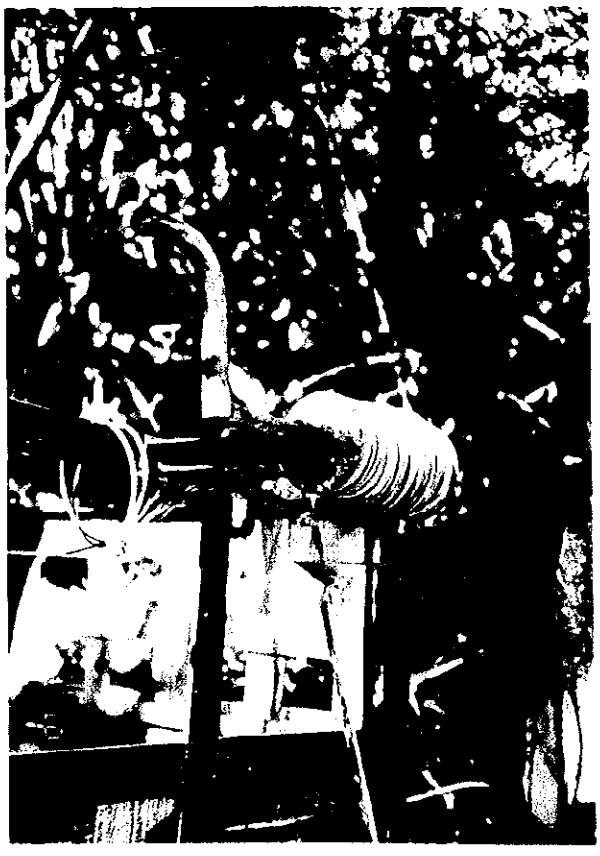
Daily Water Level before May ,'92 and
April ,'93 to present

c.c. Mr.Tezuka ; JICA Study Team leader
Mr.Seng ; MIH counterpart (Hydrologist)



Cable Way for Discharge Measurement at B.Latsasin

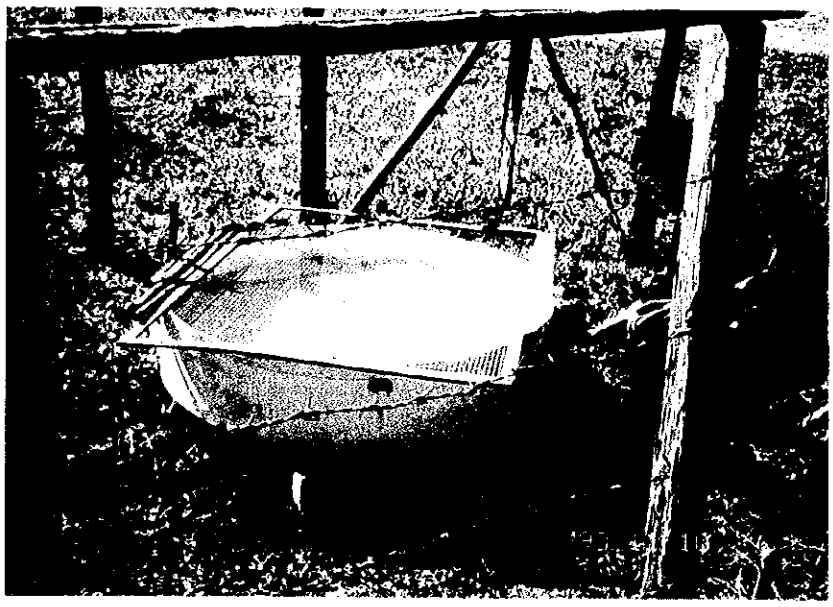
Phot - 1 : Gondla and winch



Phot - 2 : Reel equiped in Gondola

Meteorological Station at B.Latsasin

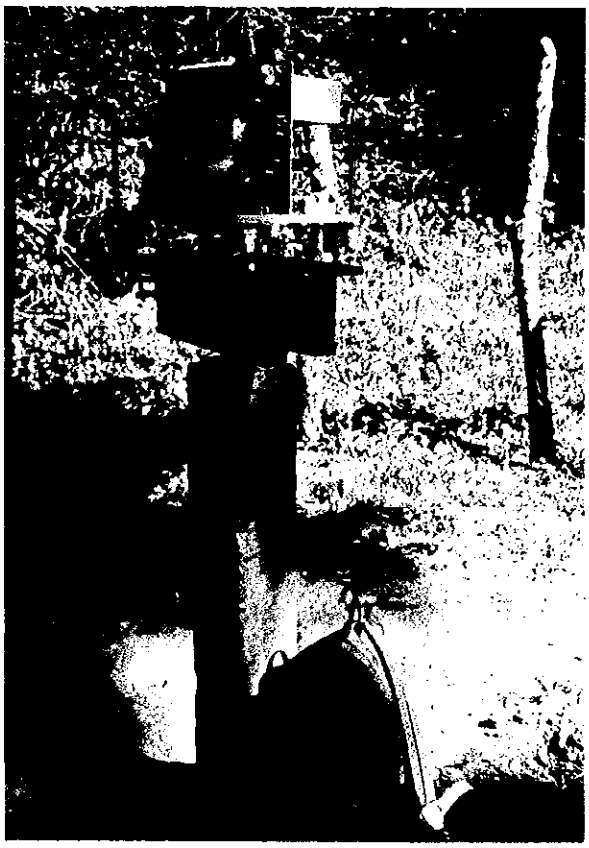
Phot - 3 : Recording Rain Gauge and Evaporation pan



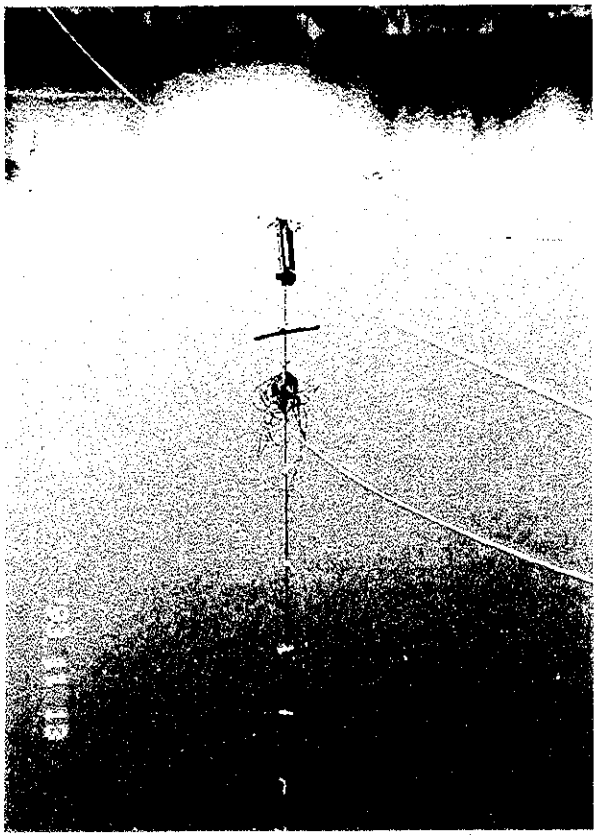
Phot - 4 : New Evaporation pan

New Rain Gauge Station at B.Pak Kayong

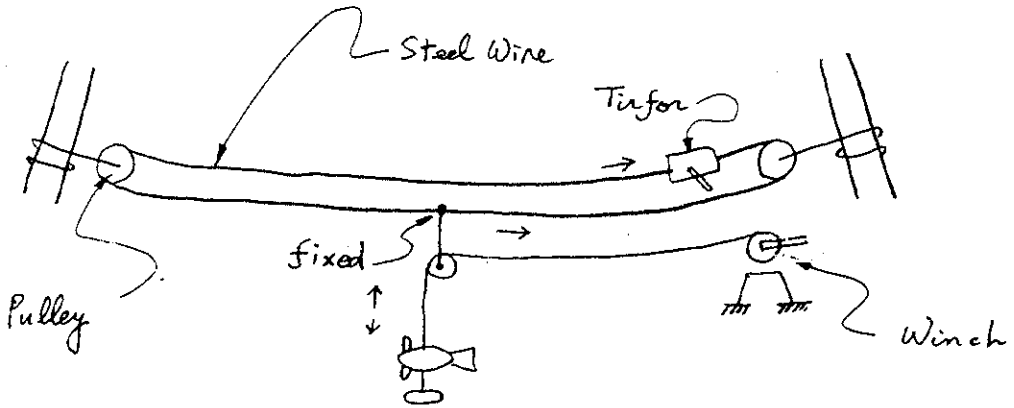
Phot - 5 : New Recording Rain Gauge



Phot - 6 : Rain Gauge without steel cover



Phot - 7 : Current Meter hung from main steel wire



Cble way for Discharge Measurement at Se Kong Town

Phot - 8 : Winch and Tirfor

Meteorological Station in Se Kong Town

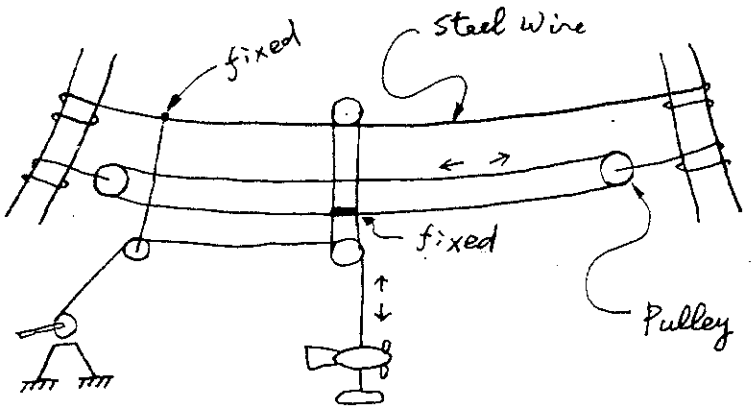
Phot - 9 : New Recording Rain Gauge and Evaporation pan

Phot -10 : Existing Water Level Station
after installation of new gauge

Meteorological Station at Attapu

Phot -11 : New Recording Rain Gauge

Phot -12 : New Evaporation pan



Cble way for Discharge Measurement at B.Fangden

Phot -13 : Steel Wires and Winch

Phot -14 : New Water Level Station