

T A B L E S

Table 2.1 Climatological Normals in Iloilo City

Month	Rain-fall (mm)	No. of Rainy Days	Temperature (°C)			Relative Humidity (%)	Atmospheric Pressure at MSL (mb)	Wind		Cloud (Okta)
			Max.	Min.	Mean			Direction	Speed (m/s)	
Jan	39.9	7	29.7	22.7	26.2	82	1,011.6	NNE	5	5
Feb	19.1	4	30.2	22.7	26.5	80	1,011.9	NNE	5	4
Mar	27.1	4	31.7	23.5	27.6	75	1,011.6	NNE	4	4
Apr	47.7	4	33.1	24.6	28.9	73	1,010.3	NE	4	4
May	117.9	9	33.1	25.1	29.1	77	1,009.3	NE	3	5
Jun	255.2	16	31.6	24.7	28.1	82	1,009.1	SW	2	6
Jul	313.2	19	30.7	24.4	27.6	85	1,009.0	SW	3	6
Aug	363.7	18	30.4	24.5	27.5	85	1,008.9	SW	3	6
Sep	266.8	17	30.8	24.4	27.6	85	1,009.2	SW	3	6
Oct	264.1	17	31.1	24.2	27.7	84	1,009.5	N	2	6
Nov	174.8	13	30.9	24.0	27.5	84	1,009.9	NNE	3	5
Dec	64.2	9	30.2	23.4	26.8	83	1,010.8	NNE	4	5
Annual	1,953.7	137	31.1	24.0	27.6	81	1,010.1	NNE	3	5

Table 2.2 Climatological Extremes in Iloilo City

Month	Temperature		Max. Daily Rain		Highest Wind		Atmospheric Pressure at MSL							
	High (°C)	Date-Year	Low (°C)	Date-Year	Depth (mm)	Date-Year	Speed (m/s)	Direction	Date-Year	High (mb)	Date-Year	Low (mb)	Date-Year	
Jan	34.7	28-90	16.5	23-76	118.6	3-31	21	NE	5-52	1,019.6	27-87	1,000.4	24-75	
Feb	35.4	19-27	16.7	4-76	79.5	16-25	24.0	NNE	17-62	1,018.8	24-85	1,004.1	8-85	
Mar	39.0	4-73	18.6	3-68	112.3	26-82	22.0	NE	20-65	1,019.8	2-87	1,003.3	26-82	
Apr	37.4	18-78	20.0	8-76	101.6	22-60	25.0	SE	25-71	1,017.3	14-68	991.3	25-71	
May	37.8	26-87	20.2	19-77	223.8	21-22	20.0	S	17-66	1,016.2	10-57	1,000.1	5-51	
Jun	37.2	3-87	21.3	30-75	179.9	14-90	21.0	SW	2-67	1,015.3	30-83	999.1	10-74	
Jul	35.2	10-36	19.5	31-75	303.0	18-76	25.0	SSW	28-82	1,015.9	31-87	996.0	2-52	
Aug	34.8	11-39	20.0	1-75	222.3	8-29	25.0	SW	1-86	1,015.3	30-83	1,000.4	6-64	
Sep	37.8	16-75	19.8	5-75	154.7	4-62	19.0	S	23-77	1,017.0	27-82	993.6	2-84	
Oct	35.4	3-76	19.2	18-75	185.6	22-84	26.0	SW	10-78	1,017.6	5-87	995.3	24-88	
Nov	34.8	1-30	19.4	22-75	255.6	5-84	45.0	N	24-68	1,017.2	30-78	977.2	13-90	
Dec	34.3	15-86	18.3	3-04	172.2	21-33	34.0	NE	10-51	1,017.0	24-52	993.0	10-51	
Annual	39.0	4-03-73	16.5	23-01-76	303.0	8-07-76	45.0	N	24-11-68	1,019.6	2-03-87	977.2	13-11-90	
Period	1903 - 1990		1903 - 1990		1949 - 1990		1949 - 1990		1949 - 1990		1949 - 1990		1949 - 1990	

NOTE : No record for the period of 1941-1945

Table 2.3 Climatological Normals in Cebu City

Month	Rain-fall (mm)	No. of Rainy Days	Temperature (°C)			Relative Atmospheric Humidity (%)		Wind		Cloud (Okta)
			Max.	Min.	Mean	Pressure at MSL (mb)	Direction	Speed (m/s)		
Jan	78.1	8	29.9	23.8	26.8	80	1011.2	NE	2	5
Feb	62.3	7	30.2	23.7	27.0	79	1011.6	NE	2	5
Mar	41.5	5	31.2	24.4	27.8	77	1009.6	NE	2	4
Apr	29.1	4	32.3	25.4	28.8	74	1010.3	NE	2	4
May	54.8	5	33.0	25.9	29.4	75	1009.4	NE	2	4
Jun	149.9	11	32.1	25.3	28.7	79	1009.0	SW	2	5
Jul	157.0	12	31.7	24.9	28.3	80	1008.9	SW	2	5
Aug	136.5	10	31.9	25.0	28.4	79	1008.6	SW	2	5
Sep	167.3	13	31.7	24.8	28.3	80	1009.2	SW	2	5
Oct	148.3	12	31.6	24.7	28.1	81	1009.3	NE	2	5
Nov	131.4	11	31.2	24.7	27.9	81	1009.5	NE	2	5
Dec	103.8	10	30.3	24.2	27.3	82	1010.4	NE	2	5
Annual	1260.0	108	31.4	24.7	28.1	79	1009.8	NE	2	5

Table 2.4 Climatological Extremes in Cebu City

Month	Temperature			Max. Daily Rain			Highest Wind			Atmospheric Pressure at MSL			
	High (°C)	Date-Year	Low (°C)	Date-Year	Depth (mm)	Date-Year	Speed (m/s)	Direction	Date-Year	High (mb)	Date-Year	Low (mb)	Date-Year
Jan	33.5	3-88	20.0	4-73	117.4	2-78	30.0	NE	24-75	1,018.5	30-73	995.3	24-75
Feb	34.8	16-83	20.0	3-76	61.8	12-74	22.0	E	18-88	1,018.7	23-83	1,004.5	8-85
Mar	33.6	21-81	21.4	1-80	141.3	26-82	25.0	SW	26-82	1,018.9	2-87	996.0	26-82
Apr	34.8	17-87	22.5	27-82	48.7	15-79	17.0	NE	1-75	1,016.4	1-80	1,003.0	16-79
May	36.4	30-79	22.3	31-74	82.0	31-78	20.0	W	17-89	1,014.3	5-80	1,000.2	21-76
Jun	35.5	1-77	22.5	13-75	87.8	9-84	18.0	SW	22-85	1,014.3	4-76	1,001.3	9-74
Jul	35.3	20-73	20.8	5-90	99.6	9-73	16.0	SSW	31-88	1,015.9	11-79	1,001.0	26-78
Aug	35.3	24-79	20.8	19-81	96.6	17-82	25.0	SW	15-86	1,014.1	3-87	1,001.5	1-86
Sep	35.2	23-87	21.5	18-72	127.0	26-89	48.0	NE	2-84	1,015.3	5-84	983.4	2-84
Oct	34.4	22-87	21.6	24-86	90.9	23-88	20.0	WSW	23-88	1,016.8	5-87	999.8	9-78
Nov	33.8	1-80	22.0	19-87	276.1	12-90	55.0	S	12-90	1,016.6	30-89	971.1	12-90
Dec	33.5	7-85	21.6	19-86	78.5	13-75	35.0	N	21-86	1,018.5	1-78	1,000.5	21-86
Annual	36.4	30-05-9	20.0	3-02-76	276.1	12-11-90	55.0	S	2-11-90	1,018.9	2-03-87	971.1	2-11-90
Period	1972 - 1990			1972 - 1990			1972 - 1990			1972 - 1990			

NOTE : No record for the period of 1941-1945

Table 2.5 Temperature and Humidity in Tongonan

Temperature (°C)												
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1983											27.5	
1984	24.9		26.8	27.4	28.2	28.7	28.5	28.1			26.6	
1985	25.7	26.0	27.2	27.4	30.1		27.2	28.2	27.5	28.2	27.5	27.5
1986	25.0	26.4	26.5	27.8	29.4	28.4	28.3	27.8	27.5	28.0		
1987	25.1	24.8	27.0	29.8	31.4	29.4	27.5	27.8	27.5			
Average	25.2	25.7	26.9	28.1	29.8	28.8	27.9	28.0	27.5	28.1	27.2	27.5

Humidity (%)												
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1983											93.9	
1984	88.8		94.7	91.3	92.1	92.3	92.2	93.8			93.8	
1985	94.7	94.2	94.0	94.0	90.4		94.2	85.6	91.9	91.4	89.8	91.4
1986	92.6	91.0	92.0	91.9	90.9	91.0	92.0	92.6	91.3	92.4		
1987	92.3	92.3	89.6	87.2	89.2	86.6	90.8	90.1	89.0			
Average	92.1	92.5	92.6	91.1	90.7	90.0	92.3	90.5	90.7	91.9	92.5	91.4

Source : Geothermal Power Plant PNOC-EDC

(Philippine National Oil Company - Energy Development Corporation)

Table 2.6 Climatological Normals in Tacloban City

Month	Rain-fall (mm)	No. of Rainy Days	Temperature (°C)			Relative Humidity (%)	Atmospheric Pressure at MSL (mb)	Wind		Cloud (Okta)
			Max.	Min.	Mean			Direction	Speed (m/s)	
Jan	281.7	20	28.7	22.8	25.7	85	1,010.3	NW	2	6
Feb	204.1	17	29.0	22.7	25.9	84	1,010.8	NW	2	5
Mar	139.6	15	29.9	23.1	26.5	82	1,010.8	NW	2	5
Apr	118.9	14	30.9	24.1	27.5	81	1,009.4	SSE	2	4
May	142.4	14	31.4	24.8	28.1	82	1,008.0	SE	2	5
Jun	160.8	16	31.3	24.6	28.0	82	1,007.6	SE	2	6
Jul	167.0	16	31.1	24.4	27.8	82	1,007.1	NW	1	6
Aug	135.5	14	31.4	24.5	28.0	81	1,006.0	NW	1	6
Sep	161.5	16	31.3	24.4	27.9	82	1,007.4	NW	1	6
Oct	197.2	19	31.0	24.2	27.6	84	1,007.9	NW	2	5
Nov	279.0	20	30.1	23.8	27.0	86	1,008.4	NW	2	6
Dec	305.3	21	29.3	23.4	26.3	86	1,009.5	NW	2	6
Annual	2,293.0	202	30.5	23.9	27.2	83	1,008.6	NW	2	6

Table 2.7 Climatological Extremes in Tacloban City

Month	Temperature			Max. Daily Rainfall			Highest Wind			Atmospheric Pressure at MSL			
	High (°C)	Date-Year	Low (°C)	Date-Year	Depth (mm)	Date-Year	Speed (m/s)	Direction	Date-Year	High (mb)	Date-Year	Low (mb)	Date-Year
Jan	34.7	28-24	18.8	30-05	246.7	14-16	29.0	NNW	7-72	1,020.3	30-73	993.4	8-72
Feb	34.8	26-19	17.6	24-05	153.7	14-89	20.0	W	24-70	1,018.8	8-73	1,001.9	24-70
Mar	35.9	31-24	18.0	4-05	178.6	15-37	16.0	NNW	19-71	1,019.2	2-87	1,002.9	23-80
Apr	38.0	6-24	20.2	23-11	136.1	24-71	53.0	NNW	15-79	1,017.4	7-70	972.9	15-79
May	37.9	2-24	20.5	1-85	325.9	2-59	55.0	SW	15-66	1,015.9	10-57	985.8	4-51
Jun	36.5	3-87	20.9	23-75	244.0	23-75	27.0	WSW	24-71	1,014.9	2-57	989.5	24-71
Jul	37.8	24-20	21.2	20-73	244.3	14-13	30.0	WSW	14-71	1,014.6	2-65	994.4	3-71
Aug	38.0	18-24	20.6	1-20	116.0	12-87	22.0	WSW	8-68	1,014.8	27-60	994.6	25-87
Sep	37.2	10-24	21.0	14-82	116.0	6-12	18.0	SW	11-66	1,015.4	6-53	997.7	26-78
Oct	36.0	8-47	19.8	30-20	167.9	23-88	32.0	W	26-52	1,016.0	27-68	976.1	27-52
Nov	35.2	1-24	19.4	17-68	206.5	22-28	47.0	SW	23-68	1,017.8	30-78	966.9	7-88
Dec	34.0	2-02	17.5	3-04	192.8	6-58	30.0	N	9-51	1,017.9	26-72	988.6	9-51
Annual	38.0	18-08-24	17.5	3-12-04	325.9	2-05-59	55.0	SW	5-05-66	1,020.3	10-01-73	966.9	7-11-88
Period	1903 - 1990			1903 - 1990			1951 - 1990			1949 - 1990			

NOTE: No record for the period of 1941-1945

Table 2.8 Tropical Cyclone in the Visayas
(1948-1991)

Year	Number of Typhoon		
	Philippines	Visaya	(%)
1948	20	2	10.0
1949	22	5	22.7
1950	18	1	5.6
1951	13	2	15.4
1952	29	3	10.3
1953	17	2	11.8
1954	18	3	16.7
1955	15	1	6.7
1956	26	2	7.7
1957	15	1	6.7
1958	18	2	11.1
1959	18	1	5.6
1960	19	1	5.3
1961	23	1	4.3
1962	21	3	14.3
1963	16	0	0.0
1964	32	2	6.3
1965	21	1	4.8
1966	22	2	9.1
1967	21	2	9.5
1968	13	1	7.7
1969	15	1	6.7
1970	21	2	9.5
1971	27	7	25.9
1972	17	2	11.8
1973	12	1	8.3
1974	23	2	8.7
1975	14	1	7.1
1976	21	1	4.8
1977	19	3	15.8
1978	25	3	12.0
1979	22	11	50.0
1980	23	13	56.5
1981	23	13	56.5
1982	21	9	42.9
1983	23	9	39.1
1984	20	6	30.0
1985	17	7	41.2
1986	21	9	42.9
1987	16	8	50.0
1988	20	8	40.0
1989	19	4	21.1
1990	20	9	45.0
1991	19	9	47.4
Total	875	176	20.1

Source: Tropical Cyclone Summaries from 1948 to 1978
(PAGASA)

Table 2.9 (1/2) Rainfalls caused by Tropical Cyclones in the Visayas

No.	Year	Categories	Name	Date	Maximum Daily Rainfall (mm)			
					Iloilo	Cebu	Tacloban	Ormoc
1	1948	T.D.	None	Nov 29-30	-	-	-	-
2	1948	T.	None	Dec 12-16	-	-	-	-
3	1949	T.S.	Elaine	Jul 06-09	-	98.3	-	-
4	1949	T.	None	Oct 31-Nov 03	-	68.1	-	-
5	1949	T.S.	None	Nov 04-08	-	96.3	-	-
6	1949	T.S.	Rena	Nov 20-22	-	0.0	-	-
7	1949	T.	Betty	Dec 02-07	-	36.8	-	-
8	1950	T.	Delilah	Nov 18-22	-	77.0	-	-
9	1951	T.	Wanda	Nov 18-22	-	40.1	-	-
10	1951	T.	Amy	Dec 05-16	-	321.6	-	-
11	1952	T.D.	None	Jun 06-07	-	2.3	-	-
12	1952	T.	Emma	Jun 30-Jul 04	-	165.1	-	-
13	1952	T.	Wilma	Oct 25-29	-	100.1	-	-
14	1953	T.	Irma	Feb 24-26	-	26.9	-	-
15	1953	T.D.	None	Nov 23-Dec 01	-	28.5	-	-
16	1954	T.	Elsie	May 08-09	-	2.5	-	-
17	1954	T.	Tilda	Nov 27-30	-	85.6	-	-
18	1954	T.S.	None	Dec 23-27	-	49.5	-	-
19	1955	T.	Patsy	Nov 26-Dec 01	-	49.5	-	-
20	1956	T.S.	None	Apr 05-12	-	34.8	-	-
21	1956	T.S.	Vera	Jul 03-07	-	62.7	-	-
22	1957	T.S.	None	Jan 04-07	-	72.4	-	-
23	1958	T.	Kathy	Oct 18-23	-	21.3	-	-
24	1958	T.D.	None	Nov 24-25	-	8.4	-	-
25	1959	T.	Gilda	Dec 15-20	-	7.9	-	-
26	1960	T.S.	Lucille	May 24-31	-	18.0	-	-
27	1961	T.S.	None	Nov 21-24	58.2	55.4	66.5	-
28	1962	T.	Hope	May 16-21	35.6	7.1	46.0	-
29	1962	T.S.	Patsy	Aug 06-09	86.4	93.1	77.5	-
30	1962	T.	Lucy	Nov 25-28	28.7	26.2	61.5	-
31	1964	T.	Ining	Nov 16-21	156.5	119.1	127.5	-
32	1964	T.S.	Moning	Nov 27-29	43.7	10.6	3.1	-
33	1965	T.S.	Daling	Mar 06-07	-	44.2	62.2	-
34	1966	T.	Klaring	May 11-12	0.0	20.3	29.7	-
35	1966	T.	Aning	Dec 25-30	5.8	9.4	105.7	-
36	1967	T.	Bebeng	Mar 02-05	8.9	26.8	36.2	-
37	1967	T.	Yayang	Nov 06-08	30.4	20.9	28.5	-
38	1968	T.	Reming	Nov 13-21	35.3	81.7	50.3	-
39	1969	T.D.	Kuring	Jul 08-10	73.7	2.6	7.9	-
40	1970	T.S.	Klaring	Jun 29-Jul 03	36.8	82.1	22.4	-
41	1970	T.S.	Uding	Oct 29-Nov 03	7.6	11.2	18.8	-
42	1971	T.S.	Diding	Apr 23-28	56.1	72.0	104.2	-
43	1971	T.S.	Eiang	Apr 28-May 07	21.3	14.0	40.9	-
44	1971	T.	Mameng	Jun 23-26	16.5	81.5	116.0	217.1
45	1971	T.	Neneng	Jun 30-Jul 04	23.9	24.6	48.8	99.6
46	1971	T.	Pepang	Jul 12-16	27.4	24.5	41.7	137.0
47	1971	T.	Barang	Oct 01-06	42.8	75.6	71.5	79.8
48	1971	T.	Goying	Oct 19-22	43.0	85.5	49.6	23.9
49	1972	T.	Asiang	Jan 05-09	83.9	46.1	54.3	257.8
50	1972	T.	Undang	Dec 01-09	44.5	130.8	75.8	95.9

Source : Tropical Cyclone Summaries from 1948 to 1978 (PAGASA)

Note : T. = Typhoon

T.S. = Tropical Storm

T.D. = Tropical Depression

Table 2.9 (2/2) Rainfalls caused by Tropical Cyclones in the Visayas

No.	Year	Categories	Name	Date	Maximum Daily Rainfall (mm)			
					Iloilo	Cebu	Tacloban	Ormoc
51	1973	T.S.	Openg	Nov 18-24	198.0	53.8	48.0	48.0
52	1974	T.D.	Kading	Dec 19-22	9.7	10.1	62.0	52.8
53	1974	T.D.	Delang	Dec 19-22	1.3	2.5	10.0	6.1
54	1975	T.	Auring	Jan 22-25	89.4	-	26.1	-
55	1976	T.D.	Kayang	Dec 29-30	2.8	40.2	53.4	17.2
56	1977	T.	Kuring	Jun 13-14	26.2	7.6	1.1	2.0
57	1977	T.D.	Tasing	Nov 03-05	3.2	11.6	21.8	26.7
58	1977	T.S.	Yeyeng	Dec 31-Jan 03	10.8	105.9	27.8	64.3
59	1978	T.	Atang	Apr 18-27	75.0	69.3	135.4	139.0
60	1978	T.D.	Deling	Jun 27-30	24.6	36.6	19.6	0.0
61	1978	T.D.	Cardiang	Dec 13-16	52.8	11.9	93.2	53.1
62	1979	T.	Bebeng	Apr 12-20	62.2	58.4	78.6	173.9
63	1979	T.D.	Karing	May 10-16	35.6	47.4	84.8	42.2
64	1979	T.S.	Krasing	Dec 21-24	-	31.0	66.8	76.2
65	1980	T.D.	Asiang	Feb 12-14	-	31.5	81.1	64.6
66	1980	T.S.	Biring	Mar 20-27	68.0	17.0	44.0	6.6
67	1980	T.S.	Huaning	Jun 22-25	-	22.0	38.6	58.6
68	1980	T.D.	Seniang	Aug 30-Sep 04	22.3	53.4	30.0	117.9
69	1980	T.D.	Basiang	Nov 11-13	62.9	41.2	134.9	62.2
70	1981	T.D.	Saling	Sep 24-27	17.5	64.4	109.3	111.8
71	1981	T.S.	Unsing	Oct 12-13	37.4	83.8	64.3	77.5
72	1982	T.	Bising	Mar 22-29	112.3	141.3	94.7	62.2
73	1982	T.	Norming	Aug 19-Sep 04	87.0	54.0	62.7	259.1
74	1983	T.	Yayang	Nov 23-25	90.6	30.6	70.6	47.7
75	1984	T.	Nitang	Aug 31-Sep 04	78.3	46.2	30.8	45.2
76	1984	T.D.	Osang	Sep 19-20	80.0	21.7	55.4	23.9
77	1984	T.	Undang	Nov 03-06	255.6	70.6	153.0	90.2
78	1985	T.D.	Elang	Jul 04-07	29.9	20.2	63.0	43.5
79	1985	T.	Rubing	Oct 12-14	61.5	31.5	24.3	19.6
80	1986	T.D.	Bising	Apr 05-06	40.0	12.4	73.5	50.8
81	1986	T.	Pasing	Oct 10-14	33.4	30.2	58.9	83.1
82	1986	T.S.	Ruping	Oct 17-20	25.4	42.0	90.7	55.9
83	1986	T.S.	Uding	Nov 10-14	71.4	34.4	81.7	64.7
84	1986	T.	Aning	Dec 20-24	19.8	19.4	14.0	32.5
85	1986	T.	Bidang	Dec 30-Jan 01	41.6	54.2	23.9	26.2
86	1987	T.	Herming	Aug 08-14	49.0	14.0	116.0	88.6
87	1987	T.S.	Rusing	Nov 11-17	24.2	30.0	49.0	76.2
88	1987	T.	Sisang	Nov 23-27	37.5	9.0	90.2	127.0
89	1987	T.	Trining	Dec 14-19	7.2	7.0	80.4	40.6
90	1988	T.S.	Edeng	Jun 26-28	48.5	29.0	61.0	89.9
91	1988	T.	Unsang	Oct 21-26	40.8	90.9	167.9	216.2
92	1988	T.S.	Welpring	Nov 01-02	53.4	82.2	94.1	62.2
93	1988	T.	Yoning	Nov 05-08	73.0	58.4	126.0	177.0
94	1989	T.	Bining	May 15-19	56.9	42.6	113.9	112.6
95	1989	T.	Kuring	Jun 04-08	64.4	56.0	43.9	57.2
96	1990	T.	Ruping	Nov 10-01	78.0	-	98.1	25.0
97	1991	T.S.	Auring	Mar 11-13	36.6	26.2	204.0	93.0
98	1991	T.S.	Bebeng	Apr 24-26	11.6	31.6	59.1	50.0
99	1991	T.S.	Uring	Nov 02-06	38.8	46.9	140.2	115.0
100	1992	T.S.	Maring	Sep 18-23	-	-	-	13.0
Average					47.6	48.7	69.6	78.9
Maximum					255.6	321.6	204.0	259.1

Source : Tropical Cyclone Summaries from 1948 to 1978 (PAGASA)

Note : T. = Typhoon
T.S. = Tropical Storm
T.D. = Tropical Depression

Table 2.10 Rainfall Gauging Station in the Master Plan Area

Urban Center	Station Name	Station No.	Latitude	Longitude	Record Period	Related Organization
Iloilo	Iloilo City	637	10% 42' N	122% 34' E	1951-Present	PAGASA
	Cabatuan	608	10% 53' N	122% 29' E	1971-Present	PAGASA
	Donsol	609	10% 57' N	122% 37' E	1983-Present	PAGASA
	Miagao	610	10% 38' N	122% 14' E	1971-Present	PAGASA
Cebu	Lahug Airport	645	10% 20' N	123% 54' E	1949-Present	PAGASA
	Mactan Airport	646	10% 19' N	123% 59' E	1972-Present	PAGASA
	Adolaon Manual		10% 26' N	123% 52' E	1977-Present	WRC
	Adolaon Recorder		10% 26' N	123% 52' E	1977-Present	WRC
	Barot (ACMDC)				1969-Present	PAGASA
	Biga (ACMDC)		10% 19' N	123% 42' E	1962-Present	PAGASA
	Bonbon (Manual)		10% 22' N	123% 49' E	1978-Present	WRC
	Bonbon (Recorder)		10% 22' N	123% 49' E	1978-Present	WRC
	Bucaue		10% 20' N	123% 49' E	1980-Present	WRC
	Buhisan #1		10% 18' N	123% 51' E	1976-1978	PAGASA
	Buhisan #2		10% 18' N	123% 50' E	1976-1978	PAGASA
	Buhisan #3		10% 19' N	123% 51' E	1976-1977	PAGASA
	Buhisan #4		10% 19' N	123% 51' E	1976-1978	PAGASA
	Buhisan #5		10% 19' N	123% 50' E	1976-1978	PAGASA
	Buhisan #6		10% 20' N	123% 50' E	1976-1978	PAGASA
	Buhisan #7		10% 20' N	123% 51' E	1976-1978	PAGASA
	Cambinocot		10% 27' N	123% 54' E	1977-Present	WRC
	Cambitas		10% 23' N	123% 50' E	1980-Present	WRC
	Camp 7-BFD		10% 20' N	123% 47' E	1980-Present	WRC
	Camp 7-FORI		10% 15' N	123% 47' E	1938-Present	FORI
	Carmen (ACMDC)		10% 20' N	123% 43' E	1977-Present	ACMDC
	Cebu Customs House		10% 17' N	123% 54' E	1904-1939	BOC
	DAS/UG ACMDC		10% 19' N	123% 42' E	1954-Present	ACMDC
	Estancia (BPI)		10% 20' N	123% 56' E	1972-Present	BPI
	Frank Pit (ACMDC)				1976-1977	ACMDC
	Kansagahan		10% 32' N	123% 46' E	Aug-Dec 1985	WRC
	Khyber Pass				1975-1980	ACMDC
	Lusaran		10% 29' N	123% 53' E	1977-Present	WRC
	Malubog dam		10% 22' N	123% 43' E	1975-Present	ACMDC
	NPC-TP		10% 13' N	123% 45' E	1984-Present	NPC
	Odlum				1981-1982	ACMDC
	RCPI		10% 22' N	123% 51' E	1977-Present	WRC
Sigpit		10% 20' N	123% 42' E	1976-Present	ACMDC	
Sinsin		10% 21' N	123% 46' E	1980-Present	WRC	
South Lantoy				1972-1980	ACMDC	
Tabunan		10% 26' N	123% 49' E	1977-Present	WRC	
Talamban (Recorder)		10% 21' N	123% 54' E	1977-Present	WRC	
Talamban (Manual)		10% 21' N	123% 54' E	1977-Present	WRC	
Ormoc	Merida	806	10% 55' N	124% 33' E	1971-Present	PAGASA
	Jaro	808	10% 55' N	124% 33' E	1983-Present	PAGASA
	PNOC-EDC		10% ' N	124% ' E	1984-Present	PNOC
Tacloban	Tacloban City	550	11% 14' N	125% 02' E	1951-Present	PAGASA
	Tolosa	802	11% 04' N	125% 02' E	1971-Present	PAGASA
	Dagami	809	11% 04' N	124% 54' E	1977-Present	PAGASA
	Pastrama	810	11% 08' N	124% 53' E	1977-Present	PAGASA
	Santa Fe	811	11% 10' N	124% 55' E	1977-Present	PAGASA

Table 2.11 Mean Monthly Rainfall in Iloilo Station

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1961	0.5	9.8	15.1	28.1	252.3	466.2	349.2	511.9	158.4	370.7	130.3	70.4	2,362.9
1962	16.0	30.7	9.3	28.4	123.4	87.1	638.6	335.7	518.6	137.8	141.8	25.7	2,093.1
1963	3.3	0.6	12.3	4.8	17.3	274.5	178.7	372.5	322.7	240.2	63.9	91.3	1,582.1
1964	19.1	38.7	14.2	37.6	250.2	308.8	81.6	324.3	256.3	195.7	460.8	52.5	2,039.8
1965	---	---	---	---	---	---	---	---	---	---	---	---	0.0
1966	81.1	21.1	10.5	11.0	514.4	255.5	364.7	115.4	234.5	200.5	255.6	70.7	2,135.0
1967	184.8	48.8	39.9	12.4	78.1	246.4	326.6	425	102.0	322.5	185.7	29.7	2,001.9
1968	11.5	7.1	10.7	15.1	75.7	158.4	173.6	409.7	141.2	50.8	190.4	9.9	1,254.1
1969	6.4	0.0	8.9	10.0	39.3	153.0	426.1	125.0	183.6	109.6	---	---	1,061.9
1970	25.9	7.2	35.1	5.3	151.0	414.4	195.8	256.1	234.9	225.0	101.8	60.7	1,713.2
1971	9.2	4.1	5.6	84.0	94.2	174.8	353.3	182.4	42.6	301.3	77.4	110.5	1,439.4
1972	143.4	23.4	26.0	31.0	78.7	236.6	767.8	221.9	377.6	187.9	188.1	150.0	2,432.4
1973	3.5	20.5	2.0	12.5	0.0	120.2	392.6	533.9	480.9	272.3	483.5	161.7	2,483.6
1974	48.8	22.0	43.1	27.5	36.8	265.2	302.4	326.9	92.9	669.0	147.0	139.0	2,120.6
1975	130.5	9.0	0.0	144.9	147.1	378.5	99.5	253.6	297.7	328.2	55.0	119.5	1,963.5
1976	45.5	37.9	26.0	20.6	315.3	217.3	509.1	386.7	331.2	174.3	131.8	99.5	2,295.2
1977	38.7	60.4	21.0	0.0	8.1	247.5	224.4	281.0	545.5	73.6	77.0	21.7	1,598.9
1978	26.2	9.1	3.8	131.4	66.8	150.1	131.6	503.6	320.8	252.7	119.6	162.6	1,878.3
1979	12.5	17.7	0.1	125.3	97.5	129.5	501.5	667.4	207.6	706.4	84.5	---	2,550.0
1980	---	---	74.8	7.3	---	---	220.8	203.1	0.0	363.2	198.0	---	1,067.2
1981	40.3	5.8	7.6	80.4	30.6	---	203.0	345.9	283.8	117.6	134.3	85.3	1,334.6
1982	15.3	2.0	151.8	60.8	158.0	396.6	309.2	661.2	381.0	215.6	53.4	9.9	2,414.8
1983	73.4	5.0	31.2	2.4	9.2	181.7	247.5	278.5	346.2	264.6	284.9	102.1	1,826.7
1984	32.3	64.6	97.0	66.8	109.5	508.6	391.6	505.8	412.5	515.8	366.1	72.3	3,142.9
1985	36.9	54.1	35.4	267.6	59.2	460.4	294.8	161.7	341.7	470.2	182.0	90.4	2,454.4
1986	40.2	15.3	51.5	49.2	70.4	254.2	300.8	892.4	257.5	182.4	248.9	97.4	2,460.2
1987	30.1	12.0	1.0	5.7	41.9	162.4	452.7	224.5	517.0	152.0	212.3	21.8	1,833.4
1988	13.7	13.3	13.1	85.2	197.6	483.0	323.5	264.9	272.7	561.6	312.7	39.4	2,580.7
1989	94.1	33.0	58.8	68.7	253.5	323.5	308.5	672.6	160.6	138.2	37.4	8.8	2,157.7
1990	15.1	0.6	8.0	9.1	262.1	602.2	326.6	466.1	182.0	124.6	319.5	22.5	2,338.4
1991	3.1	20.0	48.4	26.4	8.2	357.9	371.5	703.3	76.7	94.1	123.4	37.8	1,870.8
Average	41.4	20.5	28.7	48.7	122.3	286.2	325.6	387.1	269.4	267.3	185.1	72.7	2,054.9

Table 2.12 Mean Monthly Rainfall in Lahug Station

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1949	35.6	71.6	42.0	68.2	66.4	161.7	253.4	134.4	281.6	190.1	313.2	125.4	1,743.6
1950	72.0	42.0	85.5	73.4	68.6	270.7	277.3	199.1	358.8	130.1	151.5	89.2	1,818.2
1951	69.1	147.2	45.2	5.7	234.0	215.3	225.4	140.5	299.1	178.9	112.2	456.5	2,129.1
1952	33.1	75.9	53.6	11.8	204.6	251.8	302.9	431.0	242.7	396.8	150.3	232.5	2,387.0
1953	115.7	103.7	22.5	63.1	116.3	230.6	141.4	144.8	203.5	208.9	253.9	292.0	1,896.4
1954	97.8	40.5	97.3	35.8	120.8	233.5	224.4	202.7	374.4	242.3	146.3	176.3	1,992.1
1955	209.9	50.2	18.5	11.7	84.8	130.2	210.0	148.2	205.0	276.7	203.6	134.3	1,683.1
1956	101.4	15.3	63.9	308.3	265.9	251.0	222.9	230.6	116.8	181.3	152.5	238.2	2,148.1
1957	120.1	169.2	50.9	52.4	21.4	125.6	236.7	179.0	68.0	167.9	85.1	13.4	1,289.7
1958	53.5	31.0	37.1	40.9	141.2	50.5	138.4	175.0	81.3	143.9	78.3	82.3	1,053.4
1959	130.3	41.8	63.6	26.1	105.6	78.3	264.4	258.0	248.9	127.5	177.0	135.1	1,656.6
1960	71.6	48.1	80.5	165.3	56.3	210.1	211.4	192.9	283.0	141.5	181.2	23.3	1,665.2
1961	53.5	39.8	22.2	68.2	127.9	164.6	253.8	75.3	155.7	261.1	113.2	102.4	1,437.7
1962	53.1	181.0	82.9	32.0	83.0	176.8	210.9	331.2	140.0	112.4	138.9	66.9	1,609.1
1963	69.3	26.0	78.6	88.7	81.3	128.9	253.0	220.2	238.5	210.5	101.4	38.0	1,534.4
1964	90.6	141.9	39.8	85.1	188.8	160.0	249.5	66.8	163.7	208.5	343.0	48.2	1,785.9
1965	82.8	99.7	134.7	77.9	32.8	287.6	86.5	182.1	67.0	221.1	109.7	146.5	1,528.4
1966	70.3	38.4	8.0	24.5	271.8	125.2	305.2	214.8	142.5	202.1	208.9	161.8	1,773.5
1967	463.7	73.5	77.8	12.4	57.7	187.9	180.4	98.5	113.0	107.1	139.3	59.6	1,570.9
1968	57.1	56.4	58.1	32.6	5.1	144.6	115.7	134.9	177.3	147.6	265.8	41.1	1,236.3
1969	11.5	4.8	26.5	5.5	54.5	172.5	103.7	181.5	141.3	89.0	47.5	66.2	904.5
1970	51.8	22.8	17.6	17.0	43.8	239.6	238.7	182.0	98.1	197.5	231.1	152.0	1,492.0
1971	84.1	53.5	21.4	86.0	194.0	301.5	137.0	96.1	253.2	295.1	138.4	77.7	1,738.0
1972	253.2	16.8	83.7	82.7	126.7	166.3	86.8	194.6	249.1	100.3	100.2	70.5	1,530.9
1973	12.3	70.0	20.4	10.8	28.4	154.1	234.4	170.1	315.3	109.7	480.3	112.8	1,718.6
1974	67.6	138.5	113.4	35.2	194.7	96.9	103.9	72.8	103.6	309.2	106.2	191.4	1,533.4
1975	173.4	107.8	20.1	56.9	50.3	280.6	187.6	179.7	315.0	247.1	43.4	225.8	1,887.7
1976	155.6	36.4	8.0	16.5	215.1	198.5	371.5	121.6	330.8	112.4	41.6	120.1	1,728.1
1977	168.3	100.2	38.7	0.0	70.8	148.0	313.6	166.2	205.3	149.2	133.5	25.4	1,519.2
1978	194.9	35.5	46.8	63.0	78.2	175.1	106.2	103.0	396.4	148.1	167.6	128.4	1,643.2
1979	39.5	33.1	7.1	48.1	140.0	348.6	116.5	94.1	178.0	204.8	114.5	96.6	1,420.9
1980	79.6	90.6	62.7	63.3	51.8	316.4	180.6	519.4	160.1	251.0	224.3	134.7	2,134.5
1981	95.2	62.3	18.3	8.4	62.3	77.8	151.1	44.0	195.3	257.7	168.9	138.9	1,280.2
1982	4.8	45.2	240.2	6.8	34.4	62.0	128.3	198.8	50.3	167.9	85.2	51.0	1,074.9
1983	44.0	11.2	18.2	5.0	8.0	118.7	387.7	318.0	252.5	207.8	117.6	187.6	1,676.3
1984	143.0	160.4	29.0	40.4	77.7	325.2	92.9	81.9	178.9	208.3	177.5	186.0	1,701.2
1985	140.5	17.2	41.9	118.9	161.8	89.5	367.6	71.6	199.4	192.1	79.4	38.6	1,518.5
Average	101.9	67.6	53.4	52.7	106.1	185.3	207.3	177.2	205.0	192.0	159.0	126.1	1,633.5

Table 2.13 Mean Monthly Rainfall in Merida Station

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1971	*	*	*	*	*	538.5	514.7	134.1	188.4	357.1	198.1	105.0	2,035.9
1972	72.9	33.1	92.2	40.8	156.5	268.3	74.9	424.3	491.8	262.7	203.8	182.4	2,953.7
1973	37.8	47.7	45.3	39.3	15.9	87.8	308.8	204.4	203.9	377.3	297.8	211.7	1,877.7
1974	48.7	147.9	24.4	49.1	127.3	193.8	93.5	130.0	70.9	727.8	*	361.7	1,975.1
1975	*	134.4	28.9	222.0	12.7	214.5	375.5	81.9	145.1	337.2	73.3	388.5	2,014.0
1976	124.4	77.3	98.7	36.2	170.0	*	318.5	242.0	201.4	88.8	237.7	390.7	1,985.7
1977	196.0	243.3	89.9	10.4	75.5	125.8	445.1	289.8	127.3	200.7	168.3	17.3	1,989.4
1978	148.5	71.2	128.5	262.6	183.2	133.1	153.8	251.1	511.5	186.4	274.6	266.9	2,571.4
1979	29.0	19.1	13.2	222.2	204.0	297.9	353.5	110.0	181.3	242.8	279.1	157.6	2,109.7
1980	153.8	119.6	24.8	41.8	23.7	305.1	250.3	298.4	319.7	122.6	316.8	122.8	2,099.4
1981	253.1	64.2	39.7	14.7	15.7	151.1	195.0	130.7	294.8	198.2	189.6	190.2	1,737.0
1982	59.4	83.4	154.7	28.0	51.4	77.8	263.4	494.1	148.7	263.9	69.2	48.4	1,742.4
1983	56.2	6.6	1.0	2.5	0.0	131.7	649.3	338.9	321.7	334.1	331.5	305.6	2,479.1
1984	324.0	*	70.9	88.9	71.9	168.2	163.1	204.6	257.9	296.9	312.3	207.4	2,166.1
1985	369.2	110.5	50.5	123.6	273.9	121.0	312.7	158.4	420.9	238.9	145.0	85.3	2,409.9
1986	270.1	36.2	111.0	153.9	177.6	187.8	133.8	583.3	103.4	333.6	277.6	72.6	2,440.9
1987	105.3	73.1	27.0	7.4	0.8	190.7	*	318.0	180.9	154.8	445.6	151.2	1,654.8
1988	77.4	86.7	56.0	55.8	93.8	333.8	216.0	215.0	204.8	636.3	582.4	227.8	2,785.8
1989	245.5	168.8	105.7	56.9	231.0	211.0	114.3	106.2	133.4	326.2	128.6	57.5	1,885.1
1990	223.8	12.3	6.0	26.4	164.8	244.9	195.8	112.5	205.6	502.9	284.6	49.3	2,028.9
1991	105.8	148.1	187.6	70.0	90.2	80.8	251.6	161.5	214.0	206.5	297.2	169.0	1,982.3
1992	35.2	17.6	2.5	6.4	65.6	118.2	280.2	190.1	106.5	294.0	*	*	1,116.3
Average	179.3	85.1	64.7	74.2	105.0	199.1	269.7	235.4	228.8	304.1	255.7	179.5	2,092.8

Table 2.14 Mean Monthly Rainfall in Tacloban Station

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1961	71.7	178.5	109.5	109.3	176.2	82.4	159.2	113.8	64.6	203.3	290.0	139.2	1,697.7
1962	211.7	237.8	201.4	83.7	205.9	74.7	131.8	185.0	257.1	48.9	195.9	189.3	2,023.2
1963	241.7	125.5	108.0	83.7	61.5	170.2	120.1	303.0	150.0	86.1	276.8	182.6	1,909.2
1964	172.9	377.4	77.2	190.5	68.0	134.7	95.4	50.3	149.3	194.8	349.3	151.4	2,011.2
1965	224.3	264.9	235.2	194.7	116.3	156.2	159.3	87.5	173.7	93.8	194.0	543.3	2,443.2
1966	99.4	126.7	98.3	33.6	297.9	100.3	242.7	131.9	65.0	150.7	125.4	407.0	1,878.9
1967	862.5	339.8	136.3	48.9	71.9	51.2	116.3	148.4	75.8	137.8	225.1	204.0	2,418.0
1968	197.6	164.2	80.0	29.5	40.6	102.7	59.8	72.5	230.7	136.8	343.9	285.7	1,744.0
1969	58.4	35.9	13.5	83.1	56.3	162.0	246.9	97.4	96.1	95.7	135.8	376.1	1,477.2
1970	204.8	321.2	167.6	64.9	88.5	125.7	172.4	92.2	225.7	344.5	390.4	254.9	2,452.8
1971	325.8	195.0	260.6	201.8	181.0	320.1	185.5	97.9	137.8	287.6	184.9	225.8	2,603.8
1972	587.0	49.9	252.2	94.8	171.0	142.6	73.3	211.7	177.4	127.7	285.6	234.9	2,408.1
1973	46.2	70.4	95.9	80.7	112.4	55.9	242.3	191.1	175.3	157.3	272.3	279.8	1,779.6
1974	169.0	238.3	77.9	92.5	277.8	209.6	116.6	27.6	49.6	234.0	190.0	411.8	2,094.7
1975	272.3	219.1	167.1	326.9	115.0	163.9	157.9	131.4	151.5	97.4	149.7	617.0	2,569.2
1976	365.7	220.3	224.1	100.2	136.0	191.4	149.7	124.6	108.2	175.8	187.8	362.9	2,346.7
1977	141.8	481.3	101.0	73.8	134.8	124.1	319.2	71.2	95.1	73.6	194.7	89.9	1,900.5
1978	203.6	235.3	156.5	320.6	120.6	150.0	60.8	122.6	372.2	81.1	187.6	600.0	2,610.9
1979	106.9	161.5	48.6	132.7	167.4	308.5	213.2	60.7	181.6	201.8	201.8	287.8	2,072.5
1980	408.3	260.3	75.4	153.7	66.2	296.6	121.7	375.5	45.5	143.7	481.3	256.5	2,684.7
1981	332.5	111.5	43.1	135.7	138.0	170.4	216.9	45.0	246.9	299.4	348.0	312.1	2,399.5
1982	170.7	252.8	354.0	101.2	102.3	221.5	134.9	192.9	124.7	149.8	103.7	190.3	2,098.8
1983	83.5	26.4	59.5	20.1	23.6	99.6	474.2	128.8	190.9	213.1	318.8	752.7	2,391.2
1984	492.5	465.4	195.8	72.0	169.1	161.1	96.0	89.6	174.9	140.2	458.6	508.5	3,023.7
1985	537.3	184.7	73.4	116.6	275.6	81.7	224.2	71.4	215.5	297.4	231.2	186.7	2,495.7
1986	556.8	130.5	279.3	293.5	86.1	184.7	106.2	163.4	177.8	438.3	360.5	102.2	2,879.3
1987	206.7	169.0	69.8	29.6	22.8	172.4	215.0	284.2	64.0	201.8	581.5	235.5	2,252.3
1988	113.8	94.6	89.3	113.3	104.7	219.3	128.1	149.8	321.5	466.4	563.7	535.9	2,900.4
1989	597.8	330.1	309.7	149.6	334.0	198.3	102.0	187.2	106.1	289.8	191.5	124.5	2,920.6
1990	388.3	53.6	28.2	35.1	351.4	190.8	169.1	57.2	239.8	348.2	329.9	110.8	2,302.4
1991	3.1	20.0	48.4	26.4	8.2	357.9	371.5	703.3	76.7	94.1	123.4	37.8	1,870.8
Average	272.7	198.1	136.7	115.9	138.1	167.1	173.6	153.8	158.7	193.9	274.0	296.7	2,279.4

Table 2.15 Maximum Discharge and Mean Monthly Discharge in the Master Plan Area

No.	City	River	Catchment Area (km ²)	Mean Monthly Discharge Distribution (m ³ /s)												Annual Average Discharge (m ³ /s)	Annual Maximum Discharge (m ³ /s)	Specific Discharge (m ³ /s/km ²)	Observation Period	
				Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.					
1.	Iloilo	Sibalom	117.0	1.3	0.8	0.6	0.5	0.8	1.7	1.0	1.6	10.2	4.3	1.9	2.6	2.3	230.0	2.0	1971-1979	
		Inabasan	97.0	0.4	0.2	0.3	0.0	0.5	0.8	2.8	0.4	0.9	1.5	1.4	0.9	0.8	121.9	1.3	1971-1980	
		Jalaur	1,065.0	33.9	32.9	13.4	35.2	63.9	150.5	160.4	95.6	240.4	153.8	108.7	145.1	102.8	1,504.0	1.4	1971-1980	
		Jalaur	1,499.0	31.8	37.5	12.0	43.7	72.0	123.0	79.8	54.6	92.0	159.8	73.7	65.6	70.5	1,625.0	1.1	1971-1978	
2.	Cebu	Pitogo	40.0	0.9	0.9	0.2	0.2	0.2	0.5	0.3	0.2	0.2	0.4	0.8	0.7	0.5	14.4	0.4	1971-1977	
		Mananga	63.8	1.6	1.1	0.9	0.9	1.1	2.4	3.2	3.6	4.1	5.8	5.7	1.7	2.7	237.4	3.7	1980-1989	
3.	Taaloban	Calingcaguig	128.0	9.1	8.1	7.3	8.2	5.8	6.0	6.2	5.3	5.5	6.8	7.0	8.9	7.0	131.6	1.0	1971-1978	
		Mainit	98.0	11.7	8.9	6.9	8.2	4.5	5.8	4.1	3.6	6.2	7.8	9.1	12.1	7.4	583.2	6.0	1971-1980	
		Lingayon	10.0	1.8	1.0	1.3	1.3	0.8	1.0	1.2	1.1	1.1	0.7	1.0	1.2	1.9	1.2	48.5	4.9	1971-1980
		Dapdap	30.0	2.0	1.7	1.5	1.5	1.2	1.1	1.1	0.9	0.9	1.1	1.4	2.1	2.4	1.5	18.5	0.6	1971-1980
4.	Ormoc	Mas-in	22.0	1.9	1.0	0.6	0.5	1.0	1.8	2.6	1.7	4.3	4.7	3.9	3.1	2.3	36.8	1.7	1971-1980	
		Baleon	19.0	0.8	0.7	0.7	0.7	0.9	1.0	1.0	1.0	0.8	1.0	0.9	0.9	0.9	42.3	2.2	1971-1980	
		Bao	65.0	1.2	1.0	0.9	0.8	0.6	0.8	1.1	1.0	1.0	1.2	0.9	1.2	1.1	133.8	2.1	1971-1980	

Source: Philippine Water Resources Summary Data (1991)

Table 2.16 Streamflow Gauging Stations in the Master Plan Area

Urban Center	River/ Station	Catchment Area (km ²)	Latitude	Longitude	Collected Record Period	Related Organization
Iloilo	Jalaur-1	1,499	10 55' 50"N	122 40' 10"E	1984-88	DPWH
	Jalaur-2	534	11 06' 15"N	122 37' 40"E	1986-88	DPWH
	Jalaur-3	169	11 07' 15"N	122 31' 45"E	1985-88	DPWH
	Sibalom-1	635	10 48' 30"N	121 59' 15"E	1980-81	DPWH
	Sibalom-2	619	10 48' 30"N	121 51' 25"E	1984-88	DPWH
	Sibalom-3	117	10 44' 24"N	122 24' 10"E	1973-79	DPWH
	Sibalom-4	103	10 46' 02"N	122 23' 30"E	1985-88	DPWH
	Inabasan	97	10 50' 23"N	122 26' 55"E	1973-82	DPWH
Cebu	Pitongo	40	10 22' 42"N	123 57' 38"E	1973-77	DPWH
	Carcar	24	10 07' 52"N	123 36' 05"E	1984-89	DPWH
	Mananga	64	10 18' 57"N	123 49' 05"E	1980-89	MCWD
Ormoc	Mas-in	22	11 03' 52"N	124 30' 48"E	1973-80	DPWH
	Baleon	19	11 06' 41"N	124 34' 20"E	1973-80	DPWH
	Bao	65	11 08' 12"N	124 35' 52"E	1973-80	DPWH
Tacloban	Calingcaguig	128	11 18' 45"N	124 45' 10"E	1973-78	DPWH
	Mainit	98	11 13' 21"N	124 49' 30"E	1973-80	DPWH
	Lingayon	10	11 11' 10"N	124 51' 45"E	1973-80	DPWH
	Dap Dap	30	11 13' 00"N	124 51' 00"E	1973-80	DPWH

Note : DPWH : Department of Public Works and Highways

MCWD : Metropolitan Cebu Water District

Table 3.1 Estimation of Specific Sediment Discharge

{River}/ Location {City}/ River	Catchment Area (km ²)	Annual Mean Rain (mm)	Mean Elevation of Basin (EL. m)	Relief Ratio *1	Geological Condition	Specific Sediment Yield (m ³ /yr/km ²)	Remarks *3 (m ³ /yr/km ²)
{Jalaur River}							
Calinog	120.0	2,600	450	0.0281	III *2	1,499.0	1,500.0
Passi	534.0	2,200	600	0.0324	III	1,299.0	1,348.0
{Iloilo}							
Jaro	412.1	1,743	20	0.0200	III	323.0	
Iloilo	93.1	1,672	565	0.0033	III	8.0	
{Cebu}							
Bulacao	10.7	1,768	220	0.0294	III	782.0	
Kinalumsan	17.8	1,552	180	0.0213	III	307.0	
Guadalupe	16.3	1,673	320	0.0232	III	451.0	
Lahug	6.3	1,628	220	0.0175	III	255.0	
Subang Daku	12.6	1,437	60	0.0188	III	187.0	
{Ormoc}							
Anilao	25.2	2,158	350	0.0351	III	1,655.0	
Malbasag	11.1	2,187	280	0.0455	III	2,855.0	
{Tacloban}							
Abucay	2.4	2,068	2	0.0040	III	18.0	
Mangonbangon	4.9	2,021	5	0.0013	III	2.0	
Burayan	6.5	2,016	5	0.0006	III	0.4	

Note : *1 = Relief ratio is the difference in height between the highest point along the main water course and the outlet of valley in the watershed divided by the length of the main watershed.

*2 = Watershed mainly comprises new sedimentary rocks (Tertiary and Quaternary strata and volcanic detrious).

*3 = Annual sediment yield based on the comprehensive sedimentation study conducted by the NIA for the Jalaur Multi-purpose Project.

Table 4.1 Recorded Maximum Rainfall at Iloilo Station
(1961-1991)

Year	Daily Rainfall (mm)	Date	2 Days Rainfall (mm)	Date	3 Days Rainfall (mm)	Date
1961	154.7	Jul 17	200.7	Jul 16-17	232.4	Aug 17-19
1962	154.7	Sep 04	252.5	Sep 03-04	277.4	Sep 03-05
1963	105.2	Aug 28	148.4	Aug 27-28	154.0	Aug 26-29
1964	156.5	Nov 19	172.8	Nov 18-19	187.0	Nov 18-20
1965	---		---		---	
1966	103.4	May 16	189.2	May 16-17	274.5	May 15-17
1967	100.2	Jun 09	157.4	Jun 08-09	157.4	Jun 08-10
1968	101.4	Nov 24	117.7	NOv 23-24	156.2	Aug 16-18
1969	---		---		---	
1970	107.7	Aug 14	150.8	Jun 22-23	177.5	Jun 22-24
1971	103.7	Aug 08	111.8	Aug 08-09	114.3	Aug 07-09
1972	103.5	Jul 22	160.0	Sep 10-11	202.0	Sep 10-12
1973	198.0	Nov 20	245.0	Nov 19-20	261.0	Nov 18-20
1974	122.5	Oct 16	171.0	Oct 15-16	191.8	Oct 14-16
1975	101.9	Jun 21	118.9	May 09-10	122.5	Jun 19-21
1976	303.0	Jul 18	347.2	Jul 18-19	393.4	Jul 18-20
1977	104.1	Sep 01	151.3	Sep 01-02	157.3	Sep 01-03
1978	93.4	Aug 25	120.9	Sep 27-28	178.6	Sep 25-27
1979	203.8	Aug 15	319.8	Aug 14-15	423.8	Aug 13-15
1980	115.6	Oct 20	139.3	Oct 20-21	158.8	Oct 20-22
1981	127.7	Sep 19	140.7	Sep 19-20	157.3	Sep 19-21
1982	112.3	Mar 26	172.0	Aug 22-23	244.2	Aug 21-23
1983	100.0	Sep 25	136.8	Nov 25-26	157.9	Nov 24-26
1984	255.6	Nov 05	259.7	Nov 04-05	259.7	Nov 04-06
1985	124.2	Jun 16	225.8	Oct 02-03	229.6	Oct 02-04
1986	152.8	Aug 06	188.0	Aug 17-18	204.7	Aug 16-18
1987	109.2	Sep 12	149.4	Jul 19-20	181.9	Sep 12-14
1988	97.0	Jun 04	144.7	Nov 06-07	172.6	Oct 08-10
1989	88.8	Aug 01	130.1	Aug 01-02	177.5	Aug 18-20
1990	179.9	Jun 14	283.3	Jun 13-14	306.3	Jun 13-15
1991	159.1	Aug 04	188.8	Aug 04-05	193.8	Aug 04-06
Average	127.1		170.8		196.9	

Table 4.2 Recorded Maximum Rainfall at Lahug Station
(1941-1991)

Year	Daily Rainfall (mm)	Date	2 Days Rainfall (mm)	Date	3 Days Rainfall (mm)	Date
1949	98.3	Jul 06	125.5	Jul 06-07	153.4	Nov 04-06
1950	118.9	Sep 02	195.9	Sep 02-03	207.8	Sep 02-04
1951	321.6	Dec 09	329.2	Dec 09-10	333.8	Dec 09-11
1952	165.1	Jul 02	196.6	Jul 01-02	206.8	Jul 01-03
1953	138.9	Dec 05	154.4	Dec 05-06	185.6	Dec 04-06
1954	92.5	Sep 28	131.9	Sep 27-28	156.3	Sep 27-29
1955	87.9	Jul 08	118.6	Jul 08-09	126.4	Nov 27-29
1956	62.7	Jul 05	88.2	Aug 08-09	104.2	Aug 07-09
1957	97.8	Feb 01	152.7	Feb 01-02	153.2	Feb 01-03
1958	53.1	Jul 01	67.5	Dec 05-06	70.5	Dec 05-07
1959	80.3	Aug 12	130.6	Aug 11-12	136.2	Aug 11-13
1960	125.5	Apr 21	132.1	Apr 20-21	134.9	Apr 20-22
1961	87.4	Jul 20	89.2	Jul 20-21	95.8	Oct 15-17
1962	93.2	Aug 07	97.8	Aug 07-08	98.1	Aug 06-08
1963	62.7	Sep 23	76.8	Jun 24-25	79.6	Jun 24-26
1964	119.1	Nov 19	169.9	Nov 18-19	187.0	Nov 17-19
1965	80.1	Aug 21	87.3	Aug 21-22	88.3	Aug 21-23
1966	61.5	Nov 25	94.4	Jul 26-27	122.6	Jul 26-28
1967	112.3	Jan 18	195.5	Jan 18-19	212.5	Jan 17-19
1968	81.7	Nov 19	145.7	Nov 18-19	145.7	Nov 18-20
1969	46.2	Jul 07	79.3	Aug 29-30	79.6	Aug 28-30
1970	82.1	Jun 30	105.7	Jul 22-23	127.0	Jul 22-24
1971	101.3	Sep 24	115.3	Sep 23-24	117.1	Sep 23-25
1972	79.0	Jan 08	154.4	Jan 07-08	154.4	Jan 07-09
1973	127.9	Nov 19	209.6	Nov 18-19	253.4	Nov 18-19
1974	102.2	Oct 18	102.7	Oct 18-19	102.7	Oct 17-19
1975	75.7	Sep 29	110.0	Oct 16-17	114.4	Sep 28-30
1976	101.0	Sep 03	107.0	Sep 02-03	128.8	Jul 08-10
1977	74.5	Nov 09	84.2	Aug 27-28	93.9	Aug 26-28
1978	98.5	Jan 02	107.0	Sep 18-19	160.1	Sep 18-20
1979	81.5	Jun 27	102.6	Oct 18-19	156.1	Jun 27-29
1980	86.7	Aug 23	160.4	Aug 22-23	160.4	Aug 22-24
1981	103.2	Oct 11	131.6	Oct 10-11	158.6	Oct 09-11
1982	160.0	Mar 26	185.8	Mar 25-26	188.6	Mar 24-26
1983	71.4	Jul 22	79.4	Jul 22-23	123.2	Sep 30-Oct 01
1984	66.8	Jun 22	81.8	Nov 04-05	99.3	Jun 22-24
1985	79.5	May 12	82.9	May 11-12	113.1	Jul 08-09
1986	63.1	Oct 11	99.8	Oct 10-11	103.4	Oct 10-12
1987	77.0	Oct 01	90.5	Nov 30-Oct 01	113.6	Nov 14-16
1988	136.0	Nov 02	199.0	Nov 01-02	203.8	Nov 01-03
1989	61.0	May 22	61.0	May 22-23	65.5	Oct 09-11
1990	139.7	Nov 12	192.7	Nov 12-13	223.5	Nov 11-13
1991	64.2	Jun 12	71.0	Jun 25-26	74.2	Jun 25-27
Average	98.1		127.8		142.2	

Table 4.3 Recorded Maximum Rainfall at Merida Station
(1971-1991)

Year	Daily Rainfall (mm)	Date	2 Days Rainfall (mm)	Date	3 Days Rainfall (mm)	Date
1971	217.1	Jun 24	260.5	Jun 24-25	273.7	Jun 23-25
1972	257.8	Jan 08	351.3	Jan 07-08	369.1	Jan 06-08
1973	165.6	Oct 04	192.3	Oct 04-05	218.7	Oct 03-05
1974	149.6	Oct 31	200.1	Oct 30-31	200.1	Oct 29-31
1975	101.6	Oct 28	125.8	Oct 28-29	155.7	Oct 26-28
1976	76.2	Jul 10	106.4	Jul 10-11	112.0	Jul 10-12
1977	81.0	Jul 16	131.6	Jul 06-07	154.5	Jul 06-08
1978	139.0	Apr 20	224.1	Apr 19-20	239.1	Apr 19-21
1979	174.3	Apr 15	210.1	Apr 14-15	224.8	Apr 14-16
1980	117.9	Sep 06	169.0	Sep 06-07	176.6	Sep 05-07
1981	111.8	Sep 24	111.8	Sep 24-25	189.9	Jan 25-27
1982	259.1	Aug 19	357.7	Aug 19-20	374.7	Aug 18-20
1983	179.6	Jul 13	306.6	Jul 13-14	353.6	Jul 12-14
1984	90.2	Nov 04	133.4	Nov 04-05	135.2	Nov 03-05
1985	84.8	Jan 15	133.9	Jan 15-16	161.1	Jan 15-17
1986	112.8	Aug 12	192.3	Aug 11-12	253.8	Aug 11-13
1987	127.0	Nov 25	172.7	Aug 11-12	174.7	Aug 10-12
1988	216.2	Oct 23	396.0	Oct 23-24	416.0	Oct 22-24
1989	150.7	Oct 10	151.9	Oct 09-10	151.9	Oct 09-11
1990	70.0	Jan 08	105.2	Oct 04-05	161.2	Oct 03-05
1991	115.0	Nov 05	153.0	Nov 04-05	158.0	Nov 04-06
Average	142.7		199.3		221.6	

Table 4.4 Recorded Maximum Rainfall at Tacloban Station
(1961-1991)

Year	Daily Rainfall (mm)	Date	2 Days Rainfall (mm)	Date	3 Days Rainfall (mm)	Date
1961	77.2	Oct 17	89.9	Nov 20-21	99.6	Nov 19-21
1962	84.1	Jan 11	108.0	Sep 09-10	114.9	Sep 08-10
1963	106.7	Aug 12	150.4	Aug 11-12	153.2	Aug 11-13
1964	127.5	Nov 18	252.2	Nov 18-19	258.0	Nov 17-19
1965	96.1	Dec 15	150.5	Dec 15-16	168.6	Dec 14-16
1966	152.2	May 15	157.5	May 15-16	162.9	Jul 26-28
1967	147.1	Jan 13	237.2	Jan 18-19	343.9	Jan 17-19
1968	140.7	Nov 23	145.3	Nov 23-24	168.9	Nov 23-25
1969	79.7	Jul 16	97.1	Dec 21-22	99.1	Dec 21-23
1970	94.3	Oct 12	156.0	Feb 20-21	175.8	Feb 20-22
1971	116.0	Jun 24	152.4	Jun 24-25	171.4	Jun 24-26
1972	127.0	Jan 18	218.4	Jan 17-18	273.9	Jan 16-18
1973	94.3	Dec 26	104.4	Dec 25-26	124.3	Dec 24-26
1974	93.3	Feb 13	131.9	Dec 13-14	154.0	May 22-24
1975	120.9	Dec 13	148.1	Dec 12-13	184.2	Dec 11-13
1976	78.2	Jan 23	119.2	Jan 22-23	153.9	Jan 22-24
1977	126.2	Feb 16	190.0	Feb 16-17	209.6	Feb 15-17
1978	135.4	Apr 20	251.9	Apr 19-20	291.9	Apr 19-21
1979	106.2	Jun 17	121.4	May 11-12	130.8	May 11-13
1980	134.9	Nov 11	155.5	Jan 15-16	190.6	Jan 14-16
1981	109.3	Sep 24	131.9	Dec 02-03	202.0	Dec 02-04
1982	94.7	Mar 25	165.3	Mar 25-26	188.7	Mar 24-26
1983	145.3	Jul 13	233.0	Dec 24-25	299.9	Dec 24-26
1984	163.6	Dec 30	243.9	Dec 30-31	243.9	Dec 29-31
1985	151.5	Jan 16	208.6	Jan 15-16	226.9	Jan 15-17
1986	109.7	Jan 25	153.4	Jan 24-25	170.5	Apr 05-07
1987	116.0	Aug 12	198.0	Aug 11-12	198.0	Aug 11-13
1988	167.9	Oct 23	258.8	Dec 16-17	309.0	Dec 16-18
1989	153.7	Feb 14	172.5	Feb 14-15	175.3	Feb 13-15
1990	129.1	Jan 08	196.7	Jan 07-08	206.4	Jan 07-09
1991	204.0	Mar 12	276.7	Mar 12-13	317.6	Mar 12-14
Average	122.0		173.4		199.0	

Table 4.5 Probable Maximum Daily Rainfall at Iloilo City

(Unit: mm)						
Return Period (Year)	Iwai Method	Thomas Method	Hazen Method	Ishinara- Takase Method	Gumbel Method	Average
2	121.1	128.8	128.8	121.5	128.3	125.7
5	159.6	168.5	164.9	160.3	179.5	166.6
10	191.7	193.9	187.7	192.8	213.3	195.9
20	227.3	217.8	208.8	229.2	245.9	225.8
30	250.0	231.4	220.7	252.5	264.6	243.8
50	280.7	248.2	235.4	284.1	287.9	267.3
70	302.5	259.2	245.0	306.4	303.3	283.3
100	326.7	270.8	255.1	331.4	319.5	300.7
150	355.9	283.9	266.5	361.6	337.8	321.1
200	377.7	293.2	274.5	384.3	350.9	336.1
500	453.5	322.9	300.0	463.0	392.3	386.3

Table 4.6 Probable Maximum Daily Rainfall at Lahug Airport

(Unit: mm)						
Return Period (Year)	Iwai Method	Thomas Method	Hazen Method	Ishinara- Takase Method	Gumbel Method	Average
2	91.5	92.8	92.8	86.2	92.4	91.1
5	123.5	125.6	123.4	108.2	137.8	123.7
10	145.7	147.1	143.2	132.2	168.0	147.2
20	167.5	167.7	162.0	164.1	196.8	171.6
30	180.4	179.5	172.7	187.0	213.4	186.6
50	196.7	194.2	186.1	221.1	234.2	206.5
70	207.7	204.0	194.8	247.1	247.8	220.3
100	219.4	214.3	204.1	278.0	262.2	235.6
150	232.9	226.0	214.6	317.6	278.6	253.9
200	242.6	234.4	222.1	349.0	290.1	267.6
500	274.4	261.3	246.1	468.6	327.0	315.5

Table 4.7 Probable Maximum Daily Rainfall at Merida Station

Return Period	Iwai Method	Thomas Method	Hazen Method	Ishinara- Takase Method	Gumbel Method	(Unit: mm)
						Average
2	130.7	134.3	137.1	134.1	134.4	134.1
5	184.2	193.6	187.7	185.3	193.6	188.9
10	221.7	234.4	221.2	218.1	232.9	225.7
20	259.1	274.5	253.3	248.8	270.5	261.2
30	281.2	298.0	271.8	266.3	292.1	281.9
50	309.5	327.9	295.0	287.8	319.2	307.9
70	328.5	347.8	310.3	302.0	336.9	325.1
100	349.0	369.2	326.6	316.9	355.7	343.5
150	372.6	393.7	345.1	333.8	377.0	364.4
200	389.7	411.5	358.4	345.8	392.0	379.5
500	445.9	469.1	401.1	383.9	440.0	428.0

Table 4.8 Probable Maximum Daily Rainfall at Tacloban

Return Period	Iwai Method	Thomas Method	Hazen Method	Ishinara- Takase Method	Gumbel Method	(Unit: mm)
						Average
2	119.9	119.9	122.4	119.1	117.5	119.8
5	146.1	148.1	146.8	145.9	147.6	146.9
10	161.2	165.4	161.5	161.8	167.5	163.5
20	174.5	181.2	174.6	176.1	186.6	178.6
30	181.7	190.0	181.9	183.9	197.6	187.0
50	190.2	200.7	190.8	193.3	211.3	197.3
70	195.7	207.7	196.5	199.4	220.4	203.9
100	201.3	215.0	202.4	205.7	229.9	210.9
150	207.5	223.1	209.0	212.7	240.7	218.6
200	211.9	228.9	213.6	217.6	248.4	224.1
500	225.1	246.9	228.0	232.8	272.7	241.1

Table 4.9 Rainfall Intensity-Duration-Frequency Data in the Master Plan Area

Iloilo City		(Unit : mm/hr)							
Duration (min)	Return Period								
	2-year	5-year	10-year	15-year	20-year	25-year	50-year	100-year	
5	134.4	170.4	194.4	208.8	217.2	225.6	247.2	270.0	
10	108.0	141.0	163.2	175.8	184.2	190.8	211.8	232.2	
15	96.4	121.2	137.6	147.2	153.6	158.8	174.0	189.2	
30	71.8	92.0	105.4	113.0	118.2	122.4	134.8	147.4	
60	45.8	59.3	68.2	73.2	76.8	79.5	87.8	96.1	
120	29.0	38.0	44.0	47.4	49.8	51.6	57.2	62.8	
180	21.6	27.1	30.8	32.8	34.3	35.4	38.8	42.2	
360	13.1	18.0	21.2	23.0	24.3	25.3	28.3	31.3	
720	7.7	11.7	14.4	15.9	17.0	17.8	20.3	22.8	
1440	4.5	7.2	9.0	10.0	10.8	11.3	13.0	14.7	

Cebu Lahug Station		(Unit : mm/hr)							
Duration (min)	Return Period								
	2-year	5-year	10-year	15-year	20-year	25-year	50-year	100-year	
5	144.0	183.6	210.0	225.6	236.4	243.6	268.8	294.0	
10	115.8	146.4	166.2	177.6	185.4	191.4	210.6	229.2	
15	105.6	134.8	154.0	164.8	172.8	178.4	196.8	214.8	
30	77.6	100.8	116.2	124.8	130.8	135.6	150.0	164.2	
60	50.2	67.1	78.3	84.6	89.0	92.4	102.9	113.3	
120	30.9	45.3	54.9	60.3	64.1	67.0	76.0	84.9	
180	21.9	34.2	42.4	47.0	50.2	52.7	60.3	67.9	
360	12.2	19.9	25.0	27.9	29.9	31.5	36.3	41.0	
720	6.7	11.2	14.2	15.9	17.0	18.0	20.8	23.5	
1440	3.7	6.1	7.7	8.6	9.2	9.7	11.2	12.7	

Tacloban City		(Unit : mm/hr)							
Duration (min)	Return Period								
	2-year	5-year	10-year	15-year	20-year	25-year	50-year	100-year	
5	150.0	174.0	190.8	200.4	206.4	211.2	226.8	242.4	
10	100.8	118.2	129.6	136.2	140.4	144.0	154.8	165.6	
15	91.2	104.4	113.2	118.4	121.6	124.4	132.8	140.8	
30	67.2	78.6	86.0	90.2	93.0	95.4	102.4	109.2	
60	43.1	51.6	57.2	60.3	62.5	64.2	69.5	74.7	
120	26.3	32.8	37.1	39.5	41.2	42.5	46.5	50.5	
180	20.3	26.4	30.4	32.7	34.3	35.5	39.2	43.0	
360	11.3	15.2	17.8	19.3	20.3	21.1	23.5	25.9	
720	7.3	10.2	12.2	13.3	14.1	14.7	16.6	18.4	
1440	4.6	6.9	8.4	9.2	9.8	10.3	11.7	13.1	

Source : Rainfall Intensity-Duration-Frequency Data of the Philippines (PAGASA 1981)

Table 4.10 Results of Rainfall Intensity Analysis at Cebu Station

Return Period : 2-year

(Unit : mm/hr)

Duration (min)	PAGASA	Talbot Formula	Sherman Formula	Kuno-Ishiguro Formula
10	115.8	118.7	130.6	126.3
30	77.6	79.8	63.3	56.4
60	50.2	53.5	40.0	36.6
120	30.9	32.2	25.3	24.4
180	21.9	23.1	19.4	19.5
360	12.2	12.4	12.3	13.3
720	6.7	6.5	7.8	9.2
1440	3.7	3.3	4.9	6.4

Return Period : 10-year

(Unit : mm/hr)

Duration (min)	PAGASA	Talbot Formula	Sherman Formula	Kuno-Ishiguro Formula
10	166.2	168.2	187.5	181.5
30	116.2	126.2	99.2	95.0
60	78.3	91.8	66.3	64.7
120	54.9	59.4	44.4	44.6
180	42.4	43.9	35.1	36.0
360	25.0	24.6	23.5	25.1
720	14.2	13.1	15.7	17.6
1440	7.7	6.8	10.5	12.4

Return Period : 100-year

(Unit : mm/hr)

Duration (min)	PAGASA	Talbot Formula	Sherman Formula	Kuno-Ishiguro Formula
10	229.2	233.3	261.9	252.4
30	164.2	182.6	144.7	141.6
60	113.3	137.7	99.5	99.0
120	84.9	92.3	68.4	69.5
180	67.9	69.4	55.0	56.5
360	41.0	39.8	37.8	39.8
720	23.5	21.5	26.0	28.1
1440	12.7	11.2	17.9	19.8

Table 5.1 Subbasins of the Rivers in the Master Plan Area

Urban Center	River	Subbasin	Catchment	River		
			Area (km ²)	Length (km)		
Iloilo	Iloilo	IL-1	39.7	11.3		
		IL-2	27.5	13.5		
		IL-3	16.0	4.0		
		IL-4	9.9	9.6		
		Sub-total	93.1	38.4		
	Jaro	JA-1	117.8	23.4		
		JA-2	82.4	20.5		
		JA-3	13.1	12.4		
		JA-4	100.4	38.9		
		JA-5	66.4	15.5		
		JA-6	32.0	11.5		
	Sub-total	412.1	122.2			
	Cebu	Bulacao	BU-1	5.5	5.0	
BU-2			5.2	4.9		
Sub-total			10.7	9.9		
Kinalumsan		KI-1	10.6	7.5		
		KI-2	7.2	4.2		
		Sub-total	17.8	11.7		
Guadalupe		GU-1	14.4	6.6		
		GU-2	1.9	2.0		
		Sub-total	16.3	8.6		
Lahug		LA-1	4.4	5.7		
		LA-2	1.9	2.5		
		Sub-total	6.3	8.2		
Subang Daku		SU-1	6.4	4.8		
		SU-2	6.2	4.0		
		Sub-total	12.6	8.8		
Ormoc	Anilao	AN-1	8.4	5.5		
		AN-2	8.7	7.0		
		AN-3	1.2	1.8		
		AN-4	6.9	10.5		
		Sub-total	25.2	24.8		
	Malbasag	MA-1	5.6	5.7		
		MA-2	5.5	5.0		
		Sub-total	11.1	10.7		
		Tacloban	Burayan	BU-1	3.6	2.5
				BU-2	2.9	2.4
Sub-total	6.5		4.9			
Mangonbangon	MA-1	4.0	2.8			
	MA-2	0.9	2.5			
	Sub-total	4.9	5.3			
Abucay	AB-1	2.1	2.4			
	AB-2	0.3	0.5			
	Sub-total	2.4	2.9			

Table 5.2 Lag Time in the River Course

Urban Center	River Name	River Source	River Length (km)	River Slope	Kraven's Velocity (m/s)	Lag Time (min)	Design Lag Time (min)
Cebu	Bulacao	1	4.4	1/35	3.5	21	30
	Guadalupe	1	2.0	1/50	3.5	10	0
	Lahug	1	1.7	1/60	3.5	8	0
	Subang Daku	1	1.0	1/100	3.0	6	0
Ormoc	Anilao	1	6.1	1/50	3.5	29	30
		2	1.5	1/50	3.5	7	0
	Malbasag	1	4.8	1/30	3.5	23	30
Tacloban	Burayan	1	2.4	1/480	2.1	19	30
	Mangonbangon	1	2.5	1/500	2.1	20	30
	Abucay	1	0.5	1/100	3.0	3	0

**Table 5.3 (1/2) Design Discharge
(Iloilo & Cebu)**

City	Channel No.	Drainage Area (km ²)	Channel Length (m)	Drain Length (m)	Average Velocity (m/s)	Time of Convent. (min)	Rainfall Intensity (mm/hr)					Runoff Coeff.	Design Discharge (m ³ /s)					Spec. Discharge (m ³ /s/km ²)		
							1-yr	2-yr	3-yr	5-yr	10-yr		1-yr	2-yr	3-yr	5-yr	10-yr	3-yr	5-yr	
Iloilo	1. Ilogore Creek																			
	Is-1	8.02	3600	7500	1.2	114.2	19	35	39	48	57	0.44	18.7	34.0	38.5	47.1	55.8	4.8	5.9	
	Is-2	5.31	1300	3900	1.2	64.2	27	52	58	70	82	0.44	17.6	33.5	37.5	45.2	53.2	7.1	8.5	
	2. Bo. Obrero Creek																			
	Bo-1	3.89	800	4700	0.8	107.9	20	36	41	50	59	0.57	12.2	22.3	25.2	30.8	36.5	6.5	7.9	
	Bo-2	2.30	1300	3900	0.8	91.3	22	41	46	56	66	0.58	8.2	15.1	17.0	20.7	24.5	7.4	9.0	
	Bo-3	1.25	2600	2600	0.8	64.2	27	52	58	70	82	0.61	5.7	10.9	12.2	14.7	17.3	9.8	11.8	
	3. Rizal Creek																			
	Ri-1	0.50	2000	2000	1.2	37.8	35	69	77	91	107	0.61	2.9	5.9	6.5	7.7	9.0	13.0	15.5	
Cebu	1. Mabolo Creek																			
	Ma-1	2.78	3900	3900	3.0	31.7	33	78	89	105	124	0.68	20.5	44.0	49.7	58.5	#REF!	17.9	21.1	
	(Lahug Diversion)						-	-	-	-	-	-	-	(3.2)	(3.2)	(3.2)	(3.2)	3.2	-	-
	2. Lahug Tributary																			
	La-1	0.65	1000	1900	1.5	31.1	33	78	89	106	124	0.61	3.7	8.6	9.8	11.7	13.7	15.1	18.0	
	La-2	0.22	900	900	1.5	20.0	42	95	107	125	144	0.63	1.6	3.7	4.1	4.8	5.6	18.8	21.8	
	3. Tinago Creek																			
	Ti-1	1.10	400	2700	2.0	32.5	32	77	87	104	122	0.74	7.3	17.3	19.8	23.6	27.7	18.0	21.4	
	Ti-2	0.90	600	2300	2.0	29.2	35	81	92	109	128	0.77	6.7	15.6	17.7	21.0	24.5	19.7	23.3	
	Ti-3	0.43	1700	1700	2.0	24.2	38	88	100	117	136	0.80	3.7	8.4	9.5	11.2	13.0	22.2	26.0	
	4. Pabina Central - Kalubihan Drainage Main																			
	Pa-1	1.00		2250	3.5	20.7	41	94	106	123	143	0.80	9.2	20.9	23.5	27.4	31.7	23.5	27.4	
	5. Calamba Drainage Main																			
	Ca-1	0.79		2000	4.5	17.4	45	101	113	130	150	0.73	7.2	16.1	18.0	20.7	23.9	22.8	26.3	
	6. Sta. Teresita Village Drainage Main																			
	St.-1	3.80	200	3200	4.0	23.3	39	90	101	118	138	0.38	15.6	35.9	40.6	47.5	55.2	10.7	12.5	
	St.-2	2.94	3000	3000	4.0	22.5	40	91	103	120	139	0.33	10.7	24.5	27.7	32.3	37.5	9.4	11.0	
	7. Basak-san Nicolas Drainage Main																			
	Bas-1	0.67		1200	4.5	14.4	49	107	119	136	157	0.69	6.2	13.7	15.3	17.5	20.1	22.8	26.1	
8. Sto. Nino Creek																				
Sto.-1	5.11	600	5200	2.0	53.3	23	58	67	82	98	0.42	14.0	34.4	39.8	48.9	58.2	7.8	9.6		
Sto.-2	3.82	4600	4600	2.0	48.3	25	61	71	86	103	0.37	9.9	24.1	27.8	33.9	40.3	7.3	8.9		
9. Barangay Inayawan Drainage Channel																				
Bar.-1	1.29		1600	3.0	18.9	43	98	110	127	147	0.66	10.2	23.1	25.9	30.0	34.7	20.1	23.3		

**Table 5.3 (2/2) Design Discharge
(Ormoc & Tacloban)**

City	Channel No.	Drainage Area (km ²)	Channel Length (m)	Drain Length (m)	Average Velocity (m/s)	Time of Concen. (min)	Rainfall Intensity (mm/hr)					Runoff Coeff.	Design Discharge (m ³ /s)					Spec. Discharge (m ³ /s/km ²)	
							1-yr	2-yr	3-yr	5-yr	10-yr		1-yr	2-yr	3-yr	5-yr	10-yr	3-yr	5-yr
Ormoc																			
	1. Lotao Creek																		
	Lot-1	1.03	500	1700	1.7	26.7	26	48	58	68	229	0.49	3.6	6.8	8.1	9.5	32.1	7.8	9.3
	Lot-2	0.44	1200	1200	1.7	21.8	29	54	64	76	259	0.54	1.9	3.6	4.2	5.0	17.1	9.7	11.4
	2. City Proper Creek																		
	Cit-1	0.32	900	900	2.2	16.8	33	62	74	87	303	0.69	2.0	3.8	4.5	5.4	18.6	14.2	16.8
Tacloban																			
	1. Abucay River																		
	Abu-1	2.38	2400	2400	1.2	43.3	40	63	68	77	87	0.44	11.6	18.2	19.8	22.5	25.4	8.3	9.5
	2. Naga-naga Creek																		
	Nag-1	1.21	600	2800	1.0	56.7	33	53	59	67	76	0.48	5.4	8.6	9.4	10.8	12.3	7.8	9.0
	Nag-2	1.00	2200	2200	1.0	46.7	38	60	65	75	84	0.48	5.1	8.0	8.7	9.9	11.2	8.7	9.9
	3. Mangonbangon River																		
	Man-1	5.12	4900	4900	1.4	68.3	29	47	52	60	69	0.45	18.8	30.3	33.3	38.5	43.9	6.5	7.5
	4. Langhas Lirang Creek																		
	Lan-1	4.38	4100	4100	1.3	62.6	31	50	55	63	72	0.47	17.9	28.7	31.5	36.3	41.3	7.2	8.3
	5. Sagkaban Creek																		
	Sag-1	0.14	500	500	1.5	15.6	66	98	104	114	125	0.62	1.6	2.4	2.5	2.7	3.0	18.0	19.6
	6. Pleasantville Creek																		
	Ple-1	1.25	500	1600	1.0	36.7	44	68	74	84	94	0.52	7.9	12.4	13.4	15.1	17.0	10.7	12.1
	Ple-2	0.88	600	1100	1.0	28.3	51	78	84	93	104	0.49	6.1	9.3	10.0	11.2	12.5	11.4	12.7
	Ple-3	0.37	500	500	1.0	18.3	62	92	99	108	120	0.45	2.9	4.3	4.6	5.0	5.5	12.4	13.6
	7. Burayan River																		
	Bur-1	6.90	5200	5200	0.8	118.3	19	32	35	42	48	0.43	15.9	26.2	29.1	34.3	39.6	4.2	5.0
	Bur-3	1.41	2300	2300	0.8	57.9	33	53	58	66	75	0.45	5.8	9.3	10.2	11.7	13.3	7.2	8.3

Table 6.1 Additional Hydrological Data

Urban Center	Station Name	Kind of Record	Related Organization	1993												1994				Note
				JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR						
Iloilo	S.Barbara	Rainfall	JICA-DPWH	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Delay of paper change	
	Jaro Br.	Water Level	JICA-DPWH	*****	***	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Accident of float	
	Iloilo	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Cabatuan	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Ornoc	Rainfall	JICA-DPWH	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Delay of paper change	
Cebu	Anilao Br.	Water Level	JICA-DPWH	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Paper override	
	Merida	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Tacloban	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Jaro	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Accident of rain gauge	
	PNOC-EDC	Rainfall	PNOC-EDC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Guadalupe	Rainfall	JICA-DPWH	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Colon Br.	Water Level	JICA-DPWH	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Mactan	Rainfall	PAGASA	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Adlaon-AR	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
	Bonbon-AR	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
Bonbon-M	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Bucauc	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Cambinocot	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Cambitas	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Camp 7-BFD	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Kansagahan	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Lusaran	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
RCPI	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Sinsin	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Tabunan	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Talamban-AR	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			
Talamban-M	Rainfall	USC-WRC	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****			

Note: ***** : available data

Table 6.2 (1/3) Daily Rainfall at JICA/DPWH Sta. Barbara Station

(Unit: mm)

DATE	JUN.93	JUL.93	AUG.93	SEP.93	OCT.93	NOV.93	DEC.93	JAN.94	FEB.94	MAR.94	APR.94
1		42.0	2.0	4.0	1.0	32.0	34.0	N	1.0	0.0	0.0
2		49.0	1.0	0.0	3.0	1.0	1.0	N	0.0	0.0	0.0
3		0.0	14.0	0.0	18.0	0.0	0.0	N	0.0	0.0	34.0
4	0.0	52.0	26.0	0.0	59.0	0.0	19.0	3.0	0.0	0.0	117.0
5	0.0	0.0	9.0	27.0	29.0	0.0	27.0	14.0	2.0	0.0	0.0
6	0.0	70.0	0.0	0.0	19.0	5.0	2.0	0.0	2.0	0.0	N
7	0.0	37.0	12.0	0.0	1.0	2.0	134.0	4.0	0.0	0.0	N
8	16.0	94.0	54.0	0.0	6.0	17.0	17.0	0.0	0.0	0.0	N
9	0.0	14.0	39.0	0.0	0.0	47.0	0.0	0.0	0.0	0.0	N
10	0.0	1.0	1.0	0.0	0.0	3.0	2.0	1.0	0.0	0.0	N
11	0.0	0.0	80.0	0.0	2.0	15.0	N	0.0	0.0	0.0	N
12	0.0	23.0	8.0	0.0	1.0	1.0	N	0.0	0.0	1.0	N
13	0.0	1.0	8.0	3.0	3.0	0.0	N	0.0	0.0	0.0	N
14	0.0	68.0	0.0	1.0	37.0	0.0	N	0.0	1.0	2.0	N
15	9.0	2.0	0.0	21.0	1.0	2.0	N	0.0	0.0	9.0	N
16	6.0	0.0	0.0	6.0	20.0	0.0	N	0.0	0.0	1.0	N
17	6.0	0.0	29.0	0.0	4.0	3.0	N	0.0	0.0	0.0	N
18	4.0	0.0	1.0	9.0	4.0	0.0	N	1.0	0.0	0.0	N
19	25.0	0.0	0.0	34.0	0.0	67.0	N	2.0	0.0	0.0	N
20	0.0	0.0	0.0	1.0	5.0	59.0	N	0.0	0.0	0.0	N
21	0.0	4.0	100.0	1.0	14.0	7.0	N	34.0	0.0	0.0	N
22	0.0	0.0	82.0	0.0	31.0	0.0	N	0.0	0.0	0.0	N
23	0.0	1.0	16.0	55.0	11.0	3.0	N	0.0	0.0	0.0	N
24	39.0	0.0	43.0	1.0	5.0	25.0	N	4.0	0.0	0.0	N
25	37.0	51.0	0.0	0.0	55.0	0.0	N	0.0	0.0	0.0	N
26	13.0	66.0	3.0	8.0	0.0	0.0	N	0.0	0.0	2.0	N
27	0.0	34.0	4.0	1.0	0.0	5.0	N	0.0	4.0	0.0	N
28	0.0	0.0	0.0	0.0	0.0	0.0	N	3.0	0.0	0.0	N
29	0.0	0.0	0.0	0.0	4.0	2.0	N	1.0	0.0	0.0	N
30	0.0	0.0	0.0	0.0	0.0	29.0	N	12.0	0.0	0.0	N
31		2.0	4.0		3.0		N	6.0			
TOTAL	155.0	611.0	536.0	172.0	336.0	325.0		85.0	10.0		15.0

N: not available

Table 6.2 (2/3) Daily Rainfall at JICA/DPWH Bagong Station

(Unit: mm)

DATE	JUN.93	JUL.93	AUG.93	SEP.93	OCT.93	NOV.93	DEC.93	JAN.94	FEB.94	MAR.94	APR.94
1		6.0	0.0	16.0	115.0	0.0	75.0				
2		5.0	93.0	0.0	5.0	0.0	0.0				
3		5.0	40.0	7.0	0.0	0.0	15.0				
4		61.0	48.0	44.0	15.0	0.0	36.0				
5		2.0	68.0	28.0	0.0	38.0	29.0				
6		2.0	0.0	14.0	0.0	0.0	0.0				
7		20.0	1.0	9.0	0.0	87.0	0.0				
8		16.0	36.0	0.0	14.0	8.0	88.0				
9		11.0	1.0	0.0	66.0	1.0	36.0				
10		51.0	0.0	13.0	1.0	0.0	1.0				
11		23.0	0.0	0.0	0.0	0.0	4.0				
12		0.0	0.0	0.0	8.0	0.0	0.0				
13		0.0	18.0	0.0	6.0	5.0	8.0				
14		0.0	25.0	0.0	15.0	1.0	37.0				
15		5.0	15.0	38.0	4.0	6.0	124.0				
16		8.0	0.0	8.0	0.0	7.0	32.0				
17		5.0	0.0	0.0	11.0	2.0	22.0				
18		78.0	0.0	0.0	22.0	0.0	0.0				
19		71.0	28.0	0.0	0.0	95.0	3.0				
20		0.0	20.0	90.0	N	5.0	10.0				
21		0.0	36.0	119.0	N	20.0	1.0				
22		27.0	21.0	162.0	N	14.0	147.0				
23		0.0	0.0	8.0	N	16.0	20.0				
24		7.0	2.0	0.0	0.0	21.0	56.0				
25		5.0	4.0	6.0	0.0	29.0	N				
26		4.0	46.0	4.0	4.0	4.0	N				
27		0.0	30.0	32.0	20.0	1.0	N				
28		0.0	1.0	28.0	6.0	1.0	N				
29		5.0	19.0	5.0	3.0	5.0	N				
30		18.0	0.0	140.0	7.0	98.0	N				
31		9.0	0.0	14.0	14.0	14.0	N				
TOTAL	233.0	477.0	787.0	362.0	477.0	715.0	744.0				

N : not available.

Table 6.2 (3/3) Daily Rainfall at JICA/DPWH Guadalupe E.S. Station

(Unit: mm)

DATE	JUN.93	JUL.93	AUG.93	SEP.93	OCT.93	NOV.93	DEC.93	JAN.94	FEB.94	MAR.94	APR.94
1		0.0	4.0	0.0	0.0	3.0	10.0	0.0	2.0	0.0	0.0
2		0.0	34.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
3		32.0	13.0	47.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
4		7.0	80.0	0.0	37.0	0.0	34.0	0.0	6.0	5.0	0.0
5		0.0	7.0	0.0	0.0	0.0	233.0	76.0	16.0	0.0	0.0
6		0.0	0.0	0.0	0.0	0.0	2.0	0.0	1.0	0.0	0.0
7		33.0	12.0	24.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0
8	0.0	32.0	1.0	125.0	13.0	0.0	1.0	1.0	0.0	1.0	0.0
9	0.0	7.0	0.0	6.0	3.0	28.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	6.0	0.0	41.0	32.0	21.0	0.0	0.0	0.0
11	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	18.0	0.0	0.0
13	13.0	0.0	0.0	0.0	16.0	9.0	0.0	0.0	0.0	1.0	0.0
14	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0
15	0.0	0.0	15.0	4.0	0.0	3.0	2.0	0.0	3.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0	0.0
17	2.0	0.0	6.0	38.0	5.0	0.0	0.0	4.0	0.0	0.0	0.0
18	1.0	0.0	0.0	4.0	12.0	3.0	0.0	23.0	0.0	0.0	0.0
19	6.0	0.0	0.0	72.0	33.0	58.0	3.0	5.0	0.0	0.0	0.0
20	0.0	23.0	0.0	16.0	7.0	96.0	1.0	50.0	0.0	0.0	0.0
21	9.0	25.0	61.0	0.0	77.0	0.0	1.0	15.0	0.0	0.0	0.0
22	0.0	5.0	45.0	0.0	74.0	3.0	61.0	2.0	0.0	0.0	0.0
23	0.0	0.0	3.0	4.0	98.0	13.0	24.0	0.0	0.0	0.0	0.0
24	0.0	43.0	0.0	0.0	0.0	7.0	13.0	15.0	0.0	0.0	0.0
25	51.0	0.0	1.0	2.0	0.0	4.0	0.0	5.0	0.0	0.0	0.0
26	1.0	1.0	12.0	1.0	0.0	1.0	162.0	18.0	0.0	0.0	0.0
27	0.0	0.0	0.0	37.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
28	0.0	0.0	8.0	57.0	0.0	27.0	20.0	38.0	0.0	0.0	0.0
29	40.0	0.0	8.0	0.0	0.0	9.0	22.0	0.0	0.0	0.0	0.0
30	2.0	0.0	0.0	27.0	3.0	53.0	0.0	4.0	0.0	0.0	0.0
31		0.0	0.0	0.0	0.0	0.0	0.0	139.0	0.0	0.0	0.0
TOTAL	129.0	209.0	310.0	471.0	381.0	359.0	651.0	416.0	66.0	66.0	66.0

Table 6.3 Daily Maximum rainfall at JICA/DPWH Colon Bridge Station

DATE	JUN. 93	JUL. 93	AUG. 93	SEP. 93	OCT. 93	NOV. 93	DEC. 93	JAN. 94	FEB. 94	MAR. 94	APR. 94
1		1.09	1.26	1.10	1.12	1.09	1.35	1.23	1.94	1.24	
2		1.09	1.47	1.10	1.09	1.08	1.26	1.23	1.80	1.24	
3		1.30	1.38	1.65	1.09	1.12	1.16	1.20	1.64	1.24	
4		1.24	2.05	1.15	1.75	1.08	1.50	1.20	1.50	1.24	
5		1.11	1.13	1.13	1.09	1.08	3.27	1.52	1.41	1.24	
6		1.11	1.08	1.13	1.08	1.08	1.96	1.40	1.38	1.24	
7	1.08	1.42	1.26	2.09	1.07	1.07	1.92	1.20	1.36	1.23	
8	1.08	1.66	1.27	2.51	1.31	1.08	1.90	1.20	1.32	1.23	
9	1.08	1.20	1.09	1.16	1.35	2.20	1.14	1.20	1.30	1.23	
10	1.09	1.14	1.09	1.42	1.07	1.65	2.10	1.64	1.29		
11	1.09	1.10	1.10	1.13	1.07	1.40	1.15	1.20	1.28		
12	1.12	1.11	1.09	1.08	1.06	1.28	1.15	1.20	1.27		
13	1.27	1.11	1.09	1.07	1.16	1.1	1.15	1.20	1.27		1.27
14	1.12	1.10	1.53	1.15	1.15	1.1	1.15	1.20	1.40		
15	1.14	1.10	1.10	1.27	1.07	1.09	1.15	1.20	1.50		
16	1.13	1.10	1.42	1.11	1.07	1.08	1.3	1.20	1.38		
17	1.20	1.10	1.11	1.57	1.28	1.07	1.15	1.20	1.30		
18	1.14	1.08	1.11	1.12	1.32	1.07	1.15	1.58	1.28		
19	1.30	1.08	1.11	2.05	1.45	1.46	1.15	1.20	1.28		
20	1.12	1.33	1.61	1.67	1.12	1.61	1.18	1.48	1.27		
21	1.35	1.81	1.58	1.20	1.52	1.45	1.15	1.61	1.27		
22	1.13	1.25	1.25	1.12	2.69	1.19	1.48	1.22	1.25		
23	1.11	1.09	1.14	1.13	2.51	1.45	1.30	1.20	1.25		
24	1.11	1.74	1.12	1.17	1.37	1.20	1.25	1.28	1.25		
25	1.70	1.09	1.20	1.18	1.17	1.19	1.15	1.29	1.25		
26	1.12	1.09	1.11	1.12	1.13	1.12	2.90	1.38	1.25		
27	1.11	1.10	1.26	1.79	1.10	1.11	1.89	1.28	1.24		
28	1.11	1.11	1.12	1.57	1.09	1.40	1.64	1.68	1.24		
29	1.60	1.10	1.11	1.11	1.22	1.38	1.48	1.25			
30	1.64	1.10	1.10	1.67	1.13	1.42	1.42	1.25			
31	1.11				1.08		1.75	2.2			

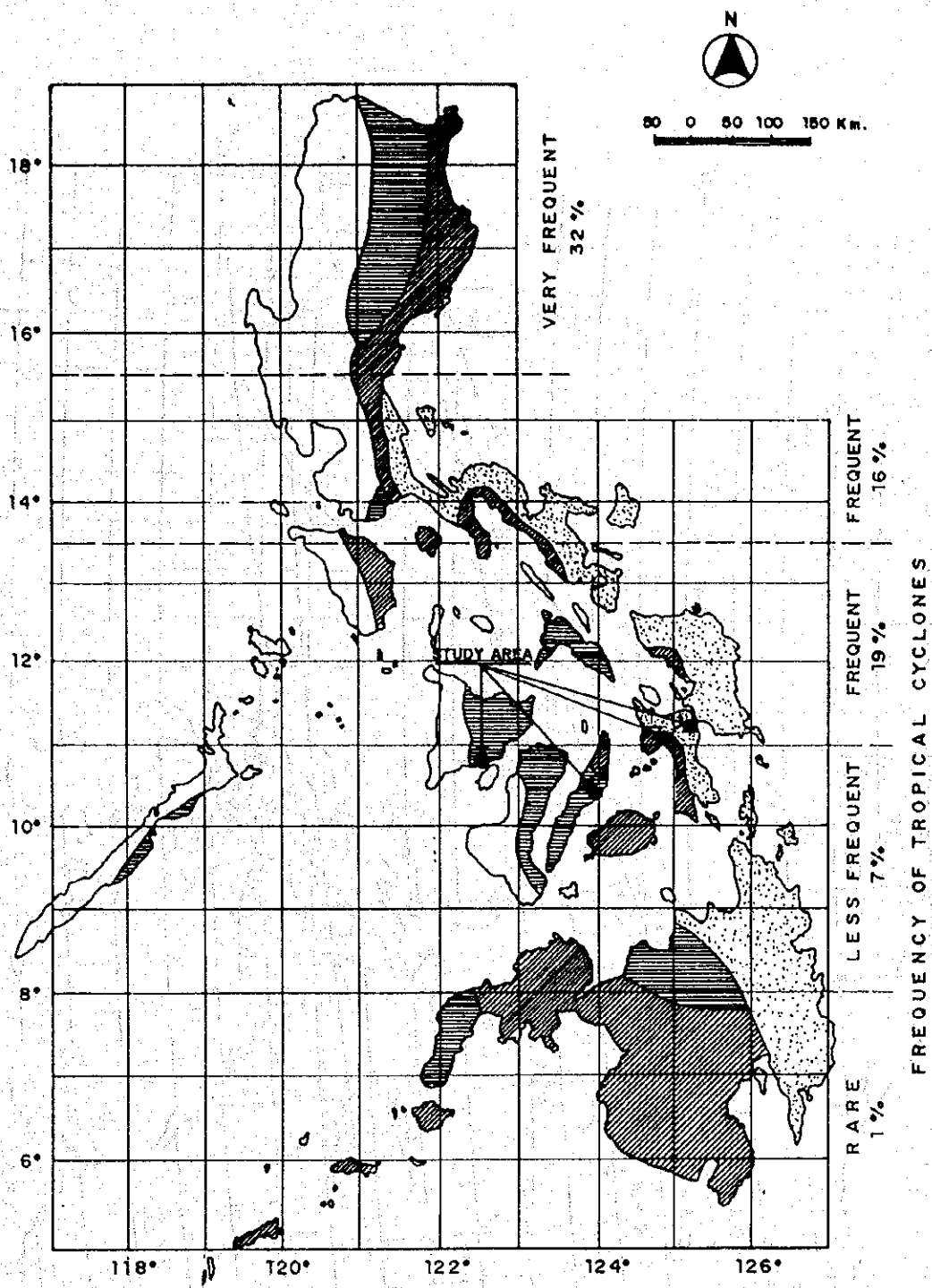
Table 6-4 (1/2) 1993 Tropical Cyclone Summary

Classification & Names	Period of Occurrence	Max Winds/Gust (kph), Obvy. Place	Max. 24hr-Rain (mm) Recorded & Place	Damage Reports
1) T.D. ATRING	Feb.28-Mar 02	37-Roxas City Feb.28 2pm	68.6-Mar. 07 Guiuan	
2) T.D. BINING	Apr.12-13		112.6-Apr. 12 Hinatuan 111.3-Apr. 13 Butunan	REGION IX Dead:3 Damaged Cost: Over P4,540M Destroyed were several houses, brgy roads and bridges
3) T.D. KURING	Apr. 24-27		81.5-Apr.25 Casiguran	
4) T.D. DALING	May 01-04		20.0-May 04 Butuan	
5) T.D. ELANG	June 17-20	40-2 pm-June18 (JFZL) ship	111.3-July 19 Munoz 105.4-July 20 Cabanatuan	
6) T.GORING	June 23-27 [KORYN-9302]	110-5am June 26 Tuguegarao 140 (Gusts) 4 am Casiguran June 26	533.6-June 25 Baguio City	Dead:75, Injured:13 Lost:121 Damage Cost: P2,774.453M
7) T.S. HULING	July 07-09	90-4:39pm July8 Daet	153.0-July 9 Roxas City	Dead:2 Injured:0 Lost:0 Damage Cost: P4.121M
8) T.S. IBIANG	July 13-17 [MARIAN]	45-July 15 (KRUG) ship	140.6-July 17 Vigan	
9) T.D.LUMING	July 20-23	40-8 am-July22 (JF7Y) ship	116.9-July21 Tacloban	
10) T.D. MILING	July 26		69.6-July 26 Iba 74.1-July 26 San Jose	
11) T.S. NARSING	July 27-28 [PERCY-9306]		92.8-July 27 Iba	
12) T. OPENG	Aug. 05-08 [ROBYN-9307]		161.8-Aug. 08 Iloilo 148.6-Aug.08 Iba	Casualties:0 Damage Cost: P0.015M
13) T.S. PINING	Aug. 11-12 [STEVE-9308]		75.6-Aug. 12 Iba	
14) T.S.RUBING	Aug.16-19 [TASHA-9309]	65 8 am Aug. 18 (9MB63) 173 (GUST)	177.9-Aug.18 Vigan 139.2-Aug. 18 Laoag	Dead:5, Injured:0 Lost:1 Damage Cost: P98.347M
15) T.S. SALIMG	Aug. 22-26 [WINONA-9312]	35-Roxas	254.6-Aug.22 Cuyo 98.0-Aug.21 Roxas City	Dead:4, Injured:1 lost:0 Damage Cost: P156.928M

Table 6-4 (2/2) 1993 Tropical Cyclone Summary

Classification & Names	Period of Occurrence	Max Winds/Gust (mph), Obsv. Place	Max. 24hr-Rain (mm) Recorded & Place	Damage Reports
16) T. TASING	Aug. 29-Sep. 02 [YANCY-9313]	85-8 am-Sep. 2 (47927) Miyakojima	76.8-Aug. 29 Laoag	
17) T.S. UNSING	Sep. 05-07 [ZOLA-9314]	75-8 am-Sep. 6 (3EBE9) ship	127.6-Sep. 07 Iba	
18) T. WALDING	Sept.08-12 [ABE-9315]	95-Basco 7 pm-Sep. 11	122.0-Sep. 08 Baguio	Casualties:0 Damage Cost: P1.318M
19) T.S.YEYENG	Sep.13-16 [BECKY-9316]	55-2 pm-Sep. 16 (JKPS) ship	361.8-Sep.15 Laoag 207.0-Sep. 15 Vigan	Casualties:0 Damage Cost: P37.737M
20) T.D. ANDING	Sep. 18-20	20-5 pm-Sep. 19 Virac	152.4-Sep.18 Romblon	
21) T.D.BINANG	Sep.21-22 (R23-27)	40-8 am-Sep. 24 (ICAC) ship	75.9-Sep. 21 Baler 50.0-Sep. 26 Alabat	
22) T. KADIANG	Sep. 30-Oct. 07 [FLO-9820]	115-11:50am-Oct. 04 Iba	238.3-Oct. 05 Itbayat 218.6-Oct. 04 Iba	Dead:126, Injured:37 Lost:26 Damage Cost: P8,752.316M
23) T. DINANG	Oct. 03-06 [ED-9319]	75-2 pm-Oct.05 (JQU) ship	no representable data	
24) T. S. EPANG	Oct. 06-08 (R-09-12)		94.4-Oct. 06 Baguio City	
25) T.S.GUNDANG	Oct. 08-10 [GENE-9321]	130-2 pm-Oct.28 (KIRH) ship	122.9-Oct. 07 Casiguran	
26) T. HUSING	Oct.28-Nov. 02 [INA-9323]	165-1:30pm-Nov.01 Casiguran	249.6-Oct.31 Virac Radar 165.5-Nov. 01 Baler	Dead:21, Injured:7 Lost:5 Damage Cost: P1,585.164M
27) T.S. INDANG	Nov.10-11 [GEANA-9324]	no representable data	62.4-Nov. 10 Virac Radar	
28) T.S. LURING	Nov.18-22 [KYLE-9325]	125-12:08N Guluan	144.8-Nov. 20 Malaybalay 137.0-Nov.20 Roxas City	Dead:8, Injured:1 Lost:4 Damage Cost: P27.680M
29) T.S. MONANG	Dec.03-06 [LOLA-9326]	175-8:15pm-Dec.05 Daet	246.8-Dec. 05 Alabat 206.1-Dec. 05 Infanta	Dead:273, Injured:607 Lost:90 Damage Cost: P2,339.577M
30) T. NANING	Dec. 06-13 [Manny-9327]	151-11:07am-Dec.10 Masubate	175.4-Dec.09 Masubate 147.9-Dec.10 Legaspi	Dead:93, Injured:579 Lost:10 Damage Cost: P1,389.460M
31) T.D. ONING	Dec. 14-17	40-8 am-(JCGC) Dec. 15	99.7-Dec.14 Virac Synop	
32) T. PURING	Dec.24-29 [NELL-9328]	151-10:45pm-Dec. 26 Mactan (98646)	233.9-Dec. 26 Surigao 207.0-Dec.27 Virac Synop	Dead:157, Injured:276 Lost:52 Damage Cost: P2,732.327M

FIGURES

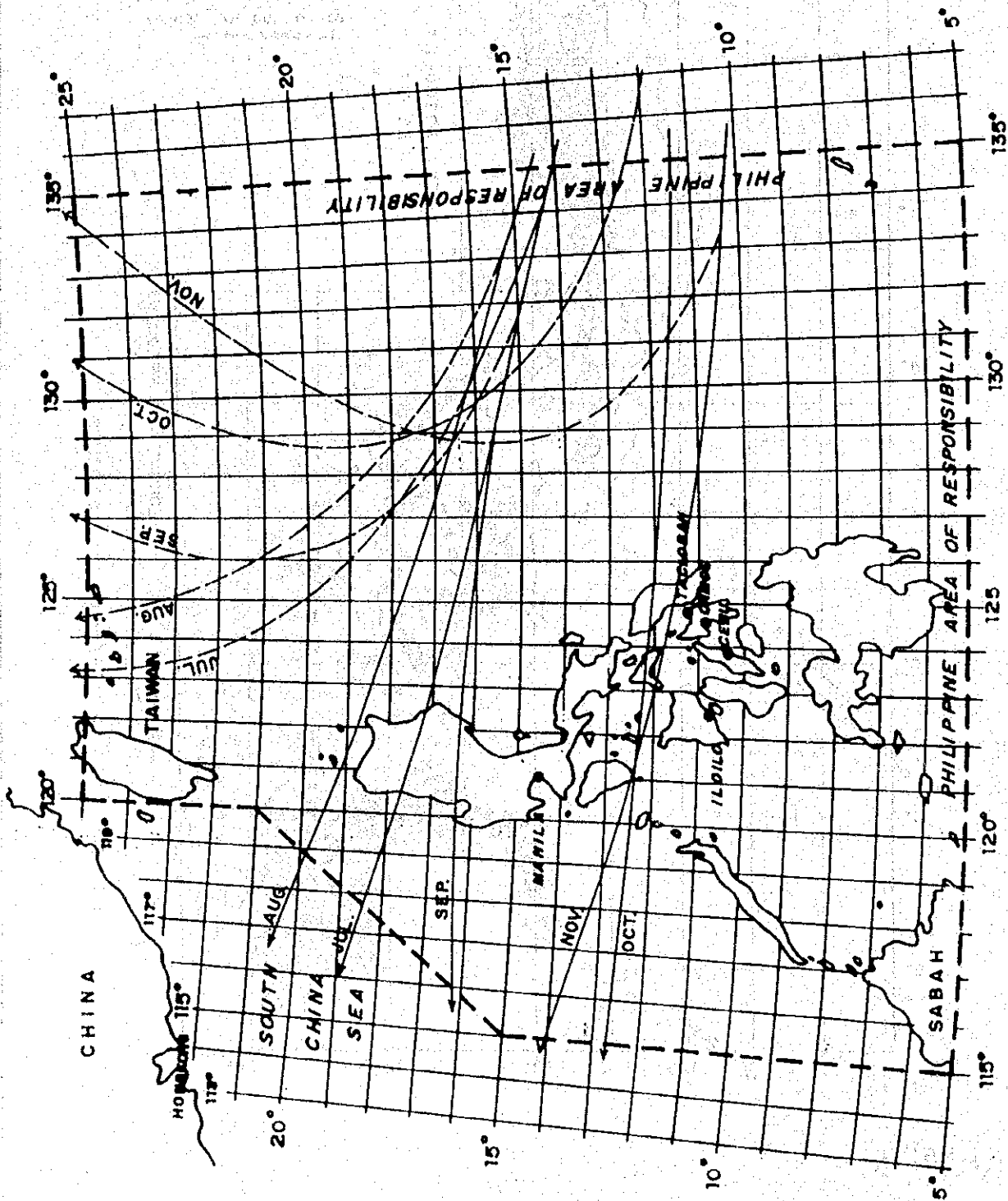


LEGEND :

- | | |
|---|--|
| <p>□ TYPE I - Two pronounced seasons: dry from Nov. to April, wet during the rest of the year.</p> <p>▤ TYPE II - No dry season with a very pronounced maximum rainfall from Nov. to Jan.</p> | <p>▨ TYPE III - Seasons not very pronounced, relatively dry from Nov. to April and wet during the rest of the year.</p> <p>▧ TYPE IV - Rainfall more or less evenly distributed throughout the year.</p> |
|---|--|

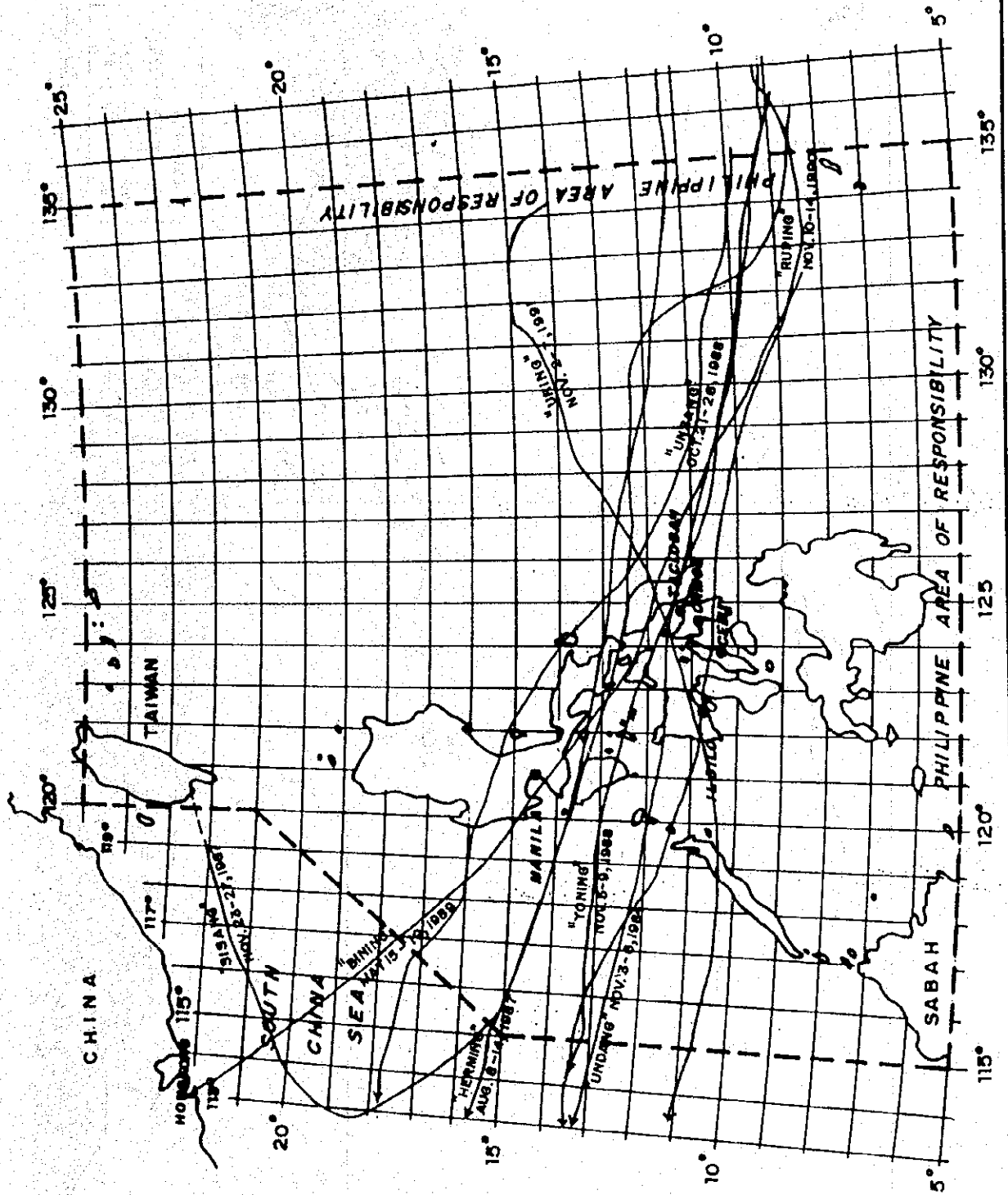
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
IN THE SELECTED URBAN CENTERS
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.1
Climate Classification



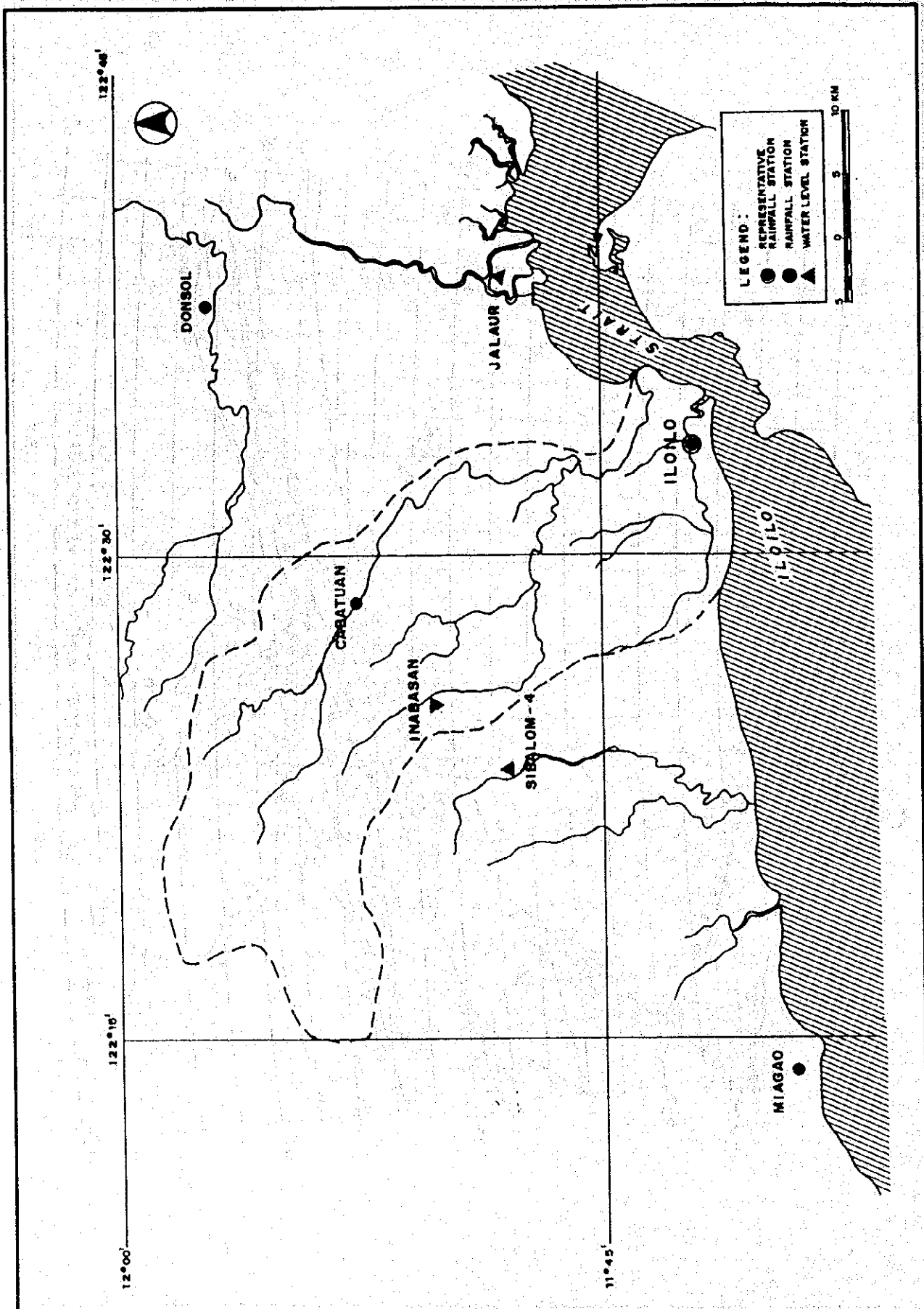
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
IN THE SELECTED URBAN CENTERS
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.2
Monthly Tracks of Tropical Cyclones Affecting the
Visayas



THE STUDY ON THE FLOOD CONTROL FOR RIVERS
 IN THE SELECTED URBAN CENTERS
 JAPAN INTERNATIONAL COOPERATION AGENCY

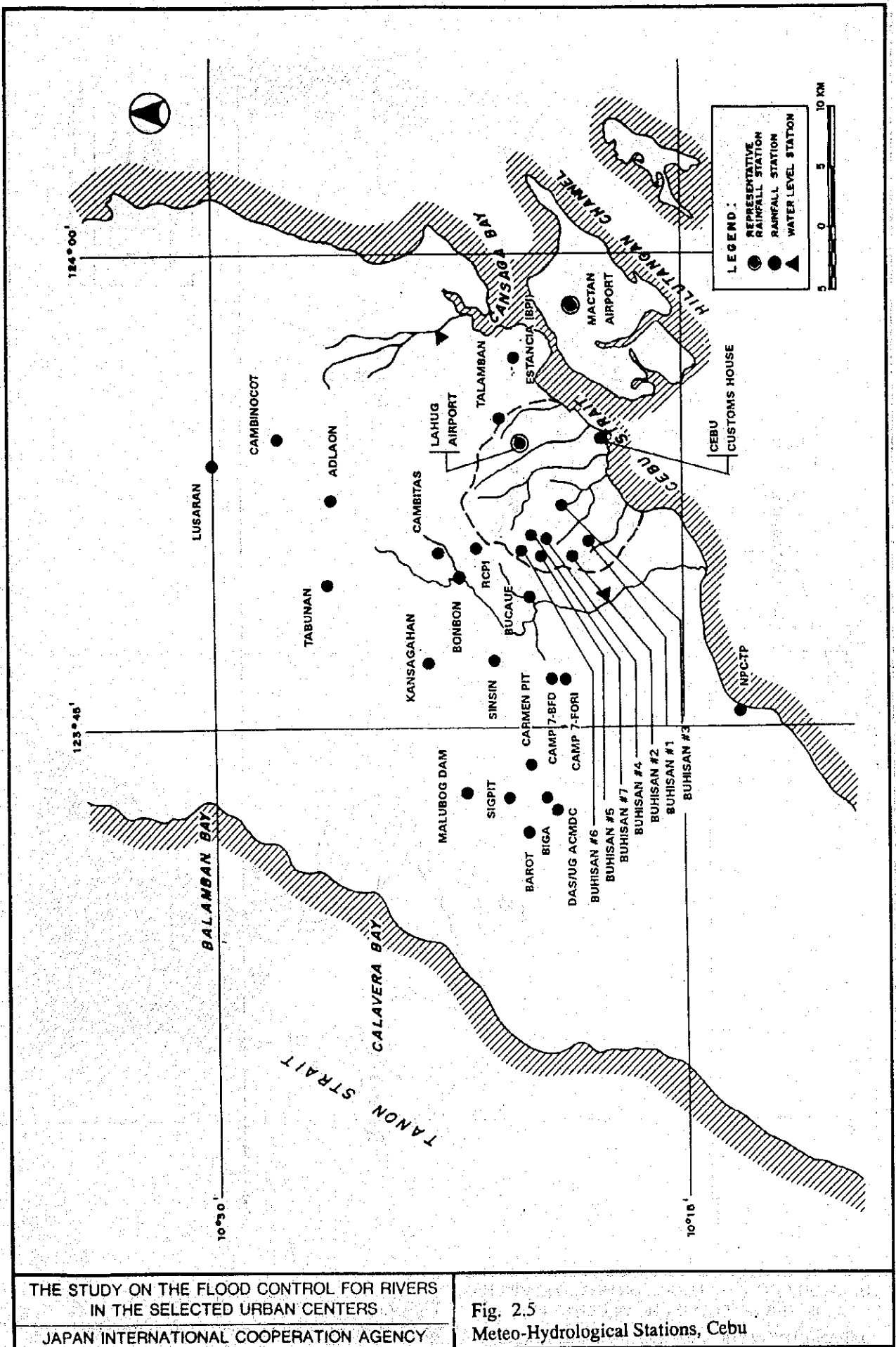
Fig. 2.3
 Tracks of Tropical Cyclones Affecting Visayas in the
 Last Decade

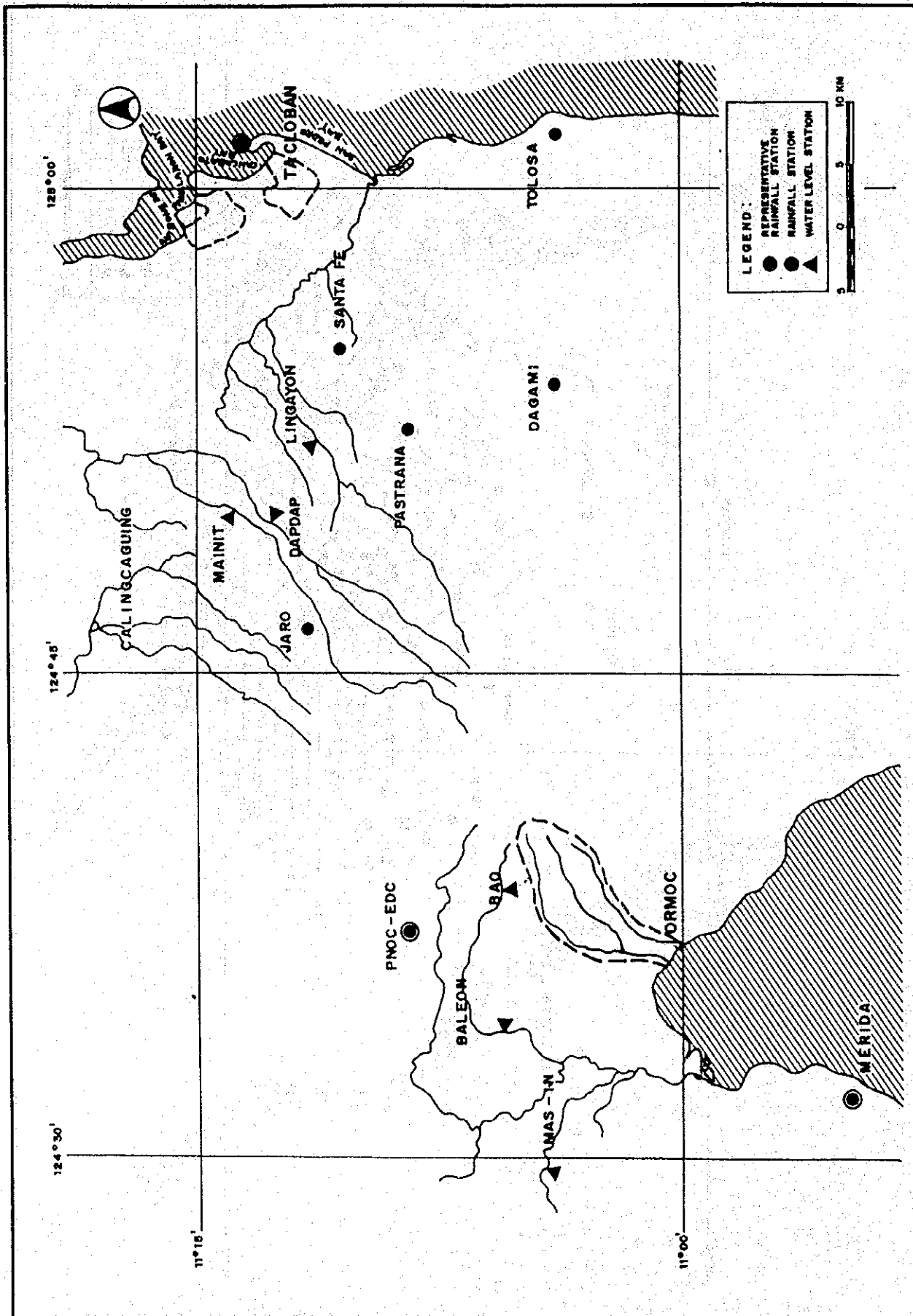


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Fig. 2.4
Meteo-Hydrological Stations, Iloilo

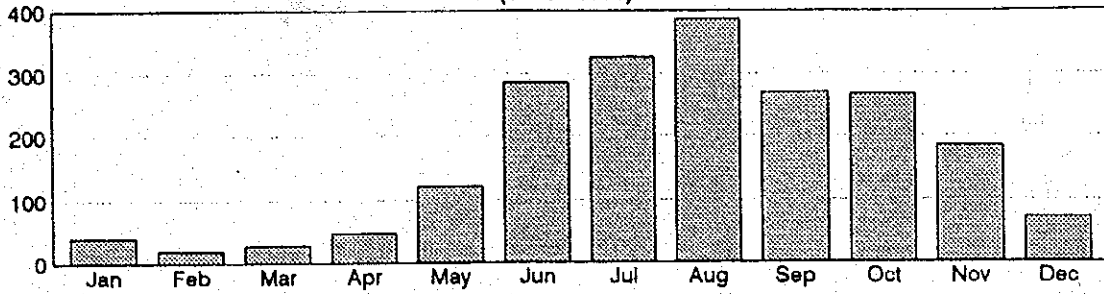




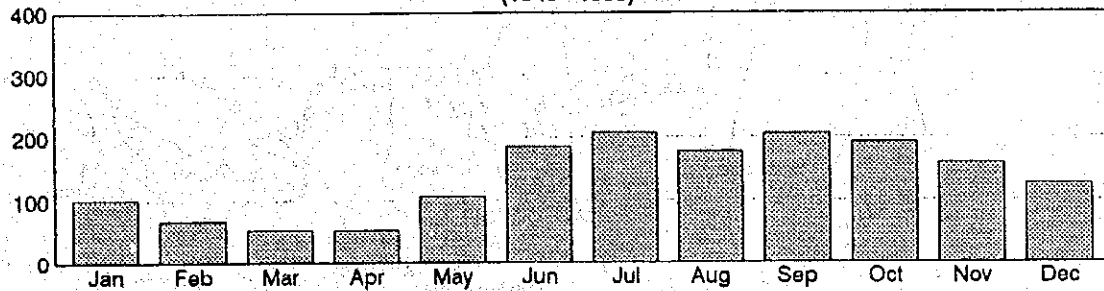
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 2.6
 Meteo-Hydrological Stations, Ormoc And Tacloban

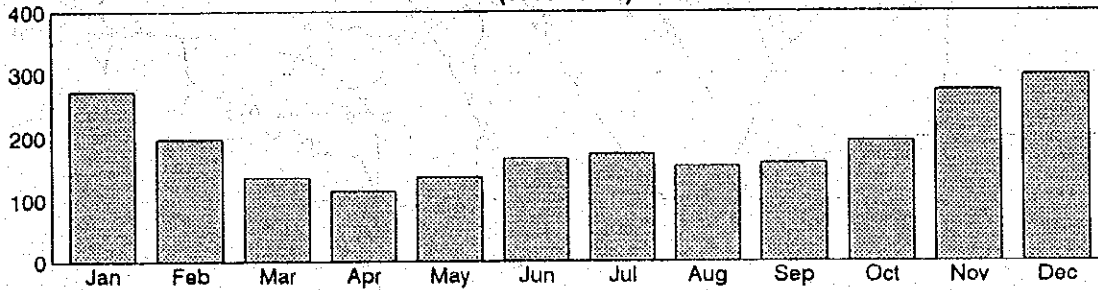
**MEAN MONTHLY RAINFALL IN ILOILO STATION
(1961 - 1991)**



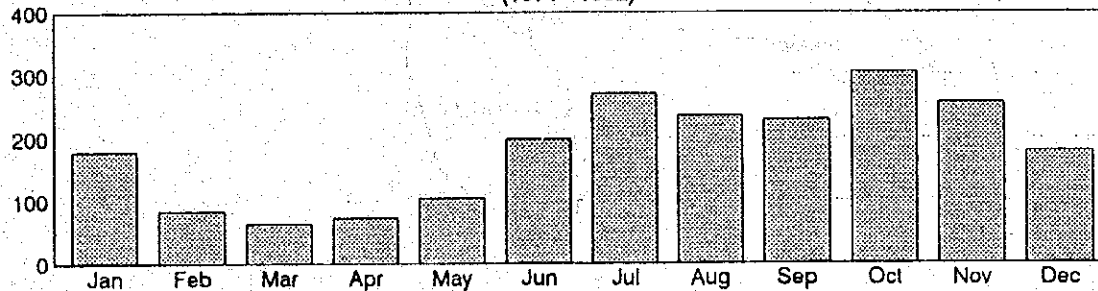
**MEAN MONTHLY RAINFALL IN LAHUG STATION
(1949 - 1985)**

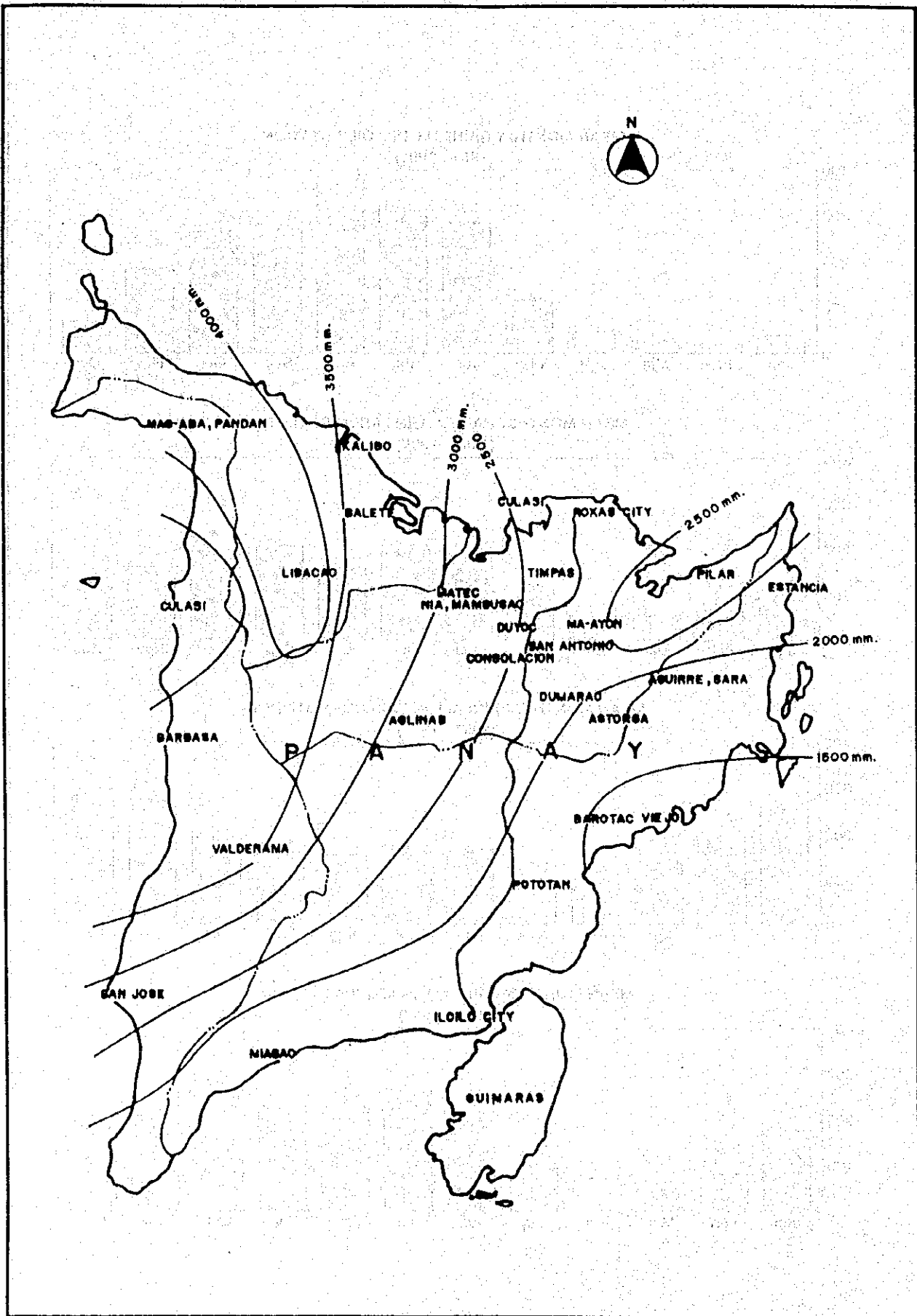


**MEAN MONTHLY RAINFALL IN TACLOBAN STATION
(1961 - 1991)**



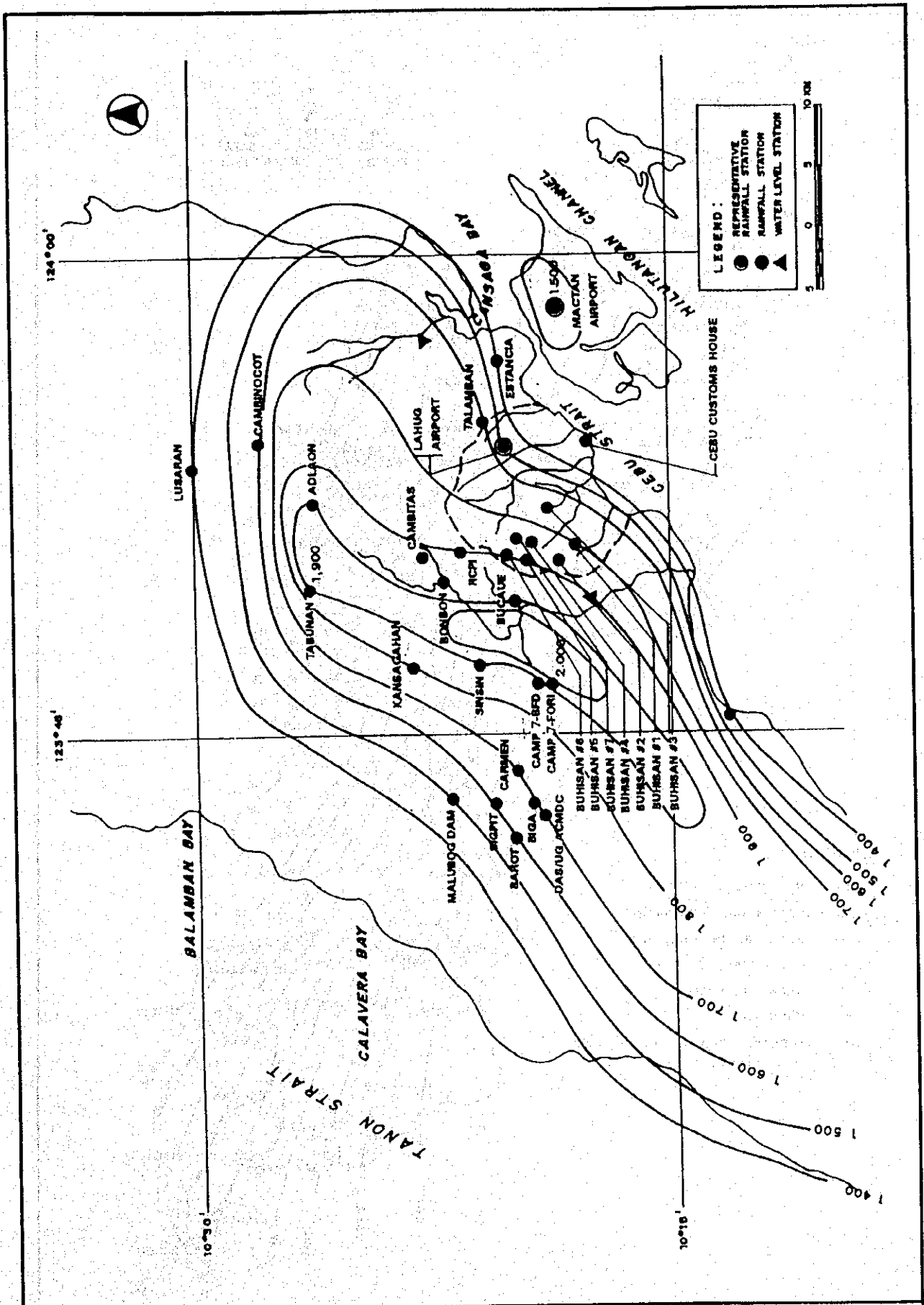
**MEAN MONTHLY RAINFALL IN MERIDA STATION
(1971 - 1992)**





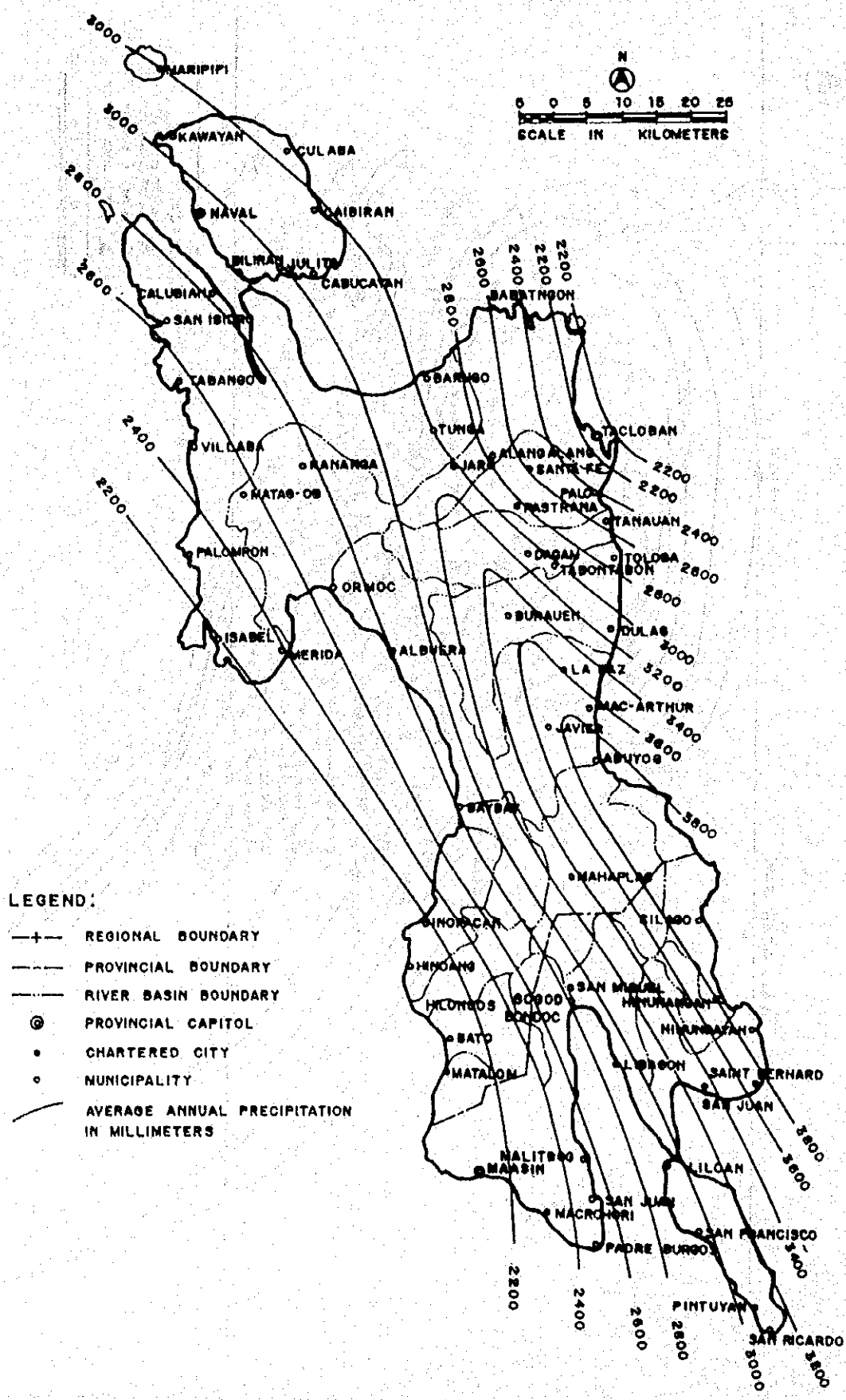
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Fig. 2.8
 Isohyetal Map, Panay Island



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Fig. 2.9
 Isohyetal Map, Cebu City and Suburbs



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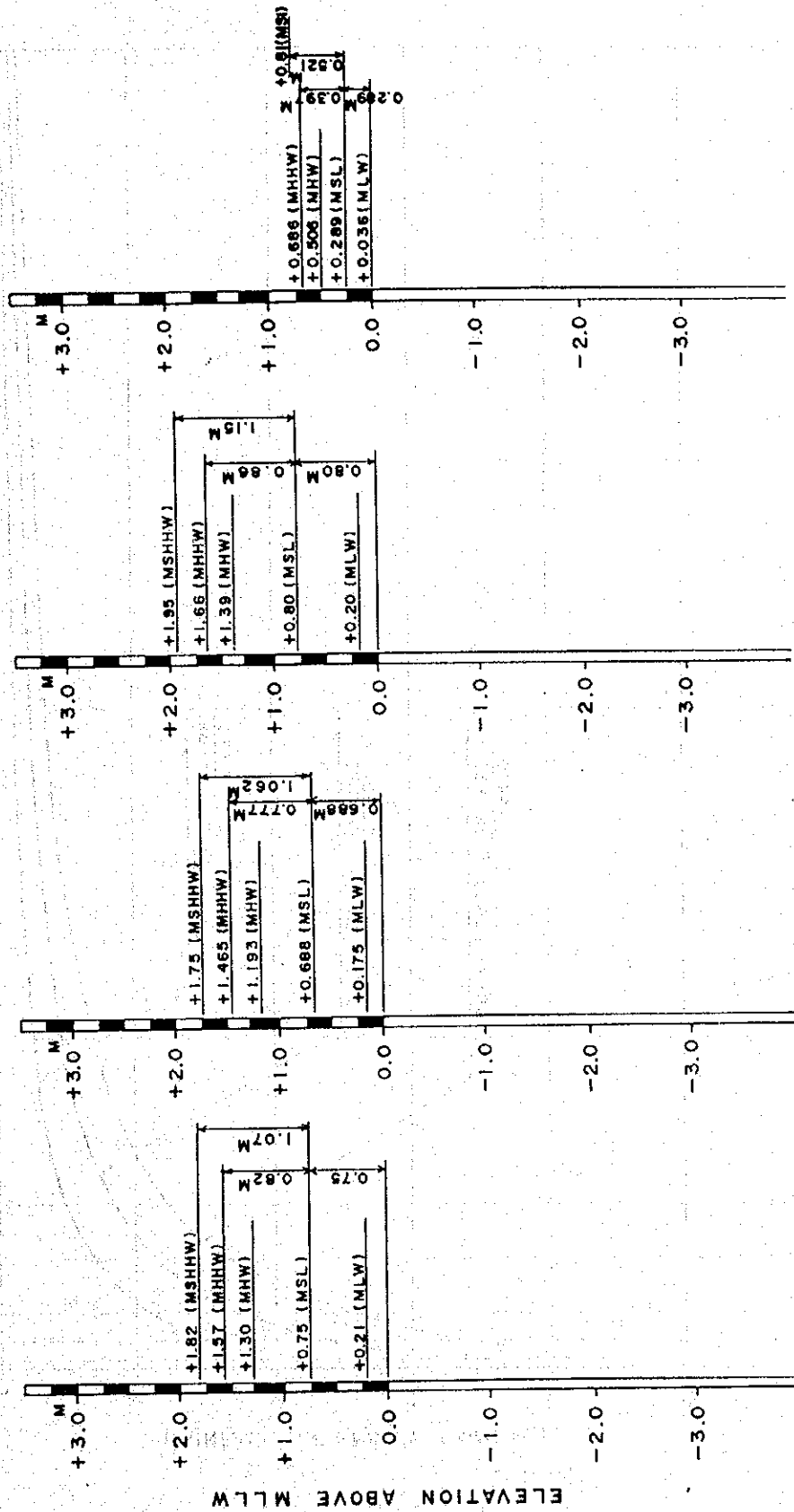
Fig. 2.10
Isohyetal Map, Leyte

TACLOBAN

ORMOC

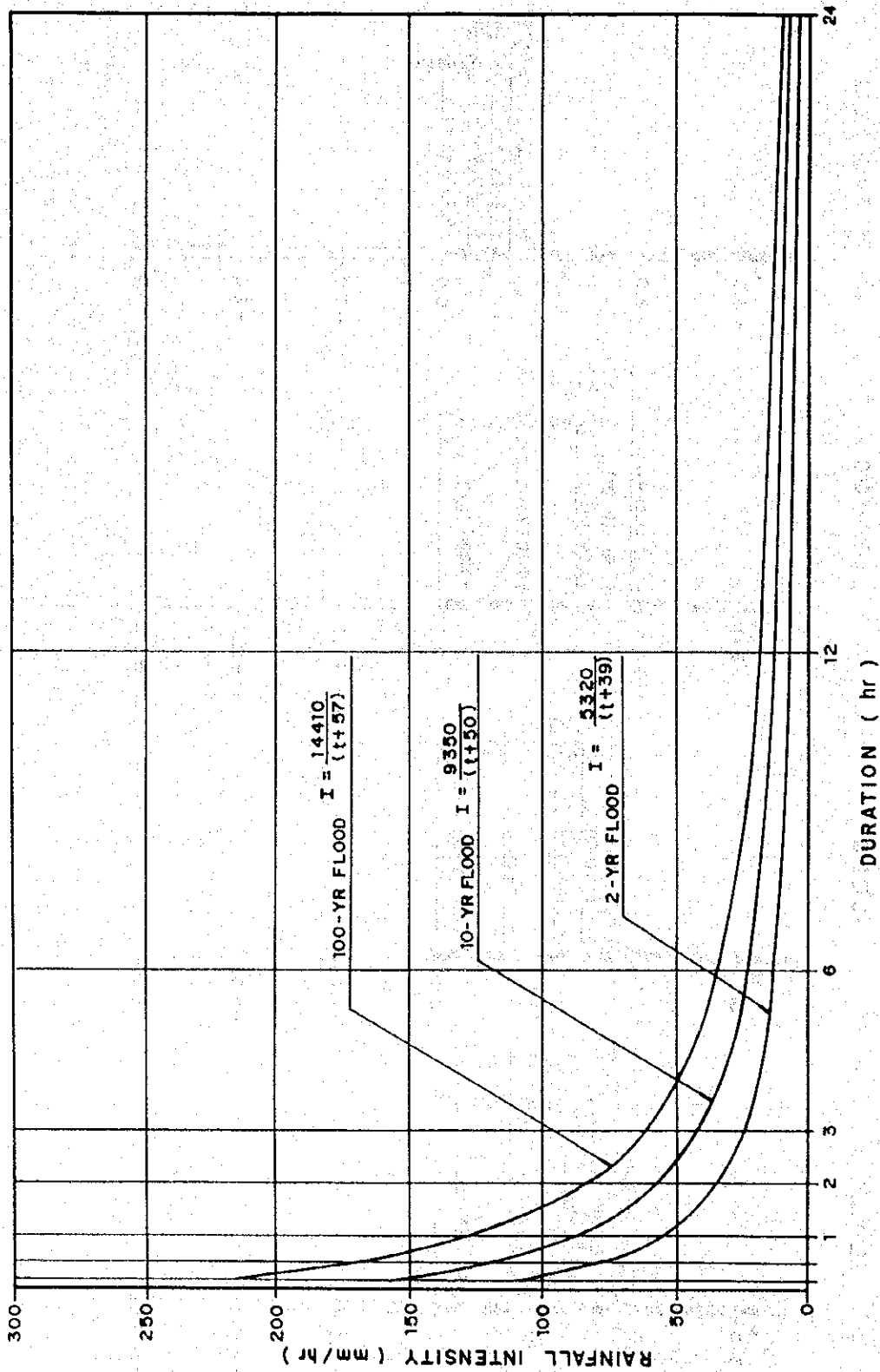
CEBU

ILOILO



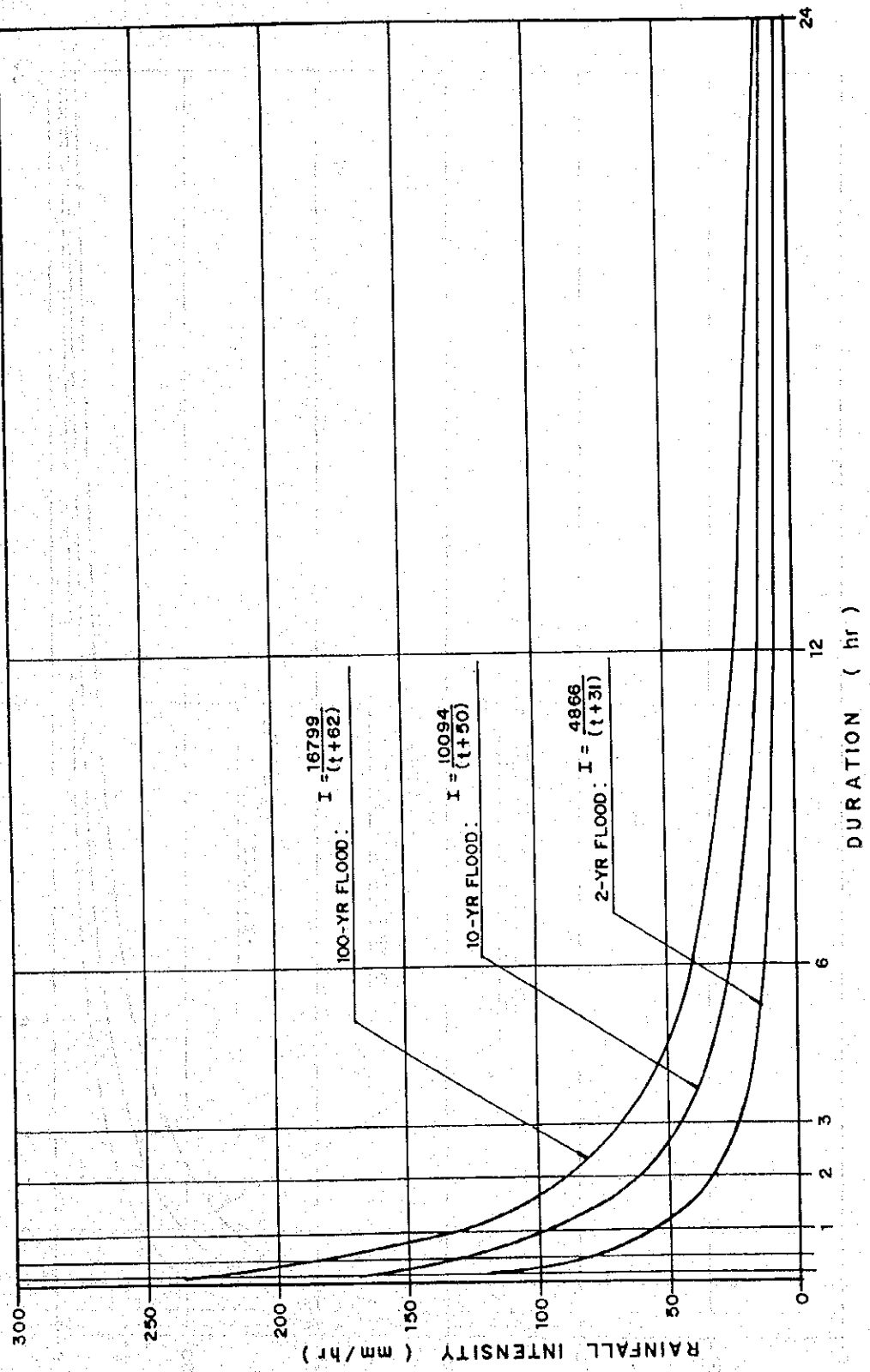
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Fig. 2.11
 Tidal Water Level in Master Plan Area



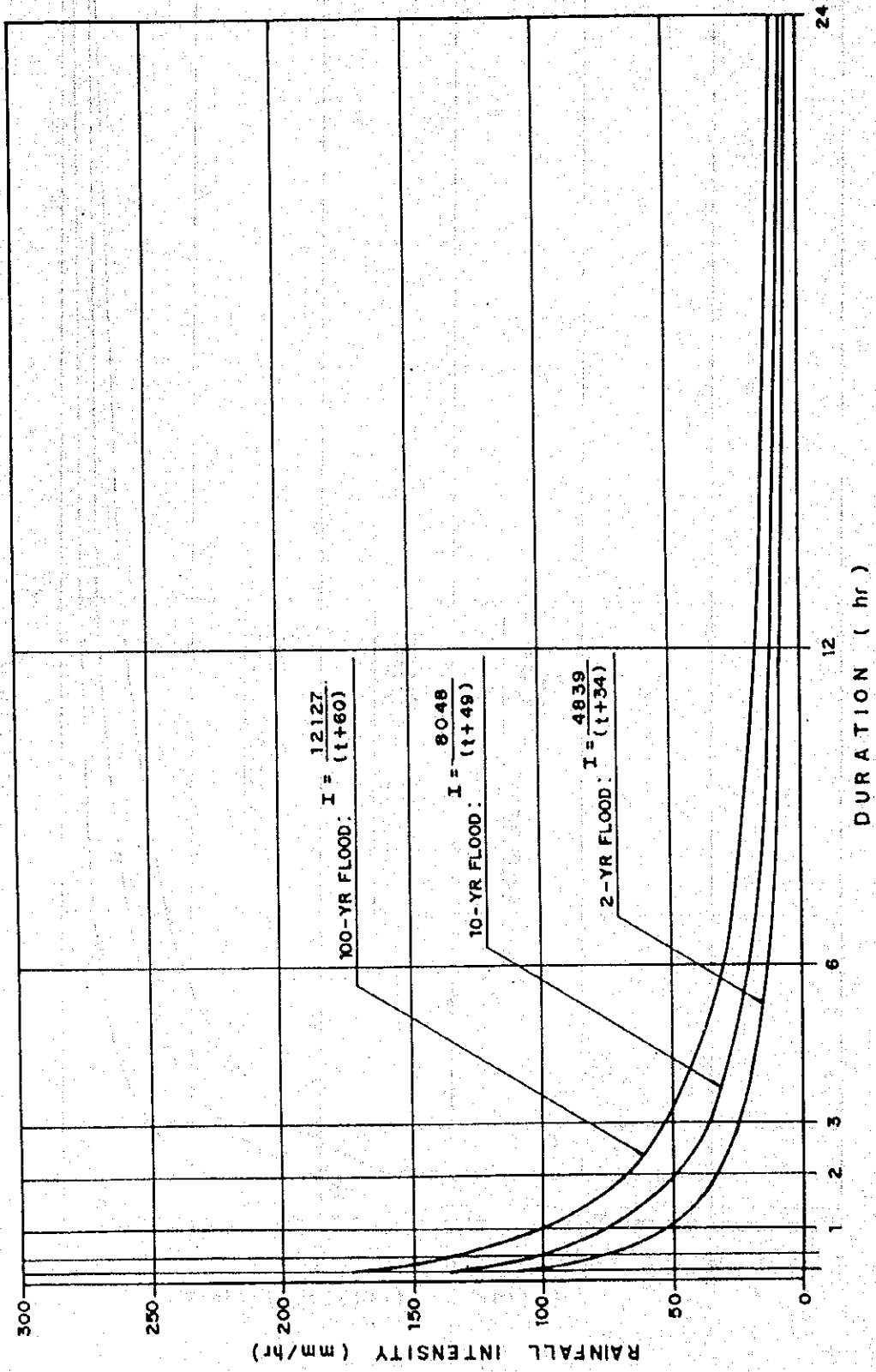
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Fig. 4.1
 Rainfall Intensity Chart, Iloilo



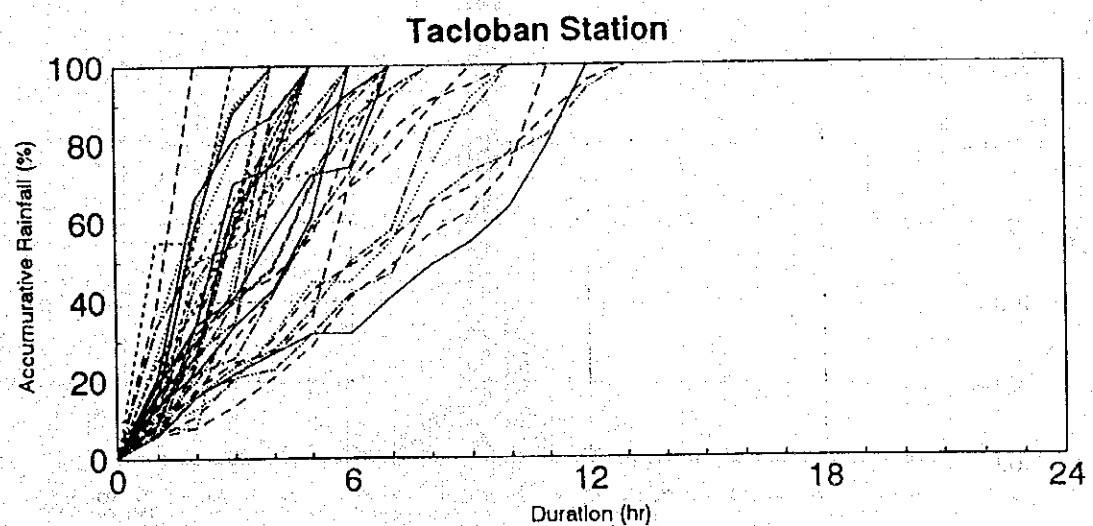
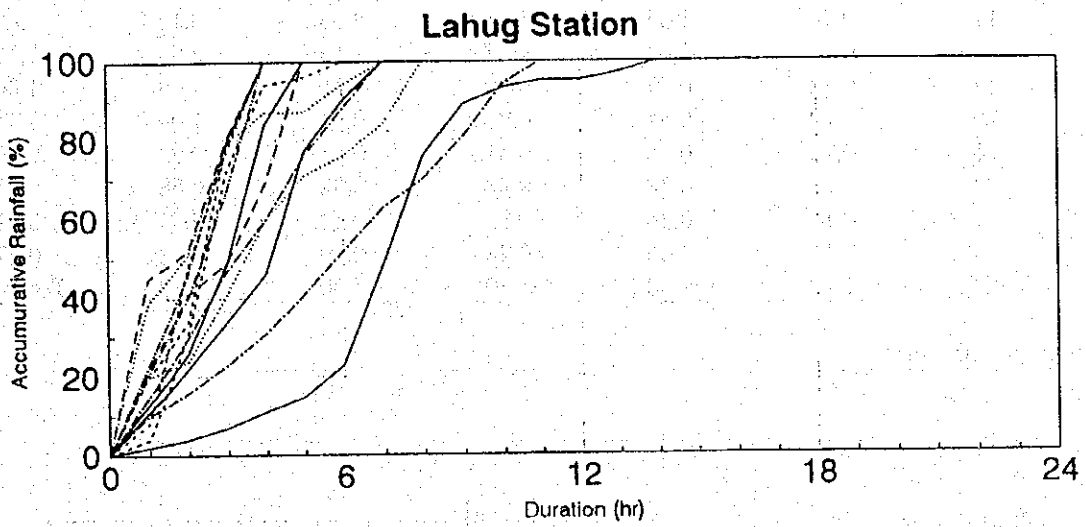
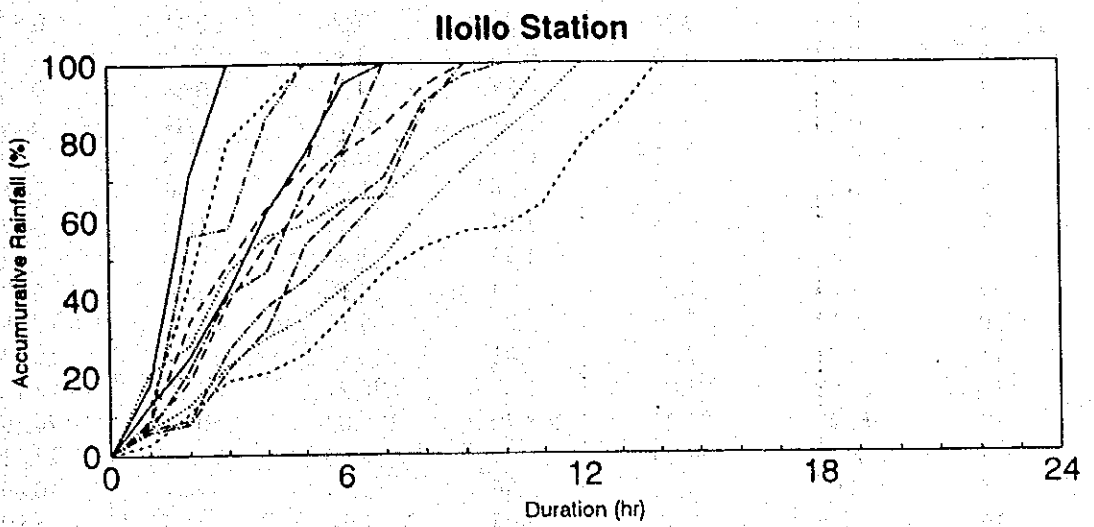
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Fig. 4.2
Rainfall Intensity Chart, Cebu



THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 4.3
 Rainfall Intensity Chart, Tacloban

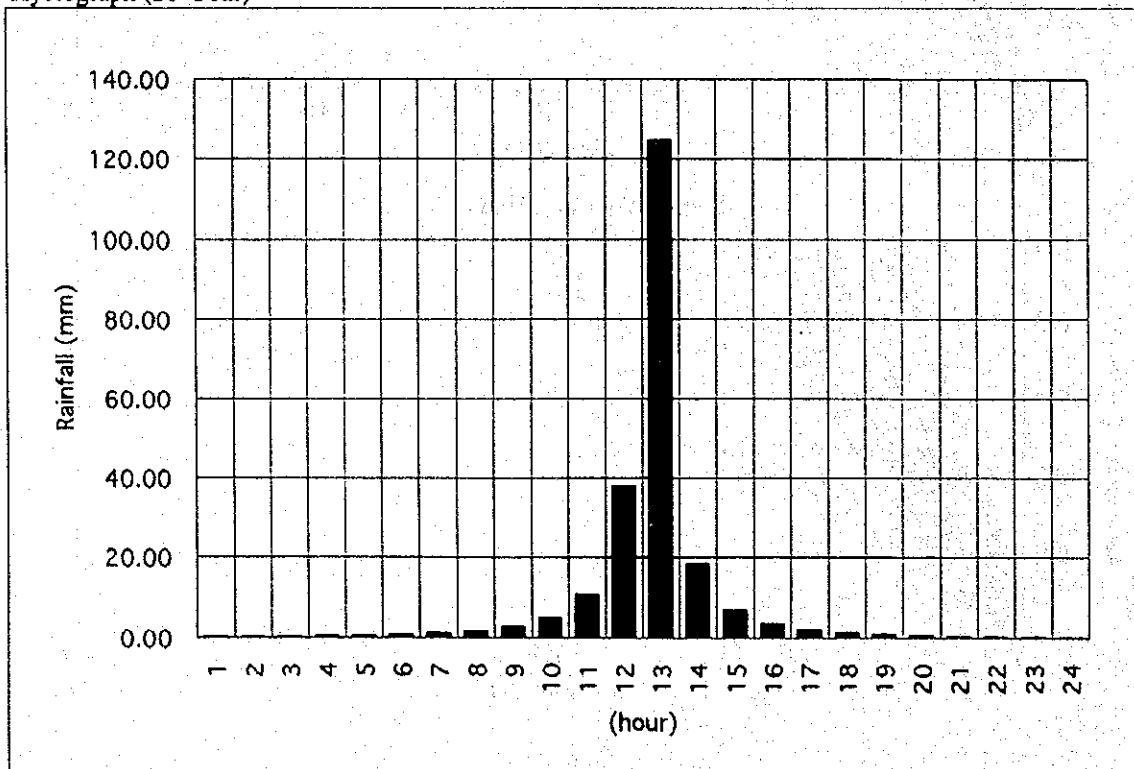


THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 4.4
 Storm Rainfall Mass Curves at Representative
 Stations

Hour	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
1	0.14	0.26	0.28	0.39	0.41	0.57
2	0.14	0.26	0.35	0.39	0.54	0.71
3	0.14	0.26	0.38	0.52	0.68	0.71
4	0.28	0.38	0.51	0.65	0.81	0.99
5	0.28	0.51	0.64	0.78	0.95	1.13
6	0.42	0.64	0.76	1.03	1.36	1.56
7	0.56	0.89	1.15	1.42	1.76	2.12
8	0.84	1.28	1.53	1.94	2.44	2.97
9	1.26	1.91	2.42	2.97	3.80	4.52
10	2.10	3.32	4.20	5.17	6.65	7.78
11	4.77	7.14	8.91	10.99	13.98	16.54
12	18.50	26.03	31.82	38.27	48.05	56.12
13	75.27	92.24	108.20	125.03	150.94	174.16
14	8.42	12.23	15.29	18.60	23.62	27.71
15	3.08	4.72	5.86	7.24	9.37	10.89
16	1.54	2.42	3.05	3.88	4.89	5.80
17	0.98	1.53	1.91	2.33	3.12	3.68
18	0.70	1.02	1.27	1.55	2.04	2.40
19	0.42	0.77	0.89	1.16	1.49	1.84
20	0.42	0.51	0.76	0.91	1.09	1.41
21	0.28	0.38	0.51	0.65	0.95	0.99
22	0.28	0.38	0.38	0.52	0.68	0.85
23	0.14	0.26	0.35	0.52	0.54	0.71
24	0.14	0.26	0.28	0.39	0.54	0.57
Total	121.10	159.60	191.70	227.30	280.70	326.70

Hyetograph (20-Year)



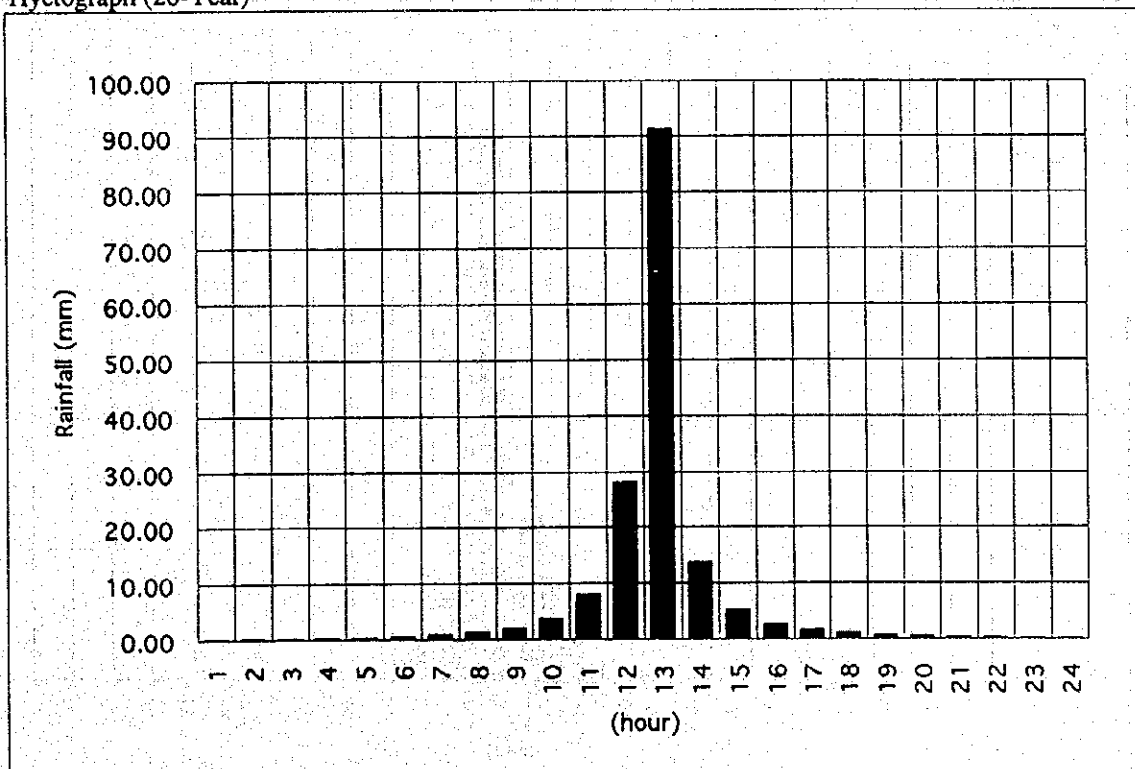
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 4.5
Design Hyetograph, Iloilo

Hour	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
1	0.11	0.19	0.20	0.26	0.32	0.40
2	0.11	0.19	0.26	0.34	0.42	0.49
3	0.11	0.19	0.26	0.34	0.50	0.57
4	0.12	0.29	0.36	0.43	0.58	0.65
5	0.23	0.38	0.45	0.60	0.75	0.90
6	0.23	0.48	0.63	0.77	1.00	1.14
7	0.35	0.67	0.81	1.03	1.33	1.47
8	0.46	0.86	1.16	1.46	1.83	2.13
9	0.81	1.34	1.79	2.24	2.82	3.27
10	1.38	2.39	3.14	3.87	4.82	5.56
11	3.00	5.26	6.81	8.18	10.13	11.69
12	12.68	19.71	24.19	28.32	34.04	38.34
13	61.65	73.37	82.26	91.41	103.29	112.56
14	5.42	9.19	11.56	13.86	16.94	19.29
15	1.96	3.44	4.48	5.42	6.73	7.77
16	1.04	1.82	2.33	2.84	3.65	4.17
17	0.58	1.05	1.43	1.81	2.24	2.62
18	0.35	0.77	0.99	1.21	1.49	1.80
19	0.23	0.57	0.72	0.86	1.08	1.31
20	0.23	0.38	0.54	0.69	0.83	0.98
21	0.12	0.29	0.45	0.52	0.66	0.74
22	0.11	0.29	0.36	0.43	0.50	0.65
23	0.11	0.19	0.26	0.34	0.42	0.49
24	0.11	0.19	0.26	0.27	0.33	0.41
Total	91.50	123.50	145.70	167.50	196.70	219.40

Hyetograph (20-Year)



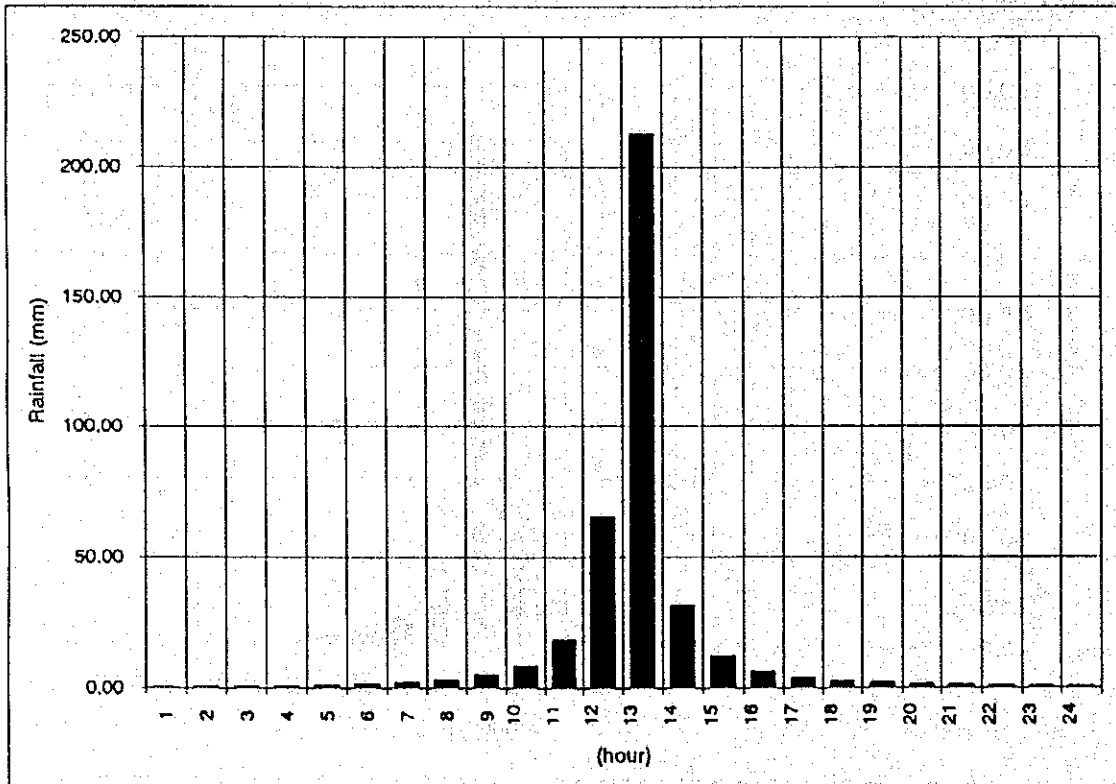
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 4.6
Design Hyetograph, Cebu

Hour	5-Year	10-Year	20-Year	50-Year	100-Year
1	0.26	0.52	0.52	0.78	0.79
2	0.52	0.52	0.78	0.78	1.05
3	0.52	0.78	0.78	1.04	1.32
4	0.52	0.78	1.04	1.31	1.58
5	0.78	1.04	1.30	1.57	1.84
6	1.05	1.30	1.81	2.09	2.63
7	1.57	1.82	2.33	2.87	3.42
8	2.09	2.59	3.37	4.18	4.74
9	3.14	4.15	5.18	6.27	7.38
10	5.49	7.26	8.81	10.97	12.65
11	12.30	15.57	18.66	22.99	26.61
12	45.52	55.52	65.33	78.37	88.78
13	170.05	191.46	212.83	243.72	266.34
14	21.19	26.46	31.63	38.66	44.26
15	7.85	10.12	12.44	15.41	17.65
16	4.19	5.45	6.48	8.10	9.48
17	2.62	3.37	4.15	4.96	5.80
18	1.83	2.33	2.85	3.40	3.95
19	1.31	1.56	2.07	2.61	2.90
20	1.05	1.30	1.56	1.83	2.11
21	0.78	1.04	1.30	1.57	1.84
22	0.52	0.78	1.04	1.31	1.32
23	0.52	0.52	0.78	1.04	1.05
24	0.52	0.52	0.78	0.78	1.05
Total	286.21	336.74	387.80	456.62	510.54

Hyetograph (20-Year)



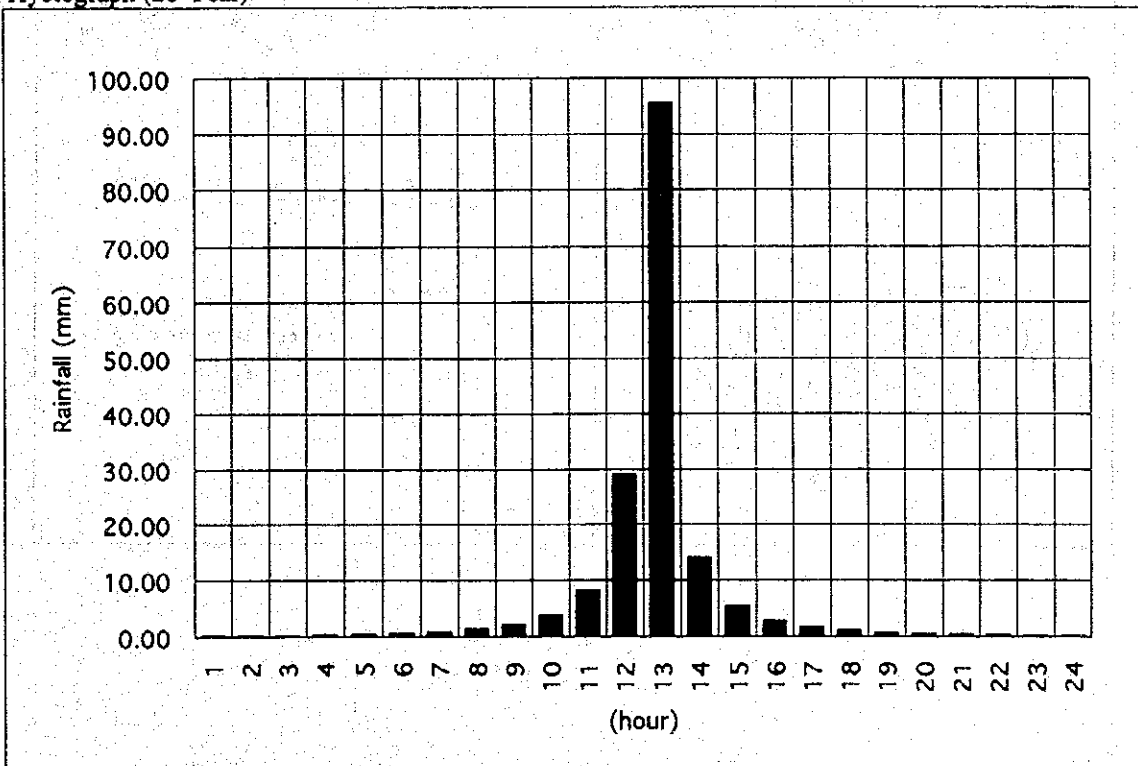
THE STUDY ON THE FLOOD CONTROL FOR RIVERS
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Fig. 4.7
Design Hyetograph, Ormoc

Hour	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
1	0.10	0.15	0.25	0.28	0.33	0.31
2	0.15	0.24	0.27	0.35	0.33	0.42
3	0.15	0.27	0.35	0.35	0.44	0.52
4	0.20	0.30	0.37	0.47	0.54	0.62
5	0.30	0.40	0.50	0.58	0.65	0.73
6	0.30	0.53	0.62	0.82	0.87	1.04
7	0.46	0.80	0.87	1.05	1.20	1.35
8	0.76	1.07	1.24	1.52	1.74	1.87
9	1.06	1.60	1.99	2.33	2.61	2.91
10	1.97	2.80	3.48	3.97	4.57	4.99
11	4.25	6.28	7.45	8.40	9.58	10.49
12	17.30	23.24	26.58	29.39	32.64	35.00
13	78.16	86.81	91.65	95.77	101.52	105.01
14	7.61	10.82	12.66	14.22	16.10	17.43
15	2.73	4.01	4.84	5.60	6.42	6.96
16	1.37	2.14	2.61	2.92	3.37	3.74
17	0.91	1.34	1.61	1.87	2.07	2.29
18	0.61	0.93	1.12	1.28	1.41	1.56
19	0.46	0.67	0.75	0.93	1.09	1.14
20	0.30	0.53	0.62	0.70	0.76	0.83
21	0.30	0.40	0.50	0.58	0.65	0.73
22	0.15	0.32	0.37	0.47	0.54	0.52
23	0.15	0.25	0.25	0.35	0.44	0.42
24	0.15	0.20	0.25	0.30	0.33	0.42
Total	119.90	146.10	161.20	174.50	190.20	201.30

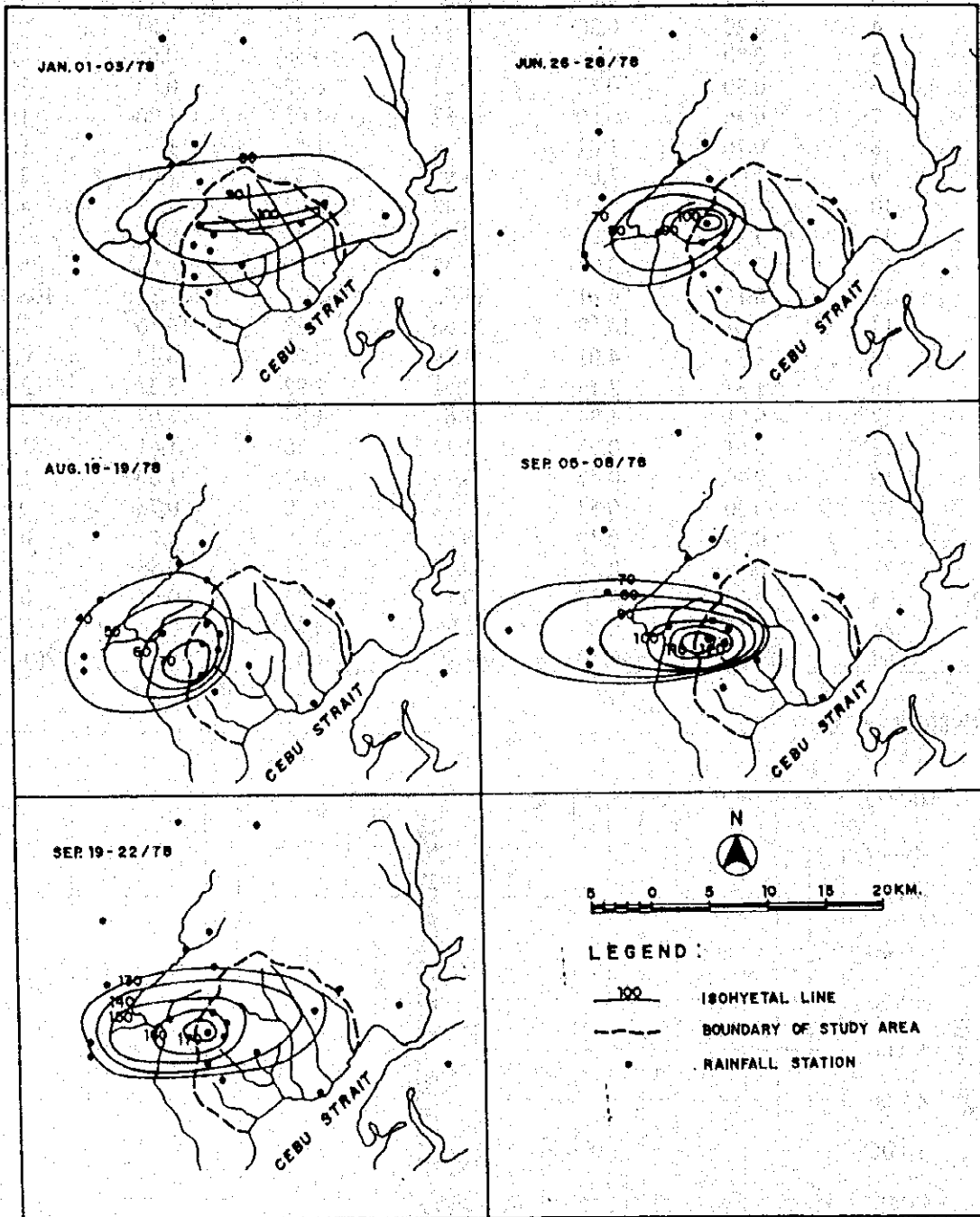
Hyetograph (20-Year)



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Fig. 4.8
Design Hyetograph, Tacloban



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Fig. 4.9
 Isohyetal Maps of Storm Rainfalls Observed in
 Cebu, 1978

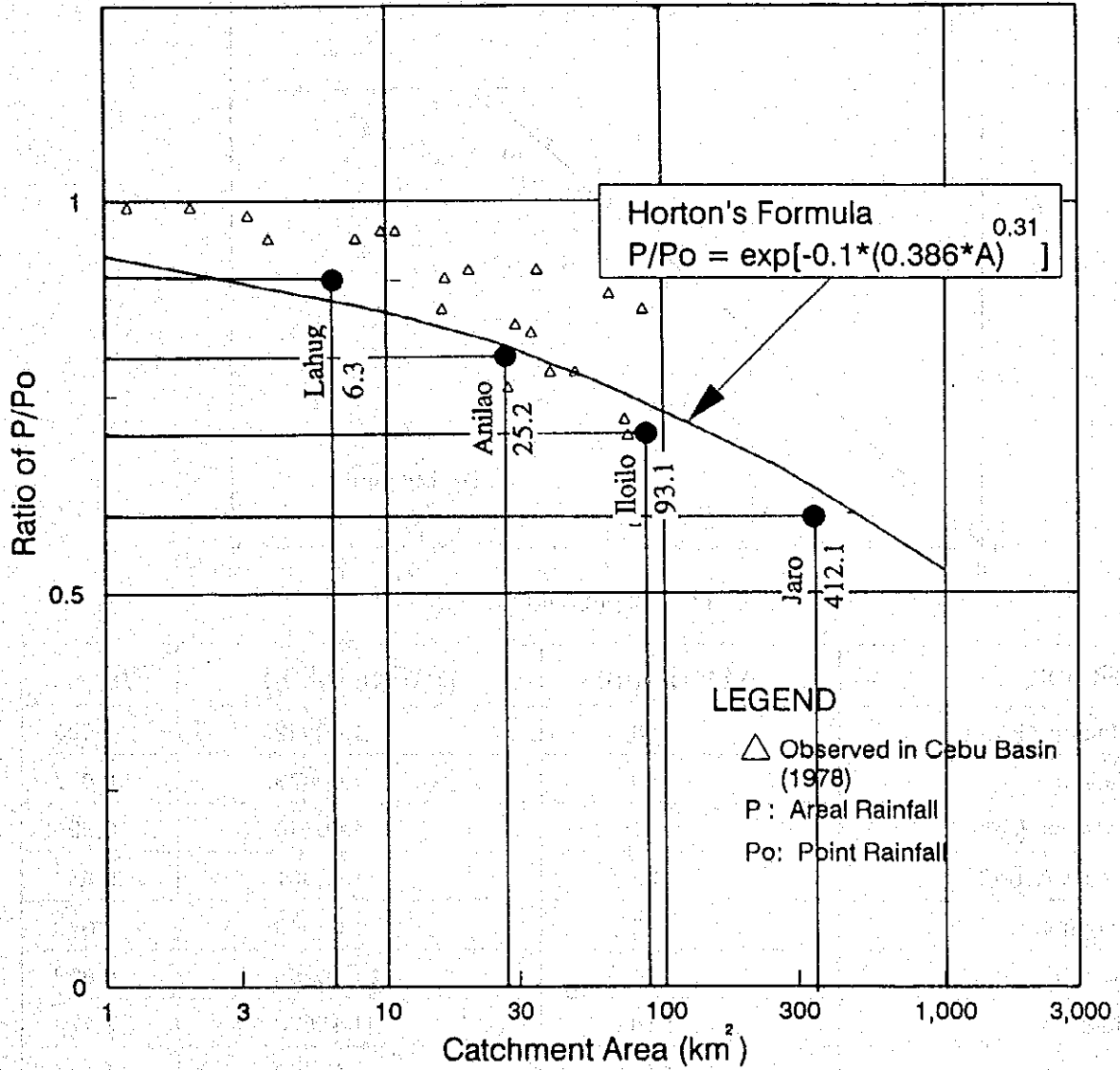
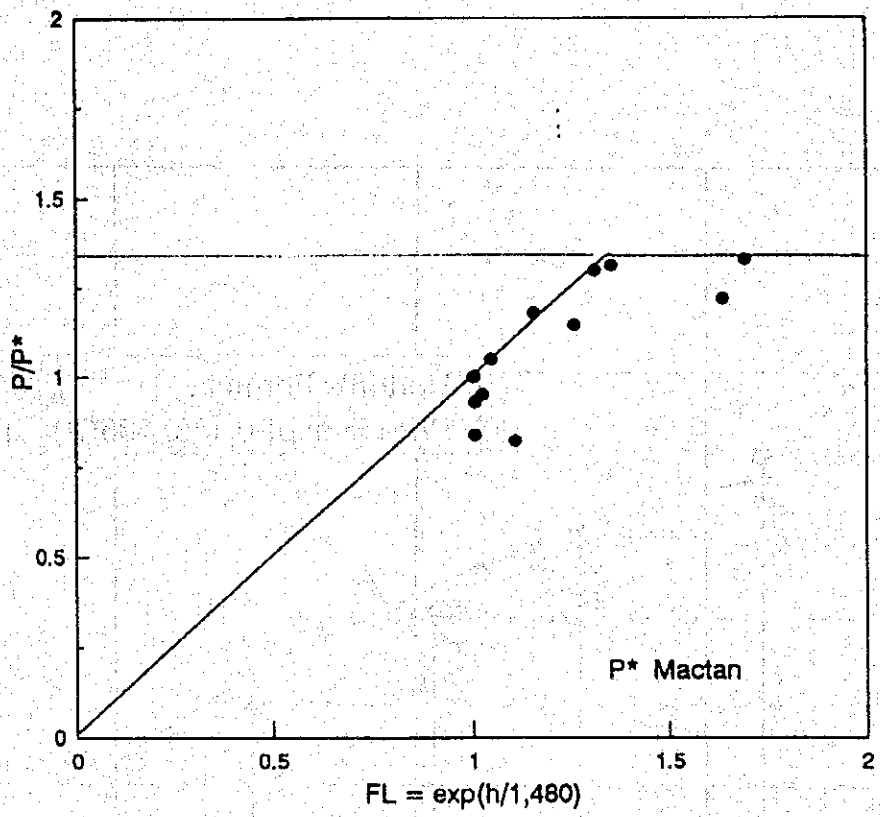


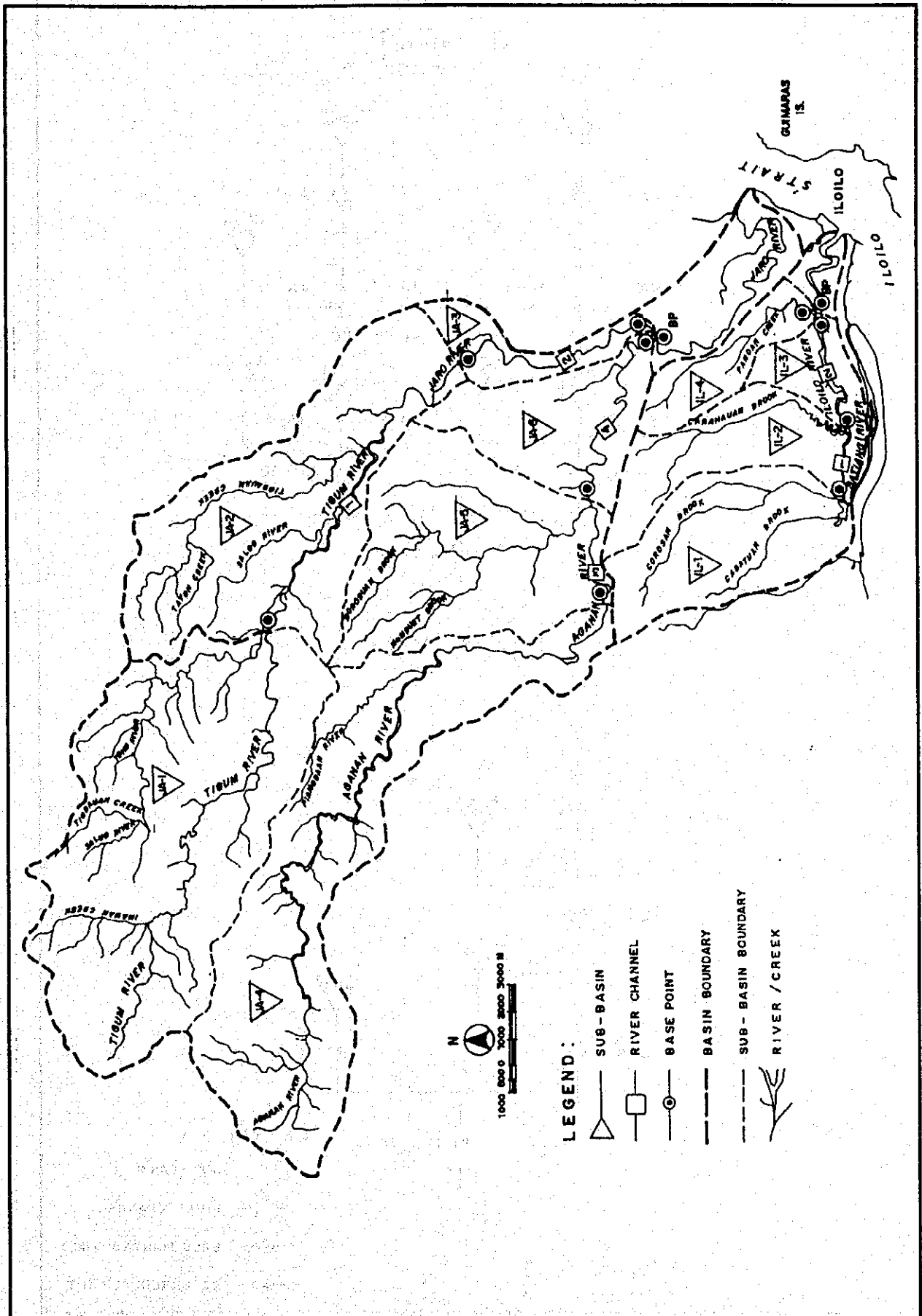
Fig. 4.10
 Relation between Catchment Area and Rainfall



Station	Altitude (m)	(EXP(h/1480))	P/P*
Mactan Airport	8	1.00542	1.000
Talaga	10	1.00678	0.837
Estancia (BPI)	11	1.00746	0.929
Lahug Airport	38	1.02601	0.950
Talamban	70	1.04843	1.048
Lusaran	154	1.10966	0.823
Bonbon	218	1.15870	1.177
Carmen	345	1.26252	1.144
Adlaon	404	1.31386	1.298
Camp 7-FOR1*	450	1.35534	1.313
RCPI	730	1.63762	1.216
Mantalungon	780	1.69389	1.329

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Fig. 4.11
Relation between Altitude and Rainfall



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Fig. 5.1
 Basin Division, Iloilo