TABLES

FOR

APPENDIX I




TABLE 1.1-1 LIST OF RAINFALL GAGING STATION

No.	Location	Superintendent	Period (End 1984)
R1-A	Roxas City (Airport)	PAGASA	1949.3 - Present
B	Astorga, Dumarao	"	1979.1 - Present
C	San Antonio	" (MOA)	1979.1 - 1980'12
D	Maayon	"	1975.9 - 1979.8
E	Culasi, Roxas	"	1971.6 - 1977.1
F	Matec Mambusao	"	1975,11- Present
R2-A	Timpas, Panitan	PHILSUCOM Asturias Mill	1975.6 - Present
* B	Burias (Matec), Mambusao	"	1978.1 - Present
C	Consolacion (Sta Cruz), Dumalag	"	1975.6 - Present
D	Poblacion, Dumarao	"	1975.6 - Present
E	Dayoc, Dao	"	1975.6 - 1983
** R3-A	Office (Central Compound) President Roxas	PHILSUCOM Pilar Mill	1965.1 - Present
B	EWA-01	"	1971.7 - 1974.5
C	EWA-02	"	1970.3 - 1974.3
D	EWA-03	"	1971.7 - 1973.11
E	EWA-04	"	1971.11- 1974.9
F	EWA-05 Location is not sure	"	1971.10- 1975.4
G	EWA-06 Data not reliable	"	1970.2 - 1974.9
H	EWA-07	"	1970.2 - 1974.8
I	EWA-08	"	1970.2 only
J	Pilar Station	"	1970.1 - 1971.11
R4-A	Mambusao	NIA	1975.1 - Present
B	"	"	1975.1 - Present
C	"	"	1975.1 - Present
* D	Brgy Aguirre, Sara	NIA	1979.1 - Present
R5-A	Aglinab, Tapaz	NPC	1979.10- Present
R6-A	Lemery	MPWH, NWRC	1984.4 - Present
B	Villa Flores	"	1984.4 - Present
C	Brgy Roxas, Tapaz	"	1984.4 - Present
D	Jamindan	"	1984.4 - Present

* R2-B is the same station as R1-F, That is, Philsucom gets data from pag-asa.

** R3-A to J and R4-D stations are located outside of Panay river basin.

TABLE I.1-2 MONTHLY RAINFALL AT ROXAS CITY

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Total
1949	-	-	21.8	31.5	78.0	206.8	280.3	215.4	107.4	284.7	189.2	216.9		-
1950	201.4	60.2	124.7	104.9	184.7	316.7	108.5	213.9	400.3	325.9	172.7	100.3		2,314.2
1951	68.8	37.1	32.0	42.7	300.5	71.4	226.8	97.3	333.5	205.0	258.6	241.6		1,915.3
1952	73.4	71.9	62.5	0.5	159.8	228.3	225.3	388.1	240.5	649.7	257.1	165.6		2,522.7
1953	109.0	65.3	48.3	31.8	32.5	489.0	277.6	255.0	205.	470.2	247.1	494.5		2,725.5
1954	50.5	67.1	178.1	32.8	196.9	412.5	245.9	214.9	128.3	196.6	164.9	239.8		2,128.3
1955	264.7	37.3	24.1	5.6	136.7	271.0	195.6	239.0	212.6	399.3	443.0	75.4		2,304.3
1956	107.2	61.0	38.7	269.0	377.2	153.4	426.8	293.4	229.7	404.1	137.0	550.4		3,047.9
1957	210.6	36.1	49.3	74.4	21.9	235.8	247.4	213.4	150.1	309.6	135.7	43.4		1,727.7
1958	70.7	28.8	90.0	55.7	53.1	197.7	226.3	414.3	49.8	574.6	329.0	65.0		2,155.0
1959	47.5	4.6	71.4	3.8	55.9	203.5	414.6	171.0	267.5	188.5	251.0	362.8		2,042.1
1960	38.5	108.1	110.9	75.0	192.3	183.4	191.5	276.8	402.5	392.2	228.8	74.8		2,274.8
1961	18.8	46.7	56.0	9.1	164.1	230.6	101.9	156.7	219.0	162.8	137.6	50.8		1,354.1
1962	94.2	61.9	61.8	50.0	172.7	182.2	310.1	457.5	439.3	257.0	263.1	34.9		2,384.7
1963	34.0	21.2	29.8	50.1	62.0	141.4	368.4	294.2	263.1	251.0	83.6	79.4		1,678.2
1964	15.7	77.8	17.2	8.6	267.2	258.2	352.0	220.1	386.7	470.4	448.1	103.0		2,625.1
1965	157.4	17.9	68.8	64.9	107.0	213.0	153.0	229.0	256.8	154.6	116.7	178.0		1,717.1
1966	84.2	5.8	0.0	14.7	578.6	226.4	465.5	263.3	266.4	446.3	-	175.7		-
1967	317.0	120.2	21.4	23.9	102.3	170.9	202.6	172.6	61.7	267.2	312.0	44.7		1,816.5
1968	94.5	30.8	15.5	3.3	30.8	171.4	268.1	208.1	148.0	366.2	231.9	140.6		1,709.2
1969	43.1	32.3	21.1	10.5	163.0	193.8	394.9	275.9	137.4	153.3	80.6	171.4		1,677.3
1970	47.2	122.6	96.7	0	0	306.8	284.8	148.5	293.7	758.6	419.4	140.6		2,618.9
1971	148.8	72.0	118.3	131.3	307.0	625.5	447.4	171.9	248.9	379.3	372.9	78.9		3,102.2
											(to be continued)			

Unit: mm

TABLE I.1-2 MONTHLY RAINFALL AT ROXAS CITY

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Total
1972	429.6	19.7	60.8	21.7	28.8	277.8	46.3	136.7	230.0	168.0	248.9	166.3		1,834.6
1973	3.5	25.5	39.0	12.9	0	121.5	290.9	372.8	580.7	287.3	534.2	379.6		2,647.9
1974	102.8	74.2	21.2	22.6	74 1	154.4	274.2	149.2	114.5	464.0	224.3	236.6		1,912.1
1975	126.2	72.9	8.9	270.8	95.4	212.8	159.6	215.6	387.2	395.9	209.2	389.8		2,544.3
1976	33.3	25.6	30.0	12.9	164.7	141.4	143.5	299.1	138.3	237.2	362.3	267.3		1,855.6
1977	123.2	134.7	29.5	46.6	79.4	315.8	227.9	209.2	197.0	183.0	74.7	77.5		1,698.5
1978	50.1	32.3	13.4	68.2	110.3	260.8	160.5	135.2	250.2	-	209.8	211.9		-
1979	64.2	25.7	8.4	169.6	104.5	381.7	136.1	241.8	174.6	228.5	80.0	177.4		1,792.5
1980	82.3	60.3	99.9	39.0	86.0	706.6	255.8	181.7	122.0	254.5	214.0	119.9		2,222.0
1981	17.4	17.2	12.7	30.7	57.3	211.7	122.8	145.8	222.8	235.9	192.6	118.5		1,385.4
1982	60.3	36.0	93.2	10.5	105.5	199.2	87.7	369.5	143.7	142.1	94.8	55.2		1,397.7
1983	19.8	4.0	5.7	1.5	6.4	292.4	366.8	214.3	245.8	426.1	223.0	-		-

Unit: mm

Table 3.1-3 Monthly Mean Rainfall (1)

MONTH	R1-A Roxas City	R1-B Astor-ga	R1-C San Antonio	R1-D Ma-ayon	R1-E Culasi	R1-F Matec	R2-A Timpas	R2-B Matec	R2-C Conso-lacion
JAN	112.2	100.2	157.95	59.70	137.58	228.42	78.16	98.30	103.80
FEB	49.9	37.74	57.70	105.93	27.40	69.75	84.33	57.00	54.60
MAR	52.3	60.84	46.20	52.95	35.84	90.80	59.30	81.30	39.22
APR	51.46	37.28	123.30	34.66	10.83	121.60	30.50	102.50	82.70
MAY	136.9	139.0	212.50	188.00	122.00	182.10	125.80	92.20	83.46
JUN	256.2	249.8	532.40	390.30	187.14	446.20	231.77	356.96	190.50
JUL	246.18	219.0	290.80	175.50	145.99	282.00	190.90	230.00	177.00
AUG	235.7	285.4	215.60	306.40	197.00	309.40	161.29	180.90	145.80
SEP	235.12	249.6	167.80	246.50	266.00	267.40	174.36	245.00	165.50
OCT.	322.4	266.52	391.70	227.96	233.90	386.50	204.20	174.30	128.90
NOV	233.2	164.0	260.80	189.90	174.39	322.12	218.96	242.50	186.20
DEC	177.3	148.12	238.80	91.50	201.60	392.52	185.29	288.70	180.68
TOTAL	2,109	1,958	2,696	2,069	1,740	3,099	1,744	2,150	1,538
YEARLY MAX	3,102	2,608	2,586	----	1,529	3,643	2,764	2,764	3,026
YEARLY MIN	1,354	1,756	2,586	----	1,337	2,485	744	1,123	770
YEARS OF AVAILABLE RECORDS	29	4	1	----	2	4	5	4	4

Note: Years of available records mean the number of years which has complete records without lacking. But, the monthly mean rainfall is the mean of all the the monthly rainfall records in all the observation period including the years with lacking records.

Table J.1-3 Monthly Mean Rainfall (2)

MONTH	Gauging Station								
	R2-D Pobla -cion	R2-E Dayac	R3-A1 Pilar Office	R3-A2 Pilar Office	R3-A3 Pilar Office	R3-A4 Pilar Office	R3-B Pilar EWA-01	R3-C Pilar EWA-02	R3-D Pilar EWA-03
JAN	115.30	260.20	249.20	177.90	454.73	252.33	444.90	355.2	748.20
FEB	90.80	163.53	135.60	59.90	52.00	134.20	49.40	117.86	82.40
MAR	57.85	62.90	73.02	116.10	346.20	122.00	141.00	136.40	140.25
APR	74.00	44.40	50.30	6.20	20.60	43.27	12.52	40.60	----
MAY	131.80	170.20	117.00	59.47	154.30	141.00	41.23	121.00	122.95
JUN	262.00	309.90	443.8	108.33	339.60	217.10	269.40	251.20	468.20
JUL	231.10	498.20	254.13	66.00	323.60	238.19	203.65	316.97	321.20
AUG	233.60	351.85	224.70	78.40	451.60	247.00	257.85	335.80	461.70
SEP	235.70	294.40	296.9	85.00	220.63	280.20	499.30	256.30	443.40
OCT	203.53	506.00	338.20	73.33	420.00	313.2	280.60	436.90	443.40
NOV	246.70	570.40	316.10	73.50	444.40	346.80	631.50	488.40	470.90
DEC	183.00	573.9	387.52	106.10	199.30	395.93	126.10	356.17	274.20
TOTAL	2,065	3,943	2,886	1,010	3,428	2,731	2,957	3,213	----
YEARLY MAX	3,394	4,790	2,976	3,741	----	3,951	----	----	----
YEARLY MIN	825	4,790	2,179	92.3	----	1,882	----	----	----
YEARS OF AVAILABLE RECORDS	6	1	3	5	--	5	--	--	--

Note: (1) For the records of R3-A (President Roxas), there are four data sources (R3-A1 to A4)

(2) Data of R3-A to J is not available to use for the analysis as the recording period is short and the locations are not sure. However, the data of monthly mean rainfall will be available for reference of study.

Table 1.1-3 Monthly Mean Rainfall (3)

MONTH	Gauging station R3-E Pilar EWA-04	R3-F Pilar EWA-05	R3-G Pilar EWA-06	R3-4 Pilar EWA-07	R3-I Pilar EWA-08	R3-3 Pilar Station
JAN	519.90	391.00	144.9	226.70	----	103.20
FEB	153.40	73.80	73.91	90.70	31.49	108.15
MAR	203.00	63.00	----	66.40	----	67.90
APR	24.50	67.43	----	----	----	67.31
MAY	150.90	157.90	4.14	----	----	140.32
JUN	726.90	349.75	253.07	223.80	----	228.70
JUL	212.85	49.10	257.80	340.15	----	269.68
AUG	380.70	461.70	345.53	238.90	----	307.80
SEP	431.00	194.30	302.26	418.00	----	260.00
OCT	428.00	521.50	394.70	576.30	----	491.20
NOV	439.30	389.50	420.70	761.70	----	607.15
DEC	484.50	236.20	109.47	332.74	----	225.50
TOTAL	4,154	2,955	----	----	----	2,810
YEARLY MAX	----	----	----	----	----	----
YEARLY MIN	----	----	----	----	----	----
YEARS OF AVAILABLE RECORDS	----	----	----	----	----	----

Table 1.1-3 Monthly Mean Rainfall (4)

MONTH	Gauging Station R4-A NIA-A	R4-B NIA-B	R4-C NIA-C	R4-D Aguirre	R5-A Aglinab
JAN	203.60	182.20	155.80	68.32	370.72
FEB	123.00	92.08	97.41	18.50	120.40
MAR	91.30	114.71	56.21	64	344.50
APR	113.50	88.66	59.57	40.3	39.86
MAY	182.20	126.38	120.32	94.0	100.90
JUN	319.30	370.18	337.24	285.8	265.17
JUL	315.00	321.23	274.75	270.5	241.35
AUG	205.50	271.20	275.20	217.6	280.55
SEP	243.70	254.90	298.80	203.5	195.18
OCT	270.50	241.60	293.00	248.2	257.80
NOV	328.10	543.80	332.40	123.12	248.55
DEC	352.60	327.50	336.70	109.15	247.35
TOTAL	2,749	2,934	2,637	1743	2,712
YEARLY MAX	3,497	3,256	4,377	2025	3,961
YEARLY MIN	1,752	2,323	1,924	1297	2,169
YEARS OF AVAILABLE RECORDS	6	5	6	3	2

Table 1.1-3 Monthly Mean Rainfall (5)

MONTH	GAUGING STATION BALETE	CULASI	BARBAZA	MAG-ABA PANDAN	SAN JOSE	VALDE -RAMA	ILOILO
JAN	250	90.2	49.56	106.55	41.30	62.73	42.20
FEB	244.5	37.64	20.33	231.0	4.40	15.01	21.20
MAR	112.4	40.6	25.68	98.65	92.70	37.11	23.8
APR	572.5	48.15	20.15	36.10	131.13	58.24	64.6
MAY	131.5	226.37	254.01	239.0	268.5	348.27	107.2
JUN	199.2	443.66	547.4	423.3	270.7	552.3	204.8
JUL	219.4	596.5	724.4	514.75	288.4	728.2	277.2
AUG	180.7	684.3	786.48	553.35	335.0	589.6	319.1
SEP	265.4	504.9	574.26	998.8	268.56	554.8	237.0
OCT	343.7	336.01	368.5	210.45	553.53	379.6	209.7
NOV	452.1	293.37	219.60	625.8	309.50	159.77	139.5
DEC	470.7	196.47	115.13	269.15	154.63	82.91	70.4
TOTAL	3442.1	3498.3	3705.6	4306.9	2718.3	3568.8	1717.4
YEARLY MAX	4892.1	4584.1	4605	4434.7	3430.1	4522.9	2483.6
YEARLY MIN	868.3	2512.8	2660.8	4434.7	1682	2786.6	87.07
YEAR	12	15	13	1	2	12	9

Note: The station shown in this table are located outside of Panay river basin but in Panay island.

Table 1.1-3 Monthly Mean Rainfall (6)

MONTH	GAUGING STATION					
	BAROTAC	ESTAN -CIA	MIAGAO	POTOTAN	KALIBO	LIBA -CAO
JAN	71.9	155.6	16.6	72.6	126.6	357.0
FEB	41.3	87.1	19.4	37.2	108.4	233.1
MAR	44.8	48.3	40.7	30.9	105.7	172.2
APR	50.9	50.7	51.1	53.8	140.8	154
MAY	130.6	124.9	133.0	127.2	147	196.4
JUN	141.4	284.3	280.1	238	347.6	304.0
JUL	172.4	302.5	325.3	299.9	434.12	430.2
AUG	133.1	275.3	321.2	264.5	433.9	230.0
SEP	124.6	282.9	209.6	311.50	435.2	334.7
OCT	209.9	213.7	237.6	256	446.1	778.7
NOV	178.2	241.4	131.9	183.1	362.5	528.0
DEC	122.8	183.3	46.4	102.5	397.3	641.5
TOTAL	1421.9	2250	1893.9	1977.2	3485.2	4360.2
YEARLY MAX	2010.7	2736	2625.2	2383.8	7972.1	5864.9
YEARLY MIN	953.9	1970	962.6	1762.3	1509.3	3722.8
YEAR	9	6	8	3	9	9

Note: The stations shown in this table are located outside of Panay river basin but in Panay island.

TABLE 1.1-4 HOURLY RAINFALL OF MORE THAN 30 MM AT ROXAS CITY (1972 - 1979)

(Unit: mm)

Date		Hourly	Daily
1972	Nov 1	33.7,49.5	108.2
1973	Sep 12	75.7	93.5
1973	Nov 20	29.8	170.1
1973	Dec 3	93.1	148.0
1974	Oct 2	47.5	103.5
1975	Apr 23	39.1	43.8
1975	Dec 24	44.2	81.5
1977	Jun 13	31.0	59.5
1977	Aug 2	32.0	47.0
1977	Aug 3	45.5	56.5
1978	Jun 26	68.8	115.5
1979	Jun 17	33.1	145.0

Note : (1) Roxas City station was equipped with an automatic rainfall recorder in the period of 1972 - 1979.

(2) The daily rainfall by automatic recorder is not the same as that by ordinary type gage due to the difference of time taken for the day and also some errors of reading.

TABLE 1.1-5 HEAVY RAINFALL (1-Day)

Station	Rainfall (Date/mm)					Data Period (years)
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
R1 - A	1966 May 16	1976 Nov 29	1959 Dec 18	1956 Dec 28	1952 Oct 27	35
Roxas City	310.7	270.8	261.40	246.10	216.4	
R1 - B	1980 Jun 30	1082 Mar 27	1981 Sep 23	1979 Jul 21	1983 Jul 8	5
Astorga	163.10	113.50	105.50	99.20	64.0	
R1 - C	1980 Jun 29	1979 Jun 17				2
San Antonio Cuartero	151.0	143.60				
R1 - D	1975 Nov 3	1979 Jun 19	1977 Sep 2	1978 Jun 4	1976 Sep 4	5
Maayon	79.70	76.20	66.0	64.0	56.10	
R1 - E	1973 Oct 1	1972 Jan 5	1971 Oct 2	1974 Jul 29	1976 Nov 28	7
Culasi	128.0	110.50	88.30	53.3	7.9	
R1 - F	1978 Dec 14	1979 Oct 31	1980 Jun 1	1983 Jun 22	1982 Aug 19	7
Matec	158.0	130.70	130.50	126.60	122.20	
R2 - A	1976 Nov 29	1980 Jul 1	1979 Dec 1	1975 Oct 27	1977 Jun 10	9
Timpas	200.0	130.0	112.20	105.0	83.0	
R2 - B	1978 Dec 14	1980 Jul 1	1983 Jun 22	1982 Mar 26	1981 Dec 6	6
Matec	158.0	128.0	126.60	118.70	115.50	
R2 - C	1980 Jul 1	1979 Jun 17	1983 Oct 13	1978 Dec 13	1976 Dec 10	9
Consolacion	146.2	127.0	102.40	72.0	69.0	
R2 - D	1976 Jun 25	1980 Jun 11	1983 Jun 22	1978 May 18	1975 Oct 12	9
Dumarao	176.0	140.0	130.0	110.0	107.0	
R2 - E	1976 Nov 29	1975 Oct 3	1977 Jan 9	1978 Aug 7		4
Dayoc Dao	280.3	180.5	70.5	70.4		
R3 - A	1973 Nov 20	1976 Nov 29	1972 Mar 17	1970 Oct 25	1974 Jan 6	10
Pilar Office	276.8	230.88	198.10	183.84	116.84	
R4 - A,B,C	1980 Mar 26	1978 Jun 28	1981 Oct 26	1982 Jun 10	1979 Apr 16	9
NIA Mambusao	158.0	94.0	92.0	91.50	74.50	
R4 - D	1979 Jul 22	1982 Oct 5	1983 Jun 22	1980 Nov 11	1981 Sep 16	5
Sara	182.1	99.6	85.0	62.0	57.8	
R5 - A	1980 Jan 22	1979 Dec 2	1981 Nov 6	1983 Aug 8	1982 Nov 6	5
Aglinab	144.0	117.0	71.6	71.40	57.0	

Note; The records at most stations located outside of the basin are not included here.

TABLE 1.1-6 HEAVY RAINFALL (2-Days)

Station	Rainfall (Date/mm)					Data Period (years)
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
R1 - A	1966 May	1956 Dec	1952 Oct	1958 Oct	1976 Nov	
	15-16	28-29	26-27	20-21	29-30	35
Roxas City	355.1	338.6	329.4	276.9	272.6	
R1 - B	1980 Jun	1981 Sep	1982 Aug	1979 Apr	1980 Sept	
	29-30	22-23	19-20	15-16	27-28	5
	181.4	144.5	136.0	126.9	126.6	
R1 - C	1979 Jun	1980 Jun	1979 Apr	1980 Oct		
	16-17	28-29	15-16	23-24		2
	235.5	189.0	171.8	107.0		
R1 - D	1979 Jun	1978 Jun	1977 Sep	1979 Aug	1975 Nov	
	18-19	3 - 4	1 - 2	17-18	3 - 4	5
Maayon	150.6	90.4	89.4	88.9	86.8	
R1 E	1971 Oct	1973 Oct	1973 Nov	1972 Jan	1972 Nov	
	2 - 3	1 - 2	19-20	4 - 5	4 - 5	7
Culasi	169.0	159.8	150.1	125.7	96.5	
R1 - F	1982 Aug	1978 Jun	1978 Dec	1979 Oct	1979 Apr	
	19-20	26-27	13-14	31- 1	15-16	7
Matec	233.7	219.9	214.9	203.4	159.8	
R2 - A	1976 Nov	1980 Jul	1979 Nov	1975 Oct	1976 Dec	
	28-29	1 - 2	30- 1	26-27	4 - 5	9
Timpas	350.0	230.0	138.6	132.0	120.0	
R2 - B	1978 Dec	1980 Jul	1979 Apr	1980 Aug	1981 Dec	
	13-14	1 - 2	15-16	18-19	5 - 6	6
Matec	214.9	161.5	159.8	137.5	125.2	
R2 - C	1979 Apr	1980 Jul	1979 Aug	1980 Nov	1976 Dec	
	15-16	1 - 2	13-14	11-12	9 -10	9
Consolacion	240.0	191.8	145.0	140.0	129.0	
R2 - D	1980 Jul	1976 Aug	1976 Jul	1979 Apr	1978 May	
	1 - 2	15-16	24-25	15-16	18-19	9
Pob. Dumarao	240.0	205.0	193.0	177.5	169.0	
R2 - E	1976 Nov	1975 Oct	1976 Nov	1975 Sep	1977 Jan	
	29-30	3 - 4	17-18	28-29	24-25	4
Dayoc	291.0	260.9	211.4	190.8	101.6	
R3 - A_4	1973 Nov	1979 Jun	1973 Sep	1972 Dec	1972 Sep	
	19-20	17-18	1 - 2	2 - 3	6 - 7	10
Pilar Office	370.1	182.3	180.4	176.8	175.80	
R4 - C	1977 Nov	1982 Jun	1978 Jun	1980 Sep	1982 Aug	
	19-20	26-27	27-28	21-22	21-22	
NIA Mambusao	206.8	166.20	158.2	140.30	137.50	
R4 - D	1979 Jul	1979 Jun	1982 Jun	1982 Oct	1980 Mar	
	21-22	16-17	20-21	4 - 5	23-24	5
Aguirre	332.1	197.0	122.2	120.2	106.2	
R5 - A	1980 Jan	1979 Dec	1979 Dec	1983 Aug	1981 Jun	
	22-23	1 - 2	2 - 3	7 - 8	1 - 2	5
Aglinab	272.0	194.0	194.0	122.4	98.0	

Note; The records at most stations located outside of the basin are not included here.

TABLE 1.1-7 HEAVY RAINFALL (3-Days)

Station	Rainfall (Date/mm) NO.1	NO.2	NO.33	NO.4	NO.5	Data Period (years)
R1 - A	1966 May	1956 Dec	1952 Oct	1958 Oct	1959 Dec	
	15-17	28-30	26-28	20-22	17-19	35
Roxas City	396.8	372.9	332.5	305.3	272.6	
R1 - B	1980 Jun	1980 Sep	1979 Nov	1979 Apr	1982 Aug	
	28-30	27-29	28-30	15-17	18-20	5
ASC, Astorga	210.1	163.7	161.4	160.7	150.0	
R1 - C	1979 Jun	1980 Jun	1979 Apr	1980 Jul		
	15-17	27-29	15-17	19-21		2
San Antonio	261.4	211.1	202.8	162.2		
R1 - D	1979 Jun	1975 Oct	1978 Jun	1977 Sep	1978 Jun	
	17-19	3 - 5	17-19	1 - 3	17-19	5
Maayon	156.4	123.3	156.4	109.7	104.1	
R1 - E	1971 Oct	1973 Nov	1971 Sep	1973 Jul	1972 Nov	
	2 - 4	18-20	27-29	7 - 9	4 - 6	7
Culasi	202.3	168.2	117.8	114.3	97.8	
R1 - F	1978 Dec	1982 Aug	1978 Jun	1979 Oct	1981 May	
	13-15	19-21	25-27	31- 2	16-18	7
Matec	268.3	244.1	240.5	236.5	216.0	
R2 - A	1976 Nov	1980 Jul	1979 Nov	1976 Dec	1975 Oct	
	28-30	1 - 3	29- 1	4 - 6	25-27	9
Timpas	405.0	313.0	171.3	160.0	153.0	
R2 - B	1978 Dec	1979 Apr	1979 Jun	1980 Jul	1980 Aug	
	13-15	15-17	15-17	1 - 3	18-20	6
Matec	268.3	199.7	193.4	191.5	145.7	
R2 - C	1979 Apr	1980 Jul	1980 Nov	1979 Nov	1976 Dec	
	15-17	1 - 3	11-13	29-30	9 -11	9
Consolacion	300.0	217.2	175.6	171.4	144.0	
R2 - D	1980 Jul	1976 Aug	1976 Jun	1979 Apr	1979 Aug	
	1 - 3	15-17	23-25	15-17	12-14	9
Pob. Dumarao	330.0	266.0	213.0	202.7	175.0	
R2 - E	1976 Nov	1975 Oct	1975 Sep	1976 Nov	1978 Jun	
	28-30	3 - 5	28-30	16-18	1 - 3	4
Dayoc, Dao	301.2	281.7	241.6	232.3	131.0	
R3 - A_4	1973 Nov	1975 Feb	1972 Sep	1978 Jun	1979 Jun	
	18-20	20-22	1 - 3	1 - 3	16-18	10
Pilar Office	384.80	238.80	224.90	218.50	194.80	
R4 - C	1977 Nov	1982 Jun	1980 Sep	1980 Jul	1981 Oct	
	8 -10	26-28	20-22	29-30	26-28	
NIA Mambusao	254.4	221.6	210.6	176.70	168.70	
R4 - D	1979 Jul	1979 Jun	1983 Jun	1982 Jun	1982 Aug	
	20-22	15-17	25-27	19-21	16-18	5
Aguirre	374.1	214.0	132.4	128.9	126.6	
R5 - A	1980 Jan	1979 Dec	1983 Aug	1980 Mar	1981 Jun	
	22-24	1 - 3	7 - 9	22-24	1 - 3	5
Aglinab	343.0	271.0	158.8	156.5	150.0	

Note; The records at most stations located outside of the basin are not included here.

TABLE I.1-8 RAINFALL AT THE TIME OF FLOOD IN NOVEMBER 1973

(Unit: mm)

Date	Roxas City, Capiz					President Roxas, Capiz	Barotac Viejo, Iloilo			Balete, Aklan			Libacao, Aklan			Barbaza, Antique			Culasi, Antique		
	8:00	14:00	20:00	2:00	Total	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total
Nov. 15					0	0	1.0	12.2	12.2	36.6	14.0	34.3	0.8	0	0	0	0	0	22.9	2.5	2.5
16	0	0	0	0	0	0	0	1.3	1.3	20.3	49.5	62.7	0	0	6.4	0	0	0	0	0	0
17	3.8	2.8	0	0	6.6	24.4	0	0	0	13.2	8.1	8.1	6.4	0	6.6	0	0	0	0	0	0
18	0	8.1	9.7	18.8	36.6	14.7	0	0	0	0	1.0	16.5	6.6	1.0	48.0	0	0	34.3	0	0	58.4
19	27.9	0.8	14.0	34.0	76.7	92.5	0	45.7	45.7	15.5	49.3	57.2	47.0	8.1	62.7	34.3	20.8	45.2	58.4	17.8	58.4
20	48.5	41.7	50.3	15.8	156.3	277.6	0	96.5	96.5	7.9	63.0	102.6	54.6	13.1	408.4	24.4	87.1	210.5	40.6	48.3	548.7
21	2.0	0	0	0	2.0	3.6	0	27.9	30.9	39.6	50.8	99.8	395.3	9.1	9.1	123.4	7.6	117.6	500.4	16.5	48.3
22	0	0	3.1	0	3.1	0	3.0	25.4	25.4	49.0	73.7	142.0	0	0.8	2.1	110.0	5.1	23.1	31.8	10.2	10.2
23					1.8	0	0	16.5	22.3	68.3	46.2	87.9	1.3	14.5	14.5	18.0	2.8	2.8	0	0	0
24					0	0	5.8	1.3	30.5	41.7	66.8	87.1	0	0	0	0	0	0	0	0	0
25					0	0	29.2	0.5	0.5	20.3	9.1	9.1	0	0	0	0	0	0	0	0	0

Date	Iloilo City, Iloilo					Estancia, Iloilo			Miagau, Iloilo			Kalibo, Aklan			Valderrama, Antique			San Jose, Antique		
	8:00	14:00	20:00	2:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total
Nov. 15					0	0	0	0	0	0	0	12.7	0	0	0	0	0	1.5	4.6	28.7
16					0	0	0	0	0	0	0	0	0	12.7	0	0	0	24.1	59.0	173.8
17					0	0	0	0	0	0	0	12.7	5.1	17.8	0	0	0	114.8	44.7	108.9
18	0	5.5	9.0	1.5	16.0	0	9.1	33.0	0	0	22.9	12.7	0	15.8	0	0	0	64.2	28.7	39.9
19	3.0	0.5	20.5	23.0	47.0	23.9	5.1	94.0	22.9	7.6	38.6	15.8	0	2.7	0	50.8	88.9	11.2	3.3	10.4
20	67.0	83.0	35.0	13.0	198.0	88.9	25.4	63.2	31.0	37.1	140.0	2.7	50.8	94.6	38.1	12.7	23.1	7.1	12.4	36.3
21	1.5	3.5	0	7.0	12.0	37.8	4.6	5.9	102.9	22.9	137.2	43.8	50.8	103.4	10.4	11.2	16.8	23.9	6.1	18.3
22	4.0	2.5	5.5	8.0	20.0	1.3	0.2	0.2	114.3	29.2	35.6	52.6	0	0	5.6	5.8	5.8	12.2	3.8	7.4
23						0	0	1.0	6.4	T	T	0	0	0	0	0	0	3.6	0	1.0
24						1.0	0	0.8	0	0	0	0	0	10.2	0	0	41.9	1.0	11.7	11.7
25						0.8	0	0	0	0	4.6	10.2	0	5.1	41.9	0	0	0	4.1	13.0

TABLE I.1-9 RAINFALL AT THE TIME OF FLOOD IN NOVEMBER 1984

(Unit: mm)

Date	Roxas City, Capiz					Agtinab Tapaz, Capiz			Astorga, Capiz			Brgy Roxas, Tapaz, Capiz				Lemery, Capiz					Timpas Panitan, Capiz
	8:00	14:00	20:00	2:00	Total	8:00	17:00	Total	8:00	17:00	Total	5:00	12:00	17:00	Total	8:00	10:00	12:00	17:00	Total	Total
Nov. 1	0	0	0	0	0	7.0	11.0	17.0	0	0	0	0	–	–	12.0	0	–	–	0	0	2.0
2	0	0	0	0	0	6.0	5.0	10.8	0	0	0	12.0	–	–	30.0	0	–	–	0	0	2.5
3	0	0	0	0	0	5.8	4.8	9.6	0	0	0	30.0	–	–	24.0	0	–	–	0	0	25.6
4	0	0	3.0	2.0	7.0	4.8	6.0	6.0	0	0	43.0	24.0	–	–	52.5	0	–	–	0	1.8	22.0
5	2.0	72.0	23.0	0	95.0	0	50.0	78.0	43.0	72.5	72.5	52.5	86.0	54.0	190.0	1.8	30.5	48.6	29.4	108.5	250.0
6	0	0	0	0	0	28.0	0	0	0	0	0	50.0	–	–	34.0	0	–	–	0	0	0
7	0	0	0	0	0	0	0	0	0	0	44.5	34.0	–	–	36.0	0	–	–	0	0	3.5
8	0	0	0	0	0	0	0	0	44.5	0	0	36.0	–	–	28.0	0	–	–	0	0	0.2
9	0	3.0	2.0	0	5.0	0	0	2.4	0	0	0	28.0	–	–	30.0	2.8	–	–	0	0	85.0
10	0	12.5	0	0	12.5	2.4	0	0	0	0	0	30.0	–	–		0	–	–	0	0	0

Date	Poblacion Dumarao, Capiz	Kalibo, Aklan			Miagao, Iloilo			Barbaza, Antique			Iloilo City, Iloilo					President Roxas, Capiz	West Villaflores, Capiz			Jamindan, Capiz
	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	14:00	20:00	2:00	Total	Total	8:00	17:00	Total	8:00
Nov. 1	1.0	–	0	6.2	–	0	0	–	0	1.2						18.3	0	0	0	0
2	2.0	6.2	0	0	0	24.1	55.6	1.2	0	0					0	0	0	0	0	0
3	20.3	0	0	0	31.5	23.4	59.0	0	0	0					0	0	0	0	32.0	0
4	15.6	0	0	2.3	35.6	47.8	88.2	0	0	13.0	0	0.8	0.4	0	1.2	0	32.0	38.0	83.0	0
5	185.0	2.3	20.3	71.1	40.4	46.7	46.7	13.0	0	260.0	0.3	2.6	82.0	153.6	238.5	45.5	45.0	75.5	75.5	78.0
6	0	50.8	0	0	0	0	0	260.0	0	0	20.0	0	0	0	20.0	118.1	0	0	42.0	40.2
7	4.2	0	0	2.3	0	0	0	0	0	0					0	0	42.0	0	0	0
8	0.3	2.3	0	10.3	0	0	0	0	0	0					0	23.1	0	0	0	0
9	75.1	10.3	0	42.7	0	0	0	0	0	0						0.5	0	0	0	16.1
10	0	40.4	2.3	0	0	0	0	0	0	0						38.9	0	0	0	0

Date	Jamindan, Capiz						Matec Mambusao, Capiz			Sta Cruz Dumalag, Capiz	Balete, Aklan			Libacao, Aklan			Pandan, Antique			Culasi, Antuqie		
	10:00	12:00	14:00	16:00	17:00	Total	8:00	14:00	Total	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total	8:00	17:00	Total
Nov. 1	–	–	–	–	0.4	0.4	3.0	1.2	9.2	2.3	0	0	0	0	14.4	14.4	–	0	15.2	–	0	0
2	–	–	–	–	11.2	11.2	8.0	0	3.6	2.0	0	11.4	11.4	0	0	0	15.2	0	2.5	0	0	0
3	–	–	–	–	0	0	3.6	0	28.8	30.3	0	0	14.5	0	4.0	13.0	2.5	0	0	0	0	0
4	–	–	–	–	0(18:00)	78.0	28.8	0.6	26.6	22.9	24.5	30.0	77.2	9.0	0	3.4	0	0	4.1	0	0	0
5	40.0	37.0	46.2	18.4	12.4	194.2	26.0	132.8	208.0	215.0	47.2	61.5	61.5	3.4	102.6	121.6	4.1	49.3	81.1	0	106.7	167.7
6	–	–	–	–	0	0	75.2	0	0	0	0	0	0	19.4	0	0	31.8	0	0	61.0	0	0
7	–	–	–	–	0	0	0	0	6.0	5.0	0	0	0	0	0	7.0	0	0	1.5	0	0	0
8	–	–	–	–	0	16.2	6.0	0	0.8	0.5	0	0	0	7.0	0	12.8	1.5	0	14.7	0	0	0
9	–	–	–	–	0	0	0.8	4.0	102.8	85.9	0	0	0	12.8	7.6	58.4	14.7	0	27.9	0	0	5.1
10	–	–	–	–	0	0	98.8	0	–	0	0	8.1	11.4	50.8	0	6.2	27.9	0	0.5	5.1	0	7.6

Note: (1) The records at Mambusao (MA) are not shown as it was judged to be not reliable to use them.

(2) The records at Valderrama (Antique), Estancia (Iloilo), Barotac viejo (Iloilo), and San Jose (Antique) were not obtained as they were not get sent to the head office as of June, 1985.

TABLE 1.1-10 Recorded Annual Maximum Rainfall at Roxas City

(Unit: mm)

Year	The First Month	Date	Rainfall (mm)	The Second Month	Date	Rainfall (mm)
1949	Oct	28-30	125.7 (67.8,37.6,20.3)	Aug	21-23	82.7 (8.1,47.2,27.4)
1950	Sep	2 - 4	195.9 (110.0,70.9,15.0)	Oct	22-24	169.5 (75.2,38.9,55.4)
1951	May	4 - 6	233.4 (39.6,190.5,3.3)	Aug	31- 2	107.7 (19.8,45.7,42.2)
1952	Oct	26-28	332.0 (113.0,216.4,3.1)	Aug	29-31	174.7 (11.4,120.9,42.4)
1953	Dec	5 - 7	298.0 (61.0,121.9,115.1)	Oct	13-15	224.0 (82.0,13.5,128.5)
1954	Dec	24-26	175.9 (16.8,60.5,98.6)	Jun	9 -11	94.0 (2.3,80.5,11.2)
1955	Nov	26-28	120.5 (40.4,69.1,11.0)	Oct	14-16	134.5 (34.3,32.6,67.6)
1956	Dec	28-30	372.9 (246.1,92.5,34.3)	Jul	3 - 5	267.7 (8.1,62.5,197.1)
1957	Jan	5 - 7	114.8 (1.0,100.6,13.2)	Aug	5 - 7	84.6 (9.4,71.4,3.8)
1958	Oct	20-22	305.3 (148.3,128.6,28.4)	Aug	18-20	192.1 (106.0,82.0,4.1)
1959	Dec	17-19	272.6 (10.4,261.4,0.8)	Nov	14-16	143.6 (1.0,56.7,85.9)
1960	Oct	4 - 6	189.2 (0.8,72.6,115.8)	Aug	30- 1	123.8 (8.0,105.4,10.4)
1961	Sep	21-23	99.0 (34.5,22.6,41.9)	Jun	17-19	87.6 (57.9,15.5,14.2)
1962	Feb	6 - 8	38.0 (6.4,3.4,28.2)	Jan	8 -10	35.9 (7.9,20.1,7.9)
1962	Aug	11-13	175.8 (16.0,132.1,27.7)	Nov	5 - 7	149.6 (9.4,137.2,3.0)
1963	Jul	21-23	183.6 (65.3,39.6,78.7)	Sep	28-30	114.6 (36.1,23.9,54.6)
1964	Nov	19-21	249.4 (15.5,180.2,53.7)	Sep	9 -11	141.7 (44.1,28.0,69.6)
1965	May	21-23	86.2 (6.3,21.9,1.3)	Jan	16-18	83.6 (63.1,11.7,8.8)
1966	May	15-17	396.8 (44.4,310.7,41.7)	Oct	5 - 7	178.9 (28.7,108.5,41.7)
1967	Nov	2 - 4	174.1 (1.0,139.1,34.0)	Jan	17-19	128.3 (23.1,7.6,97.6)
1968	Oct	13-15	185.0 (89.9,45.9,49.2)	Jul	3 - 5	75.7 (33.0,1.0,41.7)
1969	Jul	14-16	128.5 (46.5,62.2,19.8)	May	29- 1	165.2 (73.7,43.2,48.3)
1970	Oct	24-26	190.6 (6.5,181.1,3.0)	Oct	28-30	119.3 (37.9,78.8,2.6)
1971	Jun	23-25	228.2 (7.7,123.7,96.8)	Jul	2 - 4	150.3 (6.0,139.0,5.3)
1972	Jan	7 - 9	220.1 (26.6,189.2,4.3)	Nov	3 - 5	146.6 (3.1,5.8,137.7)
1973	Nov	18-20	269.6 (36.6,76.7,156.3)	Nov	30- 2	208.4 (39.4,164.0,5.0)
1974	Oct	1 - 3	127.5 (83.1,20.8,23.6)	Nov	11-13	110.5 (26.7,65.0,18.8)
1975	Apr	23-25	155.7 (70.1,43.2,42.4)	Dec	23-25	131.3 (123.0,5.3,3.0)
1976	Oct	5 - 7	84.0 (14.0,44.4,25.6)	Sep	1 - 3	75.7 (14.5,49.8,11.4)
1977	Aug	1 - 3	156.2 (52.6,47.0,56.6)	Jun	11-13	121.9 (41.1,20.6,60.2)
1978	Jun	26-27	180.6 (16.0,115.3,49.3)	Sep	26-28	154.6 (45.8,68.1,40.7)
1979	Jun	15-17	237.4 (13.5,78.7,145.2)	Apr	21-23	154.6 (45.8,68.1,40.7)
1980	Jun	3 - 5	206.0 (172.7,7.1,26.2)	Aug	17-19	145.9 (6.4,38.1,101.4)
1981	Oct	4 - 6	102.0 (8.0,89.0,5.0)	Sep	24-25	94.0 (55.0,35.0,4.0)
1982	Aug	18-20	209.5 (16.5,103.0,90.0)	Jun	25-27	91.5 (55.5,33.0,3.0)
1983	Jul	19-21	171.6 (104.2,54.4,13.0)	Oct	20-22	146.5 (104.0,39.0,3.5)

Table I.1-11 RECORDED ANNUAL MAXIMUM RAINFALL AT LIBACAO

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1956						
57						
58						
59						
1960						
61						
62						
63						
64						
65						
66						
67						
68						
69						
1970	Nov. 23	122.6	Nov. 9-10	160.3	Nov. 9-11	217.3
71	Mar. 11	175.2	Mar. 10-11	312.4	Mar. 10-12	427.9
72	Nov. 5	116.6	Nov. 26-27	122.9	Nov. 26-28	160.2
73	Dec. 22	110.3	Dec. 21-22	178.4	Dec. 21-23	196.7
74	Jan. 3	150.1	Jan. 3- 4	206.8	Jan. 3- 5	252.5
75	Dec. 24	219.5	Dec. 23-24	334.3	Dec. 22-24	356.1
76	Nov. 29	153.5	Nov. 28-29	237.9	Nov. 27-29	298.9
77	Jan. 9	130.1	Jan. 9-10	164.7	Jan. 9-11	208.1
78	Oct. 22	69.8	Oct. 22-23	137.1	Oct. 21-23	198.3
79	Apr. 10	67.8	Apr. 9-10	128.7	Apr. 9-11	186.9
1980	Feb. 12	131.2	Feb. 11-12	158.8	Feb. 10-12	167.2
81						
82						
83						
84						

Note; The records of 1981 - 1984 are not shown as there are not-a-few missing or unobserved records.

Table I.1-12 RECORDED ANNUAL MAXIMUM RAINFALL AT BELETE

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1956	Jul. 5	277.9	Jul. 4- 5	318.5	Jul. 4- 6	322.3
57	Jan. 6	143.5	Jan. 6- 7	205.2	Jan. 5- 7	214.3
58	Oct. 5	108.0	Oct. 4- 5	179.4	Oct. 3- 5	202.8
59	Dec. 19	110.2	Jul. 13-14	130.3	Jul. 13-15	134.9
1960	Jun. 26	96.0	Oct. 5- 6	141.2	Oct. 5- 7	164.3
61	Jun. 26	92.5	Jun. 26-27	166.4	Jun. 25-27	227.4
62	Jul. 29	84.6	Jul. 29-30	120.4	Jul. 28-30	148.8
63	Aug. 12	29.0	Aug. 11-12	49.6	Aug. 11-12	68.9
64	Apr. 11	88.1	Nov. 17-18	135.9	Nov. 17-19	166.1
65	Dec. 16	50.8	Jul. 26-27	77.0	Jul. 25-27	86.1
66	Jul. 10	144.0	Jul. 10-11	187.7	Jul. 10-12	207.5
67	Jan. 19	95.7	Jan. 5- 6	130.0	Jan. 4- 6	147.7
68	Jan. 28	111.8	Nov. 23-24	164.0	Nov. 22-24	174.9
69	Nov. 18	152.4	Nov. 17-18	304.5	Nov. 16-18	445.8
1970	Jul. 1	114.8	Jun.30-Jul.1	206.3	Jun.29-Jul.1	263.5
71	Dec. 28	102.1	Nov. 24-25	153.0	Nov. 24-26	202.0
72	Jan. 7	117.9	Jan. 6- 7	180.6	Jan. 6- 8	223.8
73	Nov. 22	142.0	Nov. 21-22	241.8	Nov. 20-22	344.4
74	Dec. 31	63.0	Dec. 21-22	89.5	Dec. 21-23	108.6
75	Apr. 24	43.1	Apr. 23-24	75.2	Apr. 22-24	104.2
76	May 17	56.1	May 17-18	84.5	May 17-19	128.5
77	Feb. 17	31.8	Nov. 11-12	58.2	Nov. 10-12	79.8
78	Dec. 26	32.5	Dec. 25-26	43.8	Dec. 24-25	48.9
79	Apr. 13	37.9	Apr. 13-14	70.4	Apr. 13-15	103.0
1980	Dec. 13	125.3	Sep. 2- 3	124.2	Sep. 1- 3	188.6
81	Oct. 25	113.3	Oct. 25-26	204.0	Oct. 25-27	266.0
82	Jun. 26	57.3	Jun. 25-26	94.6	Jun. 24-26	139.5
83	Sep. 25	73.2	Sep. 25-26	99.1	Sep. 24-26	118.7
84						

Table I.1-13 RECORDED ANNUAL MAXIMUM RAINFALL AT BARBAZA

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1956	Dec. 30	228.1	Dec. 29-30	394.5	Dec. 28-30	554.6
57	Sep. 12	147.6	Aug. 13-14	222.0	Aug. 12-14	316.5
58	Oct. 21	308.9	Oct. 20-21	512.1	Oct. 20-22	593.1
59	Jul. 13	162.6	Jul. 13-14	285.3	Jul. 13-15	354.1
1960	Aug. 3	419.6	Aug. 3- 4	441.7	Aug. 3- 5	498.1
61	Aug. 31	110.7	Aug. 8- 9	197.6	Aug. 8-10	296.7
62	Jul. 10	194.3	Jul. 9-10	266.7	Jul. 8-10	417.1
63	Aug. 12	186.9	Aug. 12-13	368.0	Aug. 12-14	436.6
64	Nov. 19	186.7	Nov. 19-20	276.9	Nov. 18-20	299.8
65	Jun. 22	112.8	Jun. 22-23	165.1	Jun. 22-24	184.2
66	May 16	243.8	May 16-17	345.4	May 15-17	399.5
67	Aug. 18	175.2	Aug. 18-19	306.0	Aug. 17-19	418.0
68	Aug. 17	169.2	Aug. 17-18	290.4	Aug. 16-18	354.2
69	Jul. 8	322.2	Jul. 7- 8	578.0	Jul. 6- 8	615.1
1970	Oct. 12	225.8	Oct. 12-13	271.5	Oct. 12-14	379.2
71	Oct. 3	265.4	Oct. 3- 4	378.3	Oct. 3- 5	431.7
72	Nov. 5	185.5	-	214.9	-	263.9
73	Nov. 20	210.5	Aug. 8- 9	289.8	Aug. 7- 9	390.9
74	Jun. 10	213.4	Jun. 9-10	325.2	Jun. 8-10	459.3
75	Jul. 31	133.3	Jul. 30-31	147.3	Jul. 29-31	260.1
76	Sep. 8	227.3	May 23-24	297.9	May 22-24	437.6
77	Sep. 23	154.5	Sep. 22-23	230.6	Sep. 21-23	329.2
78						
79	Aug. 14	305.8	Aug. 13-14	439.6	Aug. 12-14	532.4
1980	Nov. 5	236.8	Nov. 4- 5	306.2	Nov. 4- 6	365.4
81	Jun. 19	130.0	Aug. 2- 3	178.8	Aug. 2- 4	233.2
82	Aug. 20	272.6	Aug. 19-20	371.0	Aug. 19-21	433.4
83	Jul. 14	194.6	Jul. 14-15	264.2	Jul. 13-15	285.6
84						

Table I.1-14 RECORDED ANNUAL MAXIMUM RAINFALL AT VALDERAMA

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1956	Jul. 5	552.4	Jul. 4- 5	614.6	Jul. 4- 6	665.4
57	Aug. 13	139.7	Aug. 13-14	221.0	Aug. 13-15	288.3
58	Oct. 23	90.2	Sep. 2- 3	104.1	Sep. 2- 4	142.2
59	Sep. 28	78.4	Aug. 3- 4	116.8	Aug. 3- 5	165.1
1960	Aug. 4	105.9	Aug. 4- 5	159.2	Aug. 4- 6	184.6
61	Aug. 10	87.6	Oct. 10-11	146.1	Oct. 10-12	196.9
62	Aug. 9	86.4	Jul.31-Aug.1	114.3	Jul.31-Aug.2	165.1
63	Sep. 3	128.3	Aug. 17-18	219.7	Aug. 16-18	321.3
64	Jun. 29	152.4	Jun. 29-30	254.0	Jun. 28-30	315.0
65	Jun. 22	101.6	Jun. 22-23	203.2	Jun. 22-24	219.7
66	May 16	261.6	May 17-18	332.7	May 16-18	398.7
67	Nov. 3	183.0	Aug. 18-19	264.6	Aug. 18-20	328.1
68	Aug. 18	152.4	Aug. 17-18	256.5	Aug. 16-18	358.1
69	Jul. 8	195.6	Jul. 7- 8	320.1	Jul. 6- 8	332.8
1970	Jul. 12	138.4	Oct. 13-14	194.3	Oct. 12-14	270.3
71	Jul. 20	303.5	Jul. 19-20	377.2	Jul. 18-20	450.9
72	Jun. 24	203.2	Jun. 24-25	303.0	Jun. 24-26	313.0
73	Aug. 20	99.1	Aug. 20-21	190.6	Aug. 20-22	249.0
74	Jun. 8	193.0	Jun. 8- 9	294.6	Jun. 8-10	294.6
75	Aug. 6	76.2	Jun. 10-11	96.5	Jun. 10-12	126.9
76	May 22	134.6	May 22-23	219.4	May 22-24	290.6
77	Jul. 17	152.4	Jul. 16-17	213.1	Jul. 15-17	246.1
78						
79						
1980						
81						
82						
83						
84						

Note; The records of 1978 - 1984 are not shown as there are not-a-few missing or unobserved records.

Table I.1-15 RECORDED ANNUAL MAXIMUM RAINFALL AT CULASI

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1956						
57						
58						
59						
1960						
61						
62						
63						
64						
65						
66	Jun. 16	363.2	Jun. 16-17	596.9	Jun. 15-17	673.1
67	Aug. 29	157.5	Aug. 28-29	226.1	Aug. 28-30	266.7
68	Aug. 7	139.7	Aug. 7- 8	203.2	Aug. 7- 9	294.6
69	Jul. 8	195.6	Jul. 8- 9	353.1	Jul. 7- 9	353.1
1970	Oct. 13	129.6	Oct. 12-13	200.7	Oct. 12-14	256.5
71	Jun. 25	157.2	Jun. 24-25	248.6	Jun. 23-25	258.8
72	Jan. 8	213.4	Jun. 24-25	315.0	Jun. 24-26	325.2
73	Nov. 20	548.7	Nov. 19-20	607.1	Nov. 18-20	665.5
74	Jun. 10	170.2	Jun. 9-10	302.2	Jun. 8-10	391.1
75	Oct. 18	111.7	Oct. 17-18	203.2	Oct. 17-19	236.3
76	May 23	185.5	May 22-23	246.5	May 22-24	294.8
77	Sep. 23	165.1	Sep. 22-23	267.0	Sep. 21-23	363.6
78	Jun. 27	160.0	Jun. 27-28	210.8	Jun. 26-28	226.0
79	Aug. 13	299.8	Aug. 13-14	487.7	Aug. 12-14	561.4
1980	Aug. 27	147.4	Aug. 26-27	198.2	Aug. 25-27	299.8
81						
82	Aug. 8	218.5	Jun. 25-26	312.4	Jun. 25-27	386.1
83	Sep. 23	129.6	Sep. 22-23	208.4	Sep. 21-23	284.6
84						

Table I.1-16 RECORDED ANNUAL MAXIMUM RAINFALL AT ILOILO

(Unit: mm)

Duration	1-Day		2-Day		3-Day	
Year	Occurrence Date	Amount	Occurrence Date	Amount	Occurrence Date	Amount
1949	Oct. 2	128.5	Oct. 2- 3	147.8	Nov. 4- 6	155.2
50	Jun. 9	124.2	Aug. 2- 3	131.8	Jul. 23-25	149.4
51	Dec. 10	117.9	Dec. 9-10	198.4	Dec. 9-11	211.7
52	Jul. 2	157.7	Jul. 2- 3	194.5	Jul. 1- 3	200.6
53	Jul. 3	71.4	Aug. 9-10	99.4	Aug. 8-10	137.8
54	Sep. 14	92.0	Sep. 13-14	164.9	Sep. 12-14	169.0
55	Nov. 28	150.9	Nov. 27-28	199.2	Nov. 26-28	214.0
56	May 12	101.1	May 12-13	129.3	Dec. 28-30	153.8
57	Jan. 6	105.0	Aug. 16-17	165.2	Aug. 15-17	193.7
58	Jul. 15	104.2	Jul. 15-16	187.6	Jul. 14-16	211.8
59	Jul. 14	117.7	Jul. 13-14	172.1	Jul. 13-14	172.1
1960	Apr. 22	101.6	Apr. 21-22	111.6	Apr. 21-22	111.6
61	Jul. 17	154.7	Jul. 16-17	200.7	Aug. 17-19	232.5
62	Sep. 4	154.7	Sep. 3- 4	252.0	Sep. 3- 5	276.9
63	Aug. 28	105.2	Aug. 27-28	148.4	Aug. 26-28	154.0
64	Nov. 19	156.5	Nov. 18-19	172.8	Nov. 17-19	207.1
65	Nov. 25	113.5	Nov. 25-26	204.2	Nov. 25-27	204.6
66	May 16	103.4	May 16-17	189.2	May 15-17	274.5
67	Jun. 9	100.2	Jun. 8- 9	157.4	Jun. 8- 9	157.4
68	Nov. 24	101.4	Nov. 23-24	117.7	Aug. 16-18	156.2
69	Jul. 8	73.7	Jul. 7- 8	114.4	Jul. 6- 8	123.5
1970	Aug. 14	107.7	Jun. 22-23	150.8	Jun. 22-24	177.5
71	Aug. 8	103.7	Aug. 8- 9	111.8	Aug. 7- 9	114.3
72	Aug. 22	103.5	Sep. 10-11	160.0	Sep. 10-12	202.0
73	Nov. 20	198.0	Nov. 19-20	245.0	Nov. 18-20	261.0
74	Oct. 16	122.5	Oct. 15-16	171.0	Oct. 14-16	191.8
75	Jun. 21	101.9	May 9-10	118.9	Jun. 19-21	122.5
76	Jul. 18	303.0	Jul. 18-19	347.2	Jul. 18-20	393.4
77	Sep. 1	104.1	Sep. 1- 2	151.3	Sep. 1- 3	157.3
78						
79						
1980	Oct. 20	115.6	Oct. 20-21	139.3	Oct. 20-22	158.8

TABLE 1.1-17 METEOROLOGICAL RECORD IN ROXAS CITY
(From the records of Jan. 1971 - Sept. 1983)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL PERIOD
AIR TEMPERATURE (°C)													
Highest	32.5	33.0	34.0	35.0	36.0	38.5	35.7	35.7	35.3	33.2	33.1	32.8	36.0
Lowest	18.0	18.1	19.9	20.6	21.0	21.1	16.5	20.5	20.3	21.1	21.4	20.6	16.5
Ave. Daily Max.	28.5	28.7	29.7	31.4	32.2	31.6	31.3	31.5	30.7	30.1	30.2	29.1	30.4
Ave. Daily Min.	23.5	23.3	23.6	24.5	24.8	24.2	23.9	23.8	24.5	24.8	24.3	23.9	24.1
Average	25.9	26.0	26.7	27.9	28.5	27.9	27.6	27.2	27.2	27.0	27.3	26.5	27.1
RELATIVE HUMIDITY (%)													
Maximum	100.0	94.0	93.0	91.0	93.0	95.0	94.0	99.0	98.0	94.0	98.0	93.0	100.0
Minimum	58.0	67.0	64.0	69.0	66.0	70.0	66.0	72.0	71.0	72.0	67.0	69.0	58.0
Average	79.8	80.6	79.2	77.0	78.0	81.8	82.9	82.4	82.9	82.5	81.1	82.0	80.9
ATMOSPHERIC PRESSURE (millibar)													
Maximum	1,020.2	1,019.8	1,019.5	1,018.6	1,015.3	1,015.4	1,015.2	1,014.9	1,015.7	1,016.1	1,016.5	1,018.2	1,020.2
Minimum	1,002.9	1,006.9	1,004.5	1,003.5	1,004.1	999.2	998.4	999.2	1,001.9	998.6	995.6	1,002.1	998.4
Average	1,011.7	1,012.8	1,012.2	1,011.0	1,009.3	1,008.7	1,008.2	1,008.4	1,008.9	1,009.3	1,000.6	1,010.8	1,010.0
WIND VELOCITY (knot/hour)													
Maximum	50.0	32.0	83.0	76.0	76.0	45.0	50.0	38.0	35.0	38.0	42.0	82.0	83.0

Note; The maximum and minimum record are the extreme value among the records observed 3 or 4 times a day. That is, they do not always present the actual maximum and minimum.

TABLE 1.1-18 METEOROLOGICAL RECORD IN ILOILO
(From the records of Feb. 1960 - 1983)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL PERIOD
AIR TEMPERATURE (°C)													
Highset	33.5	34.7	39.0	37.4	37.2	36.7	34.4	34.1	35.4	35.4	34.5	33.5	39.0
Lowest	16.5	16.7	18.6	20.0	20.2	20.0	19.5	20.0	19.8	19.2	19.0	19.3	16.5
Ave. Daily Max.	29.3	29.9	31.2	32.5	32.3	31.3	30.6	30.2	30.5	30.7	30.4	29.8	30.7
Ave. Daily Min.	22.5	22.5	23.2	24.4	25.3	24.4	24.2	24.4	24.2	24.0	23.8	23.4	23.85
Average	25.9	26.2	27.2	28.2	28.8	27.9	27.3	27.3	27.4	27.4	27.2	26.6	27.28
RELATIVE HUMIDITY (%)													
Maximum	94.0	96.0	94.0	94.0	95.0	98.0	97.0	95.0	96.0	97.0	98.0	97.0	98.0
Minimum	71.0	67.0	67.0	65.0	69.0	62.0	83.0	81.0	77.0	77.0	75.0	75.0	62.0
Average	81.2	79.2	75.9	73.4	77.4	81.9	86.4	85.0	85.4	85.4	86.1	85.5	81.9
ATMOSPHERIC PRESSURE (millibar)													
Maximum	1,019.4	1,018.5	1,019.4	1,017.3	1,015.1	1,015.3	1,014.5	1,015.3	1,017.0	1,015.8	1,017.2	1,017.0	1,019.4
Minimum	1,000.4	1.004.3	1,003.3	991.3	1,001.3	1,001.5	1,001.5	1,000.4	1,000.2	999.0	991.4	1,001.6	991.3
Average	1,011.8	1,011.9	1,011.6	1,010.7	1,009.4	1,009.5	1,009.3	1,009.2	1,009.5	1,009.5	1,010.1	1,010.9	1,010.3
WIND VELOCITY (knot/hour)													
Maximum	42.0	46.0	42.0	48.0	39.0	45.0	40.0	42.0	36.0	36.0	21.0	48.0	81.0

Note; The maximum and minimum record are the extreme value among the records observed 3 or 4 times a day. That is, they do not always present the actual maximum and minimum.

TABLE 1.1-19 METEOROLOGICAL RECORD AT ROXAS CITY IN 1983

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total Period
AIR TEMPERATURE (°C)													
Highest	32.5	32.9	34.0	35.0	36.0	38.5	34.0	34.4	33.5	34.5	31.6	29.5	38.5
Lowest	23.0	20.5	22.0	21.8	23.5	21.3	16.5	22.0	20.3	20.8	21.5	19.8	16.5
Ave. Daily Max.	31.1	31.8	32.5	33.8	34.6	33.9	31.8	32.6	31.9	31.2	30.1	27.9	31.9
Ave. Daily Min.	24.2	23.4	23.2	23.5	24.6	24.2	22.5	23.5	23.2	23.3	23.5	22.7	23.5
Mean	27.7	27.6	27.8	28.7	29.6	29.1	27.1	28.0	27.5	27.2	26.7	25.3	27.7
RELATIVE HUMIDITY (%)													
Maximum	96	96	93	92	91	98	98	98	96	100	98	99	100
Mean	80.4	76.5	76.4	74.3	73.6	80.1	83.7	84.3	85.0	85.6	85.0	88.4	81.1
ATMOSPHERIC PRESSURE (millibar)													
Minimum	1,010.0	1,008.1	1,009.0	1,001.0	1,005.0	1,005.3	1,003.9	1,004.2	1,005.0	1,000.4	1,000.3	1,009.0	1,000.4
Mean	1,013.7	1,014.2	1,013.4	1,011.8	1,009.9	1,009.4	1,008.7	1,009.1	1,008.9	1,008.8	1,009.8	1,011.9	1,010.8
WIND													
Max. Velocity (m/s)	9	9	8	6	6	8	9	5	7	6	11	8	11
Ave. Velocity (m/s)	3.4	3.5	3.6	3.4	2.7	3.0	2.9	2.6	2.3	2.9	4.3	4.2	3.2
Prevailing Direction	WSW	WNW	WSW	WSW	WNW	WNW	NNE	NNE	NNE	NNW	NNE	WSW	NW

Note; The maximum and minimum record are the extreme value among the records observed 3 or 4 times a day. That is, they do not always present the actual maximum and minimum.

TABLE 1.1-20 MONTHLY EVAPORATION (Revised)

Matec, Mambusao, Capiz)

Unit: mm

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
1978					145.7	114.0	-	-	-	-	-	-	
1981	113.1	97.9	141.2	149.2	-	123.6	138.6	150.9	144.0	142.4	141.6	120.3	
1982	105.9	101.1	132.9	165.6	163.9	147.8	119.8	114.9	-	128.8	113.8	113.5	
1983	128.3	109.2	168.3	201.6									
MEAN	115.8	102.7	147.5	172.1	154.8	128.5	129.2	132.9	144.0	135.6	127.7	116.9	1,607.7

Data Source : Original records compiled by PAGASA (Manila), collected in December, 1983

* : Monthly total is revised by the following method.

$$\text{Original total} \times \frac{\text{Days of the month}}{\text{(Days of the month - Days of no observation}}$$

TABLE 1.1-21 MONTHLY EVAPORATION (Revised)

(Aguirre, Sara, Iloilo)

Unit: mm

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
1979	144.0	165.8*	232.1*	214.5	173.3*	119.9*	135.6*	143.5*	140.2*	115.0*	123.0*	130.8*	1,837.7
1980	113.5*	120.6*	187.1*	187.9*	-	-	-	117.2*	110.2*	124.5*	108.9*	95.0*	
1981	96.8*	148.5*	147.3*	114.5	154.2	115.6*	119.9*	131.5*	144.0*	130.5	117.5*	130.3	1,550.6
1982	135.0	132.2	137.2	159.1	162.3	137.4	137.2	118.6	117.0	121.3	126.2	120.9	1,478.1
1983	108.8												
MEAN	149.5	141.8	175.9	169.0	163.3	124.3	130.9	127.7	127.9	122.8	118.9	119.2	1,671.2

Data Source : Original records compiled by NIA (Manila), collected in December 1983.

* : Monthly total is revised by the following method.

$$\text{Original total} \times \frac{\text{Days of the month}}{\text{(Days of the month - Days of no observation}}$$

TABLE 1.1-22 MONTHLY EVAPORATION
(Cato-ogan, Pototan, Iloilo)

Unit: mm

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1957			229.2	193.2	229.7	171.9	139.8	148.3	138.9	157.4	158.3	173.9	
1958	157.4	177.7	248.6	242.7	228.1	180.7	166.3	150.4	171.8	141.0	135.5	132.2	2,132.4
1959	147.2	187.1	204.1	225.8	189.8	217.2	151.9	142.6	142.4	138.6	130.3	128.2	2,005.2
1960	156.3	150.4	184.5	210.8	183.7	159.9	149.5	146.3		144.5	112.9	132.4	
1961	140.7	147.3	212.6	218.9	189.9	139.4	160.5	137.9	149.6	149.4	147.6	139.9	1,933.7
1962	122.9	113.3	185.9	213.1	226.8	146.1	148.3	130.0	119.1	155.9	137.2	145.0	1,843.6
1963	126.2	132.8	169.9	232.4	226.3	150.6	170.7		145.0	119.6	132.3	140.9	
1964	183.4	155.4	242.3	208.3	174.5	168.6	137.9	178.3	124.9	145.8	117.8	121.9	1,959.1
1965	142.2	164.3	188.7	156.2	209.8	161.0	140.5	177.8	134.4				
1966	173.1	201.3	227.1	270.6		155.3	126.5	176.9	174.5	143.2	160.8		
1967	163.8	172.5	221.9				148.7	158.4	190.4	117.8	160.6	205.8	
1968	197.6	195.5	220.1	218.1	228.9	198.9	187.4	167.6	166.6	164.2	173.4	214.9	2,333.2
1969	226.0	221.8	249.1	211.1	195.9	144.7	148.6	167.2	150.1	163.8	178.2	185.1	2,241.6
1970	178.0	185.3	222.2	216.6	244.6	153.4	146.4	169.5	171.9	145.7	155.0	162.0	2,150.6
1971	211.2	190.5	208.6	227.6	162.7	140.5	139.2	189.7	201.8	167.0	152.1	198.6	2,189.5
1972	158.8	214.3	213.2	217.9	228.6	198.9	169.7	166.1	146.6	168.7	160.4	197.3	2,240.5
1973		196.2	218.2	239.5	234.2	192.1	208.3	183.7	106.8	174.5	144.1	144.2	
1974	204.5	208.2	233.7	214.3	235.2	193.5			179.9				
MEAN	168.1	177.3	215.6	218.7	211.8	169.0	155.3	161.9	153.8	149.8	147.3	161.5	2,090.1

Data Source : Frame work plan, Western Visayas,
Panay river basin (NWRC, 1977)

TABLE 1.1-23 TYPHOON RECORD (TYPHOON PASSING BY PANAY ISLAND) (1)

Year	Date	Name	Maximum Wind (KPH) Oberved Place and Date	Minimum SLP (mb) Observed Place and Date	Maximum 24 - Hour Rainfall (mm) Place and Date	Daily Rainfall (mm) at Roxas City
1949	July 6 - 9	Storm ELAINE	88 kph at Lahug Airport, Cebu City on July 7	1,004.1 mb at Cebu City on July 7	243.3 mm at Camp No. 7 Minglanilla, Cebu on July 7	25.9 (July 6) 39.6 (July 7)
1949	Oct. 31 - Nov. 3	Typhoon (No name)	160 kph at Lahug Airport, Cebu City on November 1	1,006.6 mb Over Water	213.6 mm at Surigao, Surigao on Novbember 1	20.6 (Nov. 1) 20.1 (Nov. 3)
1949	November 4 - 8	Storm (No name)	39 kph at Lahug Airport, Cebu City	996.0 mb Over Water	142.2 mm at Surigao, Surigao	29.2 (Nov. 6)
1949	December 2 - 7	Typhoon BETTY	88 kph at Hinatuan, Surigao on December 4	1,004.0 mb Over Water	391.2 mm at Daet, Camarines Norte on December 5	49.3 (Dec. 4)
1951	December 5 - 16	Typhoon AMY				26.4 (Dec. 6) 79.0 (Dec. 9) 31.5 (Dec. 16)
1952	June 30- July 4	Typhoon EMMA	128 kph at Cuyu, Palawan on July 3	890.1 mb at Cuyu, Palawan on July 3	521.0 mm at La Carlota Negros Occidental on July 2	33.0 (July 1) 37.3 (July 2) 12.5 (July 3)
1954	November 27 - 30	Typhoon TILDA	97 kph at Iloilo City & Cuyo Palawan Nov. 29	998.2 mb Over Water	170.0 mm at Minglanilla, Cebu on November 29	26.9 (Nov. 27) 29.0 (Nov. 29)
1954	December 23 - 27	Storm (No name)	84 kph at Hinatuan, Surigao on December 24	986.0 mb Over Water	215.0 mm at Bago, Negros Occidental on December 24	16.8 (Dec. 24) 60.5 (Dec. 26) 98.6 (Dec. 26)
1956	April 5 - 12	Tropical Storm (No name)	49 kph at iloilo City on April 9	1,003.4 mb at Borongan, Samar on April 8	156.7 mm at Catbalogan, Samar on April 7	31.5 (April 5) 34.8 (April 7) 50.8 (April 8)
1959	December 15 - 20	Typhoon GILDA	212 kph at Catbalogan, Samar on December 18	969.0 mb at Catbalogan, Samar on December 18	387.85 mm at Catbalogan, Samar on December 18	10.4 (Dec. 17) 261.4 (Dec. 18)
1962	August 6 - 9	Tropical Storm PATSY	74 kph at Borongan, Samar on August 8	997.3 mb at Roxas City on August 7	178.0 mm at Coron, Palawan on August 8	26.5 (Aug. 6) 58.7 (Aug. 7) 65.8 (Aug. 8)

(to be continued)

TABLE 1.1-23 TYPHOON RECORD (TYPHOON PASSING BY PANAY ISLAND) (2)

Year	Date	Name	Maximum Wind (KPH) Observed Place and Date	Minimum SLP (mb) Observed Place and Date	Maximum 24 - Hour Rainfall (mm) Place and Date	Daily Rainfall (mm) at Roxas City
1962	November 5 - 8	Typhoon JEAN	83 kph at Legaspi City on November 6	995.8 mb at Catarman, Samar on November 6	286.0 mm at Casiguran, Quezon on November 7	137.2 (Nov. 6) 13.0 (Nov. 7)
1962	November 25 - 28	Typhoon LUCY	121 kph over Cuyu, Palawan on November 28	989.7 mb at Cebu on November 27	183.40 mm at Hinatuan, Surigao del Sur on November 26	20.3 (Nov. 27)
1966	December 25 - 30	Typhoon ANING	185 kph at Masbate on December 27	977.4 mb at Borongan, Eastern Samar on December 26	264.3 mm at Borongan, Samar on December 26	18.5 (Dec. 25) 22.6 (Dec. 26)
1967	March 2 - 5	Typhoon BEBENG	120 kph at Surigao, Surigao on March 3	1,000.6 mb at Surigao, Surigao on March 3	94.0 mm at Basco on March 5	
1970	October 24 - 27	Tropical Storm UDING	40 kph SSW as reported by Roxas City on October 26	1,005.4 mb at Cebu on October 26	181.1 mm at Roxas City on October 26	181.1 (Oct. 25)
1971	April 23 - 28	Tropical Storm	160 kph at Tacloban on April 24	986.5 mb at Tacloban on April 24	69.1 mm at Cebu on April 24	57.0 (April 24)
1972	January 5 - 9	Typhoon ASIANG	104 kph at Tacloban on January 8	993.4 mb at Tacloban on January 8	189.2 mm at Roxas City on January 8	63.1 (Jan. 5) 26.6 (Jan. 7) 189.2 (Jan. 8)
1972	November 4 - 6	Typhoon TOYANG (PAMELA)	148 kph at Romblon on November 5	988.6 mb at Masbate on November 5	233.7 mm at Itbayat on November 6	137.7 (Nov. 5)
1972	December 1 - 8	Typhoon UNDANG (THERESE)	110 kph at Cuyo, Palawan on December 4	997.5 mb at Minatian on December 3	199.5 mm at Cuyo, Palawan on December 5	38.3 (Dec. 2) 32.6 (Dec. 3) 24.2 (Dec. 4)
1973	November 18 - 24	Typhoon OPENG (VERA)	89 kph at Guiuan, Samar on November 20	993.4 mb at Coron on November 22	198.0 mm at Iloilo on November 22	36.6 (Nov. 18) 76.7 (Nov. 19) 156.3 (Nov. 20)
1974	December 14 - 17	Typhoon KADING	50 kph at Baler on December 15	1,003.3 mb at Masbate on December 16	162.50 mm at Baler on December 15	78.9 (Dec. 14)

(to be continued)

TABLE 1.1-23 TYPHOON RECORD (TYPHOON PASSING BY PANAY ISLAND) (3)

Year	Date	Name	Maximum Wind (KPH) Observed Place and Date	Minimum SLP (mb) Observed Place and Date	Maximum 24 - Hour Rainfall (mm) Place and Date	Daily Rainfall (mm) at Roxas City
1974	December 19 - 22	Tropical Depression DELANG	150 Kph at Catbalogan, Samar on December 20	994.0 mb at Borongan, Samar on December 20	216.9 mm at Infanta on December 21	27.2 (Dec. 20)
1975	January 22 - 25	Typhoon AURING (LOLA)	110 kph at Mactan, Cebu on January 24	984.9 mb at Surigao, Surigao on January 24	102.2 mm at Baler on January 25	19.4 (Jan. 24)
1978	April 18 - 27	Typhoon ATANG	180 kph at Romblon on April 20	961.8 mb at Basco on April 20	222.2 mm at Masbate on April 20	16.5 (April 19) 41.8 (April 20)
1978	June 27 - 30	Tropical Depression DELING	52 kph at Dagupan on June	1,001.6 mb at PAG-ASA island on June	131.1 mm at Cuyu on	115.3 (June 26) 49.3 (June 27) 12.7 (June 28)
1979	December 21 - 24	Tropical Depression KRISING				80.0 (Dec. 21)
1980	June 22 - 25	Tropical Storm HUANING	85 - Recon 55 - Guiuan & Roxas	992.0 - Recon 1,005.5 - Roxas	146.3 - Iloilo 113.9 - Catbalogan	23.10 (June 23)
1980	November 11 - 13	Tropical Depression BASIANG	65 - Guiuan	1,006.4 - Hinatuan	126.5 - Catbalogan 134.9 - Tacloban 121.2 - Masbate	69.9 (Nov. 11)
1981	October 12 - 14	Tropical Storm UNSING	75 - Recon 45 - Cuyo	1,002.0 - Recon 1,002.3 - Iloilo 1,002.3 - Cuyo	193.8 - Cuyo	
1982	March 22 - 29	Typhoon BISING	185 - Recon 95 - Cebu 95 - Roxas 85 - Guiuan	938.0 - Recon 992.0 - Cuyo 996.0 - Guiuan 996.4 - Cebu	141.3 - Cebu 141.0 - Maasin 112.3 - Iloilo 94.7 - Tacloban	70.5 (March 26)
1982	August 20 - September 4	Typhoon NORMING	220 - Iba 150 - (ship) 125 - Dagupan	963.0 - Recon 993.1 - Baguio 995.4 - Ship	147.6 - San Jose 120.0 - Iba 87.6 - Baguio	103.0 (Aug. 19) 90.0 (Aug. 20) 40.0 (Aug.23) 32.0 (Aug. 27)
1982	December 2 - 8	Typhoon ANING	160 - Recon	963.0 - Recon	36.6 - Catarman 121.5 - Virac Radar	160.0 (Dec. 7)
1983	November 23 - 25	Tropical Storm YAYANG	110 - Recon	985 - Recon	48.8 - Roxas	48.8 (Nov. 24) 51.4 (Nov. 25) 11.0 (Nov. 26)

TABLE 1.1-24 NUMBER OF TYPHOON (1)

Year	NUMBER OF TYPHOON				
	Whole Philippines	Passing by Panay			
	Total	Typhoon	T. S.	T. D.	Total
1948	20	0	0	0	0
1949	22	2	2	0	4
1950	18	0	0	0	0
1951	13	1	0	0	1
1952	29	1	0	0	1
1953	17	0	0	0	0
1954	18	1	1	0	2
1955	15	0	0	0	0
1956	26	0	1	0	1
1957	15	0	0	0	0
1958	18	0	0	0	0
1959	1	0	0	0	1
1960	19	0	0	0	0
1961	23	0	0	0	0
1962	21	2	1	0	3
1963	16	0	0	0	0
1964	32	0	0	0	0
1965	21	0	0	0	0
1966	22	1	0	0	1
1967	21	1	0	0	1
1968	13	0	0	0	0
1969	15	0	0	0	0
1970	21	0	1	0	1

(to be continued)

TABLE 1.1-24 NUMBER OF TYPHOON (2)

(continued)

Year	NUMBER OF TYPHOON				
	Whole Philippines	Passing by Panay			
	Total	Typhoon	T. S.	T. D.	Total
1971	27	0	1	0	1
1972	17	2	0	0	2
1973	12	1	0	0	1
1974	23	1	0	1	2
1975	14	1	0	0	1
1976	21	0	0	0	0
1977	19	0	0	0	0
1978	25	1	0	1	2
1979	22	0	1	0	1
1980	23	0	1	1	2
1981	23	0	1	0	1
1982	21	3	0	0	3
1983	23	0	1	0	1
Total	723	19	11	3	33
Average	20.08	0.53	0.31	0.08	0.92

Note: Among 723 in whole Philippines, 365 are classified as Typhoon, 176 as Tropical Storm (T.S.), and 160 as Tropical Dipression (T.D.)

TABLE 1.1-25 MONTHLY FREQUENCY OF TROPICAL CYCLONES CROSSING THE PHILIPPINES
From 1948 to 1977 (30 Years Period)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948							2	1	2	2	4	2	13
1949							1	1	2	2	3	2	11
1950								1	1	1	1	1	5
1951					1		1	1	3		1	1	8
1952						2	2	1	2	3	2	3	15
1953						2		3	1	2	2		10
1954			1		1			1		1	3	1	8
1955	1							2	1		1		5
1956				2			2	1	1	1	3	2	12
1957	1					2	1		3	1	1		9
1958									1	1	2		4
1959								1	1		2	2	6
1960				1	1	1		1	2	2			8
1961					1		1	2	1		1		6
1962					1		1	2	1		2		7
1963						2	1	1	1			1	6
1964						1	1	1	4	3	2	2	14
1965	1		1			2	2		1				7
1966					2		6	1		1	2	2	14
1967			1	1		1		2		1	2		8
1968							1	2	1		3		7
1969							2		1	1			4
1970						1	1	1	2	3	3		11
1971				1	3	2	4	1	1	4			16
1972	2					1	1		1	1	1	1	8
1973						1			1	3	1	0	6
1974						1	1	1	1	4	3	2	13
1975	1								1	2	1	1	6
1976					1	1		1				2	5
1977							2		3		1		6
TOTAL	6	0	3	5	11	20	33	29	40	39	47	25	258
% of 250	2.3	0	1.2	1.9	4.3	7.8	12.8	11.2	15.5	15.1	18.2	9.7	100

Data Source : Annual Tropical Cyclone Report 1979 (PAGASA)

TABLE 1.1-26 MONTHLY FREQUENCY OF TROPICAL CYLONES CROSSING THE PANAY
From 1948 to 1983 (36 Years Period) (1)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1948													
1949							1			1	1	1	4
1950													
1951												1	1
1952							1						1
1953													
1954											1	1	2
1955													
1956				1									1
1957													
1958													
1959												1	1
1960													
1961													
1962								1				2	3
1963													
1964													
1965													
1966												1	1
1967			1										1
1968													
1969													
1970										1			1

(to be continued)

TABLE 1.1-26 MONTHLY FREQUENCY OF TROPICAL CYCLONES CROSSING THE PANAY From 1948 to 1983 (36 Years Period) (2)

(continued)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1971				1									1
1972	1										1		2
1973											1		1
1974												2	2
1975	1												1
1976													
1977													
1978				1		1							2
1979												1	1
1980						1					1		2
1981										1			1
1982			1					1				1	3
1983											1		1
TOTAL	2	0	2	3	0	2	2	2	0	3	8	9	33
% of 33	6.1	0	6.1	9.0	0	6.1	6.1	6.1	0	9.0	24.2	27.3	100

TABLE 1.2-1 LIST OF STREAM GAUGING STATION

No.	Location	Superintendent	Period
S1	Tumalalud, Mambusao ***	NWRC	1919.6 - 1922.12 1950.6 - 1977.12
S2	Rallano, Maayon *** (Palaguian)	"	1956.1 - 1978.12
S3	Sto Niño, Cuartero *** (Sta Rita)	"	1956.3 - 1978.12
S4-A	Mambusao (Weir)	NIA	1975.1 - Present
B	(Canal)	"	1975.1 - Present
S5	Aglinab, Tapaz	NPC	1959.4 - 1965 * 1966.1 - 1971.2 ** 1979.9 - Present
S6	Sto Niño, Cuartero ****	NWRC	1984.1 - Present
S7	Panitan ****	"	1984.1 - Present
S8	Dumalag ****	"	1984.1 - Present
S9	Dumarao	"	1984.1 - Present
S10	Salocon	MPWH	1984.7 - Present
S11	Pontevedra	"	1984.9 - Present
S12	Sigma	"	1984.10 - Present

* Discharge data only

** Gauge height only, but discharge measurement records are available 1961 - 1969 and 1979 - 1983 (once or twice a year).

*** The automatic recorder together with staff gage existed in these three stations, but the daily records only by staff gage are available at present.

**** Only staff gage is established first but the works establishment of automatic recorder is already started in September 1984.

Table I.2-2 Monthly Mean Runoff at Cuartero (C.A.: 930 km^2)

Unit: m^3/sec.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVERAGE	Max.	Min.
1956	44.6*	(13.6)	19.3	34.0	39.7	36.6	72.0	63.1	33.5	61.0	54.9	78.9	45.9	78.9	13.6
1957	119.1	26.9	14.6	29.5	12.6	23.1	58.7	53.0	37.0	49.4	36.0	18.7	39.9	119.1	12.6
1958	22.1	13.4	11.5	15.3	16.7	31.5	40.5	50.2	27.4	111.9	99.8	41.9	40.2	111.9	11.5
1959	18.3	11.4	21.7	8.3	30.8	26.0	92.2	46.6	77.3	78.3	88.0	53.9	46.1	92.2	8.3
1960	20.6	(24.1)	13.4	(45.1)	24.9	53.0	61.4	50.0	32.1	77.1	112.6	46.4	46.7	112.6	13.4
1961	31.3	20.9	13.9	10.3	22.3	34.7	47.4	38.7	47.8	75.2	51.6	27.8	35.2	75.2	10.3
1962	30.6	24.8	25.3	11.1	9.8	41.4	76.6	83.0	141.2	36.6	82.1	62.2	52.1	141.2	9.8
1963	48.4	26.3	15.2	10.9	8.7	9.4	20.4	68.3	40.9	47.6	37.1	59.6	32.7	68.3	8.7
1964	23.1	(15.3)	(8.2)	8.6	23.4	(9.4)	15.4*	23.4*	(77.1)	(41.9)	104.6	74.5	35.4	104.6	8.2
1965	64.7	24.9	36.7	21.0	14.4	40.6	50.0	69.1	41.3	50.7	22.8	67.4	42.0	69.1	14.4
1966	27.9	11.7	9.6	(8.0)	48.3	39.5	68.5	75.1	94.7	119.1	137.6	64.3	58.7	137.6	9.6
1967	173.1	70.2	34.4	(13.2)	11.5	15.1	28.5	24.5	(39.4)	45.9	82.4	29.3	47.3	173.1	11.5
1968	23.4	30.8	35.2	(41.2)	40.8	36.4	46.0	39.3	(30.8)	(76.8)	(95.0)	(19.9)	43.0	95.0	23.4
1969	(7.9)	7.1	5.5	(5.2)	6.3	23.0	75.8	33.6	45.0	38.5	43.8	110.3	33.5	110.3	5.2
1970	(17.0)	(31.1)	(30.7)	(15.8)	(13.9)	(24.7)	(87.4)	(23.5)	(33.3)	(43.9)	(78.3)	(71.3)	39.2	87.4	13.9
1971	(38.2)	(46.2)	(34.8)	(7.6)	(40.3)	(126.2)	(45.5)	(22.3)	21.7*	28.0*	(66.2)	(45.1)	43.5	126.2	7.6
1972	(30.3)	(11.9)	(21.4)	(17.8)	(8.9)	(25.3)	(87.6)	(22.8)	(77.3)	(21.3)	(82.7)	(75.5)	40.2	87.6	8.9
1973	(32.1)	(25.1)	(17.8)	(14.6)	(12.1)	(8.3)	13.3	24.8	87.4	60.5	322.2	171.8	65.8	322.2	8.3
1974	76.8	98.0	48.7	16.0	17.6	24.9	53.9*	25.5	29.3	47.5	36.5	36.0	42.6	98.0	16.0
1975	35.4	60.6	23.7	15.3	9.6	61.5	43.9	63.6	65.4	52.3	43.9	97.9	47.8	97.9	9.6
1976	56.5	49.1	17.0	28.3	36.4	48.8	(32.5)	162.6	32.9	15.3	40.5	61.7	48.5	162.6	15.3
1977	31.5	19.1	24.6	16.0	21.3	47.7	45.4	38.1	39.5	37.6	50.8	34.5	33.8	50.8	16.0
1978	22.3	31.5	8.4	22.3	40.4	56.1	84.0*	12.9	26.4	42.8	61.9	67.3	39.7	84.0	8.4
Average	43.3	30.2	21.4	18.1	22.2	36.7	54.2	48.4	51.2	54.7	79.6	61.6	43.5	113.3	11.5
Max.	173.1	98.0	48.7	45.1	48.3	126.2	92.2	162.6	141.2	119.1	322.2	171.8	65.8	322.2	23.4
Min.	18.3	7.1	5.5	5.2	6.3	8.3	13.3	12.9	26.4	15.3	22.8	18.7	32.7	46.0	5.5

Note: (1) Discharge without any marks is the monthly mean daily discharge records in the month with complete records.
(2) Discharge with ( ) is the mean of daily discharge records in the month with incomplete records, that is, some daily records in the month are missing or not recorded.
(3) Discharge with * is estimated by the correlation to the discharge of another station in the basin.
(4) Discharge with ** is estimated at the mean of monthly discharge of all the other years, as there is no available record for the correlation.

Annual Rainfall : 2,600 mm
Specific Discharge: 0.0481 m^3/sec/km^2
Annual Runoff Coefficient : 1,475/2,600 = 56%

Table I.2-3 Monthly Mean Runoff at Tumalalud Mambusao (C.A.: 307 km^2)

Unit: m^3/sec.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVERAGE	Max.	Min.
1950	23.2**	10.5**	8.4**	5.4**	7.8**	58.1	12.9	(28.6)	28.3	36.4	53.3	18.6	24.3	58.1	5.6
1951	8.5	10.1	3.5	1.8	37.1	25.2	20.9	10.4	22.3	32.7	39.8	61.5	22.8	61.5	1.8
1952	16.2	4.1	4.0	1.7	12.2	14.1	29.3	41.8	58.7	71.0	68.0	31.3	29.4	71.0	1.7
1953	71.2	16.3	8.4**	5.4**	4.8	11.7	9.1	6.0	16.8**	23.5**	28.2**	28.3**	19.1	71.2	4.8
1954	23.2**	10.5**	9.3	0.5	0.5	56.5	45.1	10.4	13.7	26.5	18.1	109.9	27.0	109.9	0.5
1955	87.4	5.1	4.2	11.8	5.2	78.6	73.9	21.1	38.7	15.5	71.2	75.3	40.7	87.4	4.2
1956	17.7	20.3	16.1	18.5	29.4	17.7	29.5	27.4	14.9	35.5	29.6	27.6	23.7	35.5	14.9
1957	41.5	14.7	8.1	23.8	6.2	9.5	22.1	16.8	11.3	24.3	19.5	8.9	17.2	41.5	6.2
1958	12.8	8.0	9.1	6.2	6.1	10.8	12.5	25.7	7.0	39.2	(35.7)	16.4	15.8	39.2	6.1
1959	6.9	4.2	11.0	3.9	8.1	13.3	28.5	14.8	(8.1)	(21.5)	30.2	26.0	14.7	30.2	3.9
1960	12.0	8.4	6.9	17.9	9.2	21.0	28.7	9.3	17.6	33.4	43.9	19.0	18.9	43.9	6.9
1961	8.2	3.9	2.6	2.2	4.6	17.6	13.6	(10.5)	(16.8)	(53.3)	(20.4)	(7.6)	13.4	53.0	2.2
1962	(18.2)	(12.7)	(13.1)	(4.0)	(6.1)	(28.0)	(24.6)	(23.8)	(46.6)	(11.2)	(24.7)	(41.3)	21.2	46.6	4.0
1963	(24.8)	(5.1)	6.1*	4.4	3.5*	(1.8)	5.4	18.8	(25.2)	15.7	18.2	27.8	13.1	27.8	5.4
1964	8.0	7.4	4.4	6.5	9.2	11.4	6.1	9.3	23.3	26.3	57.7	19.4	15.8	57.7	4.4
1965	19.1	8.9	8.5	3.7	6.2	11.1	11.7	7.8	11.5	23.7	9.1*	27.0*	12.4	25.7	3.7
1966	25.2	4.0	3.5	3.2	22.4	(10.6)	27.6	12.8	4.6	30.8	7.6	(18.0)	14.2	30.8	3.2
1967	69.9	14.0	9.6	(2.7)	2.4	4.9	4.3	3.6	3.4	16.5	(11.0)	3.9	12.2	67.9	2.4
1968	3.9	3.0	2.4	(1.8)	(1.7)	4.4	4.4	9.2	(3.4)	7.0	(29.1)	(3.4)	6.1	29.1	2.4
1969	2.3	1.8	1.2	0.5	(0.8)	9.2	25.9	6.4	22.3	16.2	14.8	18.5	10.0	25.9	0.5
1970	3.7	3.1	2.6	1.8	1.3	2.4	1.6	2.7	2.8	(18.1)	28.9*	(60.3)	10.8	60.3	1.3
1971	62.8	(50.8)	(63.3)	(1.4)	1.2	6.1	7.0	6.7	8.6	11.1	23.1	12.9	21.2	62.8	1.2
1972	(13.9)	5.3	(5.3)	1.8	1.8	6.9	13.1	13.8	12.6	8.5*	33.1*	30.2*	12.2	77.7	1.8
1973	12.8*	(1.1)	0.9	1.0	1.2	2.6	9.1	(11.5)	9.0	(9.1)	(11.3)	7.5	6.6	14.9	0.9
1974	3.6	1.7	2.4	1.5	2.8	10.0*	21.6*	10.2*	11.7*	19.0*	14.6*	7.5	8.9	21.6	1.5
1975	14.2*	24.2*	9.5*	6.1*	3.8*	24.6*	17.6*	25.4*	26.2*	20.9*	17.6*	39.2*	19.1	39.2	3.8
1976	22.6*	19.6*	6.8*	11.3*	14.6*	19.1*	18.2*	(6.6)	2.5	52.	(15.2)	(42.2)	15.3	42.2	2.5
1977	15.2	14.6	4.1	0.7	1.8	5.6	11.7	7.7	3.9	5.2	17.3	4.0	7.7	17.3	0.7
Average	23.2	10.5	8.4	5.4	7.8	17.6	19.1	14.2	16.8	23.5	28.2	28.3	16.9*	48.3	3.5
Max.	87.4	50.8	63.3	23.8	37.1	78.6	73.9	41.8	58.7	71.0	77.7	109.9	40.7	109.9	14.9
Min.	2.3	1.1	0.9	0.5	0.5	2.4	1.6	2.7	2.5	5.2	7.6	3.4	6.1	14.9	0.5

Note: (1) Discharge without any marks is the monthly mean daily discharge records in the month with complete records.
(2) Discharge with ( ) is the mean of daily discharge records in the month with incomplete records, that is, some daily records in the month are missing or not recorded.
(3) Discharge with * is estimated by the correlation to the discharge of another station in the basin.
(4) Discharge with ** is estimated at the mean of monthly discharge of all the other years, as there is no available record for the correlation.

Annual Rainfall : 3,200 mm
Specific Discharge: 0.0550 m^3/sec/km^2
Annual Runoff Coefficient : 1,736/3,200 = 54%

Table I.2-4 Monthly Mean Runoff at Rallano, Maayon (C.A.: 265 km^2)

Unit: $m^3/sec.$

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVERAGE	Max.	Min.
1956	5.8	5.9	4.3	11.1	14.1	9.7	21.6	16.0	7.3	16.2	13.9	31.4	13.1	31.4	4.3
1957	30.7	5.5	2.3	7.4	2.2	3.9	9.9	23.8	18.5	24.7	8.1	2.6	11.6	30.7	2.2
1958	3.3	1.7	1.5	2.6	1.9	8.0	7.0	13.1	5.9	49.5	25.0	8.1	10.6	49.5	1.5
1959	2.6	1.9	3.6	1.8	3.5	4.8	37.0	12.6	19.5	15.9	24.8	9.3	11.4	37.0	1.8
1960	(4.4)	(3.7)	(3.0)	10.4*	(9.1)	(21.1)	21.2	(20.3)	(13.7)	25.0	44.5	(12.7)	15.8	44.5	3.0
1961	(8.4)	(6.8)	(2.3)	(2.0)	(5.5)	(8.2)	14.6	(11.8)	(19.7)	(37.1)	(16.1)	7.7	11.7	37.1	2.0
1962	10.3	7.9	7.8	2.2	2.8	7.7	17.6	34.7	17.9	7.3	15.2	17.5	12.4	34.7	2.2
1963	8.6	3.9	2.2	1.7	1.4	1.3	5.7	18.9	9.7	9.8	6.7	11.5	6.8	18.9	1.3
1964	3.4	2.9	2.4	2.1	3.9	7.5	10.8	7.9	14.6	12.8	43.8	17.3	10.8	43.8	2.1
1965	13.4	4.0	8.0	3.2	1.9	10.1	13.0	10.6	9.1	21.0	7.9	17.6	10.0	21.0	1.9
1966	4.3	(2.2)	1.8	1.5	11.1*	9.1*	15.8*	17.3*	21.8*	7.5	(11.1)	(7.9)	9.3	21.8	1.5
1967	(39.4)	10.6	6.0	(3.3)	3.2	5.7	8.2	(7.2)	6.7	5.3	5.1	9.6	9.2	39.4	3.2
1968	(10.9)	3.9	(2.8)	2.3	5.1	7.5	12.7	5.8	6.5	5.6	(4.2)	(12.3)	6.6	12.7	2.3
1969	4.2	0.8	0.7	(0.6)	2.8	4.7	6.0	11.1	14.6	8.1	12.6	(14.7)	6.7	14.7	0.6
1970	7.9	(1.2)	(0.5)	(0.5)	(0.5)	(7.9)	33.3	6.7	8.3	(6.7)	(24.0)	(16.6)	9.5	33.3	6.7
1971	4.8	(25.1)	(10.3)	3.3	6.4	(10.5)	(13.1)	11.5	13.5	(20.2)	(21.2)	(12.0)	11.6	21.2	3.3
1972	(20.0)	8.2	7.3	3.8	(7.6)	(17.0)	3.7	5.0	(12.9)	10.1	(10.3)	(9.8)	9.6	20.0	3.7
1973	2.0	4.0	1.0	0.5	0.4	1.6	(11.2)	(14.1)	(21.3)	(8.5)	(13.6)	(17.7)	6.5	21.3	0.4
1974	(11.7)	(11.8)	(6.4)	3.8	3.2	(11.2)	(12.4)	11.4	(8.2)	(12.6)	(12.0)	(11.5)	9.7	12.4	3.2
1975	(16.9)	(8.8)	6.2	(4.9)	8.7	12.8	(13.8)	(10.9)	(12.0)	(9.0)	10.3	(15.8)	10.8	16.9	4.9
1976	(15.8)	6.1	2.5	1.9	(5.4)	(6.7)	(11.7)	(9.5)	(15.2)	9.8	(15.0)	(13.3)	9.4	15.8	1.9
1977	(12.3)	(13.4)	(12.2)	5.9	8.3	(14.0)	(14.8)	15.8	(21.4)	16.1	14.3	(16.2)	12.0	21.4	5.9
1978	7.2	6.1	5.7	4.9	8.4	(11.1)	(19.3)	18.6	(18.8)	(14.5)	(16.6)	(17.5)	12.4	19.3	4.9
Average	10.8	6.4	4.4	3.6	5.1	8.8	14.4	13.7	13.8	15.4	16.4	13.5	10.3	26.9	2.8
Max.	39.4	25.1	12.2	11.1	14.1	21.1	37.0	34.7	21.4	59.5	44.5	31.4	13.1	49.5	6.7
Min.	2.0	0.8	0.7	0.5	0.4	1.3	3.7	5.0	5.9	3.3	5.1	2.6	6.6	12.7	0.4

Note: (1) Discharge without any marks is the monthly mean daily discharge records in the month with complete records.
(2) Discharge with ( ) is the mean of daily discharge records in the month with incomplete records, that is, some daily records in the month are missing or not recorded.
(3) Discharge with * is estimated by the correlation to the discharge of another station in the basin.
(4) Discharge with ** is estimated at the mean of monthly discharge of all the other years, as there is no available record for the correlation.

Annual Rainfall : 2,300 mm
Specific Discharge: 0.0389 $m^3/sec/km^2$
Annual Runoff Coefficient : 1,226/2,300 = 53%

Table I.2-5 Monthly Mean Runoff at Aglinab, Tapaz (C.A.: 230 km^2)

Unit: m^3/sec.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVERAGE	Max.	Min.
1959	-	-	-	(5.4)	29.9	61.9	69.1	25.7	44.6	40.6	32.4	32.0	-	-	-
1960	12.5	11.7	5.3	23.5	24.5	28.6	28.9	24.2	24.9	28.9	61.5	35.1	25.8	61.5	5.3
1961	19.5	15.8	6.5	5.2	24.1	26.2	28.3	33.2	21.5	34.3	30.9	19.1	22.1	34.3	5.2
1962	32.8	27.2	20.4	9.0	3.7	25.9	35.8	37.6	57.1	26.4	49.7	39.4	30.4	57.1	3.7
1963	37.0	28.3	15.3	1.4	1.8	4.0	10.9	37.3	27.1	21.4	20.0	44.5	20.8	44.5	1.4
1964	16.5	20.0	4.8	6.0	17.5	24.0	24.8	19.4	44.6	27.2	59.1	47.0	25.9	59.1	4.8
1965	29.2	14.2	27.8	13.4	11.1	20.6	25.0	27.2	(30.5)	41.6	20.0	(42.1)	23.0	41.6	11.1
1966	18.3	(5.4)	(5.5)	(9.1)	15.2	15.1	26.1	19.6	8.5	32.6	27.6	29.7	17.7	32.6	5.4
1967	(50.3)	34.8	18.6	(21.6)	(5.2)	(9.9)	17.4	10.1	16.0	23.9	22.7	20.7	20.9	50.3	5.2
1968	26.9	19.8	17.5	10.5	11.1	20.4	23.2	28.6	11.8	15.6	19.5	20.4	18.8	28.6	11.1
1969	7.6	-	(3.5)	-	(14.4)	12.3	25.1	18.8	19.6	19.7	26.7	35.7	-	-	-
1970	15.5	15.6	13.7	(17.0)	(16.1)	15.2	25.7	18.5	20.0	33.1	36.6	(30.4)	21.4	36.6	13.7
1971	26.4	52.8	-	-	-	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	31.3	33.5	28.0	27.4	34.3	-	-	-
1980	36.2	(28.0)	12.2	9.8	18.1	(24.7)	(21.0)	28.0	21.5	(40.5)	30.8	31.4	25.2	40.5	9.8
1981	40.6	20.6	8.0	7.1	12.7	15.6	21.6	13.4	22.5	26.4	36.7	31.2	21.4	40.6	7.1
1982	25.2	20.4	(9.2)	(34.0)	(31.2)	17.3	18.3	27.0	17.7	22.0	22.4	17.8	21.9	34.0	9.2
1983	9.9	3.0	2.4	2.2	3.2	10.4	21.2	27.0	25.6	24.7	-	-	-	-	-
Average	25.3	21.2	11.4	11.7	15.0	20.7	26.4	25.3	25.6	28.7	32.9	32.0	22.7	43.2	7.2
Max.	50.3	52.8	27.8	34.0	31.2	61.9	69.1	37.3	44.6	41.6	61.5	47.0	30.4	61.5	13.7
Min.	7.6	3.0	2.4	2.2	1.8	4.0	10.9	10.1	8.5	15.6	20.0	17.8	17.7	28.6	1.4

Note: Discharge with ( ) is the mean of daily discharge records in the month with incomplete records, that is, some daily records in the month are missing or not recorded.

TABLE 1.2 - 6 ANNUAL EXTREME DAILY DISCHARGE RECORD

Station: Tumalalud, Mambusao

(Unit: m^3/sec)

Year	Maximum Month	Maximum Day	Maximum Discharge	Minimum Month	Minimum Day	Minimum Discharge
1919	Dec	5	65.16	Aug	27	0.45
1920	Nov	4	135.26	May	3	1.45
1921	Nov	11	157.11	Apr	21	1.60
1922	May	22	404.10	Apr	29	1.74
1960	Oct	7	271.20	Mar	13	2.80
1961	Oct	25	227.20	May	3	1.44
1962	Sep	24	196.32	Mar	28	3.60
1963	Dec	10	191.76	Jun	24	1.32
1964	Oct	27	115.80	Jul	21	1.70
1965	Oct	14	162.10	Apr	19	1.60
1966	Jan	5	116.96	Dec	27	1.05
1967	Jan	24	460.00	May	19	1.64
1968	Nov	23	134.94	May	24	1.18
1969	Jul	8	216.88	Apr	29	0.35
1970	Dec	5	83.75	Aug	2	0.52
1971	Mar	6	80.80	May	10	0.41
1972	Jan	9	181.88	Apr	17	1.57
1973	Nov	4	21.36	May	1	0.90
1974	May	27	11.94	Apr	15	1.32
1976	Dec	2	106.50	Sep	19	1.00
1977	Feb	23	83.32	May	16	0.08

TABLE I.2-7 ANNUAL EXTREME DAILY DISCHARGE RECORD

Station: Rallano, Maayon

(Unit: m^3/sec)

Year	Maximum Month	Maximum Day	Maximum Discharge	Minimum Month	Minimum Day	Minimum Discharge
1957	Jan	9	130.4	May	11	1.56
1958	Oct	24	138.80	May	25	1.0
1959	Nov	18	129.28	Feb	15	1.42
1960	Oct	8	99.36	Mar	30	2.14
1961	Oct	25	81.50	Apr	24	1.75
1962	Nov	7	99.88	May	16	1.99
1963	Dec	11	55.50	Jun	15	1.18
1964	Nov	28	150.0	Apr	1	1.87
1965	Jul	1	66.29	May	25	1.04
1966	Dec	30	20.78	Apr	21	1.50
1967	Jan	27	70.20	May	8	2.20
1968	Jul	20	20.30	Mar	16	1.62
1969	Dec	29	26.70	Apr	17	.64
1970	Jul	6	98.22	Mar	16	.46
1971	Feb	8	52.20	Jan	20	1.18
1972	Jan	17	33.02	Aug	4	.74
1973	Dec	11	28.05	Jun	1	.38
1974	Jan	14	30.60	May	2	1.87
1975	Dec	28	33.52	Apr	20	3.73
1976	Jan	13	33.52	May	5	1.70
1977	Nov	30	48.80	May	13	4.91
1978	Aug	3	33.52	Jun	8	4.24

TABLE 1.2-8 ANNUAL EXTREME DAILY DISCHARGE RECORD

Station: Sto. Niño Cuartero

(Unit: m^3/sec)

Year	Maximum			Minimum		
	Month	Day	Discharge	Month	Day	Discharge
1957	Jan	7	969.3	Jun	4	7.0
1958	Oct	22	773.9	Mar	30	5.9
1959	Nov	17	640.9	Apr	25	4.0
1960	Apr	22	609.9	Apr	14	5.3
1961	Oct	18	335.4	May	1	8.6
1962	Nov	7	550.9	May	14	6.4
1963	Dec	10	291.3	Jun	10	7.1
1964	Sep	12	342.1	Apr	7	3.9
1965	Jan	19	317.0	May	11	12.3
1966	Nov	21	437.4	Mar	30	4.2
1967	Jan	20	732.9	May	21	8.2
1968	Nov	26	250.4	Sep	9	11.8
1969	Jul	9	473.3	May	7	3.9
1970	Nov	25	230.8	Jan	5	3.9
1971	Nov	29	205.9	Apr	30	3.9
1972	Nov	6	377.8	Feb	15	4.2
1973	Nov	22	1,411.7	May		5.6
1974	Jan	2	314.4	Jan	27	3.7
1975	Dec	21	182.9	Apr	15	3.7
1976	Aug	11	321.3	Oct	18	3.7
1977	Nov	30	171.5	May	16	3.7
1978	Dec	15	377.8	Mar	31	3.7

Note: The date of the minimum discharge is a representative one when there are some same discharge records in a year.

TABLE 1-2-9 ANNUAL EXTREME DAILY DISCHARGE RECORD

Station: Aglinab, Tapaz

(Unit: m^3/sec)

Year	Maximum Month	Maximum Day	Maximum Discharge	Minimum Month	Minimum Day	Minimum Discharge
1959	Jun	24	274.60	Apr	19	1.36
1960	Nov	26	156.40	Mar	12	.27
1961	Nov	30	153.20	May	4	1.70
1962	Sep	12	224.00	May	15	.05
1963	Dec	10	190.80	Jun	27	.25
1964	Dec	7	224.0	Mar	8	0
1965	Dec	1	197.20	Apr	7	.25
1966	Oct	6	151.0	May	1	0
1967	Jan	21	195.4	Jun	1	0
1968	Aug	11	143.20	Sep	9	0
1969	Dec	11	122.24	Mar	3	0.4
1970	Nov	25	162.50	Jun	14	4.0
1971	Feb	12	117.40	Jan	20	7.0
1979	Aug	14	178.80	Aug	29	4.5
1980	Jan	23	148.2	May	14	4.0
1981	Jan	26	99.10	Mar	23	5.0
1982	Aug	21	179.60	Jun	1	4.0
1983	Aug	8	54.20	Apr	25	1.6

TABLE 1.2-10 STREAMFLOW RECORDS AT NOV. 1973 FLOOD

Station: Sto. Niño, Cuartero

Day		A M (7:00) G.H.	A M (7:00) Q (m^3/s)	P M (5:00) G.H.	P M (5:00) Q (m^3/s)
Nov	15	2.88 m	120	2.95 m	125
Nov	16	2.89	120	2.69	110
Nov	17	3.13	145	3.27	175
Nov	18	3.56	175	3.75	190
Nov	19	3.89	205	4.00	215
Nov	20	5.10	350	7.13	700
Nov	21	9.43	1,190	10.40	1,450
Nov	22	10.40	1,450	9.89	1,325
Nov	23	9.83	1,320	9.54	1,230
Nov	24	9.41	1,200	8.73	1,030
Nov	25	8.10	880	7.10	685
Nov	26	6.40	550	5.50	410
Nov	27	4.71	300	4.11	230
Nov	28	3.93	205	3.71	190
Nov	29	3.50	175	3.10	130
Nov	30	2.90	120	2.65	100

		A M (6:00)	P M (5:00)
Dec	1	2.40	2.75
Dec	2	2.98	3.10
Dec	3	3.35	3.62
Dec	4	3.45	3.28
Dec	5	3.15	3.05

Note: Hourly records are available in day time on Nov. 18 and 20. But, they are not used as the period is not the peak of flood and the hydrograph curve is almost not changed by using the hourly variation.

TABLE 1.2 - 9 ANNUAL EXTREME DAILY DISCHARGE RECORD

Station: Aglinab, Tapaz

(Unit: m^3/sec)

Year	Maximum Month	Maximum Day	Maximum Discharge	Minimum Month	Minimum Day	Minimum Discharge
1959	Jun	24	274.60	Apr	19	1.36
1960	Nov	26	156.40	Mar	12	.27
1961	Nov	30	153.20	May	4	1.70
1962	Sep	12	224.00	May	15	.05
1963	Dec	10	190.80	Jun	27	.25
1964	Dec	7	224.0	Mar	8	0
1965	Dec	1	197.20	Apr	7	.25
1966	Oct	6	151.0	May	1	0
1967	Jan	21	195.4	Jun	1	0
1968	Aug	11	143.20	Sep	9	0
1969	Dec	11	122.24	Mar	3	0.4
1970	Nov	25	162.50	Jun	14	4.0
1971	Feb	12	117.40	Jan	20	7.0
1979	Aug	14	178.80	Aug	29	4.5
1980	Jan	23	148.2	May	14	4.0
1981	Jan	26	99.10	Mar	23	5.0
1982	Aug	21	179.60	Jun	1	4.0
1983	Aug	8	54.20	Apr	25	1.6

TABLE I.2-10 STREAMFLOW RECORDS AT NOV. 1973 FLOOD

Station: Sto. Niño, Cuartero

Day		A M (7:00) G.H.	A M (7:00) Q (m^3/s)	P M (5:00) G.H.	P M (5:00) Q (m^3/s)
Nov	15	2.88 m	120	2.95 m	125
Nov	16	2.89	120	2.69	110
Nov	17	3.13	145	3.27	175
Nov	18	3.56	175	3.75	190
Nov	19	3.89	205	4.00	215
Nov	20	5.10	350	7.13	700
Nov	21	9.43	1,190	10.40	1,450
Nov	22	10.40	1,450	9.89	1,325
Nov	23	9.83	1,320	9.54	1,230
Nov	24	9.41	1,200	8.73	1,030
Nov	25	8.10	880	7.10	685
Nov	26	6.40	550	5.50	410
Nov	27	4.71	300	4.11	230
Nov	28	3.93	205	3.71	190
Nov	29	3.50	175	3.10	130
Nov	30	2.90	120	2.65	100

		A M (6:00)	P M (5:00)
Dec	1	2.40	2.75
Dec	2	2.98	3.10
Dec	3	3.35	3.62
Dec	4	3.45	3.28
Dec	5	3.15	3.05

Note: Hourly records are available in day time on Nov. 18 and 20. But, they are not used as the period is not the peak of flood and the hydrograph curve is almost not changed by using the hourly variation.

Table I.2-11 WATER LEVEL AT THE TIME OF 1984 NOVEMBER FLOOD (1)

(1) Dumarao

Date	AM 7:00	NOON 12:00	PM 5:00
Nov. 1	.40	.45	.45
Nov. 2	.45	.40	.40
Nov. 3	.35	.35	.30
Nov. 4	.30	.25	.20
Nov. 5			
Nov. 6			
Nov. 7			

Note: On Nov. 5, the staff gage was completely washed away.

(2) Dumalag (G.H. 0 m = El. 16.9 m, G.H. 5 m up → over)

Date	AM 7:00	NOON 12:00	PM 5:00
Nov. 1	1.15	1.02	1.00
Nov. 2	1.80	1.30	1.10
Nov. 3	1.08	1.02	1.02
Nov. 4	.99	1.75	1.10
Nov. 5	1.55	3.00	4.80
Nov. 6	Over	5.00	3.10
Nov. 7			
Nov. 8			
Nov. 9			

Note: (1) As the flood overtopped the top of gage, the gage keeper couldn't read the peak water level. However, it was judged that the maximum water level was GH 5.97 m in accordance with the information from the gage keeper and the flood mark on the pier.

(2) The observation after Nov. 7 couldn't be carried out because the staff gages at lower portion were washed away.

(3) The records of extra reading:

Nov. 4	AM 9:30	1.5 m
	AM 10:30	1.8 m
Nov. 5	AM 10:30	2.5 m
	PM 1:00	4.0 m

Table I.2-11 WATER LEVEL AT THE TIME OF 1984 NOVEMBER FLOOD (2)

(3) Pontevedra (G.H. 0 m = El.-1.07 m, G.H. 4.0 m up → over)

Date	AM 7:00	NOON 12:00	PM 5:00
Nov. 1	1.89	1.23	1.26
Nov. 2	1.23	1.25	1.15
Nov. 3	1.66	1.32	1.00
Nov. 4	1.51	1.50	1.01
Nov. 5	1.55	2.85	Over (4.1)
Nov. 6	Over (4.1)	Over (4.1)	Over (4.1)
Nov. 7	Over (4.1)	Over (4.1)	3.99
Nov. 8	3.73	3.66	3.54
Nov. 9	3.35	3.31	2.93
Nov. 10	2.54	2.59	3.71

(4) Sigma (G.H. 0 m = El. 5.80 m, G.H. 7.0 m up → over)

Date	AM 6:00	NOON 12:00	PM 6:00
Nov. 1			
Nov. 2			
Nov. 3		1.54	1.26
Nov. 4	1.10	1.00	1.01
Nov. 5	1.25	4.00	4.08
Nov. 6	2.75	Over (7.20)	Over (7.20)
Nov. 7	4.75	4.65	4.02 (at 3:00 PM)
Nov. 8	4.55	4.25	4.00
Nov. 9	3.90	3.49	3.20
Nov. 10	5.95	6.25	6.23
Nov. 11	4.90	4.00	3.38
Nov. 12	2.90	2.35	2.10

Note: Extra reading
Nov. 7 PM 3:00 6.25 m

Table I.2-11 WATER LEVEL AT THE TIME OF 1984 NOVEMBER FLOOD (3)

(5) Cuartero (G.H. 0 m = El. 6.95 m, G.H. 8.0 m up → over)

Date	AM 7:00	NOON 12:00	PM 5:00
Nov. 1	.90	1.75	1.60
Nov. 2	2.75	2.65	1.85
Nov. 3	1.50	1.46	1.44
Nov. 4	1.41	1.52	2.10
Nov. 5	1.54	1.69	1.75
Nov. 6	Over	Over	Over
Nov. 7	6.50	5.00	4.80
Nov. 8	2.90	2.85	2.72
Nov. 9	2.20	2.21	2.30
Nov. 10	3.90	4.05	3.40

Note: Maximum height is estimated at G.H. 8.73 m from the flood mark. The water level of nearly the max height continued almost 24 hours from Nov. 5 midnight until Nov. 6 midnight.

(6) Lower Panay (Salocon) (G.H. 0 m = El. 0.14 m)

Date	AM	NOON	PM
Nov. 1	1.10	0.85	0.55
Nov. 2	1.20	0.70	0.60
Nov. 3	0.90	0.55	0.70
Nov. 4	0.55	0.75	0.75
Nov. 5	1.00	1.80	4.60
Nov. 6	6.00	6.25	6.35
Nov. 7	6.35	6.32	6.20
Nov. 8	5.80	5.55	5.40
Nov. 9	4.80	4.40	4.10
Nov. 10	3.70	3.85	4.00
Nov. 11	3.75	3.60	3.20
Nov. 12	3.05	2.45	2.20
Nov. 13	2.10	1.75	1.65
Nov. 14			

Table I.2-11 WATER LEVEL AT THE TIME OF 1984 NOVEMBER FLOOD (4)

(7) Panitan (G.H. 0 m = El.-1.18 m, G.H. 7.0 m up → over)

Date	AM 7:00	NOON 12:00	PM 5:00
Nov. 1	2.24	2.30	2.25
Nov. 2	2.50	2.45	2.22
Nov. 3	2.50	2.30	2.40
Nov. 4	2.25	2.40	2.55
Nov. 5			
Nov. 6	Over	Over	Over
Nov. 7	Over	Over	Over
Nov. 8	Over	Over	Over
Nov. 9	6.50	6.10	5.72
Nov. 10	5.29	5.58	5.65
Nov. 11	5.44	6.00	5.90
Nov. 12	4.00	3.92	2.55 (at 3:00 PM)

Note: (1) The gage keeper couldn't observe the gage hight on Nov. 5 due to the serious damage of his house.

(2) On Nov. 6 morning, the water level was already over the top of gage.

(3) Discharge measurement performed on Nov. 6, 7 and 8. The gage hight was estimated from the records at the time of the measurement as follows.

Nov. 6 PM 5:00 8.95 m (Peak)
Nov. 7 PM 2:00 8.5 m
Nov. 8 AM 11:00 7.55 m

(8) Aglinab, Tapaz (G.H. 0 m = El. ? m)

Date	AM 8:00	NOON 12:00	PM 5:00
Nov. 1	0.48		0.74
Nov. 2	0.62		0.86
Nov. 3	0.64		0.78
Nov. 4	0.58		0.84
Nov. 5	0.68		Over
Nov. 7	Over		Over
Nov. 8	Over		Over
Nov. 9	1.98		1.24
Nov. 10	0.96		0.80

Table I.2-11 WATER LEVEL AT THE TIME OF 1984 NOVEMBER FLOOD (5)

(9) Mambusao Weir (NIA)

Date	Time	Height (H)	Width (W)	Discharge* (Q)
Nov. 1	7:00 AM	30 cm	86.40 m	46.81 m^3/sec
	11:00 AM	28 cm	83.20 m	40.68 m^3/sec
	1:30 PM	28 cm	83.20 m	40.68 m^3/sec
	5:00 PM	27 cm	81.60 m	37.78 m^3/sec
Nov. 2	7:00 AM	25 cm	78.40 m	32.34 m^3/sec
	11:00 AM	28 cm	83.20 m	40.68 m^3/sec
	1:30 PM	23 cm	75.20 m	27.37 m^3/sec
	5:00 PM	22 cm	73.60 m	25.06 m^3/sec
Nov. 3	7:00 AM	22 cm	73.60 m	25.06 m^3/sec
	11:00 AM	21 cm	72.00 m	22.86 m^3/sec
	1:30 PM	20 cm	70.40 m	20.78 m^3/sec
	5:00 PM	20 cm	70.40 m	20.78 m^3/sec
Nov. 4	7:00 AM	25 cm	78.40 m	32.34 m^3/sec
	11:00 AM	21 cm	72.00 m	22.86 m^3/sec
	1:30 PM	29 cm	84.80 m	43.70 m^3/sec
	5:00 PM	30 cm	86.40 m	46.81 m^3/sec
Nov. 5	7:00 AM	35 cm	94.40 m	64.50 m^3/sec
	11:00 AM	40 cm	Over (94.55)	78.93 m^3/sec
	1:30 PM	50 cm	" (94.85)	110.00 m^3/sec
	5:00 PM	120 cm	" (96.95)	420.56 m^3/sec
Nov. 6	7:00 AM	200 cm	" (99.35)	927.31 m^3/sec
	11:00 AM	185 cm	" (92.80)	821.24 m^3/sec
	1:30 PM	130 cm	" (97.25)	475.68 m^3/sec
	5:00 PM	120 cm	" (96.95)	420.56 m^3/sec
Nov. 7	7:00 AM	100 cm	" (96.35)	317.95 m^3/sec
	11:00 AM	95 cm	" (96.20)	293.95 m^3/sec
	1:30 PM	85 cm	" (95.90)	280.00 m^3/sec
	5:00 PM	75 cm	" (95.60)	204.91 m^3/sec
Nov. 8	7:00 AM	50 cm	" (94.85)	110.66 m^3/sec
	11:00 AM	40 cm	" (94.55)	78.93 m^3/sec
	1:30 PM	38 cm	" (94.49)	73.04 m^3/sec
	5:00 PM	35 cm	94.40 m	64.50 m^3/sec

* : $Q = 3.3 \times W \times H\ H$ is used as this formula is used by NIA office (Mambusao), though the formula seems to be not adequate.

TABLE I.2-12 CALCULATION FOR DOUBLE MASS CURVE (1)
(ANNUAL MEAN RUNOFF)

Unit: m^3/sec

Year	Tumalalud (Mambusao)	Rallano (Maayon)	Sto. Niño (Panay)	Aglinab (Panay)
1950	24.3			
1951	22.8			
1952	29.4			
1953	19.1			
1954	27.0			
1955	40.7			
1956	23.7	13.1	45.9	
1957	17.2	11.6	39.9	
1958	15.8	10.6	40.2	
1959	14.7	11.4	46.1	
1960	18.9	15.8	46.7	25.8
1961	13.4	11.7	35.2	22.1
1962	21.2	12.4	52.1	30.4
1963	13.1	6.8	32.7	20.8
1964	15.8	10.8	35.4	25.9
1965	12.4	10.0	42.0	23.0
1966	14.2	9.3	58.7	17.7
1967	12.2	9.2	47.3	20.9
1968	6.1	6.1	43.0	18.8
1969	10.0	6.7	33.5	-
1970	10.8	9.5	39.2	21.4
1971	21.2	11.6	43.5	-
1972	12.2	9.6	40.2	
1973	6.6	6.5	65.8	

(to be continued)

(continued) Unit: m^3/sec

Year	Tumalalud (Mambusao)	Rallano (Maayon)	Sto. Niño (Panay)	Aglinab (Panay)
1974	8.9	9.7	42.6	
1975	19.1	10.8	47.8	
1976	15.3	9.4	48.5	
1977	7.7	12.0	33.8	
1978	---	12.4	39.7	
1979				
1980				25.2
1981				21.4
1982				21.9
1983				
Mean	16.9	10.3	43.5	22.7

TABLE 1.2 - 13 CALCULATION FOR DOUBLE MASS CURVE (2)

(Annual depth of runoff)

(Unit: mm)

Year	Tumalalud (Mambusao R:)	Rallano (Maayon)	Sto. Niño (Panay)	Aglinab (Panay)
1950	2,493			
1951	2,339			
1952	3,017			
1953	1,960			
1954	2,770			
1955	4,176			
1956	2,432	1,557	1,555	
1957	1,765	1,379	1,351	
1958	1,621	1,260	1,362	
1959	1,508	1,355	1,561	
1960	1,939	1,878	1,582	3,533
1961	1,375	1,390	1,192	3,027
1962	2,175	1,474	1,765	4,163
1963	1,344	808	1,108	2,852
1964	1,621	1,284	1,199	3,547
1965	1,272	1,189	1,422	3,469
1966	1,457	1,105	1,988	2,427
1967	1,252	1,094	1,602	2,866
1968	626	784	1,456	2,585
1969	1,026	796	1,135	
1970	1,108	1,129	1,328	2,934
1971	2,175	1,379	1,473	
1972	1,252	1,141	1,362	
1973	677	773	2,229	

(to be continued)

(continued)

Year	Tumalalud (Mambusao)	Rallano (Maayon)	Sto. Niño (Panay)	Aglinab (Panay)
1974	913	1,153	1,443	
1975	1,960	1,284	1,619	
1976	1,570	1,117	1,643	
1977	790	1,426	1,145	
1978		1,474	1,344	
1979				
1980				
1981				
1982				3,003
1983				
Mean	1,734	1,224	1,473	3,109

TABLE 1.2-14 CALCULATION FOR DOUBLE MASS CURVE (3)

(Annual depth of runoff)

	Tumalalud		Means of 2 - Stations	
Year	Annual	Accumulated	Annual	Accumulated
1956	2,432	2,432	1,556	1,556
1957	1,765	4,197	1,365	2,921
1958	1,621	5,818	1,311	4,232
1959	1,508	7,326	1,458	5,690
1960	1,939	9,265	1,730	7,420
1961	1,375	10,640	1,291	8,711
1962	2,175	12,815	1,619	10,330
1963	1,344	14,159	958	11,288
1964	1,621	15,780	1,241	12,529
1965	1,272	17,052	1,306	13,835
1966	1,457	18,509	1,546	15,381
1967	1,252	19,761	1,348	16,729
1968	626	20,387	1,120	17,849
1969	1,026	21,413	965	18,814
1970	1,108	22,521	1,228	20,042
1971	2,175	24,696	1,426	21,468
1972	1,252	25,948	1,252	22,720
1973	677	26,625	1,501	24,221
1974	913	27,538	1,298	25,519
1975	1,960	29,498	1,452	26,971
1976	1,570	31,068	1,380	28,351
1977	790	31,858	1,286	29,637

(unit: mm)

TABLE I. 2-15 CALCULATION FOR DOUBLE MASS CURVE (4)

(Annual depth of runoff)

	Rallano		Means of 2 - Stations	
Year	Annual	Accumulated	Annual	Accumulated
1956	1,557	1,557	1,994	1,994
1957	1,379	2,936	1,558	3,552
1958	1,260	4,196	1,492	5,044
1959	1,355	5,551	1,535	6,579
1960	1,878	7,429	1,760	8,339
1961	1,390	8,819	1,284	9,623
1962	1,474	10,293	1,970	11,593
1963	808	11,101	1,226	12,819
1964	1,284	12,385	1,410	14,229
1965	1,189	13,574	1,347	15,576
1966	1,105	14,679	1,722	17,298
1967	1,094	15,773	1,427	18,725
1968	784	16,557	1,041	19,766
1969	796	17,353	1,080	20,846
1970	1,129	18,482	1,218	22,064
1971	1,379	19,861	1,824	23,888
1972	1,141	21,002	1,307	25,195
1973	773	21,775	1,453	26,648
1974	1,153	22,928	1,178	27,826
1975	1,284	24,212	1,789	29,615
1976	1,117	25,329	1,606	31,221
1977	1,426	26,755	968	32,189

(unit: mm)

TABLE I.2-16 CALCULATION FOR DOUBLE MASS CURVE (5)

(Annual depth of runoff)

	Sto. Niño		Means of 2 - Stations	
Year	Annual	Accumulated	Annual	Accumulated
1956	1,555	1,555	1,994	1,994
1957	1,351	2,906	1,572	3,566
1958	1,362	4,268	2,881	6,447
1959	1,561	5,829	1,432	7,879
1960	1,582	7,411	1,908	9,787
1961	1,192	8,603	1,382	11,169
1962	1,765	10,368	1,824	12,993
1963	1,108	11,476	1,076	14,069
1964	1,199	12,675	1,452	15,521
1965	1,422	14,097	1,230	16,751
1966	1,988	16,085	1,281	18,032
1967	1,602	17,687	1,173	19,205
1968	1,456	19,143	705	19,910
1969	1,135	20,278	911	20,821
1970	1,328	21,606	1,118	21,939
1971	1,473	23,079	1,777	23,716
1972	1,362	24,441	1,196	24,912
1973	2,229	26,670	725	25,637
1974	1,443	28,113	1,033	26,670
1975	1,619	29,732	1,622	28,292
1976	1,643	31,375	1,343	29,635
1977	1,145	32,520	1,108	30,743

(unit: mm)

TABLE 1.2 - 17 CALCULATION FOR DOUBLE MASS CURVE (6)

(Annual depth of runoff)

	Aglinab		Means of 3 - Stations	
Year	Annual	Accumulated	Annual	Accumulated
1960	3,533	3,533	1,800	1,800
1961	3,027	6,560	1,319	3,119
1962	4,163	10,723	1,805	4,924
1963	2,852	13,575	1,087	6,011
1964	3,547	17,122	1,368	7,379
1965	3,469	20,591	1,294	8,673
1966	2,427	23,018	1,517	10,190
1967	2,866	25,884	1,316	11,506
1968	2,585	28,469	955	12,461

TABLE I.2-18 DEPENDABLE DISCHARGE

Discharge (m^3/sec)

Duration (%)	Cuartiro	Tumalalud	Rallano	Aglinab
100	3.7	0.1	0.4	0.1
95	7.6	1.3	1.3	1.3
90	10.0	1.9	1.9	3.1
85	12.6	2.6	2.2	4.7
80	14.2	3.2	2.6	7.0
75	16.0	3.6	3.3	8.6
70	17.4	4.2	4.0	10.5
65	20.6	4.7	4.8	12.7
60	24.4	5.3	5.4	14.4
55	27.6	6.1	6.0	16.1
50	30.6	6.9	6.7	17.9
45	33.6	7.9	7.5	20.3
40	37.0	9.1	8.6	22.2
35	40.7	10.7	9.7	25.2
30	43.9	12.6	11.0	27.8
25	48.5	15.3	12.7	32.8
20	55.4	19.2	14.7	37.8
15	66.2	26.1	17.2	43.2
10	87.8	38.6	21.1	54.8
5	121.7	63.3	30.6	82.3
1	290.0	164.8	66.3	190.0
Max.	1,411.7	704.0	170.4	274.6
Mean	44.5	16.7	10.4	26.6
Number of days	7312	8257	7356	2454

Note; The mean discharge is somewhat different from that in Table I.2-2 to I.2-5 as the method of calculation is different.

TABLE 1.2-19 CONVERSION RATE FOR THE ESTIMATION OF DISCHARGE AT THE STRATEGIC POINT

Location	Catchment Area (km^2)	Basin Annual Rainfall (mm)	Related G.S. for Conversion	Converting Rate to the Discharge at G.S.
Gaging Station				
(A) Tumalalud Mambusao	C_a = 307	R_a = 3200		
(B) Rallano Maayon	C_b = 265	R_b = 2300		
(C) Sto. Niño Cuartero	C_c = 930	R_c = 2600		
(D) Aglinab Tapaz	C_d = 240	R_d = 3300		
Irrigation Intake				
(1) Mambusao	C_1 = 305	R_1 = 3200	G.S. - (A)	$K_1 = 1$
(2) Dumarao	C_2 = 300	R_2 = 1950	G.S. - (C)	$K_2 = \frac{C_2 \cdot R_2}{C_c \cdot R_c} = 0.24$
(3) Maayon	C_3 = 265	R_3 = 2300	G.S. - (B)	$K_3 = 1$
(4) Maindang	C_4 = 70	R_4 = 2250	G.S. - (B)	$K_4 = \frac{C_4 \cdot R_4}{C_b \cdot R_b} = 0.25$
(5) Panitan	C_5 = 1955	R_5 = 2600	G.S. - (C)	$K_5 = \frac{C_5 \cdot R_5}{C_c \cdot R_c} = 2.10$
Dam				
(6) Panay A	C_6 = 210	R_6 = 3400	G.S. - (C)	$K_6 = \frac{C_6 \cdot R_6}{C_c \cdot R_c} = 0.30$

(to be continued)

TABLE I.2-19 CONVERSION RATE FOR THE ESTIMATION OF DISCHARGE AT THE STRATEGIC POINT

Location	Catchment Area (km^2)	Basin Annual Rainfall (mm)	Related G.S. for Conversion	Converting Rate to the Discharge at G.S.
Dam				
(7) Panay B	$C_7 = 240$	$R_7 = 3350$	G.S. - (C)	$K_7 = \frac{C_7 \cdot R_7}{C_c \cdot R_c} = 0.33$
(8) Panay C	$C_8 = 510$	$R_8 = 3100$	G.S. - (C)	$K_8 = \frac{C_8 \cdot R_8}{C_c \cdot R_c} = 0.64$
(9) Badbaran	$C_9 = 260$	$R_9 = 1900$	G.S. - (C)	$K_9 = \frac{C_9 \cdot R_9}{C_c \cdot R_c} = 0.20$
(10) Mambusao A	$C_{10} = 70$	$R_{10} = 3350$	G.S. - (A)	$K_{10} = \frac{C_{10} \cdot R_{10}}{C_a \cdot R_a} = 0.24$
(11) Mambusao B	$C_{11} = 215$	$R_{11} = 3250$	G.S. - (A)	$K_{11} = \frac{C_{11} \cdot R_{11}}{C_a \cdot R_a} = 0.71$
River Junction				
(12) Panay-Badbaran	$C_{12} = 905\ km^2$	$R_{12} = 2650$	G.S. - (C)	$K_{12} = \frac{C_{12} \cdot R_{12}}{C_c \cdot R_c} = 0.99$
(13) Panay-Mambusao	$C = 1480$	$R_{13} = 2600$	G.S. - (C)	$K_{13} = \frac{C_{13} \cdot R_{13}}{C_c \cdot R_c} = 1.59$
(14) Panay-Maayon	$C = 1915$	$R_{14} = 2600$	G.S. - (C)	$K_{14}\ \frac{C_{14} \cdot R_{14}}{C_c \cdot R_c} = 2.06$
(15) Panay-Pontevedra	$C = 1980$	$R_{15} = 2600$	G.S. - (C)	$K_{15} = \frac{C_{15} \cdot R_{15}}{C_c \cdot R_c} = 2.13$

TABLE I.2-20 DEPENDABLE DISCHARGE

Location	Dependable Discharge				
	95%	90%	50%	10%	5%
(a) Tumalalud	1.3	1.9	6.9	38.6	63.3 m^3/s
(b) Rallano	1.3	1.9	6.7	21.1	30.6
(c) Sto. Niño	7.6	10.0	30.6	87.8	121.7
(d) Aglinab	1.3	3.1	17.9	54.8	82.3
(1) Mambusao Intake	1.3	1.9	6.9	38.6	63.3
(2) Dumarao Intake	1.8	2.4	7.3	21.1	29.2
(3) Maayon Intake	1.3	1.9	6.7	21.1	30.6
(4) Maindang Intake	0.3	0.5	1.7	5.3	7.6
(5) Panitan Intake	16.0	21.0	64.3	184.4	255.6
(6) Panay Dam A	2.3	3.0	9.2	26.3	36.5
(7) Panay Dam B	2.5	3.3	10.1	29.0	40.2
(8) Panay Dam C	4.9	6.4	19.6	56.2	77.9
(9) Badbaran Dam	1.5	2.0	6.1	17.6	24.3
(10) Mambusao Dam A	0.3	0.5	1.6	9.3	15.2
(11) Mambusao Dam B	0.9	1.3	4.9	27.4	44.9
(12) Confluence of Panay-Badbaran	7.5	9.9	30.3	86.9	120.5
(13) Confluence of Panay-Mambusao	12.1	15.9	48.6	139.6	193.5
(14) Confluence of Panay-Maayon	15.6	20.6	63.0	180.9	250.7
(15) Bifurcation of Panay-Pontevedra	16.2	21.3	65.2	187.0	259.2

TABLE I.2-21 MONTHLY MEAN DISCHARGE AT STRATEGIC POINTS

(Unit: m^3/sec)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
(1) Mambusao Intake	23.2	10.6	8.4	5.4	7.8	17.6	19.1	14.2	16.8	23.5	28.2	28.3	16.9
(2) Dumarao Intake	10.4	7.2	5.1	4.3	11.6	8.8	13.0	11.6	12.3	13.1	19.1	14.8	10.4
(3) Maayon Intake	10.8	6.4	4.4	3.6	5.1	8.8	14.4	13.7	13.8	15.4	16.4	13.5	10.3
(4) Maindang Intake	2.7	1.7	1.1	0.9	1.3	2.2	3.7	3.5	3.7	4.0	4.1	3.3	2.6
(5) Panitan Intake	90.9	63.4	44.9	38.0	46.6	77.1	113.8	101.6	107.5	114.9	167.2	129.4	91.4
(6) Panay Dam A	13.0	9.1	6.4	5.4	6.7	11.0	16.3	14.5	15.4	16.4	24.9	18.5	13.0
(7) Panay Dam B	14.3	10.0	7.1	6.0	7.3	12.1	17.9	16.0	16.9	18.0	26.3	20.3	14.4
(8) Panay Dam C	27.7	19.3	13.7	11.6	14.2	23.5	34.7	31.0	32.8	35.0	50.9	39.4	27.8
(9) Badbaran Dam	8.7	6.0	4.2	4.4	7.3	9.7	10.8	9.7	10.2	10.9	15.9	12.3	8.4
(10) Mambusao Dam A	5.6	2.5	2.0	1.3	1.9	4.2	4.6	3.4	4.0	5.6	6.8	6.8	4.1
(11) Mambusao Dam B	16.5	7.5	5.9	3.8	5.5	12.4	13.6	10.1	11.9	16.7	20.0	20.1	12.0
(12) Confluence Panay-Badbaran	42.9	29.9	21.2	17.9	22.0	36.3	53.6	47.9	50.7	54.2	78.8	61.0	43.1
(13) Confluence Panay-Mambusao	68.8	48.0	34.0	28.8	35.3	58.4	86.2	77.0	81.4	87.0	126.6	97.9	69.2
(14) Confluence Panay-Maayon	89.2	62.2	44.1	37.3	45.7	75.6	111.6	99.7	105.5	112.7	164.0	126.9	89.6
(15) Bifurcation Panay-Pontevedra	92.2	64.3	45.6	38.6	47.3	78.2	115.4	103.1	109.0	116.5	169.5	131.2	92.6

TABLE-I.2-22 MONTHLY NATURAL RUNOFF AT PROPOSED DAMSITE (1)

PROPOSED DAMSITE : PANAY B
CATCHMENT AREA : 240 (KM**2)

UNIT : M**3/SEC

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1956	14.72	4.49	6.37	11.22	13.10	12.08	23.76	20.82	11.06	20.13	18.12	26.04	15.16
1957	39.30	8.88	4.82	9.74	4.16	7.62	19.37	17.49	12.21	16.30	11.88	6.17	13.16
1958	7.29	4.42	3.80	5.05	5.51	10.40	13.37	16.57	9.04	36.93	32.93	13.83	13.26
1959	6.04	3.76	7.16	2.74	10.16	8.58	30.43	15.38	25.51	25.84	29.04	17.79	15.20
1960	6.80	7.95	4.42	14.88	8.22	17.49	20.26	16.50	10.59	25.44	37.16	15.31	15.42
1961	10.33	6.90	4.59	3.40	7.36	11.45	15.64	12.77	15.77	24.82	17.03	9.17	11.60
1962	10.10	8.18	8.35	3.66	3.23	13.66	25.28	27.39	46.60	12.08	27.09	20.53	17.18
1963	15.97	8.68	5.02	3.60	2.87	3.10	6.73	22.54	13.50	15.71	12.24	19.67	10.80
1964	7.62	5.05	2.71	2.84	7.72	3.10	5.08	7.72	25.44	13.83	34.52	24.59	11.68
1965	21.35	8.22	12.11	6.93	4.75	13.40	16.50	22.80	13.63	16.73	7.52	22.24	13.85
1966	9.21	3.86	3.17	2.64	15.94	13.04	22.61	24.78	31.25	39.30	45.41	21.22	19.37
1967	57.12	23.17	11.35	4.36	3.80	4.98	9.41	8.09	13.00	15.15	27.19	9.67	15.61
1968	7.72	10.16	11.62	13.60	13.46	12.01	15.18	12.97	10.16	25.34	31.35	6.57	14.18
1969	2.61	2.34	1.82	1.72	2.08	7.59	25.01	11.09	14.85	12.71	14.45	36.40	11.06
1970	5.61	10.26	10.13	5.21	4.59	8.15	28.84	7.76	10.99	14.49	25.84	23.53	12.95
1971	12.61	15.25	11.48	2.51	13.30	41.65	15.02	7.36	7.16	9.24	21.85	14.88	14.36
1972	10.00	3.93	7.06	5.87	2.94	8.35	28.91	7.52	25.51	7.03	27.29	24.92	13.28
1973	10.59	8.28	5.87	4.82	3.99	2.74	4.39	8.18	28.84	19.97	106.33	56.69	21.73
1974	25.34	32.34	16.07	5.28	5.81	8.22	17.79	8.42	9.67	15.68	12.05	11.88	14.04
1975	11.68	20.00	7.82	5.05	3.17	20.30	14.49	20.99	21.58	17.26	14.49	32.31	15.76
1976	18.65	16.20	5.61	9.34	12.01	16.10	10.73	53.66	10.86	5.05	13.37	20.36	15.99
1977	10.40	6.30	8.12	5.28	7.03	15.74	14.98	12.57	13.04	12.41	16.76	11.39	11.17
1978	7.36	10.40	2.77	7.36	13.33	18.51	27.72	4.26	8.71	14.12	20.43	22.21	13.10
MEAN	14.28	9.96	7.05	5.96	7.33	12.10	17.89	15.98	16.91	18.07	26.28	20.32	14.34

TABLE-I.2-23 MONTHLY NATURAL RUNOFF AT PROPOSED DAMSITE (2)

PROPOSED DAMSITE : PANAY C
CATCHMENT AREA : 510 (KM**2)

UNIT : M**3/SEC

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1956	28.54	8.70	12.35	21.76	25.41	23.42	46.08	40.38	21.44	39.04	35.14	50.50	29.40
1957	76.22	17.22	9.34	18.88	8.06	14.78	37.57	33.92	23.68	31.62	23.04	11.97	25.53
1958	14.14	8.58	7.36	9.79	10.69	20.16	25.92	32.13	17.54	71.62	63.87	26.82	25.72
1959	11.71	7.30	13.89	5.31	19.71	16.64	59.01	29.82	49.47	50.11	56.32	34.50	29.48
1960	13.18	15.42	8.58	28.86	15.94	33.92	39.30	32.00	20.54	49.34	72.06	29.70	29.90
1961	20.03	13.38	8.90	6.59	14.27	22.21	30.34	24.77	30.59	48.13	33.02	17.79	22.50
1962	19.58	15.87	16.19	7.10	6.27	26.50	49.02	53.12	90.37	23.42	52.54	39.81	33.32
1963	30.98	16.83	9.73	6.98	5.57	6.02	13.06	43.71	26.18	30.46	23.74	38.14	20.95
1964	14.78	9.79	5.25	5.50	14.98	6.02	9.86	14.98	49.34	26.82	66.94	47.68	22.66
1965	41.41	15.94	23.49	13.44	9.22	25.98	32.00	44.22	26.43	32.45	14.59	43.14	26.86
1966	17.86	7.49	6.14	5.12	30.91	25.28	43.84	48.06	60.61	76.22	88.06	41.15	37.56
1967	110.78	44.93	22.02	8.45	7.36	9.66	18.24	15.68	25.22	29.38	52.74	18.75	30.27
1968	14.98	19.71	22.53	26.37	26.11	23.30	29.44	25.15	19.71	49.15	60.80	12.74	27.50
1969	5.06	4.54	3.52	3.33	4.03	14.72	48.51	21.50	28.80	24.64	28.03	70.59	21.44
1970	10.88	19.90	19.65	10.11	8.90	15.81	55.94	15.04	21.31	28.10	50.11	45.63	25.11
1971	24.45	29.57	22.27	4.86	25.79	80.77	29.12	14.27	13.89	17.92	42.37	28.86	27.85
1972	19.39	7.62	13.70	11.39	5.70	16.19	56.06	14.59	49.47	13.63	52.93	48.32	25.75
1973	20.54	16.06	11.39	9.34	7.74	5.31	8.51	15.87	55.94	38.72	206.21	109.95	42.13
1974	49.15	62.72	31.17	10.24	11.26	15.94	34.50	16.32	18.75	30.40	23.36	23.04	27.24
1975	22.66	38.78	15.17	9.79	6.14	39.36	28.10	40.70	41.86	33.47	28.10	62.66	30.57
1976	36.16	31.42	10.88	18.11	23.30	31.23	20.80	104.06	21.06	9.79	25.92	39.49	31.02
1977	20.16	12.22	15.74	10.24	13.63	30.53	29.06	24.38	25.28	24.06	32.51	22.08	21.66
1978	14.27	20.16	5.38	14.27	25.86	35.90	53.76	8.26	16.90	27.39	39.62	43.07	25.40
MEAN	27.69	19.31	13.68	11.56	14.21	23.46	34.70	31.00	32.80	35.04	50.96	39.41	27.82

TABLE-I.2-24 MONTHLY NATURAL RUNOFF AT PROPOSED DAMSITE (3)

PROPOSED DAMSITE : MAMBUSAO B
CATCHMENT AREA : 215 (KM**2)

UNIT : M**3/SEC

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1950	16.47	7.46	5.96	3.83	5.54	41.25	9.16	20.31	20.09	25.84	37.84	13.21	17.25
1951	6.04	7.17	2.49	1.28	26.34	17.89	14.84	7.38	15.83	23.22	28.26	43.67	16.20
1952	11.50	2.91	2.84	1.21	8.66	10.01	20.80	29.68	41.68	50.41	48.28	22.22	20.85
1953	50.55	11.57	5.96	3.83	3.41	8.31	6.46	4.26	11.93	16.69	20.02	20.09	13.59
1954	16.47	7.46	6.60	0.36	0.36	40.12	32.02	7.38	9.73	18.82	12.85	78.03	19.18
1955	62.05	3.62	2.98	8.38	3.69	55.81	52.47	14.98	27.48	11.01	50.55	53.46	28.87
1956	12.57	14.41	11.43	13.14	20.87	12.57	20.95	19.45	10.58	25.21	21.02	19.60	16.82
1957	29.47	10.44	5.75	16.90	4.40	6.75	15.69	11.93	8.02	17.25	13.85	6.32	12.23
1958	9.09	5.68	6.46	4.40	4.33	7.67	8.88	18.25	4.97	27.83	25.35	11.64	11.21
1959	4.90	2.98	7.81	2.77	5.75	9.44	20.24	10.51	5.75	15.27	21.44	18.46	10.44
1960	8.52	5.96	4.90	12.71	6.53	14.91	20.38	6.60	12.50	23.71	31.17	13.49	13.45
1961	5.82	2.77	1.85	1.56	3.27	12.50	9.66	7.46	11.93	37.84	14.48	5.40	9.54
1962	12.92	9.02	9.30	2.84	4.33	19.88	17.47	16.90	33.09	7.95	17.54	29.32	15.05
1963	17.61	3.62	4.33	3.12	2.49	1.28	3.83	13.35	17.89	11.15	12.92	19.74	9.28
1964	5.68	5.25	3.12	4.62	6.53	8.09	4.33	6.60	16.54	18.67	40.97	13.77	11.18
1965	13.56	6.32	6.04	2.63	4.40	7.88	8.31	5.54	8.17	16.83	6.46	19.17	8.77
1966	17.89	2.84	2.49	2.27	15.90	7.53	19.60	9.09	3.27	21.87	5.40	12.78	10.08
1967	49.63	9.94	6.82	1.92	1.70	3.48	3.05	2.56	2.41	11.72	7.81	2.77	8.65
1968	2.77	2.13	1.70	1.28	1.21	3.12	3.12	6.53	2.41	4.97	20.66	2.41	4.36
1969	1.63	1.28	0.85	0.36	0.57	6.53	18.39	4.54	15.83	11.50	10.51	13.14	7.09
1970	2.63	2.20	1.85	1.28	0.92	1.70	1.14	1.92	1.99	12.85	20.52	42.81	7.65
1971	44.59	36.07	44.94	0.99	0.85	4.33	4.97	4.76	6.11	7.88	16.40	9.16	15.09
1972	9.87	3.76	3.76	1.28	1.28	4.90	9.30	9.80	8.95	6.04	23.50	21.44	8.66
1973	9.09	0.78	0.64	0.71	0.85	1.85	6.46	8.17	6.39	6.46	8.02	5.33	4.56
1974	2.56	1.21	1.70	1.07	1.99	7.10	15.34	7.24	8.31	13.49	10.37	5.33	6.31
1975	10.08	17.18	6.75	4.33	2.70	17.47	12.50	18.03	18.60	14.84	12.50	27.83	13.57
1976	16.05	13.92	4.83	8.02	10.37	13.56	12.92	4.69	1.78	3.69	10.79	29.96	10.88
1977	10.79	10.37	2.91	0.50	1.28	3.98	8.31	5.47	2.77	3.69	12.28	2.84	5.43
MEAN	16.46	7.44	5.97	3.84	5.38	12.50	13.59	10.12	11.96	16.67	20.06	20.12	12.01

TABLE-I.2-25 MONTHLY NATURAL RUNOFF AT PROPOSED DAMSITE (4)

PROPOSED DAMSITE : BADBARAN
CATCHMENT AREA : 260 (KM**2)

UNIT : M**3/SEC

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1956	8.92	2.72	3.86	6.80	7.94	7.32	14.40	12.62	6.70	12.20	10.98	15.78	9.19
1957	23.82	5.38	2.92	5.90	2.52	4.62	11.74	10.60	7.40	9.88	7.20	3.74	7.98
1958	4.42	2.68	2.30	3.06	3.34	6.30	8.10	10.04	5.48	22.38	19.96	8.38	8.04
1959	3.66	2.28	4.34	1.66	6.16	5.20	18.44	9.32	15.46	15.66	17.60	10.78	9.21
1960	4.12	4.82	2.68	9.02	4.98	10.60	12.28	10.00	6.42	15.42	22.52	9.28	9.35
1961	6.26	4.18	2.78	2.06	4.46	6.94	9.48	7.74	9.56	15.04	10.32	5.56	7.03
1962	6.12	4.96	5.06	2.22	1.96	8.28	15.32	16.60	28.24	7.32	16.42	12.44	10.41
1963	9.68	5.26	3.04	2.18	1.74	1.88	4.08	13.66	8.18	9.52	7.42	11.92	6.55
1964	4.62	3.06	1.64	1.72	4.68	1.88	3.08	4.68	15.42	8.38	20.92	14.90	7.08
1965	12.94	4.98	7.34	4.20	2.88	8.12	10.00	13.82	8.26	10.14	4.56	13.48	8.39
1966	5.58	2.34	1.92	1.60	9.66	7.90	13.70	15.02	18.94	23.82	27.52	12.86	11.74
1967	34.62	14.04	6.88	2.64	2.30	3.02	5.70	4.90	7.88	9.18	16.48	5.86	9.46
1968	4.68	6.16	7.04	8.24	8.16	7.28	9.20	7.86	6.16	15.36	19.00	3.98	8.59
1969	1.58	1.42	1.10	1.04	1.26	4.60	15.16	6.72	9.00	7.70	8.76	22.06	6.70
1970	3.40	6.22	6.14	3.16	2.78	4.94	17.48	4.70	6.66	8.78	15.66	14.26	7.85
1971	7.64	9.24	6.96	1.52	8.06	25.24	9.10	4.46	4.34	5.60	13.24	9.02	8.70
1972	6.06	2.38	4.28	3.56	1.78	5.06	17.52	4.56	15.46	4.26	16.54	15.10	8.05
1973	6.42	5.02	3.56	2.92	2.42	1.66	2.66	4.96	17.48	12.10	64.44	34.36	13.17
1974	15.36	19.60	9.74	3.20	3.52	4.98	10.78	5.10	5.86	9.50	7.30	7.20	8.51
1975	7.08	12.12	4.74	3.06	1.92	12.30	8.78	12.72	13.08	10.46	8.78	19.58	9.55
1976	11.30	9.82	3.40	5.66	7.28	9.76	6.50	32.52	6.58	3.06	8.10	12.34	9.69
1977	6.30	3.82	4.92	3.20	4.26	9.54	9.08	7.62	7.90	7.52	10.16	6.90	6.77
1978	4.46	6.30	1.68	4.46	8.08	11.22	16.80	2.58	5.28	8.56	12.38	13.46	7.94
MEAN	8.65	6.03	4.27	3.61	4.44	7.33	10.84	9.69	10.25	10.95	15.92	12.31	8.69

Table I.2-26 List of Date and Locations River Bed Material Sampling

No.	Sampling Date	Location
1	Oct. 6	Dumalag
2	Oct. 6	Badbaran, Dumarao
3	Oct. 6	Cuartero
4	Oct. 6	Cuartero
5	Oct. 6	Cuartero
6	Oct. 8	Aglinab
7	Oct. 8	Aglinab
8	Oct. 21	Passi
9	Oct. 21	Dingle
10	Oct. 13	Mambusao
11	Oct. 13	Jamindan
12	Oct. 13	Jamindan
13	Oct. 20	Pototan
14	Oct. 21	Calyan, Pototan
15	Oct. 21	Alibunang, Calinog
16	Oct. 27	Panitan
17	Oct. 27	Maayon
18	Oct. 27	Pontevedra
19	Oct. 27	Agbalo
20	Dec. 18	Upstream of Panitan
21	Dec. 18	Upstream of Panitan
22	Dec. 19	Panay (M-M)
23	Dec. 21	Panay (M-M)
24	Dec. 21	Panay (M-M)

Table I.2-27 Summary of Diameters of River Bed Materials

	Km	Sample No.	d10	d50	d60	d65	dm	$C(\frac{d60}{d10})$
Pontevedra	5.400	18	0.060	0.320	0.410	0.450	0.3420	6.83
	8.100	19	0.0500	0.130	0.140	0.149	0.1295	2.80
Panay(M-P)	20.800	16	0.110	0.210	0.230	0.240	0.2035	2.09
	23.300	20	0.018	0.145	0.165	0.180	0.1427	9.17
	26.003	21	0.010	0.065	0.110	0.130	0.1113	11.00
Panay(M-M)	43.500	23	0.080	0.525	0.680	0.730	1.0540	8.50
	45.800	22	0.285	0.610	0.685	0.910	1.358	2.40
	46.200	24	0.350	1.120	1.600	1.930	2.2430	4.57
Panay(M-B)	55.200	5	0.155	0.210	0.250	0.235	0.235	1.61
	54.900	4	0.024	0.234	0.289	0.320	0.280	12.04
	55.200	3	0.175	0.480	0.740	1.00	1.9343	4.23
Panay (Upper)	73.500	1	0.245	0.370	0.415	0.440	0.8631	1.69
	(110.0)	6	0.342	0.800	1.050	1.280	3.5670	3.07
	(110.0)	7	0.360	4.100	7.30	8.900	8.8200	20.28
Maayon	37.200	17	0.220	1.320	2.360	2.770	3.9050	10.73
Mambusao	71.300	10	0.309	0.565	0.625	0.675	1.1274	2.02
	(94.950)	11	0.245	7.500	10.600	12.000	10.947	43.26
	(95.0)	12	0.250	0.980	6.600	10.200	9.249	26.40
Badbaran	71.300	2	0.025	0.042	0.060	0.075	0.2131	2.40
Pototan Bridge Iloilo		13	0.275	0.630	0.800	0.950	1.599	2.909
Calyan, Pototan		14	0.205	0.460	0.490	0.500	0.896	2.390
Dingle, Iloilo		9	0.030	0.100	0.150	0.144	0.1271	4.333
Passi, Iloilo		8	0.033	17.00	25.00	28.50	19.490	757.575
Alibunang, Calinog		15	0.460	13.00	17.00	19.00	23.474	36.956

Table I.2-28 Classification of River Bed Materials and the Percentage of Composition in Each Sample

Description	Grain Size(MM)	1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %	11 %	12 %	13 %	14 %	15 %	16 %	17 %	18 %	19 %	20 %	21 %	22 %	23 %	24 %
Clay	0.001-0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt	0.005-0.05	-	60.0	1.5	18.0	2.0	-	-	21.0	39.0	-	-	-	-	-	-	1.5	1.0	7.0	9.0	25.0	45.5	1.5	9.0	-
Very Fine Sand	0.05-0.10	1.0	8.0	2.5	8.5	1.5	1.0	1.0	3.5	11.0	0.5	5.0	5.0	0.5	1.0	0.5	7.5	1.5	16.0	24.5	12.0	12.0	1.0	1.5	2.0
Fine Sand	0.10-0.25	9.0	11.0	17.0	26.5	70.5	4.0	4.5	16.5	45.0	5.0	5.5	5.0	7.5	13.5	4.0	71.0	5.5	19.5	62.5	53.0	35.5	5.5	4.0	4.0
Medium Sand	0.25-0.50	64.0	10.5	30.0	40.0	25.0	21.0	8.5	3.0	4.0	24.5	9.5	15.0	27.0	48.5	6.0	19.0	25.0	32.5	4.0	10.0	5.0	32.0	19.5	11.5
Coarse Sand	0.50-1.0	20.0	8.0	14.0	7.0	1.0	32.0	11.0	1.0	1.0	50.0	7.5	25.5	32.0	30.0	4.0	1.0	15.5	25.0	-	-	2.0	28.0	48.5	25.0
Fine Gravel	1.0-2.0	3.5	2.5	10.0	-	-	14.0	8.0	0.5	-	12.0	3.5	4.0	14.0	7.0	2.5	-	7.5	-	-	-	-	15.0	14.5	24.5
Medium Gravel	2.0-10.0	2.5	-	19.0	-	-	14.5	45.5	0.5	-	8.0	27.0	9.5	18.0	-	26.0	-	29.0	-	-	-	-	17.0	3.0	31.5
Large Gravel	10.0-100.0	-	-	6.0	-	-	13.5	21.5	54.0	-	-	42.0	96.0	1.0	-	57.0	-	15.0	-	-	-	-	-	-	1.50
Total:		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table I.20-29 List of Places for Sampling Suspended Materials and Test Results

No.	Sampling Date	Place	Test Results
1	Oct. 6	Dumalag	0.021%
2	Oct. 6	Dumalag	0.027
3	Oct. 6	Dumalag	0.022
4	Oct. 6	Dumalag	0.024
5	Oct. 6	Dumarao	
6	Oct. 6	Cuartero	0.029
7	Oct. 6	Cuartero	0.0341
8*	Oct. 20	Pototan	-
9*	Oct. 13	Mambusao	-
10	Oct. 13	Mambusao	0.0081
11	Oct. 13	Jamindan	-
12	Oct. 13	Jamindan	0.004
13	Oct. 16	Cuartero	0.0075
14	Oct. 16	Cuartero	0.009
15	Oct. 16	Panitan	0.0176
16	Oct. 21	Calyan, Pototan	0.195
17	Oct. 21	Dingle	0.0616
18	Oct. 21	Passi	0.012
19	Oct. 21	Alibunang, Calinog	0.0016
20	Oct. 21	Badbaran, Dumarao	0.024
21	Oct. 26	Panitan	0.045
22	Oct. 26	Panitan	0.0173
23	Oct. 26	Cuartero	0.0099
24	Oct. 26	Cuartero	0.0098
25	Oct. 26	Dumarao	0.0108
26	Oct. 26	Dumarao	0.0088
27*	Oct. 27	Maayon	-
28*	Oct. 27	Pontevedra	-
29	Oct. 31	Dumalag	0.015
30	Oct. 31	Dumalag	0.0137

(to be continued)

No.	Sampling Date	Place	Test Results
31	Oct. 31	Dumarao	0.4208%
32	Oct. 31	Dumarao	0.0549
33	Oct. 31	Cuartero	0.1028
34	Oct. 31	Cuartero	0.0634
35	Nov. 2	Saloco	0.0122
36	Nov. 2	Sigma	0.0188
37	Nov. 2	Sigma	0.0112
38	Nov. 7	Panitan	0.0397
39	Nov. 10	Panitan	0.0889
40	Nov. 12	Panitan	0.0428
41	Nov. 12	Salocon	0.8288
42	Nov. 14	Dumarao	0.0062
43	Nov. 14	Dumalag	0.0111
44	Nov. 14	Cuartero	0.008
45	Nov. 14	Mambusao-Sigma	0.0149
A*	October	Cuartero Bridge	-
B*	October	Panay Damsite C	-
C*	October	Cuartero	-
D*	October	Lower Panay, Intake	-
E*	October	Lower Panay, Intake	-
F*	October	Baybay	-
G*	October	Panitan Bridge	-
H*	October	Dumarao Bridge	-
I*	October	Damsite C	-
J*	October	Panitan	-
K*	October	Dumarao	-

* Samples for water quality

TABLE I.2-30 HEIGHT OF HIGH AND LOW TIDAL WATER 1984

CEBU

Unit: W.L. m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Yearly
Highest	1.91	1.86	1.72	1.80	1.94	1.98	2.05	1.96	1.79	1.92	1.95	1.89	2.05
Lowest	-0.48	-0.43	-0.28	-0.34	-0.36	-0.31	-0.29	-0.21	-0.17	-0.34	-0.42	-0.44	-0.48
Mean High	1.12	1.20	1.23	1.29	1.33	1.26	1.29	1.35	1.41	1.38	1.28	1.16	1.275
Mean Low	0.16	0.08	0.13	0.14	0.20	0.30	0.31	0.28	0.24	0.22	0.18	0.20	0.20

⇩ Conversion

CULASI (Roxas)

Unit: W.L. m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Yearly
Highest	1.63	1.58	1.44	1.52	1.66	1.70	1.77	1.68	1.51	1.64	1.67	1.61	1.77
Lowest	-0.80	-0.75	-0.60	-0.66	-0.68	-0.63	-0.61	-0.53	-0.49	-0.66	-0.74	-0.76	-0.80
Mean High	0.84	0.92	0.95	1.01	1.05	0.98	1.01	1.07	1.13	1.10	1.00	0.88	0.995
Mean Low	-0.16	-0.24	-0.19	-0.18	-0.12	-0.02	-0.01	-0.04	-0.08	-0.10	-0.14	-0.12	-0.117

Table I.2-31 Water Quality Criteria for Fresh Surface Water by NPCC (1978)

Quality Parameter	Criteria	Unit	CLASS AA	A	B	C	D	E
1. Color	not less	units	-	75	50	50	-	-
2. Temperature	not exceed	°C	-	30	30	3(e)	3(e)	-
3. Transparency	-	-	-	-	(c)	(c)	(c)	-
4. Dissolved Oxygen	not less	mg/l	-	5	5	5	3	2
5. 5-day BOD at 20°C	not exceed	mg/l	-	10	15	20	-	-
6. Total Dis. Solids	not exceed	mg/l	-	-	-	1000	1000	-
7. Total Solids	not exceed	mg/l	500(a)	500(a)	-	2000	2000	-
8. PH	within	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	5.0-9.0
9. Coliform	not exceed	MPN/100ml	50	5000	1000	5000	-	-
10. Phenolic Subs.	not exceed	mg/l	0.001	0.001	0.002	0.02	-	-
11. Radioactive Subs.:								
Gross Alpha	not exceed	pCi/l	3	3	-	-	-	-
Gross Beta	not exceed	pCi/l	30	30	-	-	-	-
12. Trace Elements								
Aluminum	not exceed	mg/l	-	-	-	-	5	-
Arsenic	not exceed	mg/l	0.05	0.05	0.05	0.05	0.1	-
Barium	not exceed	mg/l	1.0	1.0	-	0.5	-	-
Beryllium	not exceed	mg/l	-	-	-	-	0.1	-
Boron	not exceed	mg/l	-	-	-	-	0.75	-
Cadmium	not exceed	mg/l	0.01	0.01	0.01	0.01	0.01	-
Chromium	not exceed	mg/l	0.05	0.05	0.05	0.05	0.10	-
Cobalt	not exceed	mg/l	-	-	-	-	0.05	-
Copper	not exceed	mg/l	1.0	1.0	-	0.02	0.02	-
Cyanide	not exceed	mg/l	0.05	0.05	0.05	0.05	-	-
Flouride	not exceed	mg/l	0.6	0.6	-	-	1	-
Iron	not exceed	mg/l	1.0(a)	1.0(a)	-	-	5	-
Lead	not exceed	mg/l	0.05	0.05	0.05	0.05	5	-
Lithium	not exceed	mg/l	-	-	-	-	2.5(d)	-
Manganese	not exceed	mg/l	0.5	0.5	-	-	0.2	-
Mercury	not exceed	mg/l	0.002	0.002	0.002	0.002	-	-
Melyboenum	not exceed	mg/l	-	-	-	-	0.01	-
Nickel	not exceed	mg/l	-	-	-	-	0.2	-
Selenium	not exceed	mg/l	0.05	0.05	0.05	0.05	0.2	-
Silver	not exceed	mg/l	0.05	0.05	0.05	0.05	-	-
Venadium	not exceed	mg/l	-	-	-	-	0.1	-
Zinc	not exceed	mg/l	5(s)	5(s)	-	2	2	-
13. Sodium Absorption Ratio	within	(SAR)	-	-	-	-	8-18	-
14. Organic Chemicals Synthetic								
Detergents	not exceed	mg/l	NIL	0.5	0.5	0.5	-	-
Oil & Grease	not exceed	mg/l	NIL	2	2	5	5	10
15. Persistent Pesticides								
Aldrin	not exceed	mg/l	0.001	0.001	0.001	0.01	-	-
DDT	not exceed	mg/l	0.05	0.05	0.05	0.02	-	-
Dieldrin	not exceed	mg/l	0.001	0.001	0.001	0.005	-	-
Chlordane	not exceed	mg/l	0.003	0.003	0.003	0.04	-	-
Endrin	not exceed	mg/l	0.0002	0.0002	0.0002	0.002	-	-
Heptachlor	not exceed	mg/l	0.0001	0.0001	0.0001	0.01	-	-
Lindane	not exceed	mg/l	0.004	0.004	0.004	0.02	-	-
Toxaphane	not exceed	mg/l	0.005	0.005	0.005	0.01	-	-
Methexychlor	not exceed	mg/l	0.1	0.1	0.1	0.005	-	-
2, 4 - D	not exceed	mg/l	0.1	0.1	0.1	4.0	-	-
2, 4, 5 - TP	not exceed	mg/l	0.01	0.01	0.01	-	-	-
PCB	not exceed	mg/l	NIL	0.001	0.001	-	-	-
16. Other Chemicals								
Ammonia	not exceed	mg/l	-	0.01	-	-	-	-
Calcium	not exceed	mg/l	75	75	-	-	-	-
Chloride	not exceed	mg/l	200(a)	200(a)	-	-	-	-
Magnesium	not exceed	mg/l	50(a)	50(a)	-	-	-	-
Nitrate	not exceed	mg/l	30	30	-	-	-	-
Sulfate	not exceed	mg/l	200(a)	200(a)	-	-	-	-
17. Nutrients	not exceed	-	-	(b)	(b)	(b)	(b)	-

NOTES: (a) Secondary Standards; compliance with the standard analysis are not obligatory.
(b) Shall not be present in concentrations to cause deleterious or abnormal biotic growth.
(c) Secchi disk shall be visible at a min. depth of 1 M.
(d) Recommended max. concentration for irrigating is .075 mg/l
(e) The maximum rise above natural temperature

Table I.2-32 Water Quality of Panay River (1975, 1976)

Items of Analyses	Sta. 1		Sta. 2		Sta. 3		Sta. 4		Sta. 5		Sta. 6		Sta. 7	
	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season
Temperature, C	28.90	28.20	28.90	28.20	28.90	27.80	28.40	27.80	28.10	26.90	27.30	26.10	26.90	25.10
pH	7.80	7.70	8.00	7.70	8.00	8.00	8.00	7.80	8.00	7.90	7.90	7.80	8.00	8.10
Odor, Threshold Odor No.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alkalinity, mg/l	122.70	122.00	96.70	115.30	92.70	111.30	81.00	112.70	87.30	110.30	92.70	123.30	96.70	112.00
Dissolved Oxygen, mg/l	5.70	4.60	4.40	5.00	4.30	4.50	4.70	5.60	5.30	5.90	5.60	5.60	5.80	6.80
B.O.D. mg/l	19.10	3.20	42.10	2.00	35.40	1.80	31.00	1.20	8.90	1.40	15.00	1.60	9.80	1.40
Chlorides, mg/l	20296.50	20620.10	2011.4	489.500	11.40	14.70	5.80	6.60	6.40	6.90	6.80	5.90	5.90	6.60
Sulfates, mg/l	303.40	316.50	97.30	192.00	11.80	13.80	29.80	12.80	15.70	14.40	16.30	10.90	15.40	9.30
Total Solids, mg/l	36836.70	36987.70	3033.3	9696.00	423.0	836.70	323.0	609.3	517.30	694.00	456.0	456.70	431.70	450.0
Total Hardness, mg/l	8370.30	7865.10	2431.30	2191.50	95.20	116.50	81.30	110.7	81.30	114.60	90.0	81.60	94.00	93.20
Calcium, mg/l	4843.50	4919.70	1817.0	1817.00	1327.0	75.10	95.20	69.50	96.40	67.30	91.3	73.00	68.00	64.10
Magnesium, mg/l	3526.80	2945.40	614.30	864.50	20.10	21.40	11.80	14.30	14.00	23.30	17.00	13.60	20.20	29.10
Coliform, MFN/100 mlx10^4	25.50	2.50	15.10	5.10	10.20	4.40	73.00	63.30	73.00	18.60	10.80	10.10	7.90	5.20

NOTES: 1. Sampling Date : June 3, 1975 to March 3, 1976
2. Sampling Sites:

Sta. 1 : At Bo. Bara, Roxas City
Sta. 2 : At Bo. Tusa, Roxas City
Sta. 3 : At Bo. Babo, upstream of the influent of the infiltration gallery of RCWS
Sta. 4 : Approximately 10 meters downstream of the intersection of Agbalo and Panay River at Bo. Bahit Panitan
Sta. 5 : Bridge at Panitan
Sta. 6 : Bridge at Dao, downstream of MWSS Pumping Station
Sta. 7 : Bridge at Dumalag about 500 meters upstream of the water inlet station of Asturias Sugar Central

Table I.2-33 Water Quality of Panay River (1984)

Item	Pontevedro	Panay (M-P)	Panay (M-M)	Panay (B-M)	Panay (upper)	Maayon	Manbusao	Badbaran	Lower panay
Temperature (°C)	28.8	28, 28	-	29, 28	29, 28	29	30, 30	28, 28	28.5 , 28
PH	7.75	7.5, 7.4	-	7.5, 7.7	7.9, 7.8	7.7	7.8, 7.5	7.8, 7.5	7.55 , 7.65
EC (US/cm)	220	225, 225	-	265, 263	300, 285	195	145, 165	165, 165	290 , 290
Acidity (mg/ℓ of $CaCO_3$)	0	0 , 0	-	0 , 0	0 , 0	0	0 , 0	0 , 0	0 , 0
Alkalimity (mg/ℓ of $CaCO_3$)	100	100 , 100	-	125 , 125	140, 130	110	70 , 75	80 , 90	110 , 110
Chloride (mg/ℓ)	15	10 , 12.5	-	8.5 , 8.5	8.5, 8.5	0.13	8.5 , 4.2	10 , 0.17	20.8 , 30
Chlorine (mg/ℓ)	0.15	0.28, 0.32	-	0.15, 0.18	0.14, 0.12	10	0.18 , 0.17	0.15, 8.5	1.9 , 0.22
Chromium (mg/ℓ)	0	0 , 0	-	0 , 0	0 , 0	0	0 , 0	0 , 0	0 , 0
Copper (mg/ℓ)	0	0 , 0	-	0 , 0	0 , 0	0	0 , 0	0 , 0	0 , 0
Hardness (mg/ℓ of $CaCO_3$)	80	90 , 80	-	100 , 100	110 , 120	120	50 , 60	60 , 55	120 , 115
Total Iron (mg/ℓ)	0.14	0.32, 0.17	-	0.007, 0.5	0.003, 0.05	0.005	0.02, 0.07	0.15, 0.06	0.13, 0.05
Manganese (mg/ℓ)	0	0 , 0	-	0 , 0	0 , 0	0	0 , 0	0 , 0	0.3 , 0
$N-NH_3$ (mg/ℓ)	0.25	0.82, 0.16	-	0.006, 0.04	0 , 0.05	2.4	0.85, 0.55	0.41, 0.18	0.49, 0.49
$N-NO_3$ (mg/ℓ)	2.9	3.9, 3.9	-	2.4, 2.4	2.2, 2.5	2.8	1.40, 2.2	3.15, 3.1	2.3, 2.30
$N-NO_2$ (mg/ℓ)	0.005	0.032, 0.017	-	0 , 0	0 , 0.009	0.012	0.008, 0	0.0125, 0.08	0.022, 0.022
DO (mg/ℓ)	8	8 , 9	-	8 , 10	9 , 4	8	7 , 7	6 , 7	8 , 8
Phosphorous Reactive (mg/ℓ)	0	0 , 0	-	0 , 0	0 , 0	0	0 , 0	0 , 0	0 , 0
Sulfute (mg/ℓ)	6	14 , 16	-	12 , 12	16 , 18	4	0 , 4.0	18 , 6	4 , 4
Turbidity (FTU)	50	50 , 45	-	25 , 37	17.5, 10	18	65 , 25	30 , 30	36 , 25
Coliform Bacillus	weak	strong	-	strong	strong	weak	weak, strong	strong	weak, strong

Table I.2-34 Water Quality Standards of MPWH

(Physical, Chemical and Radiological Requirements)
NSDW - 1978

Parameters	Maximum Permissible Level (PPM)
Turbidity	5 Units
Color	5 Units**
Odor	Unobjectionable
Threshold odor number	Not more than 3
Taste	Unobjectionable
Total solids	500 (s)
pH	6.5 - 8.5
Phenolic substances	0.001
Radioactive Substances	
Gross Alpha	3 pCi/l
Cross Beta	30 pCi/l
Trace Elements	
Arsenic	0.05
Barium	1.0
Cadmium	0.02
Chromium	0.05
Copper	1.0
Cyanide	0.05
Flouride	0.6
Iron	1.0 (s)
Lead	0.05
Manganese	0.5 (s)
Mercury	0.002
Selenium	0.01
Zinc	5.0 (s)

(to be continued)

Parameters	Maximum Permissible Level (PPM)
Organic Chemicals	
Synthetic	
Detergents (MBAS)	0.5
Oil and Grease	Nil
Persistent Pesticides	
Aldrin	0.001
DDT	0.05
Dieldrin	0.001
Chlordane	0.003
Endrin	0.0002
Heptachlor	0.0001
Lindane	0.004
Toxaphane	0.005
Methoxychlor	0.1
2, 4-D	0.1
2,4,5 -T	0.01
PCB	Nil
Other Chemicals	
Calcium	75
Chloride	200 (s)
Magnesium	50 (s)
Nitrate (NO_3)	30
Sulfate	200 (s)
Hydrogen Sulfide	0.05 (s)

NOTE: ** (s) - Secondary standards; compliance with the standard and analysis are not obligatory.

Table I.2-35 Water Quality Standard of Japan

Item of Analysis	Unit	Permissible Level	
		For human living	For agriculture (Paddy)
Temperature	C		
PH		6.0 - 8.5	6.0 - 7.5
SS (Suspended solids)	PPM	Not more than 100	Not more than 100
DO (Dissolved oxygen)	PPM	Not less than 5	Not less than 5
BOD (Biochemical oxygen demand)	"	Not more than 8	
COD (Chemical oxygen demand)	"		Not more than 6
EC (Electric conductivity)	"		Not more than 0.3m mho/cm
Nitrogen	PPM		Not more than 1
Phosphorus	"	Not more than 0.1	
Organic phosphorus	"	0	
Coliform bacillus	"		
Mercury	"	Not more than 0.0005	
Alkali mercury	"	0	
PCB	"	0	
Cyanogen	"	0	
Cadnium	PPM	Not more than 0.01	
Lead (plumbum)	"	Not more than 0.01	
Chrom (chromium)	"	Not more than 0.05	
Arsenic	"	Not more than 0.05	Not more than 0.05
Zinc	"		Not more than 0.5
Copper	PPM		Not more than 0.02

Table I.3-1 Constants of Sub-basins for Storage Function

Basin No.	Catchment Area (km^2)	River Length (km)	River Bed Slope	K	P	Tc(hr)
1	240	45.2	1/151	26.38	0.57	1.56
2	270	16.2	1/180	25.03	0.59	0.20
3	11	3.9	1/30	42.84	0.39	0
4	22	5.0	1/26	44.72	0.38	0
5	10	7.9	1/196	24.39	0.60	0
6	260	31.6	1/632	17.17	0.80	0.93
7	45	5.9	1/113	28.78	0.53	0
8	39	6.1	1/307	21.32	0.67	0
9	4	0.7	1/700	16.65	0.82	0
10	8	0.5	1/500	18.42	0.75	0
11	25	11.2	1/187	24.74	0.60	0
12	31	10.5	1/525	18.15	0.76	0
13	18	1.8	1/900	15.44	0.87	0
14	215	24.5	1/408	19.58	0.72	0.59
15	78	8.8	1/110	29.01	0.53	0
16	67	9.6	1/239	22.98	0.63	0
17	27	4.7	1/52	36.32	0.44	0
18	48	8.5	1/423	19.37	0.72	0
19	78	14.4	1/206	24.03	0.61	0.12
20	37	5.6	1/186	24.78	0.60	0
21	28	7.9	1/794	16.03	0.84	0
22	133	15.2	1/95	30.31	0.51	0.15
23	97	9.0	1/122	28.12	0.54	0
24	23	5.9	1/591	17.52	0.78	0
25	94	18.6	1/454	18.96	0.74	0.31
26	26	8.4	1/262	22.36	0.65	0
27	20	2.2	1/220	23.56	0.62	0
28	33	9.5	1/953	15.18	0.88	0

Table I.3-2 Constants of River Channels for Storage Function

Channel No.	Channel Length(km)	Time Lag (hr)	Base Flow (m^3/s)	K	P	Remarks (m^3/s)
1	21.0	0.7	25.5	172,194.8	0.490	Q<470
				0.00631	3.272	470<Q<710
				1,261.1	1.413	Q>710
2	1.3	0.0	26.1	15,677.2	0.522	Q<130
				5,295.4	0.744	130<Q<380
				744.9	1.074	Q>380
3	8.1	0.3	27.7	43,391.8	0.953	Q<150
				329,805.0	0.548	150<Q<567
				20,424.5	0.987	Q>567
4	16.9	0.5	15.3	169,145.3	0.546	Q<270
				46,193.8	0.778	Q>270
5	5.5	0.2	17.2	23,241.4	0.520	Q<175
				0.000012	4.661	175<Q<290
				971.6	1.449	Q>290
6	6.7	0.2	17.4	60,978.0	0.098	Q<158
				0.0068	3.260	158<Q<262
				26.9	1.772	Q>262
7	8.3	0.3	46.7	61,228.2	0.531	Q<192
				4.29	2.358	192<Q<620
				1,964.0	1.405	Q>620
8	12.9	0.6	49.2	76,943.4	0.362	Q<600
				0.00496	2.950	600<Q<888
				8.918	1.846	Q>888
9	12.4	0.6	14.7	394,249.6	0.526	Q<44
				229,718.8	0.669	44<Q<385
				2,802,027.3	0.248	Q>385
10	15.2	0.7	18.0	28,610.4	1.157	Q<76
				102,092.8	0.863	76<Q<235
				1,230,258.4	0.408	Q>235
11	8.1	0.3	19.4	107,210.8	0.134	Q<210
				0.00000048	5.022	210 Q<388
				18.34	2.093	Q>388
12	6.6	0.3	25.7	591,114.2	0.226	Q<115
				2,040.3	1.421	115<Q<316
				35,840.2	0.923	Q>316
13	13.4	0.5	78.1	102,373.8	0.360	Q<475
				0.000039	3.880	475<Q<1,140
				4,719.7	1.234	Q>1,140
14	18.0	0.7	11.5	48,998.0	0.640	Q<93
				379,265.0	0.188	Q>93
15	8.0	0.3	18.7	90,078.5	0.397	Q<230
				394.7	1.396	230<Q<539
				4.31	2.114	Q>539
16	5.5	0.2	6.0	86,715.6	0.610	Q<297
				4,851.3	1.116	297<Q<899
				40,684.5	0.803	Q>899
17	13.5	0.7	99.4	66,681.0	0.572	Q<77
				312,050.4	0.217	77<Q<500
				0.957	2.259	Q>500

Table-I.3-3 3-days Rainfall in Sub-basins

Rainfall Station	Station Name	3-day Rainfall (mm)	Thiesen Weight by Sub-basin																					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Brgy Rozas, Tapaz	267	1.0	0.80	-	-	-	-	-	-	-	-	-	-	-	0.09	0.02	-	-	-	-	-	-	-
2	Jamindan	267	-	0.01	-	-	-	-	-	-	-	-	-	-	-	0.09	0.02	-	-	-	-	-	-	-
3	Matec, Mambusao	263	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06	0.18	1.0	0.59	-	0.26	-	-	-
4	Consolacion, Dumalag	268	-	0.15	0.87	1.0	0.39	-	-	-	0.80	1.0	1.0	0.46	1.0	-	0.03	-	-	0.04	0.73	-	0.70	-
5	Poblacion, Dumarao	221	-	0.04	0.13	-	0.61	-	0.88	1.0	0.20	-	-	0.54	-	-	-	-	-	-	-	-	-	-
6	Aslorga, Dumarao	116	-	-	-	-	-	0.43	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Lemery	110	-	-	-	-	-	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.40
8	Villa Flores	191	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.06
9	Timpas, Panitan	298	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.41	0.96	-	1.0	0.26	-
10	President, Roxas	163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.54
	Basin 3-day Rainfall (mm)		267	265	262	268	239	115	208	221	259	268	268	243	268	267	266	263	277	297	264	298	273	143

Rainfall Station	Station Name	3-day Rainfall (mm)	Thiesen Weight by Sub-basin							
			23	24	25	26	27	28	Cuartero	Panitan
1	Brgy Roxas, Tapaz	267	-	-	-	-	-	-	0.48	0.24
2	Jamindan	267	-	-	-	-	-	-	-	0.12
3	Matec, Mambusao	263	-	-	-	-	-	-	-	0.07
4	Consolacion, Dumalag	268	-	-	0.04	-	-	-	0.13	0.12
5	Poblacion, Dumarao	221	-	-	0.10	-	-	-	0.12	0.06
6	Aslorga, Dumarao	116	-	-	0.32	-	-	-	0.12	0.07
7	Lemery	110	-	-	-	-	-	-	0.15	0.10
8	Villa Flores	191	0.85	0.78	0.54	0.94	-	0.08	-	0.10
9	Timpas, Panitan	298	-	0.22	-	0.06	1.0	0.92	-	0.08
10	President, Roxas	163	0.15	-	-	-	-	-	-	0.04
	Basin 3-day Rainfall (mm)		187	215	173	197	298	289	220	229

Table-I.3-4 Water Level and Discharge at Panitan and Cuartero at the Time of "Undang" Flood

Date	Cuartero		Panitan	
	Water Level (m)	Discharge (m^3/s)	Water Level (m)	Discharge (m^3/s)
	0.90	25.0	2.24	80.0
Nov. 1	1.75	65.0	2.30	80.0
	1.60	55.0	2.25	80.0
	2.75	150.0	2.50	100.0
2	2.65	140.0	2.45	95.0
	1.85	75.0	2.22	75.0
	1.50	50.0	2.50	100.0
3	1.46	50.0	2.30	80.0
	1.44	50.0	2.40	90.0
	1.41	45.0	2.25	80.0
4	1.52	55.0	2.40	90.0
	2.10	80.0	2.55	100.0
	1.54	60.0		
5	1.69	65.0		
	1.75	70.0		
	8.73	1,490.0		
6	8.73	1,490.0	8.95	1,460.0
	8.73	1,490.0	(5:00 PM)	
	6.50	850.0		
7	5.00	525.0	8.50	1,270.0
	4.80	470.0	(2:00 PM)	
	2.90	170.0		
8	2.85	160.0	7.55	950.0
	2.72	150.0	(11:00 AM)	
	2.20	100.0	6.50	660.0
9	2.21	100.0	6.10	590.0
	2.30	105.0	5.72	510.0
	3.90	300.0	5.29	430.0
10	4.05	325.0	5.58	485.0
	3.40	225.0	5.65	500.0
			5.44	460.0
11			6.00	565.0
			5.90	550.0
			4.00	245.0
12			3.92	225.0
			2.55	100.0

Table I.3-5 Probable Rainfall at 7 Gaging Stations

(1) 1-day (Unit: mm)

Return Period (year)	Rainfall Station						
	Roxas	Valderama	Belete	Libacao	Barbaza	Culasi	Iloilo
1.01	44	72	23	55	97	131	85
2	124	133	84	125	209	170	110
5	184	209	133	168	265	250	150
10	227	279	170	196	307	325	170
25	284	393	219	231	360	451	220
50	333	501	259	257	399	571	250
100	383	631	301	283	439	718	300
200	453	788	345	309	479	898	320

(2) 2-day

1.01	63	74	38	102	136	172	95
2	171	213	128	177	294	265	160
5	243	315	197	241	389	376	200
10	293	387	248	291	450	471	230
25	360	482	316	362	526	618	280
50	405	556	369	420	582	749	310
100	454	632	426	485	637	901	340
200	505	712	484	555	692	1,076	360

(3) 3-day

1.01	78	105	49	142	191	214	105
2	193	265	160	220	375	321	180
5	268	372	244	295	479	440	220
10	319	444	305	354	545	538	270
25	388	538	386	439	624	684	310
50	431	608	450	510	681	811	350
100	479	680	517	589	737	955	395
200	528	753	586	676	793	1,118	405

Table I.3-6 Basin Average 3-Day Rainfall (300 km^2)

(1) Case 1

(Unit: mm)

Station Number		2	3	10	Basin Average Rainfall	Reduction
Occurrence Date	Station Name	Astorga Dumarao	San Antonio	Poblacion Dumarao		
Apr. 15-17, 1979		160.7	202.8	203.0	188.8	0.93
Jun. 15-17, 1979		22.0	261.4	78.0	120.5	0.46
Jul. 21-23, 1979		133.7	128.6	15.0	92.4	0.69
Aug. 12-14, 1979		43.3	88.4	175.0	102.2	0.58
Dec. 1-3, 1979		14.9	34.2	135.0	61.4	0.45
Mar. 23-25, 1980		53.6	99.8	94.0	82.5	0.83
Jun. 3-5, 1980		12.7	44.8	211.5	89.7	0.42
Jun. 28-30, 1980		210.1	203.4	0.0	137.8	0.66
Jul. 1-3, 1980		8.6	0.0	330.0	112.9	0.34

(2) Case 2

(Unit: mm)

Station Number		6	8	9	Basin Average Rainfall	Reduction
Occurrence Date	Station Name	Matec Mambusao	Mambusao	Consolacion Dumarao		
Apr. 15-17, 1979		199.7	143.5	300.0	214.4	0.71
Jun. 15-17, 1979		123.0	126.7	212.0	153.9	0.73
Jul. 21-23, 1979		88.2	72.2	174.6	111.7	0.64
Aug. 12-14, 1979		137.0	111.1	164.7	137.6	0.84
Mar. 23-25, 1980		196.7	81.5	69.1	115.8	0.59
Jun. 3-5, 1980		57.8	79.9	187.4	108.4	0.58
Jun. 28-30, 1980		116.2	109.0	6.8	77.3	0.67
Jul. 1-3, 1980		18.1	8.0	217.2	81.1	0.37
May 16-18, 1980		216.0	84.2	11.6	103.9	0.48
Aug. 18-20, 1980		236.1	104.7	39.0	126.6	0.54
Dec. 14-16, 1978		286.7	150.0	37.6	158.1	0.55
Jun. 26-28, 1978		222.3	237.6	84.2	181.4	0.76

Mean Reduction = 0.61

Table I.3-7 Basin Average 3-Day Rainfall (500 km^2)

(Unit: mm)

Station Number	2	3	4	9	10	11	Basin Average Rainfall	Reduction
Station Name / Occurrence Date	Astorga Dumarao	San Antonio	Maayon	Consolocion Dumalag	Poblacion Dumarao	Dayoc Dao		
Apr. 15-17, 1979	160.7	202.8	-	300.0	203.0	-	216.6	0.72
Jun. 15-17, 1979	22.0	261.4	18.0	212.0	78.0	-	118.3	0.45
Jul. 21-23, 1979	133.7	128.6	90.5	174.6	15.0	-	108.5	0.62
Aug. 12-14, 1979	43.3	88.4	-	164.7	175.0	-	117.9	0.67
Mar. 23-25, 1980	53.6	99.8	-	69.1	94.0	-	79.1	0.79
Jun. 3-5, 1980	12.7	44.8	-	187.4	211.5	-	114.1	0.54
Jun. 28-30, 1980	210.1	203.4	-	6.8	0.0	-	105.1	0.50
Jul. 1-3, 1980	8.6	0.0	-	217.2	330.0	-	139.0	0.42
Aug. 18-20, 1980	150.0	-	-	39.0	33.0	-	74.0	0.49
Nov. 3-5, 1984	115.5	-	-	268.1	220.9	-	201.5	0.75

Mean Reduction = 0.60

Table I.3-8 Basin Average 3-Day Rainfall (1,000 km^2)

(Unit: mm)

Station Number		2	3	4	6	7	8	9	10	11	Basin Average Rainfall	Reduction
Occurrence Date	Station Name	Astorga Dumarao	San Antonio	Maayon	Matec Mambusao	Timpas Panitan	Mambusao	Consolacion Dumalag	Poblacion Dumarao	Dayoc Dao		
Apr. 15-17, 1979		160.7	202.8	-	199.7	46.7	143.5	300.0	203.0	-	179.5	0.60
Jun. 15-17, 1979		22.0	261.4	18.0	123.0	104.0	126.7	212.0	78.0	-	118.1	0.45
Jul. 21-23, 1979		133.7	128.6	90.5	88.2	25.2	72.2	174.6	15.0	-	91.0	0.52
Aug. 12-14, 1979		43.3	88.4	-	137.0	129.5	111.1	164.7	175.0	-	121.3	0.69
Mar. 23-25, 1980		53.6	99.8	-	196.7	90.2	81.5	69.1	94.0	-	97.8	0.50
Jun. 3-5, 1980		12.7	44.8	-	57.8	27.0	79.9	187.4	211.5	-	88.7	0.42
Jun. 28-30, 1980		210.1	203.4	-	116.2	6.9	109.0	6.8	0.0	-	94.2	0.45
Jul. 1-3, 1980		8.6	0.0	-	18.1	313.0	8.0	217.2	330.0	-	127.8	0.39
May 16-18, 1980		28.0	-	-	216.0	7.5	84.2	11.6	11.0	-	59.7	0.28
Jun. 1-3, 1980		18.0	-	-	82.5	12.0	64.4	7.2	10.0	-	32.4	0.39
Aug. 18-20, 1980		150.0	-	-	236.1	22.9	104.7	39.0	33.0	-	97.6	0.41
Nov. 3-5, 1984		115.5	-	-	263.4	297.6	-	268.1	220.9	-	233.1	0.78

Mean Reduction = 0.49

Table I.3-9 Basin Average 3-Day Rainfall (2,000 km^2)

(Unit: mm)

Station Number	1	2	3	4	5	6	7	8	9	10	11	12	Basin Average Rainfall	Reduction
Occurrence Date / Station Name	Roxas City	Astorga Dumarao	San Antonio	Maayon	Aglinab Tapaz	Matec Mambusao	Timpas Panitan	Mambusao	Consolacion Dumalag	Poblacion Dumarao	Dayoc Dao	President Roxas		
Oct. 25-27, 1975	6.6	-	-	31.5	-	-	153.0	-	10.4	7.0	60.8	55.4	46.4	0.30
Apr. 1-3, 1976	156.2	-	-	-	-	-	115.0	-	4.6	7.0	54.4	8.1	57.6	0.37
Aug. 13-15, 1976	76.2	-	-	82.1	-	-	45.0	-	78.8	236.0	141.9	9.7	95.7	0.41
Nov. 28-30, 1976	272.6	-	-	78.7	-	-	405.0	-	-	174.0	301.2	271.0	250.4	0.62
May 17-19, 1978	0.0	-	-	38.1	-	15.3	4.5	26.3	50.0	169.0	16.4	1.0	35.6	0.21
Jun. 26-28, 1978	177.3	-	-	104.1	-	222.3	85.5	237.6	84.2	87.0	80.6	2.8	120.2	0.51
Dec. 14-16, 1978	53.1	-	-	-	-	286.7	39.5	150.0	37.6	130.6	-	120.4	116.8	0.41
Apr. 15-17, 1979	154.6	160.7	202.8	-	-	199.7	46.7	143.5	300.0	203.0	-	115.6	169.6	0.57
Jun. 15-17, 1979	237.4	22.0	261.4	18.0	-	123.0	104.0	126.7	121.0	78.0	-	69.6	125.2	0.48
Jul. 21-23, 1979	60.9	133.7	128.6	90.5	271.0	88.2	25.2	72.2	174.6	15.0	-	79.0	103.5	0.38
Aug. 12-14, 1979	135.4	43.3	88.4	-	-	137.0	129.5	111.1	164.7	175.0	-	54.3	115.4	0.66
Dec. 1-3, 1979	28.2	14.9	34.2	-	-	65.1	119.6	72.3	34.2	135.0	-	31.0	59.4	0.44
Jan. 21-23, 1980	11.5	13.9	21.0	-	354.0	63.3	19.6	3.7	68.5	25.0	-	35.8	61.6	0.17
Mar. 23-25, 1980	99.4	53.6	99.8	-	128.0	196.7	90.2	81.5	69.1	94.0	-	59.1	97.1	0.49
Jun. 3-5, 1980	206.0	12.7	44.8	-	120.6	57.8	27.0	79.9	187.4	211.5	-	87.0	103.5	0.49
Jan. 17-19, 1980	211.4	68.0	40.8	-	62.0	18.4	18.4	59.9	21.7	24.5	-	16.2	54.1	0.26
Jun. 28-30, 1980	93.5	210.1	203.4	-	-	116.2	6.9	109.0	6.8	0.0	-	133.9	97.8	0.47
Jul. 1-3, 1980	41.9	8.6	0.0	-	0.6	18.1	313.0	8.0	217.2	330.0	-	20.8	95.8	0.29
May 16-18, 1980	2.2	28.0	-	-	35.4	216.0	7.5	84.2	11.6	11.0	-	38.6	48.3	0.22
Jun. 1-3, 1980	55.6	18.0	-	-	150.0	82.5	12.0	64.4	7.2	10.0	-	98.0	55.3	0.37
Aug. 18-20, 1980	209.5	150.0	-	-	93.6	236.1	22.9	104.7	39.0	33.0	-	-	111.1	0.47
Nov. 3-5, 1984	104.0	115.5	-	-	-	263.4	297.6	-	268.1	220.9	-	163.6	204.7	0.69

Mean Reduction = 0.42

TABLE I.3-10 Alternatives of Protection Areas

Alternative	River Stretch																						
	Panay										Maayon					Mambusao						Badbaran	
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Y1	Y2	Y3	Y4	M1	M2	L3	M4	M5	M6	M7	B1	B2
Damage Potential Level	1	1	2	3	1	2	3	2	2	3	3	2	3	2	3	2	2	1	3	3	2	2	3
Alternative-1																							
" -2			*				*																
" -3			*				*																
" -4			*				*																
" -5							*																
" -6																							

Note:
- Area to be protected by structural measures
- Area to be left unprotected to act as retarding basin
- * Protection of partial areas

Table I.4-1(1) Summary of Sediment Transport Capacity, Present Condition

Unit: ton/day

River Course	100 m3/S			200 m3/S			500 m3/S			1000 m3/S		
	S.K.D.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.
Pontevedra	1,413	19	11,321	1,788	93	27,358	3,610	371	102,474	-	-	-
Panay (M-P)	35	13	139	49	108	318	95	30	1,728	171	964	5,855
Panay (M-M)	380	47	162	461	1,011	406	1,129	1,337	2,305	-	-	-
Panay (B-M)	662	14	1,295	900	369	2,741	1,583	2,648	11,341	2,955	5,303	-
Panay (Upper)	925	271	346	1,265	1,367	848	2,630	3,300	4,030	-	-	-
Maayon	520	-	690	1,394	406	1,765	2,517	441	9,598	-	-	-
Mambusao	263	586	109	536	732	403	1,233	1,870	1,992	-	-	-
Badbaran	469	228	810	785	1,660	2,129	1,893	1,384	10,389	-	-	-

Note S.K.A.: Sato-Kikkawa-Ashida Formula (Tractive sediment)
M.D. : Meyer-Peter-Muller Formula (Tractive sediment)
K.B. : Kalinske-Brown Formula (Suspended sediment)
- : Not calculated as it is over the range of calculation

Table I.4-1 (2) Summary of Sediment Transport Capacity, Al Plan

Unit: ton/day

River Course	100 m^3/S			200 m^3/S			500 m^3/S			1000 m^3/S		
	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.
Pontevedra	184	38	2,200	219	264	4,806	350	348	17,850	501	1,270	45,914
Panay (M-P)	159	153	749	277	297	7,368	647	756	26,273	1,114	133	37,648
Panay (M-M)	183	1,091	60	412	863	322	1,049	2,624	1,718	2,119	5,726	7,378
Panay (B-M)	662	14	1,295	900	369	2,741	1,583	2,648	11,341	2,955	5,303	-
Panay (Upper)	924	271	346	1,265	1,367	848	2,630	3,300	4,030	-	-	-
Maayon	525	-	690	1,394	406	1,765	2,517	441	9,598	-	-	-
Mambusao	263	586	109	534	732	403	1,233	1,870	1,992	-	-	-
Badbaran	469	228	810	785	660	2,129	1,893	1,584	10,389	-	-	-

Note S.K.A.: Sato-Kikkawa-Ashida Formula (Tractive sediment)
M.P. : Meyer-Peter-Muller Formula (Tractive sediment)
K.B. : Kaliske-Brown Forjula (Suspended sediment)

\- : Not calculated as it is over the range of calculation

Table I.4-1 (3) Summary of Sediment Transport Capacity, B1 Plan

Unit: ton/day

River Course	100 m^3/S			200 m^3/S			500 m^3/S			1000 m^3/S		
	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.
Pontevedra	266	13	2,415	284	112	5,414	432	389	18,353	641	1,624	47,747
Panay (M-P)	205	191	899	337	343	2,302	743	2,326	14,088	1,306	4,102	44,538
Panay (M-M)	177	3,462	65	347	2,110	330	893	6,100	1,940	1,948	11,809	8,046
Panay (B-M)	662	3,193	1,295	937	6,833	2,741	1,583	1,880	11,341	2,675	27,547	-
Panay (Upper)	722	200	346	1,144	2,122	848	2,109	4,998	4,030	4,402	17,658	-
Maayon	1,049	-	690	2,804	-	1,765	3,471	-	9,598	-	-	-
Mambusao	177	2,307	47	608	7,060	445	930	12,894	1,639	1,633	9,924	5,935
Badbaran	405	567	810	799	580	2,129	2,186	2,371	10,389	5,247	-	-

Note S.K.A.: Sato-Kikkawa-Ashida Formula (Tractive sediment)

M.B. : Meyer-Peter-Muller Formula (Tractive sediment)

K.B. : Kalinske-Brown Formula (Suspended sediment)

\- : Not calculated as it is over the range of calculation

Table I.4-1 (4) Summary of Sediment Transport Capacity, B2 Plan

Unit: ton/day

River Course	100 m^3/S			200 m^3/S			500 m^3/S			1000 m^3/S		
	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.	S.K.A.	M.P.	K.B.
Pontevedra	244	10	2,225	271	118	5,093	418	342	24,365	641	1,624	48,755
Panay (M-P)	191	207	759	375	369	3,161	743	866	13,327	1,289	1,604	44,317
Panay (M-M)	166	972	57	335	2,188	263	874	6,227	1,880	1,643	11,775	6,466
Panay (B-M)	379	42	754	756	393	2,886	1,589	2,648	12,229	2,838	4,774	39,240
Panay (Upper)	820	317	346	1,095	1,184	848	2,072	4,643	4,030	3,755	10,353	-
Maayon	993	-	690	1,761	-	1,765	-	48	9,598	-	-	-
Mambusao	182	2,224	109	341	1,527	470	947	12,703	2,931	1,841	2,812	9,866
Badbaran	358	2,942	810	703	659	2,129	1,475	1,099	10,389	-	1,757	-

Note S.K.A.: Sato-Kikkawa-Ashida Formula (Tractive sediment)
M.P. : Meyer-Peter-Muller Formula (Tractive sediment)
K.B. : Kalinske-Brown Formula (Suspended sediment)

\- : Not calculated as it is over the range of calculation

Table 1.6-1 Water Requirement

(Unit: m^3/s)

No.	Description	Month	1983	1990	2000	2010	2020	2030
U1	M & I for Cuartero, Dao, Dumalag, Dumarao	-	0.01	0.01	0.03	0.05	0.06	0.07
U2A	M & I for Mambusao, Sigma	-	0.01	0.01	0.03	0.04	0.05	0.06
U2B	Irrigation for Mambusao - Project : 1,640 ha - 2,500 ha (1983)	Jan.	0.97	1.48	1.48	1.48	1.48	1.48
		Feb.	1.65	2.51	2.51	2.51	2.51	2.51
		Mar.	0.43	0.66	0.66	0.66	0.66	0.66
		Apr.	0	0	0	0	0	0
		May	0.37	0.56	0.56	0.56	0.56	0.56
		Jun.	1.70	2.60	2.60	2.60	2.60	2.60
		Jul.	0.52	0.79	0.79	0.79	0.79	0.79
		Aug.	0.30	0.45	0.45	0.45	0.45	0.45
		Sep.	0.64	0.97	0.97	0.97	0.97	0.97
		Oct.	0	0	0	0	0	0
		Nov.	0.77	1.17	1.17	1.17	1.17	1.17
		Dec.	0.33	0.51	0.51	0.51	0.51	0.51
U3A	M & I for Panitan, Ma-ayon	-	0.01	0.01	0.02	0.03	0.04	0.05
U3B	M & I for Roxas City, Panay, Pontevedra	-	0.04	0.07	0.19	0.23	0.26	0.30
U3C	Irrigation for Panitan - Panay Project : 1,590 ha - 3,400 ha (1983)	Jan.	0.20	0.44	0.44	0.44	0.44	0.44
		Feb.	0.56	1.19	1.19	1.19	1.19	1.19
		Mar.	1.08	2.31	2.31	2.31	2.31	2.31
		Apr.	1.26	2.69	2.69	2.69	2.69	2.69
		May	2.32	4.97	4.97	4.97	4.97	4.97
		Jun.	1.58	3.37	3.37	3.37	3.37	3.37
		Jul.	0.25	0.54	0.54	0.54	0.54	0.54
		Aug.	0.19	0.41	0.41	0.41	0.41	0.41
		Sep.	0.40	0.85	0.85	0.85	0.85	0.85
		Oct.	1.11	2.38	2.38	2.38	2.38	2.38
		Nov.	0.48	1.02	1.02	1.02	1.02	1.02
		Dec.	0.59	1.26	1.26	1.26	1.26	1.26

Table 1.6-2 Dependable Discharge for Irrigation

(Unit: m^3/s)

	Location	Period	Dependable Discharge 95%	80%
(a)	Mambusao G.S.	Feb.	2.1	3.0
		June	2.5	3.6
(b)	Cuantero G.S.	Year	7.6	14.2
		April	5.0	5.5
		May	7.5	8.4
(c)	Intake 1	Year	7.4	13.8
(d)	Intake 2	Feb.	2.1	3.0
		June	2.5	3.6
(e)	Intake 3	April	10.5	11.6
		May	15.8	17.6

Note: Conversion rate

(1) Mambusao G.S. - Intake 2

K = 1.0

(2) Cuartero G.S. - Intake 1

K = 0.97

(3) Cuartero G.S. - Intake 3

K = 2.10

Table 1.6-3 Water Requirement and Dependable Discharge

Intake No.	Period	Purpose	Max. Water Requirement	Dependable Discharge	Remarks
1	Year	M & I	0.07	95% 7.4 m^3/s	OK
2	Feb.	M & I	0.06	95% 2.1 m^3/s	OK
		Irrigation	2.51	80% 3.0-0.06* = 2.94	OK
	June	M & I	0.06	95% 2.5 m^3/s	OK
		Irrigation	2.60	80% 3.6-0.06* = 3.54	OK
3	April	M & I	0.35	95% 10.5-0.07** = 10.4	OK
		Irrigation	2.69	80% 11.6-0.35*-0.07** = 11.2	OK
	May	M & I	0.35	95% 15.8-0.34** = 15.5	OK
		Irrigation	4.97	80% 17.6-0.35*-0.34** = 16.9	OK

Note:

*: M & I water which is taken in prior to Irrigation water

**: Return flow from the upstream

April (0.07 + 0.06 + 0) x 0.5 = 0.07

May (0.07 + 0.06 + 0.56) x 0.5 = 0.34

OK: Dependable discharge is bigger than the water requirement

FIGURES

FOR

APPENDIX I

Fig. L.1-1 Period of Record at Rainfall Gaging Stations

Station NO.	Location of Station	Period of Record (50 55 60 65 70 75 80 84)
R1 - A	Roxas City	
R1 - B	Astorga	
R1 - C	San Antonio	
R1 - D	Maayon	
R1 - E	Culasi Roxas	
R1 - F	Matec Mambusao	
R2 - A	Timpas Panitan	
R2 - C	Consolacion Dumalag	
R2 - D	Poblacion Dumarao	
R2 - E	Dayoc, Dao	
R3 - A	President Roxas	
R4-A,B,C	Mambusao Irrigation Area	
R4 - D	Aguirre Sara	
R5 - A	Aglinab Tapaz	
R6 - A	Lemery	
R6 - B	Villa Flores	
R6 - C	Brgy Roxas Tapaz	
R6 - D	Jamindan	

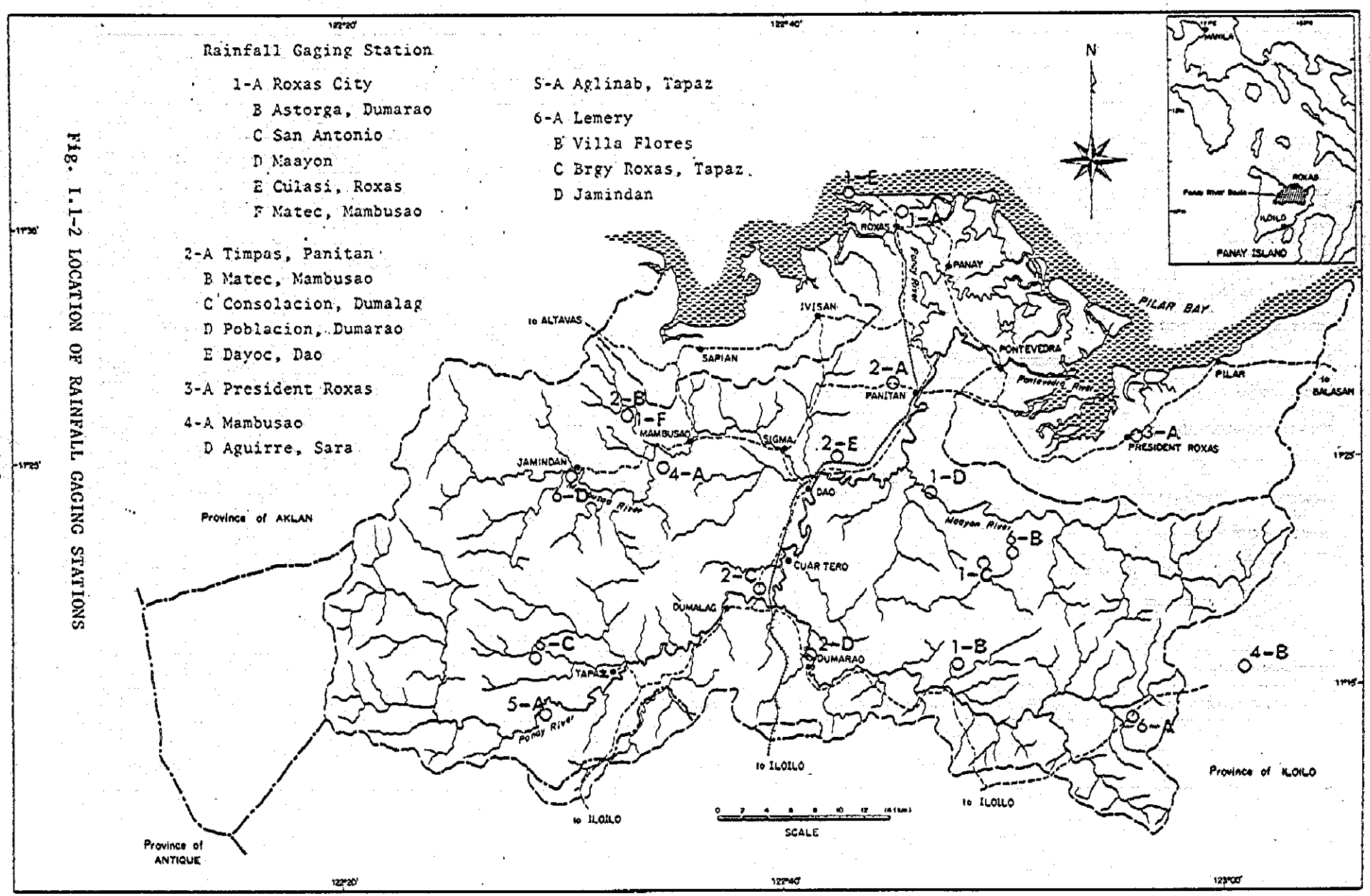


Fig. I.1-2 LOCATION OF RAINFALL GAGING STATIONS

F 1-2

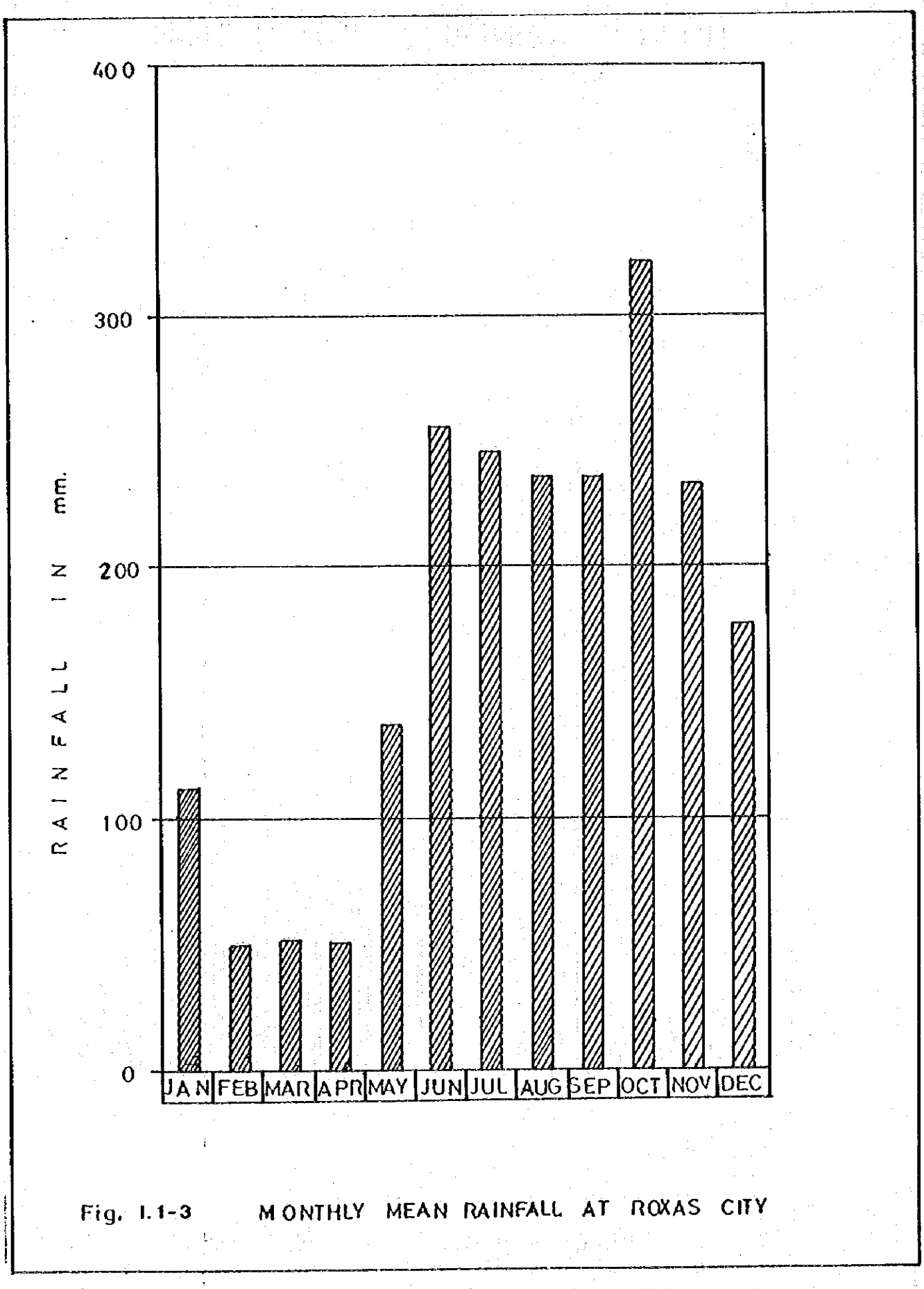


Fig. I.1-3 MONTHLY MEAN RAINFALL AT ROXAS CITY

HOURLY RAINFALL DISTRIBUTION

STATION: ROXAS CITY
YEAR: 1973

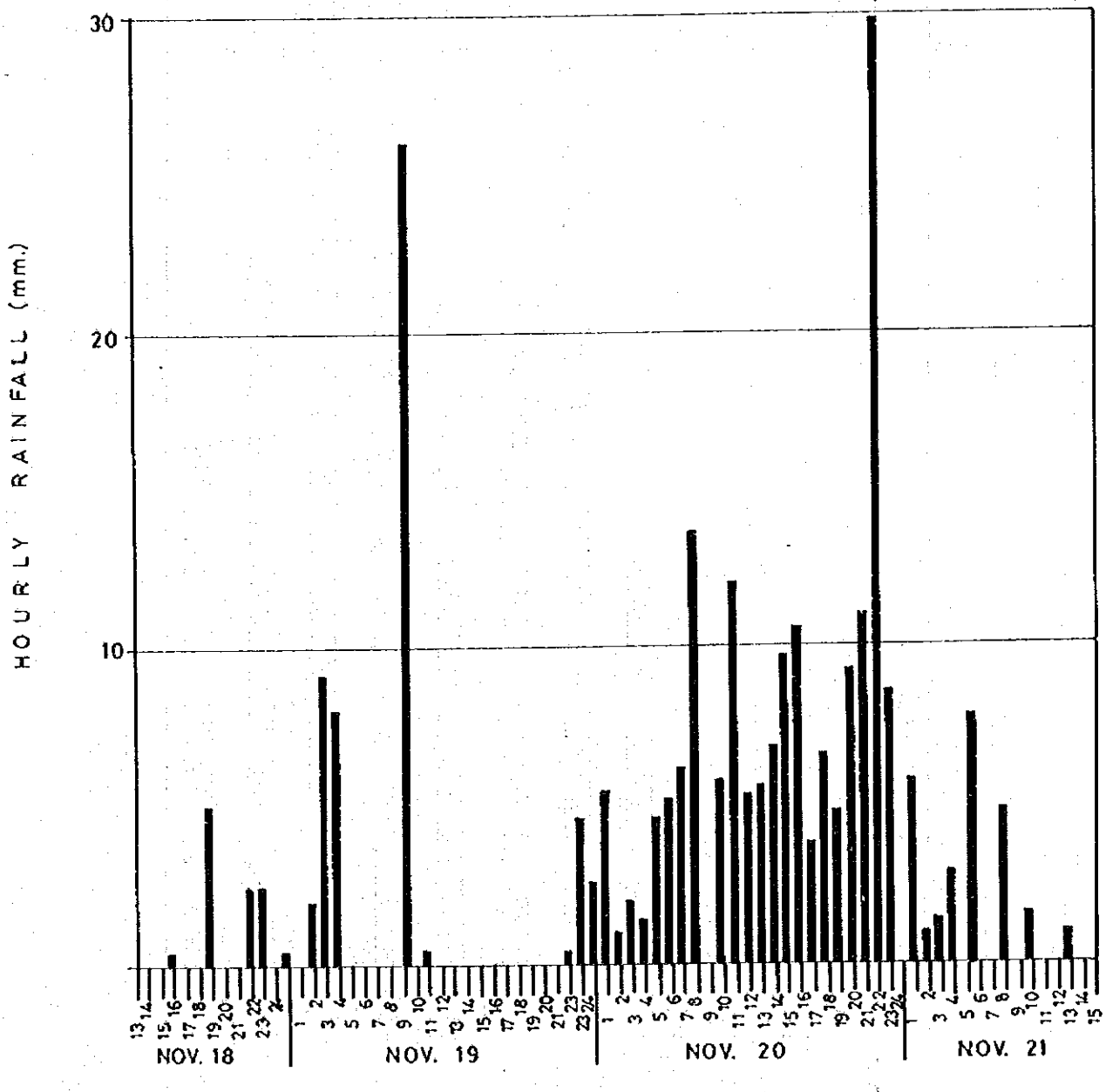


Fig. I.1-4 HOURLY RAINFALL IN NOVEMBER 1973 AT ROXAS CITY

HOURLY RAINFALL DISTRIBUTION

STATION : ILOILO
YEAR : 1973

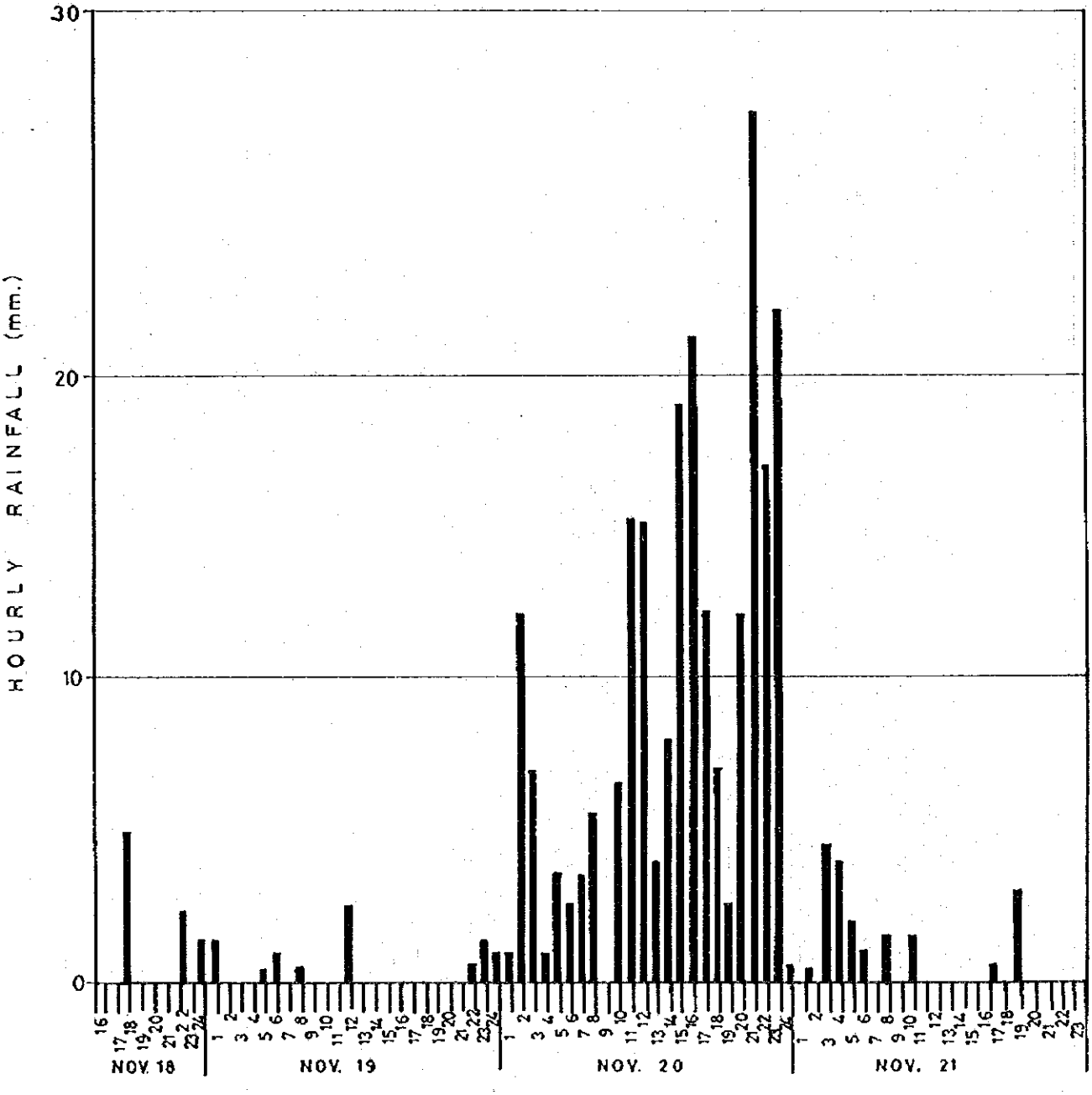


Fig.I.1-5 HOURLY RAINFALL IN NOVEMBER 1973 AT ILOILO

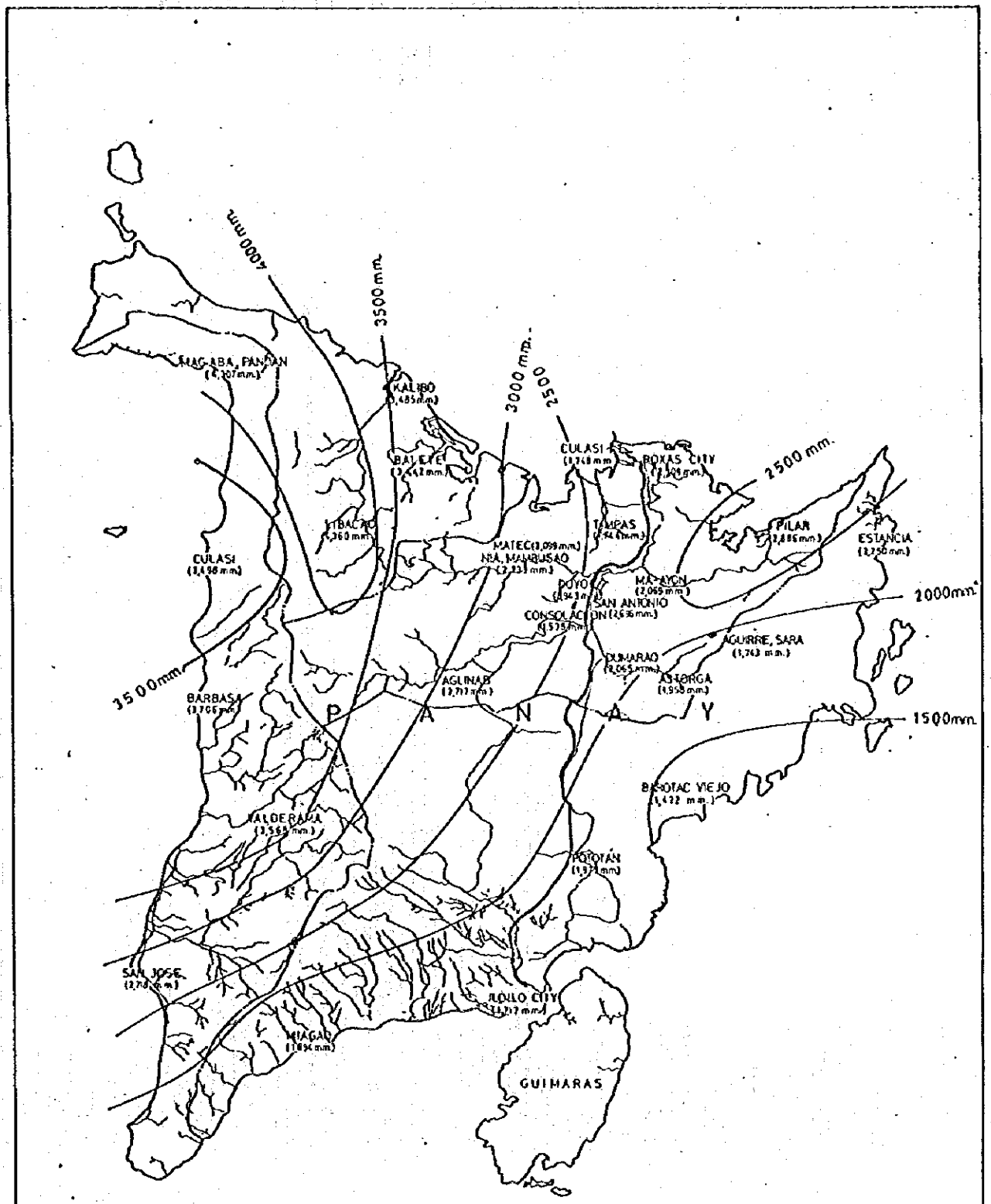
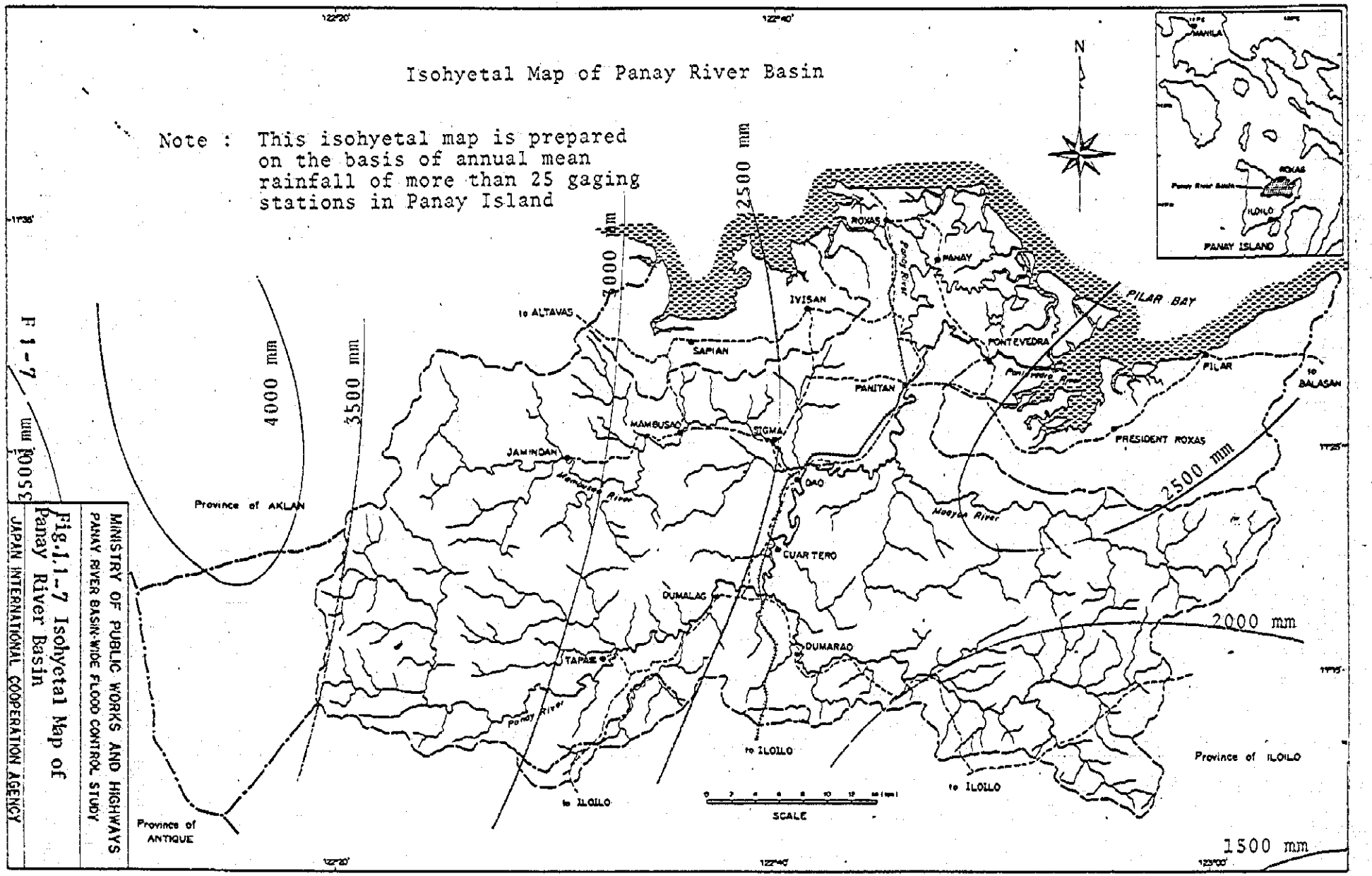


Fig.1.1-6 ISOHYETAL MAP OF PANAY ISLAND



F 1-7

MINISTRY OF PUBLIC WORKS AND HIGHWAYS
PANAY RIVER BASIN-WIDE FLOOD CONTROL STUDY
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig.1.1-7 Isohyetal Map of Panay River Basin

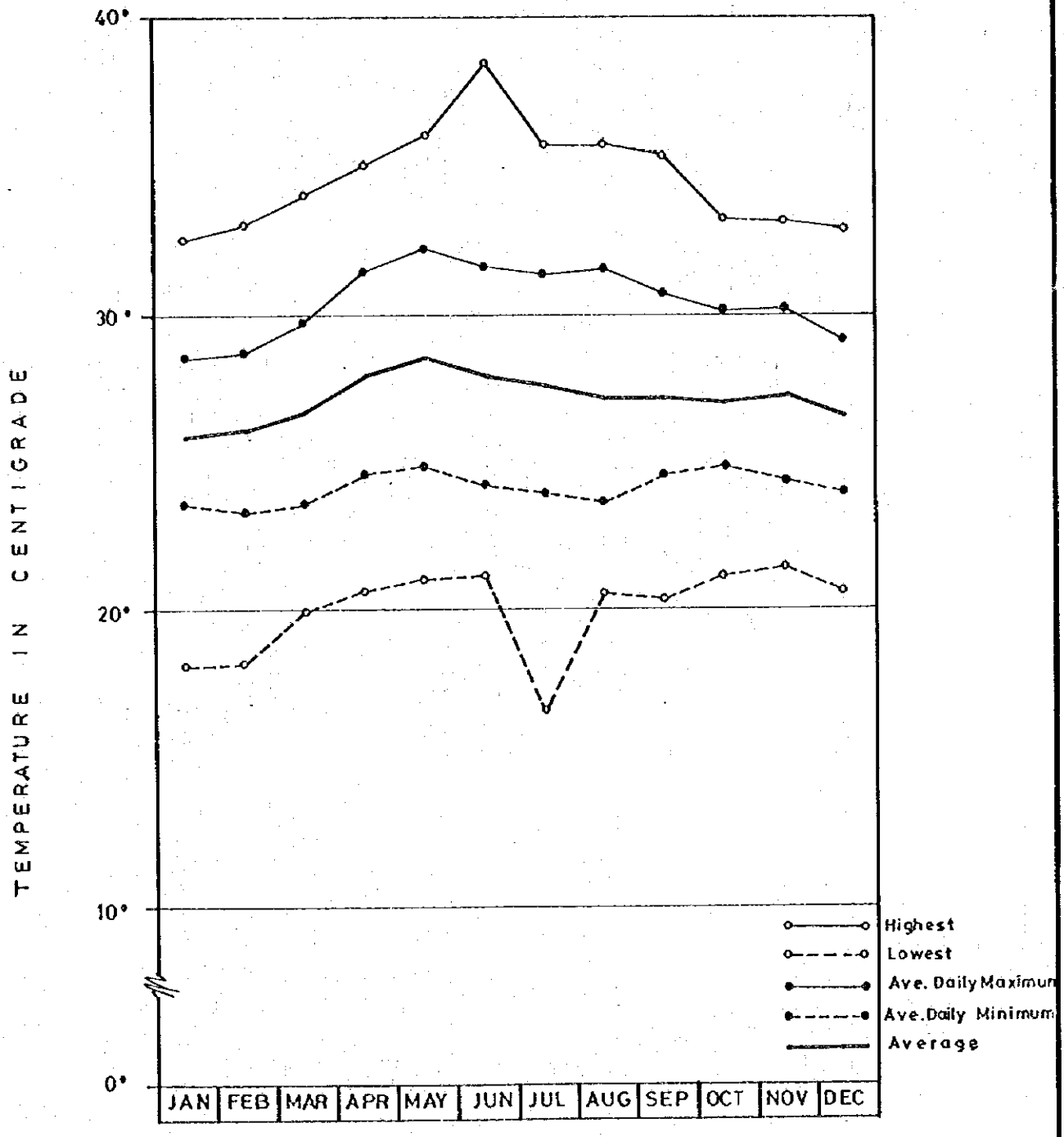


Fig. I.1-8 MONTHLY TEMPERATURE AT ROXAS CITY

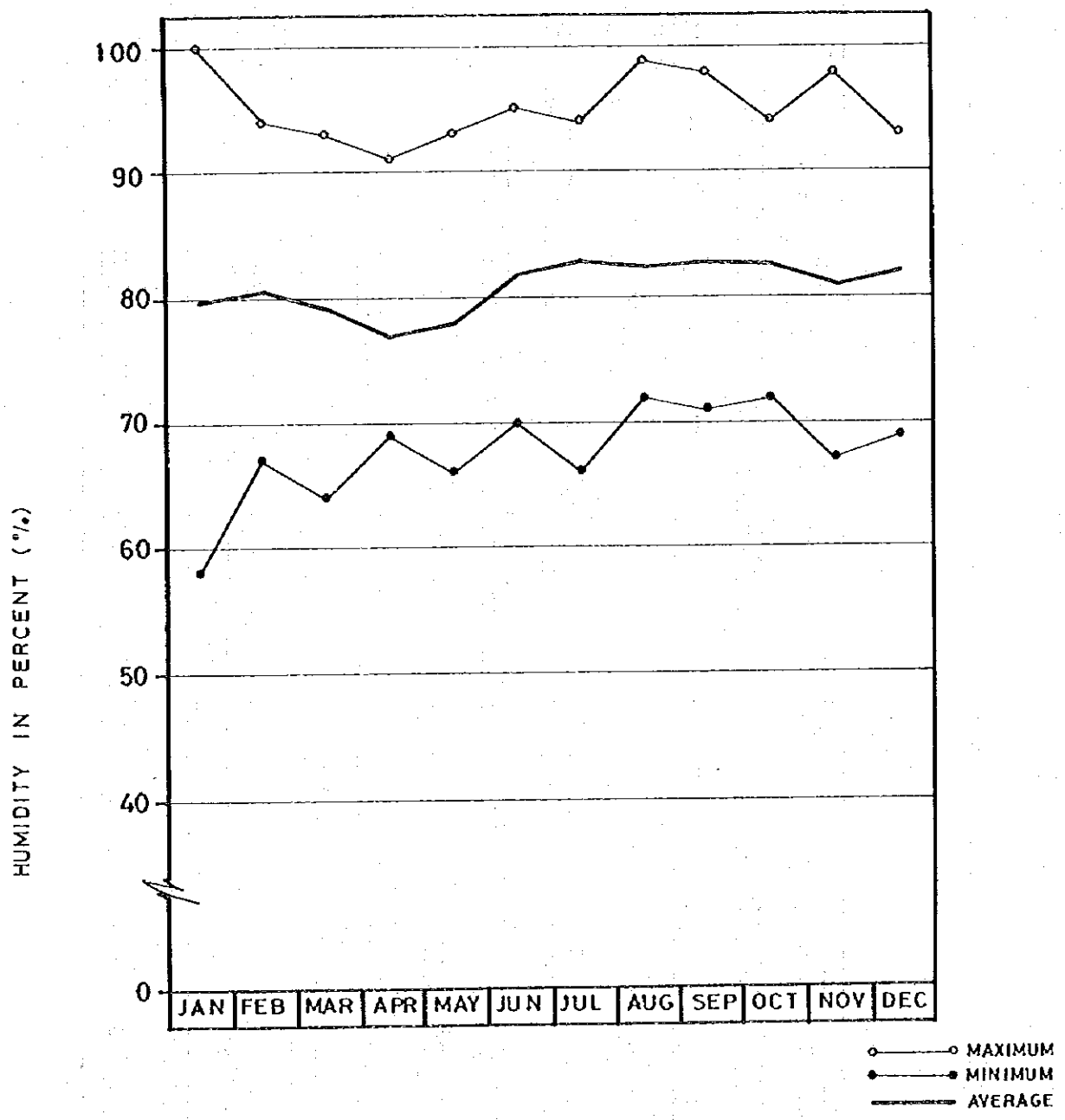


Fig.1.1-9 MONTHLY RELATIVE HUMIDITY AT ROXAS CITY

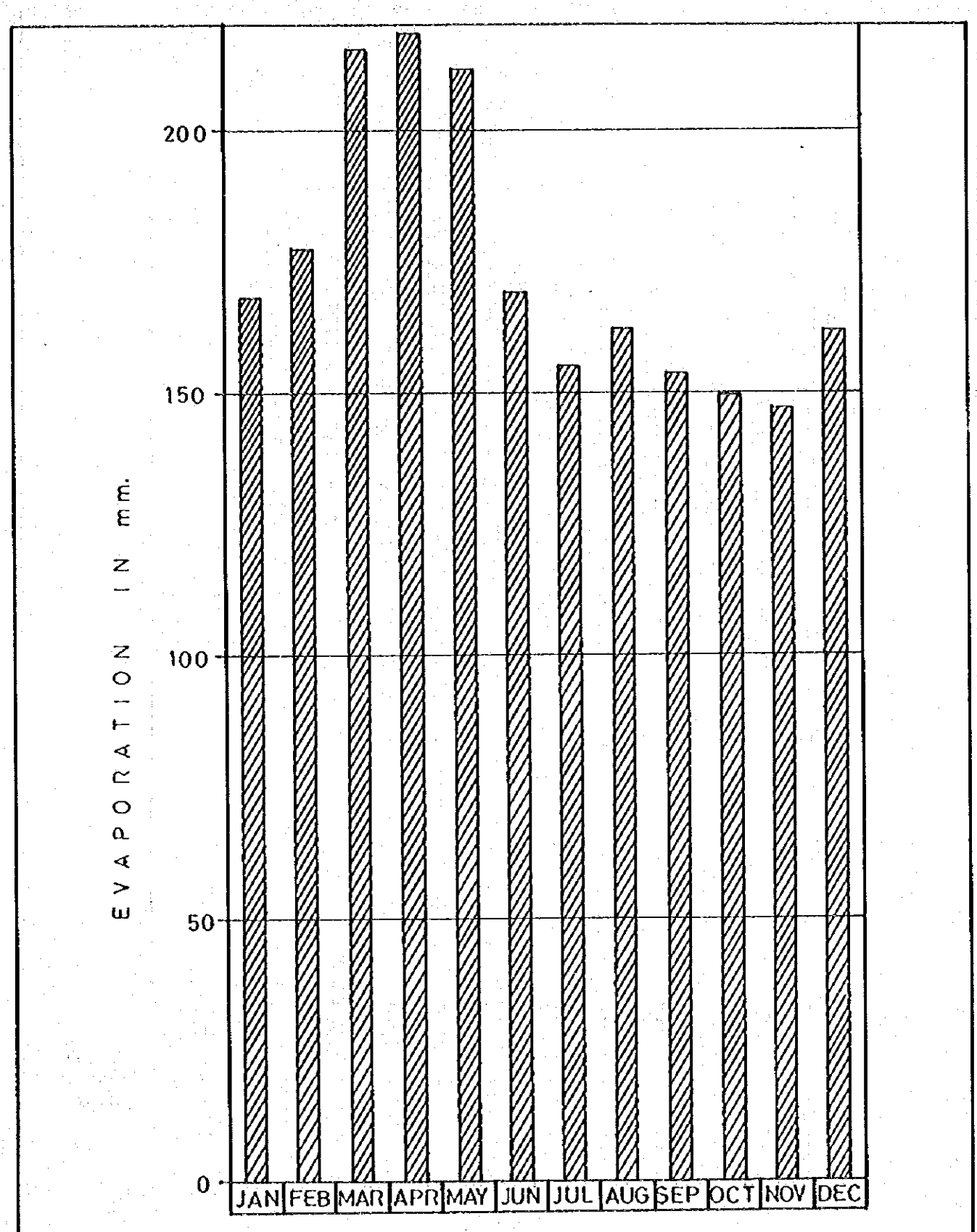


Fig. I.1-10 MONTHLY EVAPORATION AT POTOTAN

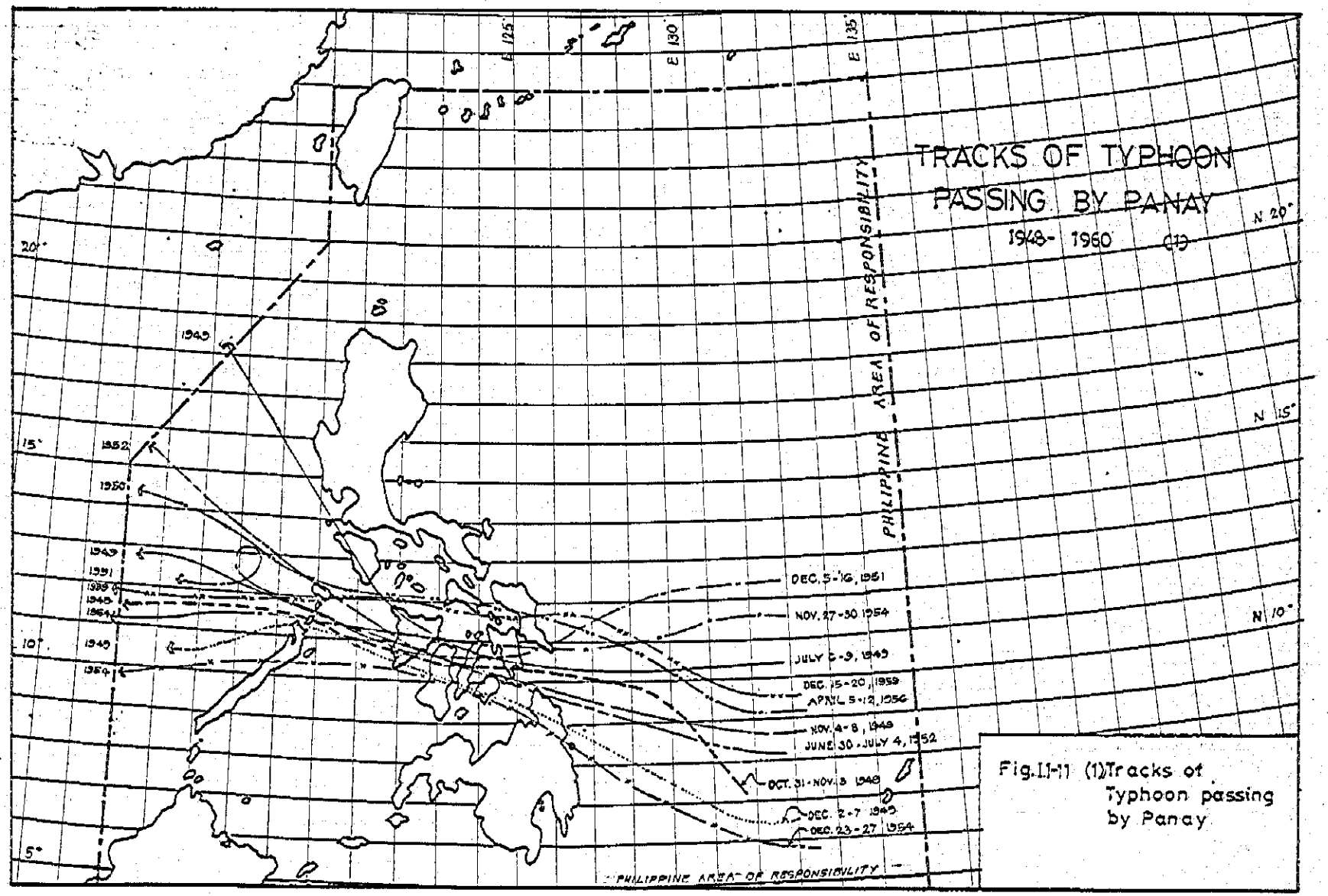


Fig.II-11 (1)Tracks of Typhoon passing by Panay

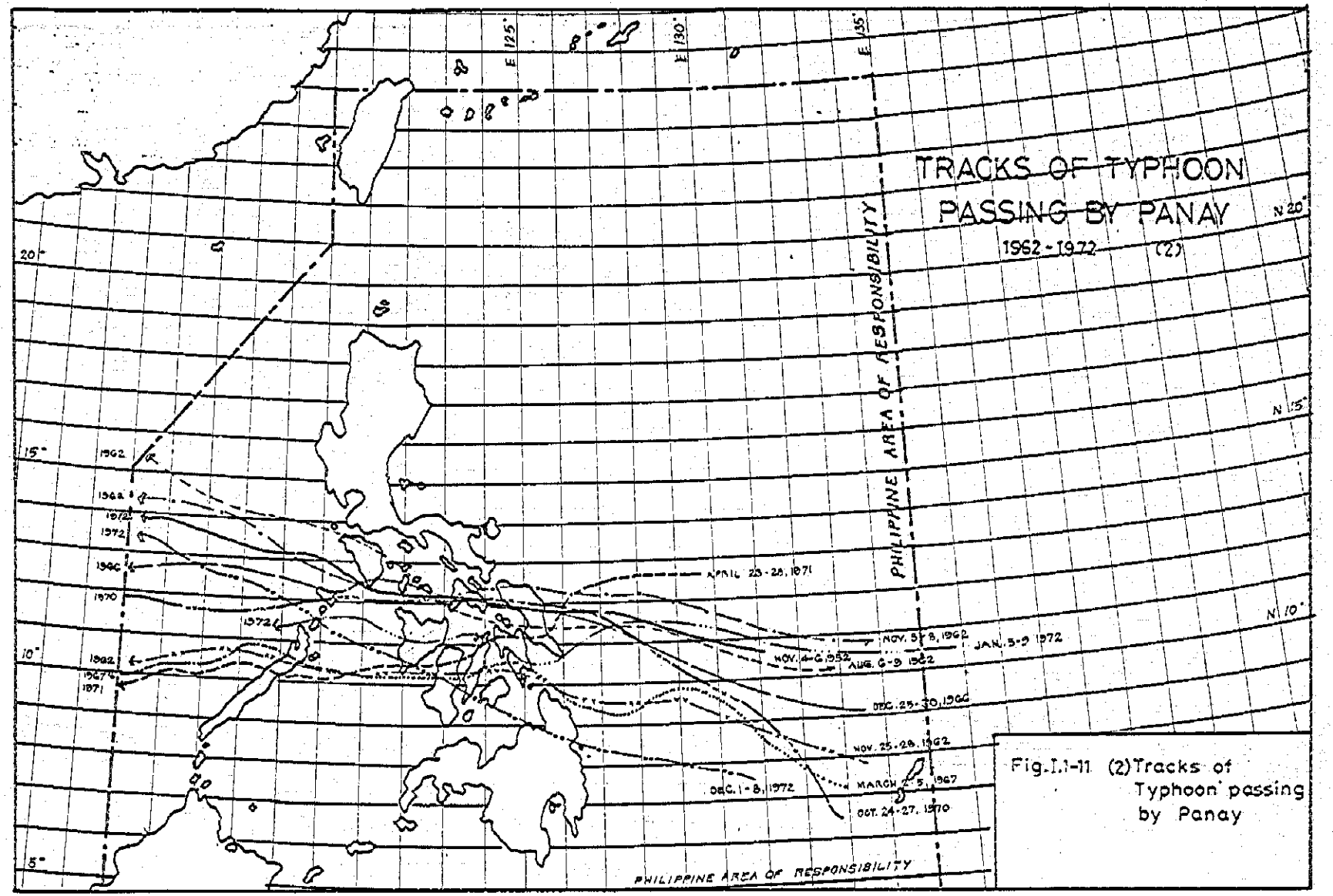


Fig.I.1-11 (2)Tracks of Typhoon passing by Panay

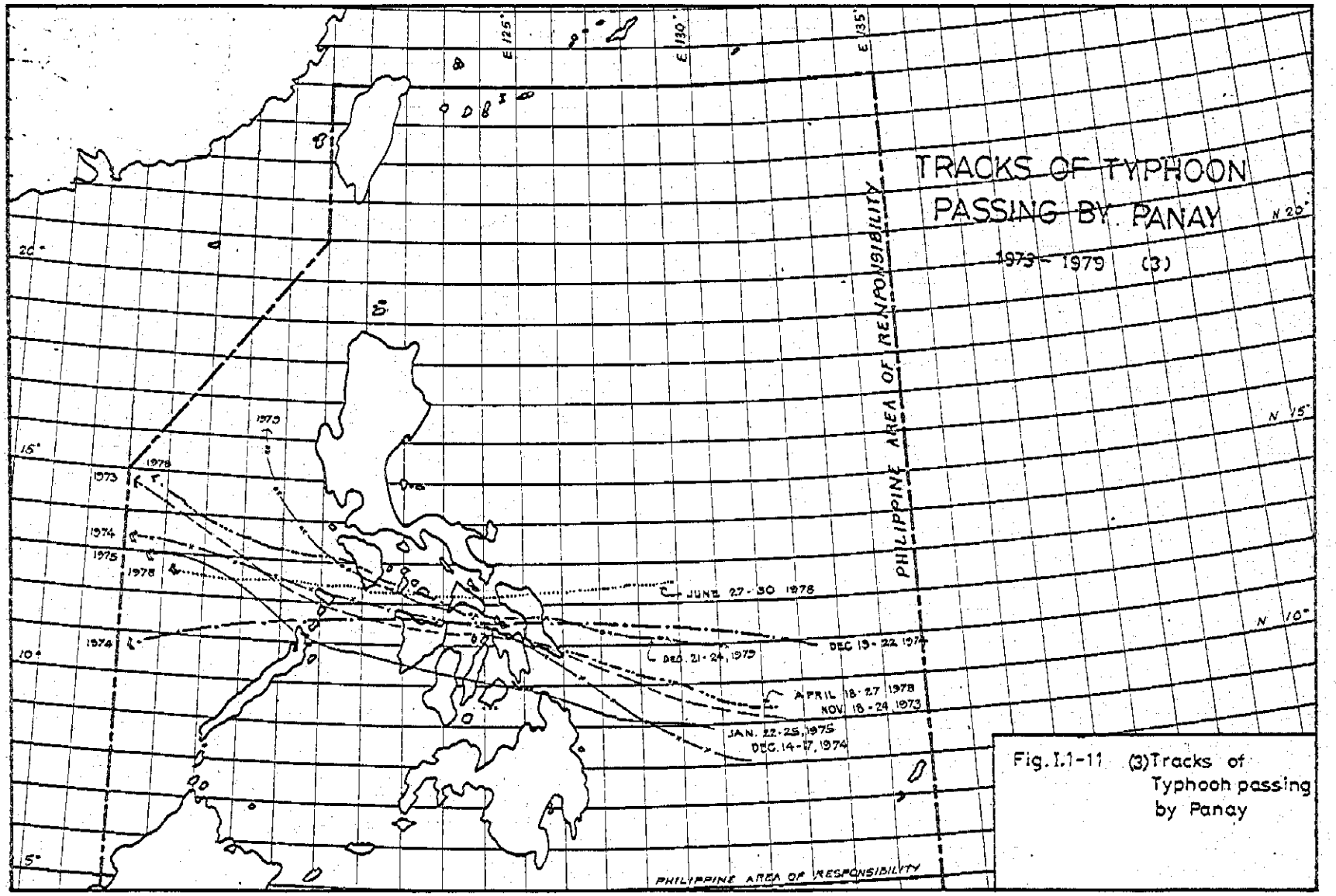


Fig. I.1-11 (3)Tracks of Typhoon passing by Panay

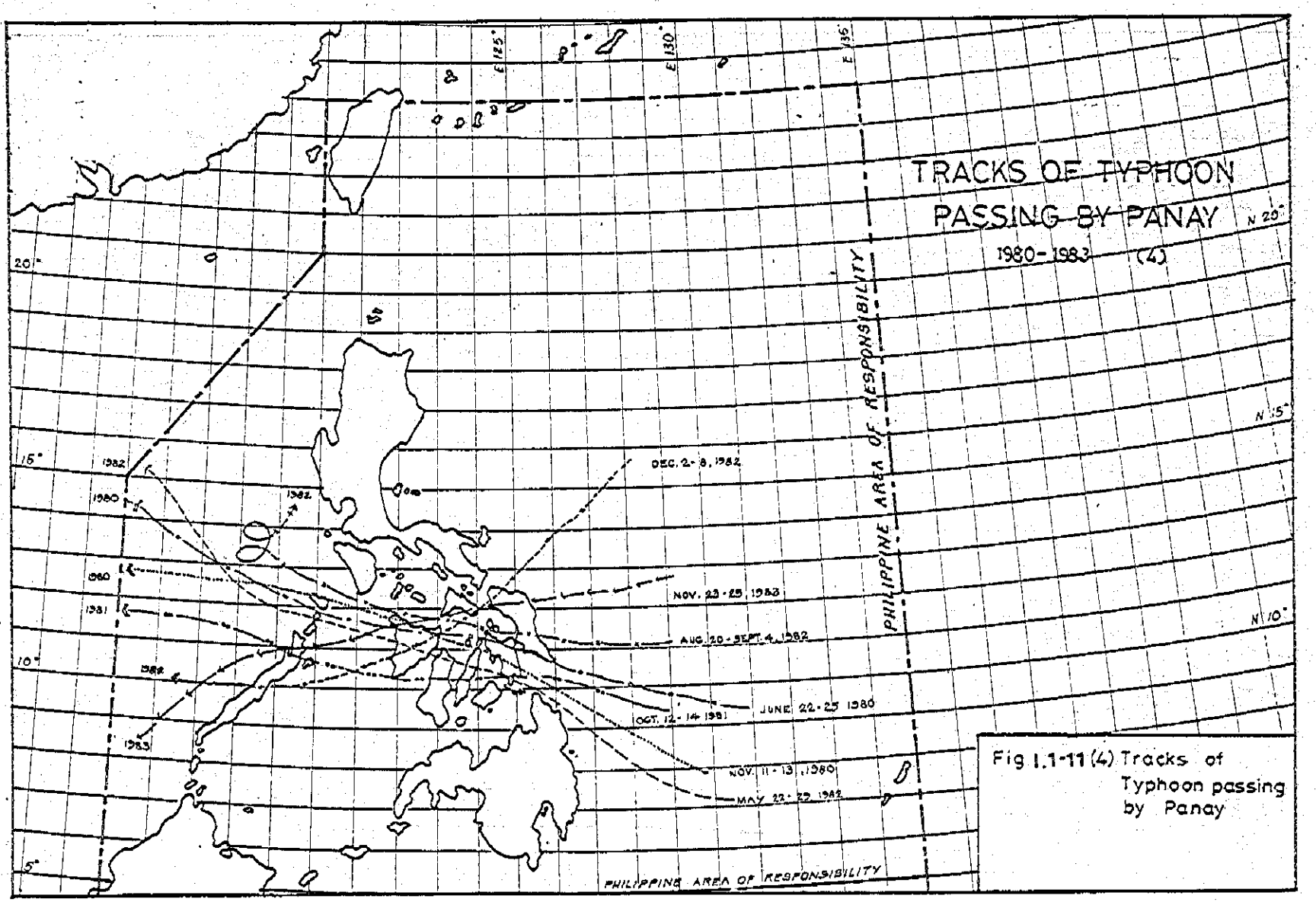
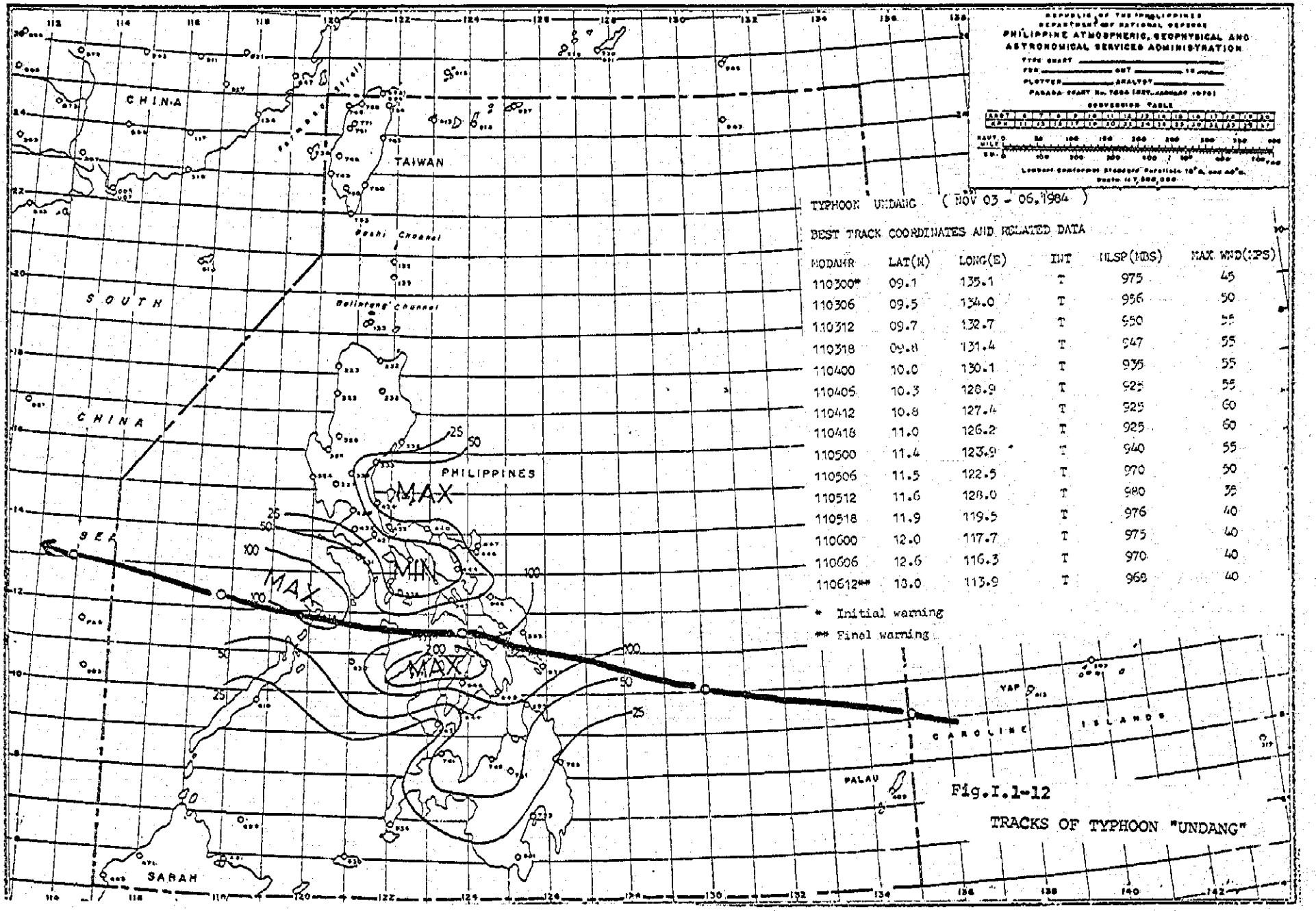


Fig I.1-11 (4) Tracks of Typhoon passing by Panay



TYPHOON UNDANG (NOV 03 - 06, 1984)

BEST TRACK COORDINATES AND RELATED DATA

MODAHR	LAT(N)	LONG(E)	INT	MLSP(MBS)	MAX WND(KPS)
110300*	09.1	135.1	T	975	45
110306	09.5	134.0	T	956	50
110312	09.7	132.7	T	950	55
110318	09.8	131.4	T	947	55
110400	10.0	130.1	T	935	55
110406	10.3	128.9	T	925	55
110412	10.8	127.4	T	925	60
110418	11.0	126.2	T	925	60
110500	11.4	123.9	T	940	55
110506	11.5	122.5	T	970	50
110512	11.6	120.0	T	980	35
110518	11.9	119.5	T	976	40
110600	12.0	117.7	T	975	40
110606	12.6	116.3	T	970	40
110612**	13.0	113.9	T	968	40

* Initial warning

** Final warning

Fig.I.1-12

TRACKS OF TYPHOON "UNDANG"