

III-4 Data Arrangement

4-1 Monthly Rainfall Distribution

The rainfall analysis is carried out based on the data of 6 stations in and around the Pasig-Potrero River basin and the Manila station as a reference, considering the location of stations record length and reliability. The six stations in the basin thus selected are Casinala Apalit, San Agustin Arayat, Bacolor Masantol, Sta Cruz Porac, San Fernando and Clark Field.

The monthly rainfall data at 6 stations and at Manila are collected and compared to determine the monthly rainfall distribution. The distribution given in FIGURE I-14 shows the apparent seasonal difference between a rainy season, May to October, and a dry season, Desember to April. The maximum, minimum and average monthly rainfall at stations and at Manila are shown in TABLE I-8.

The maximum and minimum monthly rainfall are recorded in June or August in the order of 400 - 500 mm, and in January in the order of 10 - 20 mm.

However, the maximum monthly rainfall reaches to as much as 2,274.5 mm at Porac Station in 1972.

4.2 Daily Rainfall Correlation

The correlation among 7 stations mentioned above is studied to know the rainfall distribution over the basin especially during a flood. Daily rainfall and total rainfall during big floods in the past are summarized as presented in TABLE I-11.

The floods in question are selected based on the daily rainfall data at the Porac station, located near the center of the Pasig Potrero River basin, in the following condition; (1) more than 50 mm of daily rainfall is recorded at Porac, (2) when an interval of two subsequent rainfalls is more than 12 hours, each rainfall is regarded as an independent rainfall.

As to 33 floods thus selected, correlation coefficient of daily rainfall and regression line are obtained below to know correlation of daily rainfall among stations.

$$r = \frac{\sum_{i=1}^N x_i \cdot y_i - (\sum_{i=1}^N x_i)(\sum_{i=1}^N y_i)/N}{\sqrt{[\sum_{i=1}^N x_i^2 - (\sum_{i=1}^N x_i)^2/N][\sum_{i=1}^N y_i^2 - (\sum_{i=1}^N y_i)^2/N]}} \dots\dots 4.1$$

$$y = Ax + B \dots\dots\dots(4.2)$$

$$A = \frac{z + \sqrt{z^2 + 4[\sum_{i=1}^N x_i y_i - (\sum_{i=1}^N y_i)/N]^2}}{2[\sum_{i=1}^N x_i y_i - (\sum_{i=1}^N x_i)(\sum_{i=1}^N y_i)/N]} \dots\dots\dots(4.3)$$

$$B = \sum_{i=1}^N y_i/N - A \cdot \sum_{i=1}^N x_i/N \dots\dots\dots (4.4)$$

$$Z = \sum_{i=1}^N y_i^2 - (\sum_{i=1}^N y_i)^2/N - [\sum_{i=1}^N x_i^2 - (\sum_{i=1}^N x_i)^2/N] \dots\dots (4.5)$$

x_i : Rainfall at x station

y_i : Rainfall at y station

N : Number of data

The results obtained from the above-mentioned equations are presented FIGURE I-16-1, FIGURE I-16-2, TABLE I-9 and TABLE I-10. And they show good correlation in daily rainfall, ranging 0.69 to 0.94, and better correlation in total rainfall.

4.3 Hourly Rainfall Distribution

To know the rainfall duration and the hourly distribution, rainfall data of more than 50 mm at Porac have been studied. The hourly accumulative rainfall percentage against the total rainfall is expressed as follows.

$$\alpha = \sum_{t=1}^t r_t / \sum_{t=1}^N r_t \times 100 \dots\dots\dots (4.6)$$

where;

r_t : Rainfall at time t

$\sum_{t=1}^t r_t$: Accumulative rainfall from commencement to time t.

$\sum_{t=1}^N r_t$: Total rainfall during a flood

The results of study, given in FIGURE I-17 and TABLE I-12, show the rainfall duration of less than 3 days (72 hours) except for floods in 1972 and 1976, especially the flood in 1972 which inflicted a great deal of damage to the river basin due to subsequent attacks of three typhoons such as Kongsing (June 23 - 26), Gloring (July 10 - 25) and Isang (July 29 - Aug. 1) as shown in the Tropical Cyclone Track Chart of the Reference Material. These three typhoons caused a long-duration rainfall with a low intensity throughout the period as presented in the following TABLE.

Fig. 1-13-3. ANNUAL HOURLY RAINFALL

No.

Grainville Ark. 116

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
67	/	/	/	/	/	/	/	/	60.2	81.1	15.1	7	-
68	/	/	/	/	74.3	20.8	12.1	57.8	149.2	144.1	7	7	-
69	/	/	/	/	82.0	36.7	37.5	11.5	/	/	/	/	-
70	/	/	/	1.0	0.5	172.5	110.0	237.1	/	11.1	11.0	38.5	-
71	/	/	/	/	121.2	26.5	27.0	36.1	116.0	272.0	145.5	126.2	-
72	1.0	4.0	16.2	11.9	192.0	71.2	175.7	114.1	335.4	10.7	14.6	1.5	2585.6
73	2.0	/	/	7.5	16.3	32.3	81.7	238.7	61.2	282.2	123.7	5.0	-
74	7	8.5	33.5	3.3	29.5	21.5	118.8	159.0	70.5	205.5	206.5	34.0	1929.7
75	10.0	0.5	6.5	16.7	11.3	290.3	90.0	202.4	116.2	208.4	57.6	176.6	1591.0
76	/	/	/	5.0	699.5	27.4	/	/	/	/	/	38.0	-
77	/	/	/	/	/	/	/	/	/	/	/	/	-
TOTAL	13.0	14.5	22.2	75.5	112.7	178.8	521.4	389.9	977.2	1572.6	1074.7	671.1	-
MEAN	4.3	4.5	7.1	23.0	37.1	57.8	163.3	122.4	299.2	174.6	52.0	167.2	-

Fig. 1-15-2 ANNUAL MONTHLY RAINFALL

No. 3

SAN AGUSTIN, AYACAP

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1966					69.2	25.3	132.7	222.6	322.9	178.6	34.6	32.0	
67	2.3				7.0	20.5	30.8	30.7					
68	11.5	12.3	1.0	14.0	12.1	10.1	10.1	10.9	23.7	15.9	1.7	1.7	(1248.2)
69													
70		1.1	3.1		3.8	2.2	1.4	3.2	1.9	1.7	1.3	3.8	(1276.3)
71	10.7	1.0	10.0	28.6	20.2	42.7	41.5	22.5	14.0	32.9	14.2	3.0	1806.3
72	63.0	7.4	5.2	31.7	14.7	10.3	10.8	10.0	32.5	35.1	2.7	2.7	2842.9
73	1.3	1.1	1.1	10.1	5.2	11.3	20.2	35.1	17.4	37.5	5.1	1.7	(1207.9)
74	13.1	6.3	2.2	16.5	3.7	2.6							(1270.1)
75													
76													
77													
TOTAL	119.9	22.0	27.8	29.7	142.7	222.0	236.4	224.2	129.4	128.2	58.2	21.0	
MEAN	15.7	9.5	35.3	8.7	18.6	25.2	30.8	28.6	16.6	19.6	7.4	2.7	1847.2

ANNUAL MONITORING REPORT

No. 6

BB13-01

69			50	203	894	182	5281	3500	2105	67.9	287	325
70	T	T	190	189	513	3189	2217	5181	353	1895	1184	211
71	1.9	T	354	29	1609	182	2255	919	1661	3183	1189	1228
72	11.9	45.2	167	21	253	534	2289	1136	1784	266	1112	150
73			25		312	632	2801	2301	1215	3118	1150	21
74	T	2.5	214	1520	250	3019	2029	10246	419	2007	3124	219
75	26.7	11.9	364	360	1727	176	8232	1500	521	201	213	2019
76	T	T	192	64	1282	2120	3713	528	1371.7			

TOTAL	579	51.6	157	1400	1240	2263	4181	4522	8519	1321	2243	5463
MEAN	57	4.5	14.9	156.2	124	226.2	418.2	452.2	851.9	132.1	224.3	546.3

FIG. 1-15-4 ANNUAL MONTHLY RAINFALL

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969		1.5	3.8	6.6	7.7	3.2	3.6	3.2	1.8	3.6	2.9	3.6	2.9	
70	1.5	5.8	3.5	1.0	3.8	3.5	1.5	1.5	3.4	1.2	1.5	3.2	1.2	182.5
71	6.2	2.9	1.8	7.7	7.2	1.8	1.0	1.0	3.6	1.8	3.8	1.8	1.2	182.5
72	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
73	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
74	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
75	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
76	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
77	1.5	3.6	3.9	3.8	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	182.5
TOTAL	35.0	23.9	33.9	38.0	112.6	189.2	337.5	352.5	162.2	228.2	228.9	228.9	228.9	
MEAN	6.0	4.0	3.4	3.0	1.5	3.2	4.0	5.2	2.9	1.8	1.8	1.8	1.8	182.5

Fig. 11-3-5. ANNUAL SEASONAL RAINFALL

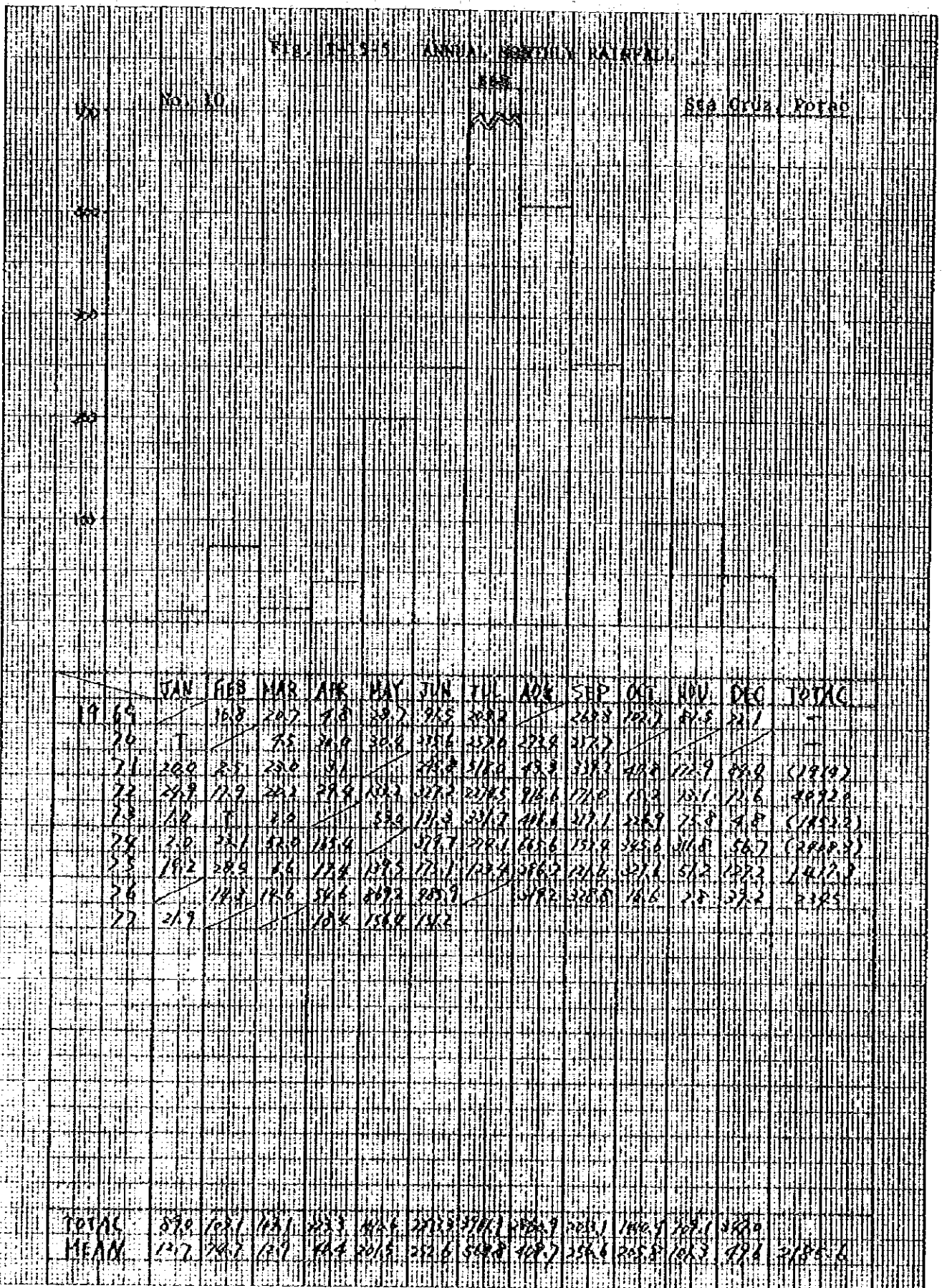


Fig. I-15-6 ANNUAL MONTHLY RAINFALL

No. 1

San Fernando

300
200
100

1970	25	29	109	318	528	276.5	315	276	126	713		
71	25	10	128	269	1637	308	372.7	534	138.5	3510	1270	976
72	27.8	20.8	209	326	1229	1217	1022.9	728.9	288.0	129	118	122
73	1.3	T	3.9	3.9	87.3	101.9	278.8	32.9	102.6	102.3	105.3	12.7
74	1.8	1.0	7.9	23.4	31.3	11.0	53.7	120.3	91.9	292.0	319.6	285.7
75	10.2	6.1	6.1	33.7	120.6	147.8	111.0	306.7	127.5	275.5	15.7	126.3
76	T	T	2.3	2.0	207.2	200.2	907.2	2310.4				
TOTAL	95.2	89.0	111.7	357.8	1977.8	2062.9	2526.1	2305.1	1228.1	1502.1	772.3	2526.5
MEAN	7.5	7.0	12.4	36.8	196.0	209.7	507.9	223	206.5	128.9	76.9	1926.9

Fig. 11-5-7. ANNUAL RAINFALL AT STATION

Year	Month												Total	
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
1954	56	78	65	58	132	127	59.7	222.3	202.4	202.7	202.9	26.2	26.2	1259.3
57	56.2	30.1	52.6	39.8	52.8	72.7	52.7	372.0	132.9	115.1	24.5	2.8	1856.3	
58	160	210	26.9	19.9	28.8	38.7	42.0	20.6	39.5	10.6	8.8	8.6	1263.7	
59	31.1	3.8	34.3	12.5	28.5	71.1	93.7	85.9	17.8	47.3	1.5		1238.7	
60	4.3	2.5	5.4	11.1	10.7	9.0	10.2	10.1	20.5	21.3	11.2	1.3	3361.3	
61	2.2	2.1	3.0								26.2	0.2	(1937.0)	
62	2.7												(1936.0)	
63	1.0	1.0	4.3	4.2	12.0	52.4	40.6	39.5	51.0	31.4	5.3	17.3	2025.9	
64	T	T	5.1	2.5	2.8	27.9	27.7	30.7	21.0	21.9	20.0	10.8	1982.5	
65	11.8	2.0	22.4	22.4	39.0	72.0	52.2	23.4	37.9	10.9	25.6	5.3	2047.6	
66	1.0	1.5	0.0	2.7	0.0	0.0	30.8	27.5	62.5	7.3	31.4	2.0	2336.0	
67	1.0	0.8	2.0	1.5	1.9	0.0	40.7	40.4	20.4	25.6	17.7	T	2030.8	
68	10.5	T	T	0.2	10.9	12.4	30.1	77.8	22.6	5.2	10.3	T	1270.9	
69	2.5	5.8	2.0	2.5	22.0	10.5	20.7	32.7	21.2	18.4	35.4	2.5	1740.3	
70	T	T	4.0	10.3	7.1	30.4	35.6	44.3	25.5	28.0	20.2	36.8	2397.9	
71	14.0	0.1	20.8	14.3	20.4	37.7	31.2	12.7	40.1	30.7	18.0	8.2	2192.2	
72	35.5	5.4	61.0	38.4	60.0	30.2	270.0	62.2	25.3	14.0	17.0	26.9	2121.7	
TOTAL	326	183	419	181	765	437	2729	710.7	678.0	222.1	155.3	37.8		
MEAN	13.2	7.6	35.8	8.8	36.3	20.9	46.9	40.7	31.9	12.2	9.5	3.9	208.3	

1-15-8 ANNUAL MONTHLY RENTALS

No. 23

MLA 76-111

1961-1978

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
61	05	61	51	22	166	580	2789	2287	2280	2117	1268	25	2278.1
62	25	T	680	28	770	1480	6114	3407	3801	2001	918	28	1959.9
63	05	05	T	10	38	908	300	2025	2220	213			
64	121	68	15	118	520	2770	2784	4079	2014	1977	2081	210	1852.8
65	37	20	20	160	1768	269	859	2205	2013	597	1219	208	1573.4
66	21	107	T	10	828	105	2020	1750	1733	615	1201	1055	2030.9
67	402	66	25	18	425	878							
68					76	123	2400	2000	3282	1029	113		
69	05	T	24	02	67	280	3855	2889	3280	120	12	236	1820.2
70	386	18	19		459	2187	3774	271	6110	2286	1450	585	2107.8
71	30	05	885	120	1120	3880	300	1600	200				
72			183	T	2084	3719	1012	1006	2000	555	320	343	
73	16	T	23	26	286	1566	2291		1483		220	277	
74	T	0.8	87	05	1107	3874	1079	730	853	1261	3222	100	2022.1
75													
76													
TOTAL	1219	339	1950	520	2184	3007	3300	2905	2383	1921	1268	513	
MEAN	189	218	112	27	124	243	493	322	290	1969	1289	387	1789.3

TABLE 1 - AVE. MAX. AND MIN. MONTHLY RAINFALL AT SELECTED STATIONS Unit: mm

AVERAGE	No. Station	J	F	M	A	M	J	J	A	S	O	N	D	Total
	1 Ca. Apalit	2.2	1.9	6.9	15.7	34.1	193.8	413.3	425.5	113.4	198.4	134.6	54.0	1698.8
	3 Sa. Arayat	15.7	3.9	45.3	87.4	181.4	257.2	338.2	326.6	215.6	196.4	97.4	42.6	1807.7
	4 Bacolor	5.7	8.5	14.5	51.2	150.2	345.5	546.0	562.8	232.9	232.9	110.6	77.9	2338.7
	9 Masantol	5.0	3.4	29.2	28.9	145.4	221.2	425.0	503.4	234.0	228.9	105.4	63.4	1993.2
	10 Sta. Porac	12.7	74.7	12.9	40.4	201.5	252.6	568.8	408.7	256.6	265.8	101.3	49.6	2185.4
	11 San Fernando	7.5	7.0	17.4	36.8	196.0	299.7	509.9	483.0	216.5	250.5	123.9	70.9	1926.7
	22 Clark Field	13.2	11.3	25.8	45.6	185.3	270.9	466.9	447.7	351.9	139.2	91.5	33.9	2083.2
	Total	62.0	110.7	152	306.0	1193.9	1840.9	3268.1	3157.7	1620.9	1512.1	769.7	392.3	14033.7
	Mean	8.9	15.8	21.7	43.7	170.6	263.0	466.9	451.1	231.6	216.0	110.0	56.0	2004.8
	23 Manila	10.5	2.4	11.2	3.9	142.4	260.3	493.0	383.2	347.0	164.7	138.9	59.7	1929.3

MAXIMUM

1	Ca. Apalit	10.0	8.5	25.5	67.9	699.5	507.4	1920.8	1001.3	235.4	386.2	125.7	190.6	
3	Sa. Arayat	63.0	12.3	104.0	203.6	683.2	412.7	1199.4	718.0	322.9	349.5	120.2	98.0	* Maximum
4	Bacolor	24.1	46.2	35.4	157.0	728.2	836.0	2384.9	1135.2	555.3	393.8	317.4	248.9	
9	Masantol	15.4	23.9	131.5	87.7	654.5	356.9	523.2	1020.0	654.4	412.8	246.9	147.0	
10	Sta. Porac	24.9	28.5	23.0	165.4	869.2	485.9	2274.5	916.6	528.8	411.8	311.8	127.2	
11	San Fernando	29.4	40.4	20.9	120.9	163.7	700.2	1982.9	1041.3	507.6	406.3	319.6	156.3	
22	Clark Field	46.2	68.3	64.0	119.1	107.7	564.4	2267.4	1038.1	651.5	382.7	257.6	175.3	
	Maximum	63.0	68.3	104.0	203.6	869.2	836.0	2384.9	1135.2	654.4	412.8	319.6	248.9	
23	Manila	58.6	10.9	53.8	16.8	436.8	538.2	1814.2	713.6	875.2	391.7	272.2	111.6	

MINIMUM

1	Ca. Apalit	0	0	0	0	0.5	20.6	60.0	86.1	10.5	18.2	0	0	
3	Sa. Arayat	0	0	0	0	39.7	107.1	47.5	47.5	110.9	35.1	13.7	14.7	
4	Bacolor	0	0	0	0	5.5	65.7	62.4	81.9	47.4	86.9	26.7	9.1	
9	Masantol	0	0	0	0	16.0	97.2	68.3	103.4	46.0	0	35.6	3.3	
10	Sta. Porac	0	0	2.0	3.1	53.0	91.5	123.4	43.3	121.6	15.2	2.8	4.6	
11	San Fernando	0	0	2.0	3.8	34.8	107.5	111.0	55.4	95.9	13.9	16.8	10.7	
22	Clark Field	0	0	0.8	2.3	24.4	59.9	92.7	122.7	132.9	18.0	3.3	0	
	Minimum	0	0	0.8	2.3	0.5	20.6	47.5	43.3	46.0	13.9	2.8	3.3	
23	Manila	0	0	0	0.2	3.3	100.5	181.3	164.4	55.5	43.2	16.3	0	

Fig. 1-16-1 DAILY RAINFALL CORRELATION
(PERIOD: 1969-1977)

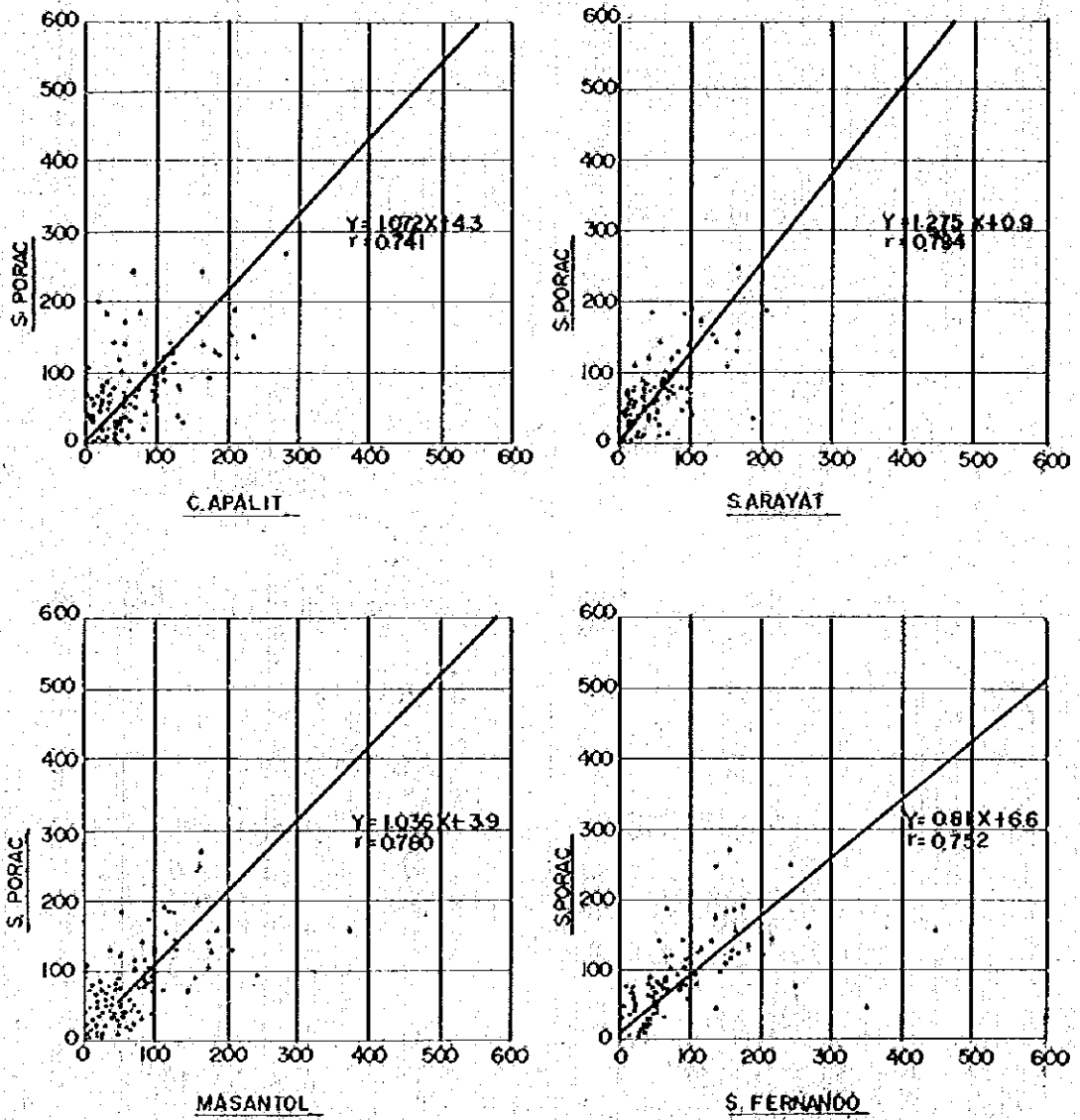


Fig. I-16-2 TOTAL RAINFALL CORRELATION
(PERIOD: 1969-1977)

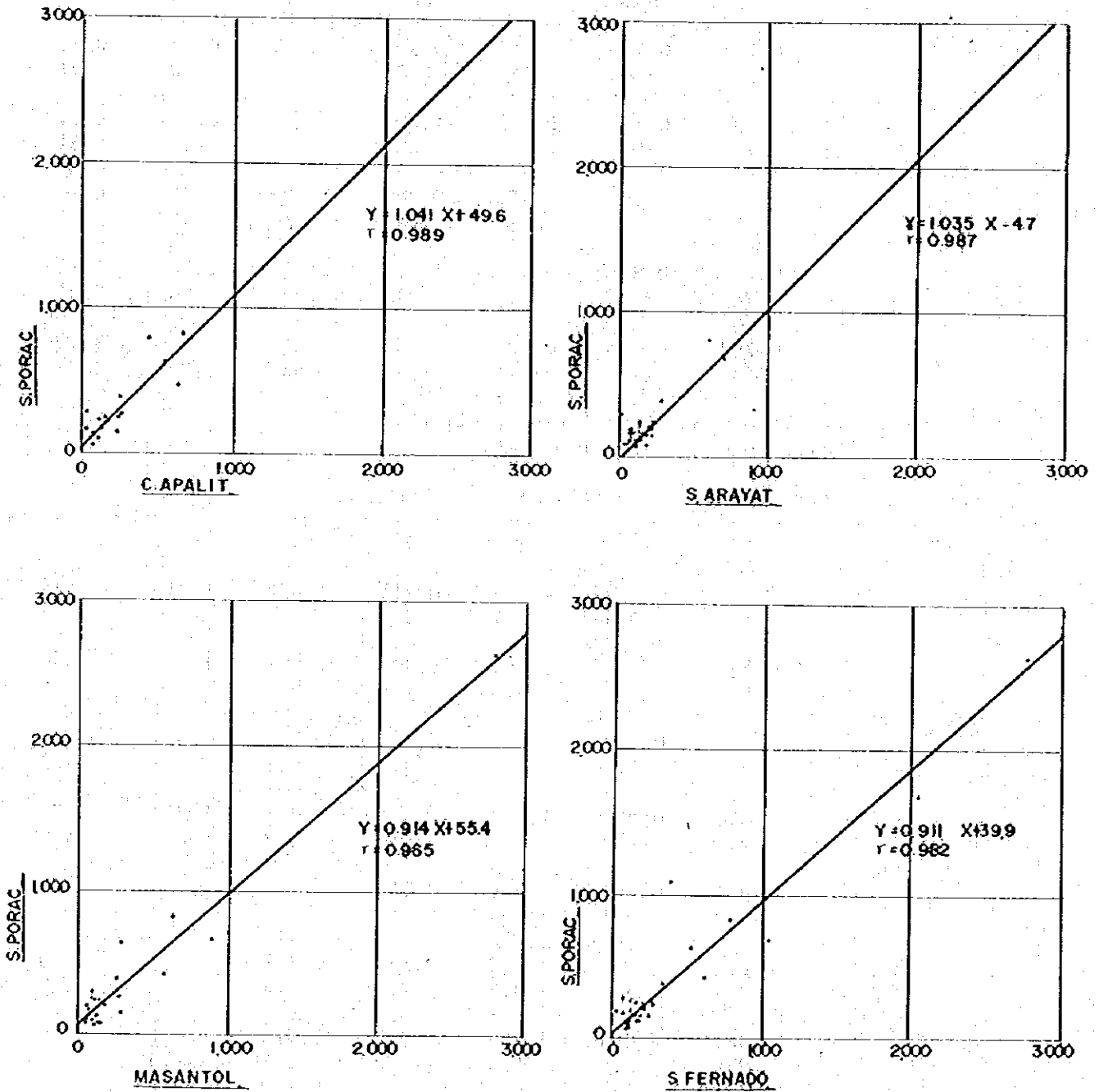


TABLE I-9 CORRELATION COEFFICIENT AND REGRESSION COEFFICIENT
(Daily Rainfall)

1. Correlation Coefficient

	1	3	4	9	10	11	22
1	1.000 291	0.737 267	0.756 291	0.786 292	0.741 291	0.719 274	0.768 145
3	0.737 267	1.000 290	0.750 290	0.755 281	0.794 289	0.824 273	0.688 147
4	0.756 291	0.750 290	1.000 338	0.795 308	0.759 337	0.937 300	0.830 151
9	0.786 292	0.755 281	0.795 308	1.000 308	0.780 307	0.781 291	0.743 151
10	0.741 291	0.794 289	0.759 337	0.780 307	1.000 341	0.752 299	0.846 151
11	0.719 274	0.824 273	0.937 300	0.781 291	0.752 299	1.000 300	0.813 134
22	0.768 145	0.688 147	0.830 151	0.743 151	0.846 151	0.813 134	1.000 151

NOTE: Upper column - Correlation Coefficient
Lower column - Number of Data

2. Regression Coefficient (Y = Ax + B)

X	Y	1	3	4	9	10	11	22
1	A		0.812	1.453	0.914	1.072	1.241	1.034
	B		3.3	-3.7	2.5	4.3	-2.9	4.0
3	A	1.232		1.789	1.203	1.275	1.513	1.506
	B	-4.1		-8.5	-1.4	0.9	-4.9	-3.7
4	A	0.688	0.559		0.704	0.720	0.867	0.792
	B	2.5	4.8		3.0	7.3	0.4	4.3
9	A	1.094	0.831	1.421		1.036	1.212	0.954
	B	-2.7	1.2	-4.3		3.9	-2.8	4.7
10	A	0.933	0.784	1.389	0.965		1.189	0.987
	B	-4.0	-0.7	-10.1	-3.7		-7.8	-0.5
11	A	0.806	0.661	1.153	0.825	0.841		0.993
	B	2.4	3.2	-0.5	2.3	6.6		1.5
22	A	0.967	0.664	1.262	1.049	1.013	1.007	
	B	-3.9	2.5	-5.4	-5.0	0.5	-1.5	

NOTE: 1. C. Apalit 3. S. Arayat 4. Bacolor 9. Masantol
10. S. Porac 11. S. Fernando 22. Clark Field

TABLE I-10 CORRELATION COEFFICIENT AND REGRESSION COEFFICIENT
(Total Rainfall)

1. Correlation Coefficient

	1	3	4	9	10	11	22
1	1.000 26	0.993 24	0.963 26	0.987 26	0.989 25	0.992 24	0.634 12
3	0.993 24	1.000 27	0.959 27	0.990 26	0.987 26	0.988 25	0.784 12
4	0.963 26	0.959 27	1.000 32	0.948 29	0.942 31	0.976 28	0.960 13
9	0.987 26	0.990 26	0.948 29	1.000 29	0.965 28	0.983 27	0.954 13
10	0.989 25	0.987 26	0.942 31	0.965 28	1.000 32	0.982 27	0.838 13
11	0.992 24	0.988 25	0.976 28	0.983 27	0.982 27	1.000 28	0.943 11
22	0.634 12	0.784 12	0.960 13	0.954 13	0.838 13	0.943 11	1.000 13

NOTE: Upper column - Correlation Coefficient
Lower column - Number of Data

2. Regression Coefficient (Y = Ax ± B)

X	Y	1	3	4	9	10	11	22
1	A		1.237	0.984	1.117	1.041	1.137	1.095
	B		-33.3	53.1	-12.3	49.6	2.9	23.9
3	A	0.809		0.779	0.910	0.841	0.919	1.138
	B	27.0		70.8	26.4	76.0	44.9	-3.0
4	A	1.016	1.284		1.136	1.035	1.137	0.829
	B	-54.0	-90.9		-70.7	-4.7	-53.5	21.9
9	A	0.895	1.099	0.881		0.914	1.004	0.818
	B	11.0	-29.0	62.3		55.4	17.7	32.9
10	A	0.960	1.189	0.966	1.094		1.097	1.565
	B	-47.6	-90.4	4.5	-60.5		-43.7	-117.1
11	A	0.880	1.088	0.880	0.996	0.911		1.029
	B	-2.5	-48.9	47.0	-17.6	39.9		-2.1
22	A	0.914	0.879	1.207	1.223	0.639	0.972	
	B	-21.8	2.6	-26.4	-40.3	74.8	2.0	

NOTE: 1. C. Apalit 3. S. Arayat 4. Bacolor 9. Masantol
10. S. Porac 11. S. Fernando 22. Clark Field

TABLE I-11 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	15	16	17	18	19	20	21	22	TOTAL
1969	1	C. APALIT	1.0	0.0	0.0	2.0	0.0	34.1	19.0	6.6	62.7
	3	S. ARAYAT	21.8	9.7	15.5	0.5	27.2	93.9	13.5	2.4	184.5
	4	BACOLOR	38.1	30.5	0.0	0.0	14.2	14.0	0.0	44.4	141.2
JULY 20	9	MASANTOL	800	14.5	7.1	0.0	T	31.8	4.6	0.0	138.0
	10	S. PORAC	0.0	4.8	7.5	1.3	0.0	56.8	0.8	0.0	71.2
	11	S. FERNANDO		NO		REC	ORD				
	22	CLARK FIELD	28.4	4.3	21.3	3.8	60.5	56.4	3.3	7.6	185.6

FLOOD	STATION	DATE	3	4	5	6	7	8	9	10	11	TOTAL
1969	1	C. APALIT	0.5	0.0	3.5	4.5	4.9	5.0	17.6	0	1.8	37.8
	3	S. ARAYAT	10.7	-	4.9	19.5	6.0	-	27.9	-	-	69.0
	4	BACOLOR	32.0	6.4	0.0	5.1	10.2	18.5	25.4	16.0	T	113.6
SEP. 6	9	MASANTOL	37.1	T	4.1	5.8	18.2	10.7	18.3	13.7	T	107.9
	10	S. PORAC	0.0	0.0	3.1	10.4	7.6	28.5	18.5	6.5	0.0	172.6
	11	S. FERNANDO		NO		REC	ORD					
	22	CLARK FIELD	T	T	2.3	30.2	26.2	10.4	19.8	4.3	1.0	94.2

FLOOD	STATION	DATE	10	11	12	13	14	15	16	17	TOTAL
1970	1	C. APALIT	-	12.5	42.0	9.0	23.5	0.5	10.5	-	98
	3	S. ARAYAT	0.0	1.3	-	-	42.7	12.5	0.0	0.0	56.5
	4	BACOLOR	0.0	0.0	10.6	8.4	64.5	4.3	0.0	0.0	87.8
JULY 14	9	MASANTOL	0.0	T	11.2	10.2	52.3	13.2	0.0	0.0	86.9
	10	S. PORAC	0.0	0.0	4.5	8.4	74.1	8.5	0.0	0.0	95.5
	11	S. FERNANDO	0.0	0.0	9.7	9.6	59.2	14.2	0.0	0.0	92.7
	22	CLARK FIELD	8.9	3.3	3.0	10.7	53.6	9.9	T	0.0	89.4

TABLE I-1-3 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	24	25	26	27	TOTAL
1971 JULY 25	1	C. APALIT	-	38.5	9.5	-	48
	3	S. ARAYAT	0.0	57.4	20.3	0.0	77.7
	4	BACOLOR	0.0	72.6	26.2	0.0	98.8
	9	MASANTOL	0.0	83.3	T	0.0	83.3
	10	S. PORAC	0.0	141.7	32.9	0.0	174.6
	11	S. FERNANDO	0.0	58.1	34.3	0.0	92.4
	22	CLARK FIELD	0.3	10.4	54.4	0.0	65.1

FLOOD	STATION	DATE	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
1971 SEP 24	1	C. APALIT	1.5	-	1.5	-	0.5	-	55.5	-	7.0	-	-	4.0	0.5	70.5
	3	S. ARAYAT	5.1	0.0	0.0	15.3	13.3	0.0	45.4	3.6	14.5	0.0	10.3	0.0	0.0	107.5
	4	BACOLOR	0.0	0.0	0.0	22.1	7.6	0.0	17.3	0.0	5.1	0.0	11.4	50.8	7.6	121.9
	9	MASANTOL	0.0	0.0	0.0	0.0	0.0	0.0	39.9	T	0.0	0.0	T	32.0	0.0	71.9
	10	S. PORAC	0.0	7.4	2.0	31.3	18.1	16.8	63.4	11.8	4.0	9.4	1.5	30.6	0.0	196.3
	11	S. FERNANDO	0.0	0.0	0.0	16.5	7.9	0.0	42.2	0.0	13.7	0.0	4.8	2.3	14.7	102.1
	22	CLARK FIELD	T	10.2	7.1	45.7	21.1	11.9	11.2	13.7	7.6	0.3	15.0	14.7	0.8	159.3

FLOOD	STATION	DATE	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL
1971 OCT 5	1	C. APALIT	-	11.5	31.5	24.5	57.0	0.5	-	42.0	32.0	11.5	40.5	-	-	251.0
	3	S. ARAYAT	0.0	1.3	31.4	36.9	41.2	2.8	0.0	58.0	32.4	24.0	50.2	0.0	0.0	278.2
	4	BACOLOR	0.0	8.4	47.0	67.0	30.0	1.3	0.0	25.4	41.9	25.4	47.0	0.0	1.3	294.7
	9	MASANTOL	0.0	13.7	36.6	20.3	53.9	0.0	0.0	28.7	51.1	25.9	35.4	0.0	0.0	265.6
	10	S. PORAC	0.0	4.0	50.5	82.5	38.0	2.5	0.0	23.5	49.8	39.4	78.0	13.5	0.0	381.7
	11	S. FERNANDO	0.0	5.6	47.5	52.6	47.5	5.3	0.0	35.8	52.6	17.7	59.7	0.0	0.0	324.3
	22	CLARK FIELD	T	0.5	30.0	56.1	56.4	12.7	T	3.8	52.8	20.6	13.3	7.9	T	354.1

TABLE I-14 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	22	23	24	25	26	27	28	29	30	1	2	TOTAL
1971	1	C. APALIT	-	3.5	56.0	22.0	0.5	25.0	7.5	3.5	-	-	0.5	118.5
	3	S. ARAYAT	0.0	3.6	34.7	26.6	5.1	19.4	7.0	1.6	0.0	0.0	0.0	98.0
	4	BACOLOR	0.0	0.0	48.8	9.9	0.0	7.6	19.6	10.2	0.8	0.0	0.0	96.9
	9	MASANTOL	0.0	0.0	50.8	T	0.0	32.3	47.2	0.0	0.0	0.0	0.0	130.3
NOV. 24	10	S. PORAC	0.0	1.5	54.4	27.5	1.0	18.5	8.5	9.5	2.5	0.0	0.0	123.4
	11	S. FERNANDO	0.0	2.5	52.4	16.5	0.0	21.6	8.1	0.0	3.3	0.0	0.0	104.4
	22	CLARKFIELD	T	0.0	35.8	43.4	0.0	2.5	17.0	13.5	2.5	0.0	T	114.7

FLOOD	STATION	DATE	20	21	22	23	24	25	26	27	28	TOTAL
1972	1	C. APALIT	0.0	5.5	1.0	0.0	8.1	54.5	1.5	2.5	0.0	73.1
	3	S. ARAYAT	0.0	0.0	9.7	4.8	9.3	29.1	4.2	0.0	0.0	57.1
	4	BACOLOR	0.0	0.0	35.6	2.5	0.0	78.2	8.1	0.0	5.6	130.0
	9	MASANTOL	0.0	0.0	17.4	0.0	20.3	93.0	0.0	0.0	0.0	130.7
JUNE 24	10	S. PORAC	0.0	4.3	47.0	9.1	67.0	38.2	9.0	0.5	0.0	175.1
	11	S. FERNANDO	0.0	0.0	66	0.0	168	18.6	6.4	0.0	0.0	484
	22	CLARKFIELD	0.0	31.2	42.7	4.8	17.8	54.1	7.4	1.0	0.0	15.9

FLOOD	STATION	DATE	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	TOTAL
1972	1	C. APALIT	21.5	7.5	0.0	1.5	84.4	74.0	17.5	32.8	28.5	47.4	26.5	17.2	9.0	2.0	206.5	282.0	160.8	163.0	-	-	-
	3	S. ARAYAT	31.2	7.3	0.0	0.0	99.9	201.8	31.8	53.4	43.3	19.2	13.0	12.7	19.6	1.8	4.2	98.5	93.2	93.2	93.2	93.2	7.2
	4	BACOLOR	4.8	2.5	8.4	1.52	49.0	186.0	64.1	48.0	64.0	23.4	15.7	13.5	4.82	3.0	T	230.7	259.1	201.6	164.3	173.5	17.5
	9	MASANTOL	0.0	0.0	T	T	74.4	120.9	31.5	24.9	52.9	45.5	13.5	T	17.8	0.0	0.0	133.3	163.6	123.7	161.3	64.0	64.0
JULY 18 (1)	10	S. PORAC	0.0	1.0	1.0	11.4	41.3	18.50	66.4	69.4	183.0	29.5	3.5	18.1	55.4	0.5	4.30	186.5	269.4	183.8	244.0	41.5	41.5
	11	S. FERNANDO	7.1	13.0	3.8	3.6	55.9	16.23	52.8	74.4	66.1	26.2	23.1	26.2	22.1	26.4	0.0	173.7	153.4	155.2	134.4	20.1	20.1
	22	CLARKFIELD	8.6	1.8	T	0.5	15.0	125.5	96.0	33.0	128.0	35.8	5.8	4.8	26.7	8.1	8.1	89.2	253.5	291.6	189.0	89.7	89.7

TABLE I-17 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	MAY 31	1	2	3	4	5	6	TOTAL
1974 JUNE 3	1	C. APALIT		3.0	2.0	13.0	29.9	15.5	0.5	63.9
	3	S. ARAYAT		10.4	200	-	27.6	7.9	-	66
	4	BACOLOR		2.5	15.2	22.9	11.8	76.2	0.0	228.6
	9	MASANTOL		T	T	30.7	34.1	14.1	0.0	78.9
	10	S. PORAC	0.0	7.0	9.7	50.0	37.2	9.0	0.0	112.9
	11	S. FERNANDO	22.4	7.4	24.4	55.7	35.8	0.0		145.7
	22	CLARK FIELD	NO	REC	ORD					

FLOOD	STATION	DATE	7	8	9	10	11	12	13	14	TOTAL
1974 JUNE 10	1	C. APALIT	4.5	8.7	60.3	55.1	20.0	7.0	-	-	155.6
	3	S. ARAYAT	-	-	2.4	12.3	50.0	14.6	0.0	23.4	202.7
	4	BACOLOR	0.0	1.8	17.5	159.3	27.2	8.4	0.0	0.0	214.2
	9	MASANTOL	0.0	0.0	5.6	92.4	20.1	T	0.0	0.0	118.1
	10	S. PORAC	0.0	0.8	10.1	173.0	46.0	15.5	0.0	0.0	244.6
	11	S. FERNANDO	0.0	7.6	14.2	135.9	23.4	7.1	0.0	0.0	188.2
	22	CLARK FIELD	NO	REC	ORD						

FLOOD	STATION	DATE	18	19	20	21	TOTAL
1974 JULY 20	1	C. APALIT	-	22.0	54.5	-	76
	3	S. ARAYAT	-	25.0	96.2	-	121.2
	4	BACOLOR	0.0	16.3	80.0	0.0	96.3
	9	MASANTOL	0.0	18.0	82.0	0.0	100.0
	10	S. PORAC	0.0	11.3	140.0	0.0	151.3
	11	S. FERNANDO	0.0	18.4	89.4	0.0	107.8
	22	CLARK FIELD	NO	REC	ORD		

TABLE I-118 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1974 AUG 16 (1)	1	C. APALIT	0.5	1.5	8.5	0.5	42.0	7.0	0.5	4.5	63.0	122.5	205.6	109.4	3.0	24.0	21.0	9.0		2.5		2.5
	3	S. ARAYAT	1.3	22.0	11.2	7.2	15.0	1.5		6.4	49.3	166.6	163.6	51.3	15.5	22.5	14.3	11.7		14.6		
	4	BACOLOR	2.0	11.4	18.2	5.0	52.8	4.0	1.0	14.8	86.6	149.1	505.5	187.9	17.3	22.1	15.7	19.8	2.8	5.1	21.6	4.8
	9	MASANTOL	0.0	T	1.99	16.3	81.0	20.6	16.8	13.5	62.5	127.5	184.4	173.9	10.9	23.4	48.5	11.2	0.0	13.7	5.8	0.0
	10	S. PORAC	0.0	10.5	6.9	4.7	32.0	1.0	6.0	9.5	56.5	127.5	154.6	107.0	32.2	7.5	17.5	13.5	1.0	9.6	8.6	0.1
	11	S. FERNANDO	0.0	3.0	17.8	3.8	33.8	3.8	0.0	11.9	94.7	160.5	442.2	147.8	4.3	18.0	11.1	13.2	0.0	9.6	7.4	0.0
	22	CLARK FIELD		NO		REC	ORD															

FLOOD	STATION	DATE	26	27	28	29	30	31	TOTAL
1974 AUG 16 (2)	1	C. APALIT	7.0	1.0	0.5	—	16.5	—	632.3
	3	S. ARAYAT	1.5	4.4	7.7	13.7	7.0	—	708.3
	4	BACOLOR	0.0	0.0	2.0	29.5	13.7	0.0	1192.7
	9	MASANTOL	0.0	0.0	0.0	58.7	T	0.0	889.6
	10	S. PORAC	1.0	6.5	16.5	41.0	0.5	0.0	671.7
	11	S. FERNANDO	0.0	0.0	0.0	24.2	13.2	0.0	1020.3
	22	CLARK FIELD		NO		REC	ORD		

FLOOD	STATION	DATE	23	24	25	26	27	TOTAL
1974 SEP. 24	1	C. APALIT	—	—	—	—	—	
	3	S. ARAYAT	—	8.5	13.0	12.7	—	342
	4	BACOLOR	5.3	0.0	0.0	0.0	0.0	53
	9	MASANTOL	0.0	0.0	0.0	0.0	0.0	0.0
	10	S. PORAC	0.0	73.5	1.0	15.1	0.0	89.6
	11	S. FERNANDO	0.0	10.9	0.0	0.0	0.0	109
	22	CLARK FIELD		NO		REC	ORD	

TABLE I-19 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	13	14	15	16	17	18	TOTAL
1974	1	C. APALIT	—	—	19.0	75.0	83.5	0.5	178.0
	3	S. ARAYAT	5.8	0.8	5.5	94.7	84.8	2.8	194.4
	4	BACOLOR	0.0	0.0	1.3	11.8	84.9	0.0	198.0
	9	MASANTOL	5.8	0.0	8.1	85.6	85.8	0.0	185.3
OCT. 17	10	S. PORAC	0.0	18.5	3.0	77.0	113.5	0.0	212.0
	11	S. FERNANDO	0.0	0.0	0.0	90.5	94.5	0.0	185.0
	22	CLARK FIELD		NO		REC	ORD		

FLOOD	STATION	DATE	27	28	29	30	TOTAL
1974	1	C. APALIT	—	235.5	—	0.5	236.0
	3	S. ARAYAT	1.5	128.5	—	—	130.0
	4	BACOLOR	1.0	142.2	0.0	0.0	143.2
	9	MASANTOL	T	115.1	0.0	0.0	115.1
NOV. 28	10	S. PORAC	0	153.5	4.8	0.0	158.3
	11	S. FERNANDO	0.0	164.3	0.0	0.0	164.3
	22	CLARK FIELD	NO		REC	ORD	

FLOOD	STATION	DATE	4	5	6	7	8	9	10	11	12	13	TOTAL
1975	1	C. APALIT	—	4.0	48.5	22.1	30.5	107.5	12.1	6.6	8.1	2.5	241.9
	3	S. ARAYAT	0.3	1.0	18.4	5.6	21.8	97.1	29.4	2.3	—	3.1	179.0
	4	BACOLOR	T	4.5	47.5	17.5	30.9	117.3	24.4	16.0	3.0	T	261.1
	9	MASANTOL	0.0	5.6	65.0	14.2	19.8	154.7	10.4	0.0	0.0	20.6	290.3
AUG. 9	10	S. PORAC	0.0	12.5	19.1	8.5	10.5	91.0	10.0	5.0	1.0	0.0	157.6
	11	S. FERNANDO	0.0	0.0	36.8	1.99	17.3	105.9	33.0	0.0	12.9	4.8	230.6
	22	CLARK FIELD		NO		REC	ORD						

TABLE I-11 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11		
1976 JUNE 25 (1)	1	C. APALIT	10.7	45.5	129.0	18.0	22.0	—	—	185.0	3.1	1.5	1.5	9.5	8.8	—	—	5.9	41.1	62.5	—	—		
	3	S. ARAYAT		NO		CHA	RT																	
	4	BACOLOR	0.0	24.9	21.0	126.7	15.5	6.6	43.2	216.4	352.0	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	
	9	MASANTOL	0.0	T	42.4	157.7	15.8	T	T	33.8	29.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	
	10	S. PORAC	0.0	3.1	37.9	200.6	23.5	0.5	7.3	127.0	41.0	1.5	2.5	1.5	18.8	1.0	17.0	17.0	8.0	32.6	80.7	9.5	0.0	
	11	S. FERNANDO	0.0	0.0	19.0	0.0	0.0	0.0	0.0	0.0	114.9	342.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	31.0
	22	CLARK FIELD		NO		REC	ORD																	

FLOOD	STATION	DATE	12	TOTAL
1976 JUNE 25 (2)	1	C. APALIT	—	544.1
	3	S. ARAYAT		
	4	BACOLOR	0.0	8386
	9	MASANTOL	0.0	291.8
	10	S. PORAC	0.0	631.0
	11	S. FERNANDO	0.0	518.1
22	CLARK FIELD			

FLOOD	STATION	DATE	16	17	18	19	20	21	22	23	24	TOTAL
1976 AUG 22	1	C. APALIT		NO		RAI	NFA	LL	REC	ORD		
	3	S. ARAYAT	1.8	10.6	19.6	4.8	—	12.8	84.2	—	3.4	137.2
	4	BACOLOR	34.0	8.9	0.0	3.0	0.0	3.0	84.1	0.0	0.0	133.0
	9	MASANTOL		NO		REC	ORD					
	10	S. PORAC	0.0	4.5	1.5	5.0	28.0	3.5	76.0	0.5	0.0	119.0
	11	S. FERNANDO	17.0	—	—	7.6	43.9	10.4	85.3	0.0	0.0	164.2
	22	CLARK FIELD		NO		REC	ORD					

TABLE I-12 DAILY RAINFALL IN MAIN FLOODS

FLOOD	STATION	DATE	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1976	1 C. APALIT			NO		CHA RT												
	3 S. ARAYAT			NO		CHA RT												
SEP. 13	4 BACOLOR	11.2	0.0	4.8	82.5	33.7	71.6	300	20.9	3.8	1.8	10.0	5.1	0.0	0.0	0.0	0.0	273.4
	9 MASANTOL		NO		REC ORD													
	10 S. PORAC	0.0	40.5	8.1	116.5	51.4	46.5	24.0	42.3	9.5	4.6	14.0	3.6	0.5	3.6	0.0		365.1
	11 S. FERNANDO		NO		REC ORD													
	22 CLARK FIELD		NO		REC ORD													

FLOOD	STATION	DATE	27	28	29	30	1	2	TOTAL
1976	1 C. APALIT			NO		CHA RT			
	3 S. ARAYAT			NO		CHA RT			
SEP. 29	4 BACOLOR	0.0	1.3	82.3	4.6	-			89.2
	9 MASANTOL		NO		REC ORD				
	10 S. PORAC	0.0	17.5	88.0	26.0	3.0	0.0		134.5
	11 S. FERNANDO		NO		REC ORD				
	22 CLARK FIELD		NO		REC ORD				

FLOOD	STATION	DATE	12	13	14	TOTAL
1977	1 C. APALIT		NO		CHA RT	
	3 S. ARAYAT		NO		CHA RT	
JUNE. 13	4 BACOLOR	NO			REC ORD	
	9 MASANTOL	NO			REC ORD	
	10 S. PORAC	0.0	670	0.0		670
	11 S. FERNANDO	NO			CHA RT	
	22 CLARK FIELD	NO			REC ORD	

Fig. 1-17 Hourly Rainfall Distribution

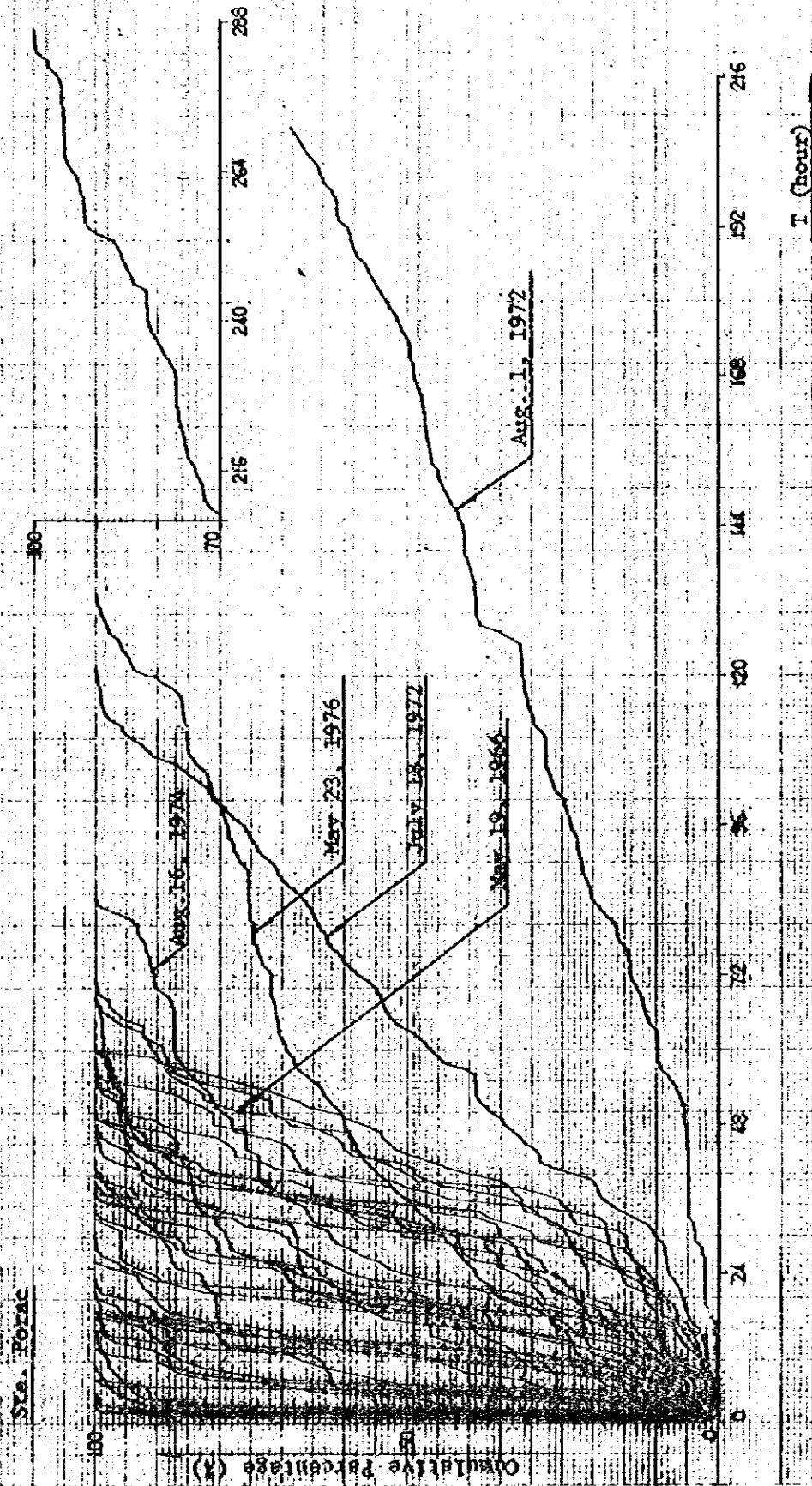


TABLE H2-1 HOURLY RAINFALL DISTRIBUTION

FLOOD	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16	r17	r18	r19	r20	r21	Z
1969	7.9	34.0	2.0	7.4		0.5	4.5															
	7.9	41.9	43.9	51.3	51.3	51.8	56.3															56.3
JULY 20	14.0	74.4	18.0	91.1	91.1	92.0	100.0															100
1969	9.8	52.9	27.4	9.3	2.0	1.5	0.5	1.5	1.0	1.0	0.5	0.5	0.5	0.5	0.5							
	9.8	62.7	90.1	99.4	101.4	102.9	103.4	104.9	105.9	105.9	101.9	107.4	107.9	107.9	108.4							108.4
SEP. 6	9.0	57.8	83.1	91.7	93.5	94.9	95.4	94.8	97.7	97.7	98.6	99.1	99.5	99.5	100.0							100
1970	1.9		0.4	0.4	1.9	0.9	0.4	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.3	30.6	7.9	2.4		
	1.9	1.9	2.3	2.7	4.6	5.5	5.9	6.8	6.8	7.2	7.2	7.6	7.6	7.6	7.6	8.0	19.3	49.9	57.8	60.2		
JULY 14	2.2	2.2	2.6	3.1	5.2	6.2	6.7	7.7	7.7	8.2	8.2	8.6	9.6	8.6	8.6	9.1	21.9	56.6	65.5	68.3		
			0.9	1.9	8.9	2.9	0.9	0.9	0.9	2.9	0.9	0.4	1.4	0.4	0.4	0.4	5.0	1.0	0.5			
	60.2	60.2	61.1	63.0	71.9	74.8	75.7	75.7	76.6	79.5	79.5	79.9	81.3	81.3	81.7	81.7	86.7	87.7	88.2			88.2
	68.3	68.3	69.3	71.4	81.5	84.8	85.8	85.8	86.8	90.1	90.1	90.6	92.2	92.2	92.6	92.6	98.3	99.4	100.0			100
1970	0.5	5.3	6.7	0.7	3.0	1.8	0.7	0.7	1.5	3.7	3.4	3.7	0.7	4.1	1.5	12.7	3.4					
	0.5	5.8	12.5	13.2	16.2	18.0	18.7	19.4	20.9	24.6	28.0	31.7	32.4	36.5	38.0	50.7	54.1	54.1	64.9	65.7	76.5	
AUG. 31	0.2	2.0	4.4	4.6	5.6	6.3	6.5	6.8	7.3	8.6	9.8	11.0	11.3	12.7	13.2	17.7	18.9	18.9	22.6	22.9	26.7	
	1.5	13.1	2.6		7.9			6.0		0.5	33.0	6.5	15.3	9.3	9.3	13.0	15.9	8.4	18.6	5.1	1.4	
	78.0	91.1	93.7	93.7	101.6	101.6	101.6	107.6	107.6	108.1	141.1	147.6	162.9	172.2	181.5	194.5	210.4	218.8	237.4	242.5	243.9	
	27.2	31.7	32.6	32.6	35.4	35.4	35.4	37.5	37.5	37.5	49.2	51.4	58.8	60.0	63.2	67.8	73.3	75.2	82.7	84.5	89.0	
	2.3	2.3	1.8	11.2	9.3	1.9	8.4	5.4	0.5													
	24.62	24.85	250.3	261.5	270.8	272.7	281.1	286.5	287.0													287.0
	85.8	86.6	87.2	91.1	94.4	95.0	97.9	99.8	100.0													100
1970	0.9	7.5	8.0	14.2	2.4	6.6	4.2	3.3	3.3	2.4	1.9	11.3	2.4	1.9		2.4	2.4	1.4	0.5	2.4	0.5	
	0.9	8.4	16.4	30.6	33.0	39.6	43.8	47.1	50.4	52.8	54.7	66.0	68.4	70.3	70.3	72.7	75.1	76.5	77.0	79.4	79.9	
SEP. 3	1.1	10.5	20.5	38.3	41.3	49.6	54.8	58.9	63.1	66.1	68.5	82.6	85.6	88.0	88.0	91.0	94.0	95.7	96.4	99.4	100.0	100
1971	7.1	1.0	5.0	2.5	6.1	7.1	2.0	12.1	6.1	1.5	2.0	1.0	4.0	3.5	2.0	0.5	7.1	10.1	9.1	4.0	9.1	
	7.1	8.1	13.1	15.6	21.7	28.8	30.8	42.9	49.0	50.5	52.5	53.5	57.5	61.0	63.0	63.5	70.6	80.7	89.8	93.8	102.9	
JUNE 16	4.4	5.1	8.2	9.7	13.5	18.0	19.2	26.8	30.6	31.5	32.8	33.4	35.9	36.1	39.3	39.6	44.0	50.3	56.0	58.5	64.2	
	26.2	16.2	3.0	5.0	1.0	4.0	1.0	0.5	0.5													
	129.1	145.3	148.3	153.3	154.3	158.3	159.3	159.8	160.3													160.3
	80.5	90.6	92.5	95.6	96.3	98.8	99.4	99.7	100.0													100
1971	0.5	1.0	1.5	3.0	5.9		1.0		0.5	0.5	5.9	1.0	1.0	2.0	2.0	1.0	0.5	1.5	0.5	5.5		
	0.5	1.5	3.0	6.0	11.9	11.9	12.9	12.9	13.4	13.9	19.8	20.8	21.8	23.8	24.8	25.3	26.8	27.3	32.8	32.8		
JULY 20	0.3	1.0	1.9	3.8	7.6	7.6	8.2	8.2	8.2	8.6	8.9	12.6	13.3	13.9	15.2	15.8	16.2	17.1	17.4	20.9	20.9	

① r (mm) HOURLY RAINFALL ③ $\sum r / \sum r (\%)$ CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL
 ② $\sum r$ (mm) CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE 1-2: HOURLY RAINFALL DISTRIBUTION

FLOOD	r 1	r 2	r 3	r 4	r 5	r 6	r 7	r 8	r 9	r 10	r 11	r 12	r 13	r 14	r 15	r 16	r 17	r 18	r 19	r 20	r 21	Σ		
1971				0.5	1.0	1.0	0.5		26.9	20.4	6.1	2.5	1.0	3.0	4.1	1.1	3.0	1.5						
	32.8	32.8	32.8	33.3	34.3	35.3	35.8	35.8	62.7	83.1	89.2	91.7	92.7	95.7	99.8	110.9	113.9	115.4	115.4	115.4	115.4	115.4	154	
JULY 20	20.9	20.9	20.9	21.3	21.9	22.5	22.9	22.9	40.0	53.1	57.0	58.6	59.2	61.1	63.7	70.8	72.7	73.7	73.7	73.7	73.7	73.7	73.7	154
	3.0	0.5			7.9				2.5	4.0	3.0	7.4	9.9	3.0										
	115.4	118.4	118.9	118.9	126.8	126.8	126.8	126.8	129.3	133.3	136.3	143.1	153.6	156.6									156.6	
	73.7	75.6	75.9	75.9	75.9	81.0	81.0	81.0	82.6	85.1	87.0	91.8	98.1	100.0									100	
1971	0.5	1.0	1.5	1.0	6.1	1.0	1.0		1.5	3.5	5.5	1.0	5.5	8.6	1.0	2.0	4.0	17.7	21.2	29.3	22.2			
	0.5	1.5	3.0	4.0	5.0	11.1	12.1	12.1	13.6	17.1	22.6	23.6	29.1	37.7	39.7	40.7	44.7	62.4	83.6	112.9	135.1			
JULY 25	0.3	0.9	1.8	2.4	3.0	6.7	7.4	7.4	8.3	10.4	13.7	14.3	17.7	22.9	23.5	24.7	27.2	37.9	50.8	68.6	82.1			
	6.6	3.9	3.9	3.9	3.4	1.0				1.5	2.5	2.8												
	141.7	145.6	149.5	153.4	156.8	157.8	157.8	157.8	157.8	159.3	161.8	164.6										164.6		
	86.1	88.5	90.8	93.2	95.3	95.9	95.9	95.9	95.9	96.8	98.3	100.0										100		
1971	11.4	4.68	4.7	0.5																		63.4		
SEP. 24	11.4	5.82	6.29	6.34																		100		
	18.0	9.12	9.92	10.00																		100		
1971	2.0	0.5	2.0	1.5	0.5	5.0	3.0	4.5	1.0	1.5	6.0			1.0	7.0	0.5	2.0	8.0	7.0			1.5		
	2.0	2.5	4.5	6.0	6.5	11.5	14.5	14.5	15.5	11.0	23.0	23.0	23.0	24.0	31.0	31.5	13.5	41.5	48.5	48.5	50.0			
OCT. 5	1.2	1.4	2.6	3.5	3.7	6.6	8.4	8.4	8.9	9.8	13.3	13.3	13.3	13.8	17.9	18.2	18.3	23.9	28.0	28.0	28.8			
	2.0			1.0	1.5	1.5	0.5	1.0	3.5	1.0	5.5	12.6			7.1	2.0	2.0	13.1	8.1	4.0	0.5			
	52.0	52.0	52.0	53.0	54.5	56.0	56.5	57.5	61.0	61.0	62.0	67.5	80.1	80.1	87.2	89.2	91.2	104.3	112.4	116.4	116.9			
	30.0	30.0	30.0	30.5	31.4	32.3	32.6	33.1	35.2	35.2	35.7	38.9	46.2	46.2	50.3	51.4	52.6	60.1	64.8	67.1	67.4			
	1.5		2.5	5.0	8.6	1.0		3.0	1.0	2.0		2.0	1.5	7.0	1.0		0.5	0.5	1.0	5.0				
	118.4	118.4	120.9	125.9	134.5	135.5	135.5	138.5	139.5	141.5	141.5	143.5	145.0	152.0	153.0	153.0	154.0	155.0	160.0	160.0	160.0			
	68.2	68.2	69.7	72.6	77.5	78.1	78.1	79.8	80.4	81.6	81.6	82.7	83.6	87.6	88.2	88.2	88.8	88.8	89.3	92.2	92.2			
	5.5	2.0	1.5		3.5			1.0																
	160.0	165.5	167.5	169.0	169.0	172.5	172.5	173.5																
	92.2	95.4	96.5	97.4	97.4	99.4	99.4	100.0																
1971	0.5	1.5	2.0	3.5	1.5	0.5	5.5	2.5	5.0	2.5	1.5	0.5		6.4	5.5	5.5	3.0	3.0	3.0	6.6	11.1			
	0.5	2.0	4.0	7.5	9.0	9.5	15.0	17.5	22.5	25.0	26.5	27.0	27.0	33.4	36.9	44.4	47.4	50.4	53.4	60.0	71.1			
OCT. 12	0.4	1.7	3.4	6.4	7.7	8.1	12.8	15.0	19.2	21.4	22.7	23.1	23.1	28.6	33.3	38.0	40.5	43.1	45.7	51.2	60.8			
	0.5	1.0	2.0	1.0	8.6	8.6	8.1	1.0	3.0	3.0	5.0	3.0	1.0											
	71.6	72.6	74.6	75.6	84.2	92.8	100.1	101.9	104.9	107.9	112.9	115.9	116.9									116.9		
	61.2	62.1	63.8	64.7	72.0	79.4	86.3	87.2	89.7	92.3	96.6	99.1	100.0									100		

① r (mm) HOURLY RAINFALL ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE I-2-3 HOURLY RAINFALL DISTRIBUTION

FLOOD	r 1	r 2	r 3	r 4	r 5	r 6	r 7	r 8	r 9	r 10	r 11	r 12	r 13	r 14	r 15	r 16	r 17	r 18	r 19	r 20	r 21	Σ
1971	1.0	1.0			4.1	4.1	2.0	0.5	2.5	5.1	5.1	5.6	4.1	3.1		0.5						2.0
	1.0	2.0	2.0	2.0	6.1	10.2	12.2	12.7	15.2	20.3	25.4	31.0	35.1	38.2	38.2	38.7	38.7	38.7	38.7	38.7	38.7	40.7
NOV. 24	1.2	2.4	2.4	2.4	7.4	12.3	14.7	15.3	18.3	24.5	30.6	37.4	42.3	46.1	46.1	46.7	46.7	46.7	46.7	46.7	46.7	48.1
	4.6	7.5	2.5		0.5				0.5	0.5	3.8	5.3	1.0	3.4	7.2	0.5	3.8	1.0				
	4.5	5.2	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	5.4	6.3	6.8	6.8	6.4	6.4	6.4	6.4	6.4	6.8	6.8	7.3	7.9	8.0	8.4	9.3	9.4	9.8	10.0	10.0	10.0	100
1972	1.0	2.0	1.5	1.0	0.5																	57.0
	1.0	3.0	4.5	5.5	6.0	6.0	6.0	6.0	6.0	7.0	10.0	15.1	17.1	19.1	20.1	21.6	21.6	22.6	23.6	23.6	27.6	100
JUNE 24	0.3	1.0	1.6	1.9	2.1	2.1	2.1	2.1	2.1	2.4	3.5	5.3	6.0	6.7	7.0	7.5	7.5	7.9	8.2	9.6	12.1	
1972	6.6	2.0	1.5	0.5	2.0	1.0	1.0	1.0	0.5	1.0		3.5	12.0	24.0	31.0	11.0	11.0	7.0	35.0	18.0	7.0	
	4.3	4.3	4.8	4.5	4.7	4.8	4.9	5.0	5.0	5.1	5.1	5.3	6.7	9.1	12.3	33.3	44.3	51.3	56.3	204.3	211.3	
	14.4	15.1	15.6	15.8	16.5	16.8	17.2	17.5	17.7	18.0	18.0	19.3	23.4	31.8	42.6	46.4	50.3	52.7	64.9	71.2	73.6	
	11.0	0.5	3.5	4.0	16.0	6.5	7.6	16.1		1.0	0.5	6.6	2.5									287.1
	22.3	22.8	22.6	23.0	24.6	25.2	26.0	27.6	27.5	27.5	27.8	28.4	28.7									100
	77.4	77.6	78.8	80.2	85.8	88.1	90.7	96.3	96.3	96.7	96.8	99.1	100.0									
1972	0.5	0.5		0.5	1.5		1.0	1.0	7.9	6.4	3.0	1.5	1.0			31.7	2.0			5.0	6.0	
	0.5	1.0	1.0	1.5	3.0	3.0	4.0	5.0	12.9	19.3	22.3	23.8	24.8	24.8	24.8	26.5	28.5	28.5	28.5	28.5	28.5	69.5
JULY 10	0.2	0.4	0.4	0.5	1.1	1.1	1.5	1.8	4.7	7.1	8.2	8.7	9.1	9.1	9.1	20.7	21.4	21.4	21.4	23.3	25.5	
	5.0	1.0	6.5	1.0	0.5	7.0	22.0	6.0	19.0	2.0	3.5	4.0	1.0	1.5	7.5	3.0	4.0	2.5	14.0	18.0	7.0	
	74.5	75.5	82.0	83.0	83.5	90.5	12.5	18.5	137.5	139.5	175.0	179.0	180.0	181.5	189.0	192.0	196.0	198.5	212.5	230.5	237.5	
	27.3	27.7	30.0	30.4	30.6	33.1	41.2	43.4	50.4	51.1	64.1	65.6	65.9	66.5	69.2	70.3	71.8	72.7	77.8	84.4	87.0	
	4.0	3.0	8.5	3.0	0.5	1.0	1.0	1.5	0.5	1.0		2.0	0.5	3.0	1.0		0.5		0.5	0.5	0.5	
	241.5	244.5	253.0	256.0	256.5	257.5	259.5	260.0	260.5	261.5	261.5	261.5	263.5	264.0	267.0	268.0	268.0	268.5	268.5	268.5	269.5	
	88.5	89.6	92.7	93.8	94.0	94.3	94.7	95.2	95.4	95.8	95.8	95.8	95.8	96.7	97.8	98.2	98.2	98.4	98.4	98.4	98.5	98.7
	1.5				2.0																	
	269.5	269.5	271.0	271.0	273.0																	273.0
	98.7	98.7	99.3	99.3	100.9																	100
1972	7.0		1.0	0.5	0.5		3.0		5.0		5.0			4.0	4.0	1.3	4.0	4.5	2.0	1.5	5.0	
	7.0	7.0	8.0	8.5	9.0	9.0	12.0	12.0	17.0	17.0	22.0	22.0	22.0	26.0	30.0	4.3	4.0	5.5	5.5	5.5	60.0	
JULY 18	0.7	0.7	0.8	0.9	0.9	0.9	1.2	1.2	1.8	1.8	2.3	2.3	2.3	2.7	3.1	4.4	4.8	5.3	5.5	5.7	6.2	

① r (mm) HOURLY RAINFALL ② Σ r (mm) CUMULATIVE RAINFALL
 ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE I-24 HOURLY RAINFALL DISTRIBUTION

FLOOD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Σ
1972	50	85	40	20	05	15	65	90	55	100	205	175	140	135	75	20	80	345	242	232		
JULY 18	650	735	775	795	800	815	830	895	985	1040	1140	1345	1520	1660	1795	1870	1890	1970	2315	2567	2789	
"	67	76	80	82	82	84	86	92	102	107	118	139	157	171	185	193	195	203	239	264	287	
"	05	61	161	86	101	141	40	152	126	76	25	15	05		166	374	35	121	81	96	131	
"	2794	2855	3016	3102	3203	3344	3384	3536	3662	3738	3763	3778	3783	3783	3949	4323	4359	4479	4560	4656	4787	
"	288	294	311	370	330	343	349	364	377	385	388	389	390	390	407	446	449	452	470	480	493	
"	222	91	61	61	20	40	56	96	171	91	121	30	111	111	35	40	86	40	51	56	66	
"	5009	5100	5161	5222	5282	5338	5434	5605	5686	5817	5847	5958	6069	6104	614	6230	6270	6321	6377	6443		
"	516	524	532	538	540	544	550	560	578	588	600	603	614	626	629	633	642	646	652	657	664	
"	81	121	131	71	20	90	140	90	45	65	60	140	100	100	70	150	60	50	120	120	135	
"	6524	6645	6776	6847	6967	7097	7187	7237	7282	7347	7407	7547	7647	7717	7867	7927	7977	8097	8217	8352		
"	672	685	698	706	708	717	731	741	746	751	757	763	778	788	795	811	817	822	835	847	861	
"	145	315	55	100	180	120	20	185	85	35	20	15	25	110	25	15						
"	8497	8812	8867	8967	9147	9267	9267	9472	9537	9592	9612	9627	9652	9662	9681	9702						9702
"	876	908	914	924	943	955	957	976	985	989	991	992	995	996	998	1000						100
1972	15			05	05	05				05				05		10	110		70	05	05	
"	15	15	15	20	25	30	30	30	30	35	35	35	35	40	40	50	160	160	230	235	260	
"	01	01	01	02	02	03	03	03	03	03	03	03	03	04	04	05	15	15	22	22	23	
"			05			35	05	120	05		25	80							10			
"	240	240	245	245	245	280	285	405	410	410	435	515	515	515	515	515	515	515	525	525	530	
"	23	23	23	23	23	27	27	38	39	39	41	49	49	49	49	49	49	49	50	50	50	
"	05		05			50				50	30	45	70	90	120	30			05	05	15	
"	535	540	540	540	590	590	590	590	590	640	670	715	785	875	995	1025	1025	1025	1030	1035	1050	
"	51	51	51	51	56	56	56	56	56	61	63	68	74	83	94	97	97	97	98	98	99	
"	110	45	15	45	35	35	65	60	45	05	05	05	25	110	50	20	20	120	100	70	85	
"	160	1205	1220	1265	1300	1335	1400	1460	1505	1510	1510	1520	1545	1655	1705	1725	1745	1865	1965	2035	2120	
"	110	114	115	120	123	126	133	138	142	143	143	144	146	157	161	163	165	177	186	193	201	
"	50	05	60	25	10	35	30	40	15	100	15	25	25	30	35	05	135	55	35	55	20	
"	2170	2175	2235	2260	2270	2305	2335	2375	2390	2390	2490	2505	2530	2560	2595	2600	2735	2790	2835	2890	2900	
"	205	206	212	214	215	218	221	225	226	226	236	237	239	242	246	246						
"		05		10	20	76	131		45	61		20	25	05	30	05			20	05	05	162
"	2900	2905	2905	2915	2935	3011	3142	3142	3167	3248	3248	3268	3293	3298	3328	3333	3333	3353	3358	3363	3525	
"	275	275	275	276	278	285	297	297	302	307	307	309	312	312	315	316	316	317	318	318	334	

① Σr (mm) HOURLY RAINFALL
 ② Σr / Σr (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE 112: HOURLY RAINFALL DISTRIBUTION

FL000	r 1	r 2	r 3	r 4	r 5	r 6	r 7	r 8	r 9	r 10	r 11	r 12	r 13	r 14	r 15	r 16	r 17	r 18	r 19	r 20	r 21	Σ
1972	207	303	35	25	05	05	20	20		30	30	40	25			15	20	30	65			95
AUG.	3732	4035	4070	4095	4100	4105	4125	4145	4145	4175	4205	4245	4270	4270	4285	4305	4305	4400	4400	4400	4495	
	353	382	385	388	389	390	392	392	392	395	398	402	404	404	406	408	410	417	417	417	426	
	60	55	60	45	35	25	80	20	15	10	30	25	30	05	10	25	10	35	45	50		
	4555	4610	4670	4715	4750	4775	4855	4875	4890	4900	4930	4955	4985	4990	5000	5010	5035	5045	5080	5125	5175	
	431	436	442	446	450	452	460	461	463	464	467	469	472	472	473	474	477	478	481	485	490	
	20	10	30	15		40	91	10	45	51	91	54	89	50	54	64	50	35	129	59	40	
	5195	5205	5235	5250	5250	5290	5381	5391	5436	5487	5578	5632	5721	5771	5825	5889	5939	5974	6103	6162	6202	
	492	493	496	497	497	501	509	510	515	519	528	533	541	546	551	557	562	566	578	583	587	
	30	05	54	145	30	15		30	45	124	30	50	30	84	100	70	65	65	50	190	160	
	6232	6237	6291	6436	6466	6481	6481	6511	6556	6680	6710	6760	6790	6874	6974	7044	7109	7174	7224	7414	7574	
	590	590	596	609	612	613	613	616	621	632	635	640	643	651	660	667	673	679	684	702	717	
	70	15	25	20	50	40	45	85	10	30	10	40	35	20	10	30	15				05	
	7644	7659	7684	7704	7754	7794	7839	7924	7934	7964	7974	8014	8049	8069	8079	8109	8124	8124	8124	8124	8129	
	724	725	727	729	734	738	742	750	751	754	755	759	762	764	765	768	769	769	769	769	770	
	35	60	55	70	60	75	50	50	20	05	15	05	05	20	200	35	35	65	35	35	78	
	8164	8224	8279	8349	8409	8484	8534	8584	8604	8609	8624	8629	8634	8654	8654	8689	8689	8689	8689	8689	8689	
	773	778	784	790	796	803	808	813	814	815	816	817	817	819	838	841	845	851	854	858	865	
	87	252	146	63	15	05	10	05	58	10	24	82	58	59	29		05					
	9224	9476	9622	9685	9700	9705	9715	9720	9778	9788	9812	9894	9952	10010	10039	10039	10044	10044	10034	10059	10089	
	873	897	911	917	919	920	920	920	926	927	929	937	942	948	950	950	951	951	952	952	952	
	10	05	05	10	25	15	80	120	95	80	35	10	10	05								
	10069	10074	10079	10089	10114	10129	10209	10329	10424	10504	10539	10549	10559	10564								10864
	953	954	954	955	951	959	966	978	978	994	997	999	1000	1000								100
1972	05	05			05			20	05			05										
AUG.16	05	10	10	10	15	15	15	35	40	40	40	45	45	45	45	45	70	130	85	25		
	02	04	04	04	06	06	06	15	17	17	17	19	19	19	19	19	127	182	217	228		
	30	25	50	25	10	50	10	80	110	80	240	70	150		84	173	188	153	35	20	35	
	570	595	645	670	680	730	740	820	930	1010	1250	1320	1470	1470	1554	1727	1915	2068	2103	2123	2158	
	241	251	272	283	287	308	312	346	393	427	528	537	621	621	656	729	809	873	888	897	911	
	45	35		15		10	05															
	2203	2238	2253	2253	2253	2263	2368															2368
	930	945	945	951	951	956	1000															100

① r (mm) HOURLY RAINFALL ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE 1-12-6 HOURLY RAINFALL DISTRIBUTION

FLOOD	r ₁	r ₂	r ₃	r ₄	r ₅	r ₆	r ₇	r ₈	r ₉	r ₁₀	r ₁₁	r ₁₂	r ₁₃	r ₁₄	r ₁₅	r ₁₆	r ₁₇	r ₁₈	r ₁₉	r ₂₀	r ₂₁	Σ	
1972	1.5	1.5	0.5	0.5	1.0	5.0	2.0	6.0	6.0	6.0	4.5	10.0	17.5	6.0	1.5								69.5
SEP. 10	2.2	4.3	5.0	5.8	7.2	14.4	17.3	25.9	34.5	43.2	49.6	64.0	89.2	97.8	100.0								100
1973	0.5	1.0	2.0	8.0	1.0	0.5		7.0	3.5	1.5	7.0	7.5	1.0	0.5									
JULY 14	0.5	1.5	1.5	1.5	2.0	2.0	2.0	9.0	12.5	14.0	21.0	28.5	29.5	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	300
	0.4	1.1	1.1	1.1	1.4	1.4	1.4	6.5	9.0	10.1	13.1	20.5	21.2	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	216
	3.5	1.0	2.0	8.0	1.0	2.0	1.0	0.5	4.5	8.5	1.5	1.5	6.0	9.0	3.0	3.0	4.5	17.5	2.0	1.5			
	33.5	34.5	36.5	44.5	54.5	56.5	57.5	58.0	58.0	62.5	71.0	72.5	72.5	78.5	87.5	90.5	90.5	95.0	112.5	14.5	16.0		
	24.1	24.8	26.3	32.0	39.2	40.6	41.4	41.7	45.0	51.1	52.2	52.2	56.5	62.9	65.1	65.1	68.3	80.9	82.4	83.5			
	4.5			0.5	2.0	9.5	1.0		1.0	2.5	1.0	0.5			0.5								
	120.5	120.5	120.5	121.0	123.0	132.5	133.5	133.5	133.5	134.5	137.0	138.0	138.5	138.5	138.5	139.0							139.0
	86.7	86.7	86.7	87.1	88.5	95.3	96.0	96.0	96.0	96.8	98.6	99.3	99.6	99.6	99.6	100.0							100
1973	0.5		2.0	6.1	0.5	1.5	7.1	25.4	2.0	25.0	19.0	10.0	4.0	15.5	12.5	1.0	0.5						0.5
AUG. 3	0.5	0.5	2.5	8.6	9.1	10.6	17.7	43.1	45.1	70.1	89.1	99.1	103.1	118.6	131.1	132.1	132.6	132.6	132.6	132.6	132.6	133.1	133.1
	0.3	0.3	1.5	5.2	5.5	6.4	10.8	26.2	27.4	42.6	54.2	60.2	62.7	72.1	79.7	80.3	80.6	80.6	80.6	80.6	80.6	80.9	80.9
	2.0	0.5	0.5	6.5	1.5	0.5	0.5	1.0	1.0	1.5	2.5	2.0	0.5	0.5	1.5	7.9	1.5						
	35.1	135.6	136.1	142.6	144.1	144.1	144.6	145.6	146.6	148.1	150.6	152.6	153.1	153.6	155.1	163.0	164.5						164.5
	82.1	82.4	82.7	86.7	87.6	87.6	87.9	88.5	89.1	90.0	91.6	92.8	93.1	93.4	94.3	99.1	100.0						100
1973	1.5	2.0	2.0	0.5	0.5	0.5	1.0	0.5		0.5						0.5							0.5
OCT. 8	1.5	3.5	5.5	6.0	6.5	7.0	8.0	8.5	8.5	9.0	9.0	9.0	9.0	9.0	9.0	9.5	9.5	9.5	10.0	11.0	13.0		
	1.2	2.7	4.3	4.7	5.0	5.4	6.2	6.6	6.6	7.0	7.0	7.0	7.0	7.0	7.0	7.4	7.4	7.4	7.8	8.5	10.1		
	0.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	2.0	8.5	1.0		1.9	0.5	4.3	4.3	20.9	1.9	1.9	2.9		
	3.5	15.0	16.5	17.0	17.5	18.0	18.5	18.5	19.0	21.0	29.5	30.5	30.5	32.4	32.4	37.2	41.5	62.4	64.3	66.2	69.1		
	10.5	11.6	12.8	13.2	13.6	14.0	14.4	14.4	14.7	16.3	22.9	23.7	23.7	25.1	25.3	28.9	32.2	48.4	49.9	51.4	53.6		
	3.8	2.9		0.5		11.9	1.9	24			4.3	4.3	1.0	6.7	14	52							
	72.9	73.8	75.8	76.3	78.3	88.2	90.1	92.5	92.5	92.5	96.8	101.1	102.1	108.8	112.4	116.9	128.9						128.9
	56.6	58.8	58.8	59.2	59.2	6.84	6.99	71.8	71.8	71.8	75.1	78.4	79.2	84.4	85.5	89.5	90.7	100.0					100
1974	1.36	0.5				7.8	46.6	1.5															
	13.6	14.1	14.1	14.1	14.1	21.9	68.5	7.00															70.0
APR. 25	1.4	2.0	2.0	2.0	3.3	97.9	100.0																100
1974	0.5	3.0	6.0	6.5	14.0	2.0	17.5	3.5	1.0	0.5	1.5	3.5	1.5	3.5	1.0		1.0						
	0.5	3.5	9.5	16.0	30.0	32.0	49.5	53.0	54.0	54.0	56.0	59.5	60.5	60.5	60.5	60.5	60.5	61.5					61.5
JUNE 3	0.8	5.7	15.4	26.0	48.8	52.0	80.5	86.2	87.8	87.8	88.6	91.1	96.7	98.4	98.4	98.4	100.0						100

① r (mm) HOURLY RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL
 ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE I-2-7 HOURLY RAINFALL DISTRIBUTION

	r ₁	r ₂	r ₃	r ₄	r ₅	r ₆	r ₇	r ₈	r ₉	r ₁₀	r ₁₁	r ₁₂	r ₁₃	r ₁₄	r ₁₅	r ₁₆	r ₁₇	r ₁₈	r ₁₉	r ₂₀	r ₂₁	Σ	
FL000																							
1974	7.0	5.5	6.0	8.5	4.0	0.5	1.5	10.5	3.0	17.5	15.5	6.0	23.0	40.0	16.0	4.0	4.0	10.0	2.5	2.0	1.5		
	7.0	12.5	18.5	27.0	31.0	31.5	33.0	43.5	46.5	64.0	79.5	85.5	108.5	148.5	164.5	182.5	172.5	182.5	185.0	187.0	188.5		
JUNE 10	3.4	6.0	8.9	13.0	15.0	15.2	15.9	21.0	22.5	30.9	38.4	41.3	52.4	71.7	79.5	81.4	83.3	88.2	89.4	90.3	91.1		
	3.5		1.0	7.5	6.5																		
	192.0	192.0	193.0	200.5	207.0																	207.0	
	92.8	92.8	93.2	96.9	100.0																	100	
1974	1.0		1.0	2.0	12.0	44.0	37.0	10.0	8.0	3.5	3.5	1.5	2.5	1.0	2.0	3.0	8.5	0.5					
	1.0	1.0	2.0	4.0	16.0	60.0	97.0	107.0	115.0	118.5	123.5	123.5	126.0	127.0	130.0	138.5	139.0					139.0	
JULY 20	0.7	0.7	1.4	2.9	11.5	43.2	69.8	77.0	82.7	85.3	87.8	88.8	90.6	91.4	95.3	99.6	100.0					100	
	2.0	1.0	0.5	0.5	0.5	0.5	3.0	1.0	1.5			1.0	1.5	1.0	2.0	2.5	13.5	0.5	0.5			3.0	
1974	2.0	3.0	3.5	4.0	4.5	5.0	8.0	9.0	10.5	10.5	10.5	11.5	13.0	14.0	16.0	18.5	32.0	32.5	33.0	33.0	36.0		
AUG. 16	0.6	0.8	1.0	1.1	1.3	1.4	2.2	2.5	2.9	2.9	2.9	3.2	3.6	3.9	4.5	5.2	9.0	9.1	9.2	9.2	10.1		
	8.0	5.5	7.5	1.5	5.0	5.0	15.0	1.5	1.0	3.0	9.0	1.0	12.5	1.5		4.5	3.5	4.5	16.5	12.5	10.1		
	44.0	49.5	57.0	58.5	63.5	68.5	83.5	85.0	86.0	89.0	98.0	99.0	111.5	113.0	113.0	117.5	121.0	125.5	142.0	154.5	164.6		
	12.3	13.9	16.0	16.4	17.8	19.2	23.4	23.8	24.1	24.9	27.5	27.7	31.3	31.7	31.7	32.9	33.9	35.2	39.8	43.3	46.1		
	9.5	11.0	4.5	3.0	1.0	9.0	10.0	5.5	16.5	6.0	11.5	10.0	14.5	10.5	17.0	5.0	1.0	0.5	0.5				
	174.1	185.1	189.6	192.6	193.6	202.6	212.6	218.1	234.6	240.6	252.1	262.1	276.6	287.1	304.1	309.1	310.1	310.6	311.1	311.1	311.1	311.1	
	4.88	51.9	53.1	54.0	54.3	56.8	59.6	61.1	65.8	67.4	70.7	73.5	77.5	80.5	83.2	86.6	88.2	87.1	87.2	87.2	87.2		
	0.5			0.5	1.0	3.0	5.5	1.5	0.5	0.5	1.0	0.5	1.5	1.0	3.5	0.5	5.4	7.9	9.9	1.5			
	311.6	311.6	311.6	312.1	313.1	316.1	321.6	323.1	323.6	324.1	325.1	325.6	327.1	328.1	331.6	332.1	337.5	345.4	355.3	356.8	356.8		
	87.3	87.3	87.3	87.5	87.8	88.6	90.1	90.6	90.7	90.8	91.1	91.3	91.7	92.0	92.9	93.1	94.6	96.8	99.6	100.0	100		
1974	60.0	12.0	1.0		0.5																		
SEP. 24	60.0	72.0	73.0	73.0	73.5																	73.5	
	81.6	99.0	99.3	99.3	100.0																	100	
1974	0.5	0.5	0.5	1.5	3.0	1.5	1.0	1.5	0.5		7.0	3.0	0.5	12.0	16.0	2.0	0.5	4.0	4.0	6.0	3.5		
	0.5	1.0	1.5	3.0	6.0	7.5	8.5	10.0	10.5	10.5	17.5	20.5	21.0	33.0	49.0	51.0	51.5	55.5	59.5	65.5	69.0		
OCT. 17	0.3	0.5	0.8	1.6	3.1	3.9	4.5	5.2	5.5	5.5	9.2	10.8	11.0	17.3	25.7	26.8	27.0	29.1	31.2	34.4	36.2		
	8.0	27.0	7.5	4.5	4.0	4.0	3.0	4.0	0.5	3.5	10.0	3.0	16.0	15.9	10.0	1.0							
	77.0	104.0	111.5	116.0	120.0	124.0	127.0	131.0	131.5	135.0	149.0	148.0	164.0	173.5	189.5	190.5						190.5	
	40.4	54.6	58.5	60.9	63.0	65.1	66.7	68.8	69.0	70.9	76.1	77.7	85.1	94.2	99.5	100.0						100	
1974	1.0	0.5	8.5	45.0	37.0	3.0	0.5		1.5	0.5		2.5		16.5	5.5	1.0	1.0	7.0	16.5	4.5	0.5		
NOV. 28	1.0	1.5	1.0	55.0	92.0	95.0	95.5	95.5	97.0	97.5	97.5	100.0	115.5	122.0	123.0	126.0	131.0	147.5	152.0	152.0	152.5		
	0.7	1.0	6.5	35.8	59.9	61.9	62.2	62.2	63.2	63.5	63.5	65.1	65.1	75.9	79.5	80.1	80.8	85.3	96.1	99.0	99.3		

① r (mm) HOURLY RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL
 ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE 1-2-8 HOURLY RAINFALL DISTRIBUTION

FLOOD	r 1	r 2	r 3	r 4	r 5	r 6	r 7	r 8	r 9	r 10	r 11	r 12	r 13	r 14	r 15	r 16	r 17	r 18	r 19	r 20	r 21	Σ
1974	0.5	0.5																				
NOV. 28	1530	1535																				1535
1975	997	1000																				100
AUG. 9	25	25	0.5	0.5	0.5	0.5	0.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.5	0.5	0.5	
"	25	50	55	60	65	65	70	70	85	90	95	95	95	100	100	100	100	100	100	100	100	120
"	24	4.7	52	57	6.2	6.2	6.6	6.6	8.1	8.5	9.0	9.0	9.0	9.5	9.5	9.5	10.0	10.0	10.0	10.0	10.0	11.8
"	05		0.5	4.5	2.5	3.5	1.0	5.0	1.5	0.5	3.0	4.0	1.5	10.5	11.5	13.0	9.0	6.0	5.5	2.0	3.5	
"	130	130	13.5	18.0	20.5	24.0	25.0	30.0	31.5	32.0	35.0	39.0	40.5	51.0	62.5	75.5	84.5	90.5	96.0	98.0	101.5	
"	123	123	12.8	17.1	19.4	22.1	23.7	28.4	29.9	30.3	33.2	37.0	38.4	48.3	59.2	71.6	80.1	85.8	91.0	92.9	96.2	
"	25	0.5	0.5	0.5	0.5																	
"	1040	104.5	1050	1050	1055																	1055
"	986	991	995	995	1000																	100
1975	6.6	7.6	40.9	1.5	1.5	0.5	0.5	0.5	0.5	0.5												
AUG. 26	66	14.2	55.1	56.6	58.1	58.6	59.1	59.6	60.1													60.1
"	11.0	23.6	91.7	94.2	96.1	97.5	98.3	99.2	100.0													100
1975	3.5	0.5		1.0			6.6	3.0	5.6	6.6	3.3	4.4	9.8	11.4	10.9	7.1	3.3	1.1	1.6	11.4	22.9	8.2
"	3.5	4.0	4.0	5.0	5.0	11.6	14.6	20.2	26.8	30.1	34.5	44.3	55.7	66.6	73.7	77.0	78.1	79.7	91.1	114.0	22.2	
OCT. 20	1.7	1.9	1.9	2.4	2.4	5.5	6.9	9.6	12.7	14.8	16.3	21.0	26.4	31.5	34.9	36.5	37.0	37.8	43.2	54.0	57.9	
"	7.1	3.8	7.1	7.1	6.5	6.0	5.4		1.6	0.5	2.5	0.5	4.0	2.0		1.0	0.5	0.5		1.0		
"	1293	133.1	140.2	14.73	153.8	159.8	165.2	166.8	166.8	167.3	169.8	170.3	174.3	176.3	177.3	177.3	177.8	178.3	178.3	179.3	179.3	
"	61.3	63.1	66.4	69.8	72.9	75.7	78.3	78.3	79.0	79.3	80.4	80.7	82.6	83.5	84.0	84.2	84.5	84.5	84.5	84.9	84.9	
"	1.0	1.3	0.5	2.0	4.0			0.5	1.0		0.5	1.5	2.4				2.4	2.9				
"	1803	193.4	193.9	193.9	195.9	199.9	199.9	199.9	200.4	201.4	201.9	203.4	205.8	205.8	205.8	205.8	206.2	211.1				211.1
"	85.4	91.6	91.9	92.8	94.7	94.7	94.7	94.9	95.4	95.4	95.6	96.4	97.5	97.5	97.5	97.5	98.6	100.0				100
1976	37	1.6	1.1	2.1	0.5	1.6	5.3	13.7	14.7	7.4	4.2	4.7	2.1	22.6	36.8	13.1	21.2	2.78	39.4	18.2	6.1	
"	37	5.3	6.4	8.5	9.0	10.6	16.4	30.1	44.8	52.2	56.4	61.1	63.2	85.8	122.6	135.7	156.9	184.7	224.1	242.3	248.4	
"	0.5	0.8	0.9	1.2	1.3	1.5	2.4	4.3	6.5	7.5	8.1	8.8	9.1	12.4	17.7	19.6	22.7	26.7	32.4	35.0	35.9	
"	4.5	10.1	6.6	4.0	7.6	5.1	5.1	7.6	6.6	6.1	5.6	8.1	7.6	7.1	6.1	8.1	7.6	7.6	8.2	7.7	6.1	
"	252.9	263.0	269.6	273.6	281.2	286.3	291.4	299.0	305.6	311.7	317.3	322.5	333.0	340.1	346.2	354.3	361.9	369.6	377.7	385.4	391.5	
"	36.5	39.0	38.9	39.6	40.6	41.3	42.1	43.2	44.1	45.0	45.8	47.0	48.1	49.1	49.1	50.0	51.2	52.3	53.3	54.3	55.6	56.5
"	7.1	2.0	3.1	3.1	5.7	2.0	1.0	4.1	7.1	4.6	7.7	3.1	6.6	8.7	9.7	3.6	2.6	5.6	3.6	4.6	1.0	
"	398.64	0.06	4.03	74.06	84.25	144.54	15.54	19.64	26.74	31.34	39.04	44.21	44.87	45.74	46.71	47.07	47.33	47.89	48.25	48.71	48.81	
"	57.6	57.8	58.3	58.7	59.6	59.8	60.0	60.6	61.6	62.3	63.4	63.8	64.8	65.0	67.0	68.0	68.3	69.1	69.7	70.3	70.5	

① r (mm) HOURLY RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL
 ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL

TABLE I-12-9 HOURLY RAINFALL DISTRIBUTION

FLOOD	r1	r2	r3	r4	r5	r6	r7	r8	r9	r10	r11	r12	r13	r14	r15	r16	r17	r18	r19	r20	r21	Σ
1976	1.0	1.0	2.5	0.5	1.5	3.0			0.5	5.0	4.5	3.0	2.0	2.5	1.5	0.5		3.5			1.5	
MAY 23	489	490	492.6	493	494.6	497.6	497.6	497.6	498.1	503	507.6	510.6	512.6	515	516.6	517.1	517.1	520.6	520.6	520.6	522.1	
	0.6	70.8	71.1	71.2	71.4	71.8	71.8	71.8	71.9	72.6	73.3	73.7	74.0	74.4	74.6	74.7	74.7	75.2	75.2	75.2	75.4	
					10.5	1.5	5.0	0.5	5.0	5.0	1.5	1.0	1.5	2.0	2.0	4.5	4.0	3.0	2.5	1.5	6.0	
	522.1	522.1	522.1	522.1	522.1	532.6	534.1	539	539.6	544.6	546.1	547	548.6	550.6	552.6	557.1	561	564	566.6	568	574.1	
	75.4	75.4	75.4	75.4	75.4	76.9	77.1	77.8	77.9	78.6	78.8	790	792	795	798	804	81.0	81.4	81.8	82.0	82.9	
	7.5	4.0	2.5	0.5	1.5	0.5	1.0	1.0	2.5	0.5		3.0	6.0	13.5	8.0	23.0	6.0	0.5	3.5	5.0	3.0	
	581.6	585.6	588.1	589.6	590.1	590.6	591.6	592.6	595.1	595.6	595.6	598.6	604.6	619	626	632	635	655	655.6	659	664	667.1
	84.0	84.6	84.9	85.0	85.2	85.3	85.4	85.6	85.9	86.0	86.0	86.4	87.3	89.2	90.4	93.7	94.6	94.7	95.2	95.9	96.3	
	10.5	3.5	2.0	4.5	0.5	4.0	0.5															692.6
	677.6	681	683	687.6	688	692	692.6															100
	97.8	98.3	98.5	99.3	99.4	99.9	100.0															
1976	6.6	13.6	7.1	7.1	23.7	8.1	4.0	20.7	5.1	5.1	11.1	6.6	28.8	22.2	23.2	7.6	1.0	0.5	2.5	6.0	11.0	
JUNE 25	6.6	20.2	27.3	34.4	58	66.2	70.2	90.9	96.0	101	112.2	118.8	147.6	169.8	193.0	200.6	201.6	202	204.6	210.6	221.6	
	30	9.0	12.2	15.4	26.0	29.6	31.4	40.7	42.9	45.2	50.2	53	66.0	75.9	86.3	89.7	90.2	90.4	91.5	94.2	99.1	
	1.5	0.5																				
	223.1	223.6																				223.6
	99.8	100.0																				100
1976	0.4	0.4	5.2	4.4	5.7	1.7	2.2	3.9	4.4	0.9					1.3	1.7	0.2	1.0	1.0	1.0	5.0	
AUG. 10	0.4	0.8	6.0	10.4	16.1	17.8	20.0	23.9	28.3	29.2	29.2	29.2	29.2	29.2	30.5	32.2	32.6	33.6	34.6	35.6	40.6	
	0.3	0.7	4.9	8.5	13.2	14.6	16.4	19.5	23	23.9	23.9	23.9	23.9	23.9	24.9	26.3	26.7	27.5	28.3	29.1	33.2	
	10.9	5.0	5.0	3.0	2.0	3.5	1.5	3.5	1.0	0.5	3.5	11.9	5.9	3.5	2.0	3.0	4.5	2.0	0.5		1.0	
	51.5	56.5	61.5	64.5	66.5	70.0	71.5	75.0	76.0	76.5	80.0	91.9	97.8	101.3	103.3	106.3	107.8	113.3	113.3	113.3	114.3	
	42	46.2	50.3	52.7	54.4	57.2	58.5	61.3	62	62.6	65.4	75.1	80.0	82.8	84.5	86.9	90.6	92.2	92.6	92.6	93.5	
	1.0	1.0	2.5	2.0	1.0	0.5																
	115.3	116.3	118	120.8	121.8	122.3																122.3
	94.3	95	97	98.8	99.6	100.0																100
1976	0.5	0.5	0.5		1.5	0.5	0.5	1.5	7.5	2.0	5.5	11.5	9.0	8.5	2.0	3.5	11.0	6.5				
AUG. 22	0.5	1.0	1.5	1.5	3.0	3.5	4.0	5.5	13.0	15.0	20.5	32.0	41.0	49.5	51.5	55.0	66.0	72.5				72.5
	0.7	1.4	2.1	2.1	4.1	4.8	5.5	7.6	17.9	20.7	28.3	44	56.6	68.3	71.0	75.9	91.0	100.0				100
	1.0	0.5	3.0	3.5	1.0	1.0	3.5	3.5	2.5	8.4	5.4	2.5	4.5	5.9	12.9	20.8	10.3	3.0	4.0	4.0	6.9	
	1.0	1.5	4.5	8.0	9.0	10.0	13.5	17.0	19.5	27.9	33.3	35.8	40.3	46.2	59.1	79.9	90.2	93.2	97.2	101.2	108.1	
	0.6	0.9	2.7	4.8	5.4	6.0	8.0	10.1	11.6	16.6	19.8	21.3	24.0	27.5	35.2	47.6	53.7	55.5	57.9	60.3	64.4	

① r(mm) HOURLY RAINFALL ③ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL TO TOTAL RAINFALL
 ② Σ r(mm) CUMULATIVE RAINFALL

TABLE I-12-10 HOURLY RAINFALL DISTRIBUTION

FLOOD	r.1	r.2	r.3	r.4	r.5	r.6	r.7	r.8	r.9	r.10	r.11	r.12	r.13	r.14	r.15	r.16	r.17	r.18	r.19	r.20	r.21	Σ
1976	59	1.5	1.0	1.0	15.7	1.5	1.5	1.0	2.0	6.1	9.6	4.5	2.5	1.0	0.5	2.5	1.0	1.0	1.0	1.5		
SEP. 13	114.0	115.5	116.5	117.5	133.2	134.7	134.7	134.7	137.7	143.8	153.4	157.9	160.4	161.4	161.9	164.4	164.4	165.4	166.4	167.9	167.9	167.9
	67.9	68.8	69.4	69.4	79.3	80.2	80.2	80.8	82.0	85.6	91.4	94.0	95.5	96.1	96.4	97.9	98.5	99.1	100.0	100.0	100.0	100.0
1976	32.0	65	4.0	13.5	5.0	5.0	5.0	7.0	3.0	6.0	2.5											
SEP. 29	32.0	38.5	38.5	42.5	56.0	61.0	66.0	73.0	76.0	79.0	85.0	87.5										97.5
	36.6	44.0	44.0	48.6	64.0	69.7	75.4	83.4	86.9	90.3	97.1	100.0										100
①																						
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① r (mm) HOURLY RAINFALL ③ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL
 ② Σ r (mm) CUMULATIVE RAINFALL ④ Σ r / Σ r (%) CUMULATIVE PERCENTAGE OF CUMULATIVE RAINFALL

