Table A8 STORM DEW POINT

No.	Station	El.	Dew Point at Site	Sea Level Dew Point
1.	Storm 81-1			
(1)	Keningau	290 m	21.5°C	22.7°C
(2)	Panimbanan	15 m	23.0	23.0
(3)	Kuamut, Kinabatangan	20 m	23.5	23.5
(4)	DID Inanam	5 m	22.7	22.7
2.	September 25-30, 1973			
(1)	Keningau	290 m	22.1°C	23.3°C
(2)	Panimbanan	15 m	23.6	23.6
(3)	Kuamut, Kinabatangan	20 m	24.4	24.4
(4)	Kaiduan, Papar	100 m	23.2	23.6
3.	Storm 73-1 (November 10-15)			
(1)	Keningau	290 m	22.0°C	23.2°C
(2)	Panimbanan	15 m	24.6	24.6
(3)	Kuamut, Kinabatangan	20 m	25.3	25.3
(4)	DID Inanam	5 m	24.5	24.5
4.	Storm 84-1 (January 21-27)			
(1)	Keningau	290 m	21.2°C	22.4°C
(2)	Panimbanan	15 m	23.5	23.5
(3)	Kuamut, Kinabatangan	20 m	24.0	24.0
(4)	DID Inanam	5 m	23.1	23.1

Note: Refer to Table A 64 for Storm/Flood No.

Table A9 MONTHLY PAN EVAPORATION AT KENINGAU

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968					151	147	152	139	150	138	154	136	
1969													
1970													
1971													
1972	117	134	134	157	154	139	167	151	nnn	167	144	135	1,599*
1973	154	160	164	116	152	150	134	154	150	144	131	135	1,744
1974	125	108	149	137	139	148	129	159	148	132	133	152	1,659
1975	156	128	138	145	142	117	132	145	133	140	128	107	1,611
1976	121	135	159	151	146	143	145	142	144	142	134	124	1,686
1977	126	104	154	165	163	146	132	163	149	155	144	135	1,736
1978	119	136	174	167	162	150	160	139	162	148	124	132	1,773
1979	137	148	161	156	136	142	154	166	156	137	157	128	1,778
1980	118	130	159	153	155	139	146	170	170	155	153	134	1,782
1981	136	127	166	156	169	134	147	158	141	140	124	135	1,733
1982	127	105	169	170	147	132	132	144	149	158	166	155	1,754
1983	141	154	192	149	157	150	141	131	120	118	106	140	1,699
1984	89	87	132	119	114	105	141	118	119	103	99	109	1,335
1985	117												
Mean	129	127	160	149	149	138	141	149	145	139	133	132	1,691

Source: 1968 ... Hydrologic Records of Sabah to 1968, DID, p.327
1972 - 1985 ... DID Kota Kinabalu

Table A10 MEAN SUNSHINE HOUR AT KENINGAU

(Unit: hr)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1976	5.7	11.5	6.9	7.0	7.3	6.8	6.7	6.3	6.8	6.7	7.0	6.7	7.1
1977	5.6	3.8	6.5	7.1	8.0	7.2	6.2	6.5	6.1	6.1	6.8	6.4	6.4
1978	5.5	7.6	3.4	6.7	7.4	6.8	6.8	5.5	6.4	6.3	5.3	6.4	6.2
1979	6.9	7.5	6.3	7.8	7.2	5.9	6.9	7.3	7.1	3.8	6.5	6.4	6.6
1980	4.6	6.2	6.6	9.2	7.5	6.4	6.8	6.0	6.5	6.4	3.6	4.9	6.2
1981	3.8	6.1	8.6	7.5	7.4	5.8	6.7	7.7	5.6	6.4	5.5	5.4	6.4
1982	5.2	5.5	6.7	7.8	6.4	6.0	6.2	6.5	6.2	6.2	7.6	7.5	6.5
1983	6.7	8.8	7.5	4.0	7.0	5.9	5.6	6.2	6.1	6.1	5.6	4.9	6.2
1984	5.2	4.3	6.7	6.7	6.5	5.7	6.2	6.5	5.4	4.4	6.2	5.5	5.8
1985	6.6	6.4	7.3	6.2									6.6
Mean	5.6	6.8	6.7	7.0	7.2	6.3	6.5	6.5	6.2	5.8	6.0	6.0	6.4

Source: 1976 - 1984 ... DID Kota Kinabalu

Table A11 MEAN SURFACE WIND SPEED AT KENINGAU

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1972	0.57	0.60	0.61	0.62	0.61	0.59	0.71	0.67	-	0.66	0.56	0.63	0.62
1973	1.01	0.46	0.91	0.71	0.60	0.58	0.59	0.63	0.63	0.67	0.57	0.57	0.66
1974	0.56	0.56	0.67	0.69	0.63	0.62	0.64	0.70	0.66	0.62	0.61	0.53	0.62
1975	0.61	0.50	0.54	0.64	0.55	0.48	0.55	0.57	0.56	0.58	0.53	0.52	0.55
1976	0.51	0.55	0.48	0.63	0.64	0.63	0.56	0.55	0.68	0.56	0.51	0.56	0.57
1977	0.47	0.50	0.55	0.55	0.58	0.50	0.48	0.58	0.68	0.56	0.53	0.48	0.54
1978	0.53	0.61	0.71	0.63	0.63	0.58	0.55	0.66	0.69	0.68	0.58	0.47	0.61
1979	0.51	0.55	0.60	0.58	0.53	0.47	0.48	0.60	0.60	0.61	0.55	0.48	0.55
1980	0.43	0.50	0.55	0.55	0.48	0.47	0.51	0.56	0.66	0.56	0.45	0.90	0.55
1981	0.40	0.50	0.61	0.51	0.55	0.51	0.58	0.68	0.63	0.58	0.47	0.42	0.54
1982	0.42	0.51	0.55	0.64	1.00	0.48	0.48	0.55	0.60	0.61	0.58	0.48	0.58
1983	0.45	0.68	0.71	0.66	0.66	0.57	0.48	0.46	0.46	0.45	0.45	0.32	0.53
1984	0.33	0.35	0.42	0.40	0.36	0.37	0.37	0.45	0.38	0.42	0.32	0.35	0.38
1985	0.38	0.40	0.48	0.38									-
Mean	0.51	0.52	0.60	0.59	0.60	0.53	0.54	0.59	0.60	0.58	0.52	0.52	0.56

Source: DID Kota Kinabalu

Table A12 MEAN SURFACE WIND SPEED AT KOTA KINABALU

Station: Kota Kinabalu
Lat. : 05°56'N
Long.: 116°03'E

Ht. of anemometer head above aground: 14.5m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	2.3	2.6	2.3	2.6	2.1	1.8	2.2	2.0	2.1	1.5	1.4	0.9	2.0
1970	1.5	1.5	1.2	1.3	1.2	1.7	1.5	1.8	1.6	1.9	1.4	1.3	1.5
1971	1.4	1.0	1.5	1.6	1.2	1.3	1.4	1.7	2.0	2.2	1.5	1.3	1.5
1972	1.9	1.9	2.2	1.9	2.1	1.8	2.4	2.3	2.3	2.3	1.9	2.1	2.1
1973	2.4	2.0	1.6	1.8	2.1	2.1	2.6	2.7	2.5	2.4	2.3	2.2	2.2
1974	2.1	1.9	1.8	1.6	1.8	2.4	2.3	2.4	1.9	2.5	1.9	1.6	2.0
1975	1.5	1.7	1.7	1.5	1.7	1.6	2.2	2.0	1.7	2.1	1.8	2.0	1.8
1976	1.9	1.6	1.6	1.6	1.5	1.4	1.6	1.8	1.8	1.5	1.6	1.7	1.6
1977	1.4	2.1	1.8	1.2	1.2	1.3	1.3	1.5	1.9	1.3	1.4	1.4	1.5
1978	1.7	1.9	1.6	1.9	1.8	1.7	1.9	2.4	2.3	2.7	2.1	1.3	1.9
1979	1.9	1.9	1.6	1.4	1.2	1.6	2.3	2.1	1.3	1.5	1.5	1.9	1.7
1980	1.5	1.7	1.4	1.5	1.6	1.9	1.6	2.0	2.5	1.8	1.8	2.0	1.8
1981	1.7	1.5	2.1	1.9	2.1	2.7	2.3	2.5	2.7	2.2	2.4	2.4	2.2
1982	2.1	2.0	2.2	2.2	2.5	2.4	2.7	2.7	2.5	2.7	2.3	2.2	2.4
1983	2.1	1.9	1.8	1.9	2.1	2.6	2.4	2.4	2.7	2.5	3.3	2.3	2.3
1984	2.2	2.1	2.1	2.3	2.1	2.2	1.9	2.3	2.3	3.3	1.9	1.7	2.2
Mean	1.9	1.8	1.8	1.8	1.8	1.9	2.0	2.2	2.1	2.1	1.9	1.8	1.9

Source: MMS

Table A13 MEAN SURFACE WIND SPEED AT SANDAKAN AIRPORT

Station: Sandakan
Lat. : 05°54'N
Long.: 118°04'E

Ht. of anemometer head above ground: 12.2m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	2.6	3.0	2.6	2.4	1.8	1.4	1.4	1.5	1.4	1.5	1.4	1.7	1.9
1970	2.2	2.7	2.6	1.9	1.5	1.5	1.5	1.6	1.5	1.7	1.6	2.0	1.9
1971	3.0	2.7	2.9	1.7	1.2	0.9	1.1	1.3	1.3	1.5	1.9	2.1	1.8
1972	2.4	2.6	2.6	1.9	1.5	1.2	1.1	1.3	1.3	1.4	1.3	2.4	1.7
1973	2.7	2.8	2.6	1.5	1.1	1.4	1.4	1.3	1.4	1.3	1.9	1.9	1.8
1974	2.2	2.4	2.4	1.9	1.4	1.3	1.3	1.4	1.3	1.2	1.7	1.6	1.7
1975	2.4	2.9	2.0	1.8	1.5	1.3	1.3	1.2	1.3	1.3	1.6	1.3	1.7
1976	2.4	2.2	2.5	1.6	1.0	0.9	0.9	1.1	1.0	1.1	1.4	1.6	1.5
1977	1.5	3.1	3.2	1.7	1.3	0.9	0.9	0.9	0.8	1.2	1.2	1.7	1.5
1978	3.0	2.7	1.7	1.2	1.0	1.0	0.9	0.7	0.7	1.1	1.1	2.4	1.5
1979	3.1	2.5	2.0	1.2	1.1	0.7	0.8	0.8	0.9	1.1	1.3	1.9	1.5
1980	2.7	2.6	2.0	2.0	1.0	0.8	0.9	0.0	0.9	0.9	1.3	1.8	1.5
1981	2.9	2.9	2.9	1.8	1.4	1.2	1.1	1.4	1.2	1.6	1.3	2.2	1.8
1982	3.3	2.8	2.3	1.7	1.3	1.0	1.2	1.3	1.3	1.6	1.8	2.0	1.8
1983	3.1	2.6	2.3	2.1	1.7	1.5	1.5	1.5	1.7	1.8	2.0	2.3	2.0
1984	2.7	3.1	2.5	1.9	1.8	1.6	1.7	1.7	1.8	1.6	1.9	2.1	2.0
Mean	2.6	2.7	2.4	1.8	1.3	1.2	1.2	1.2	1.2	1.4	1.5	1.9	1.7

Source: MMS

Table A14 MEAN SURFACE WIND SPEED AT LABUAN AERODROME

Station: Labuan
Lat. : 05°18'N
Long.: 115°15'E

Ht. of anemometer head above ground: 14.1m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8	2.0	NA
1979	3.1	2.5	1.7	1.0	0.9	1.1	1.2	1.0	1.1	2.0	1.5	1.6	1.5
1980	2.7	2.7	1.3	1.4	0.8	1.0	1.3	1.6	1.6	1.5	1.5	1.7	1.6
1981	2.0	2.4	2.8	1.5	1.3	1.5	1.2	1.2	1.8	1.2	1.3	2.5	1.7
1982	3.3	2.7	1.6	1.8	1.5	1.3	1.2	1.3	1.0	1.3	1.3	1.9	1.7
1983	3.2	2.5	1.8	1.5	0.9	0.9	0.9	1.3	1.6	1.5	2.0	1.6	1.6
1984	2.2	2.5	2.1	1.5	1.2	1.3	1.2	1.2	1.2	1.8	1.0	1.5	1.5
Mean	2.7	2.5	1.9	1.5	1.1	1.2	1.2	1.3	1.4	1.5	1.5	1.8	1.6

Source: MMS

Note: NA = Not Available

Table A15 MAXIMUM SURFACE WIND SPEED AT KOTA KINABALU (1/2)

Station: Kota Kinabalu International Airport
Lat. : 05°56'N
Long.: 116°03'E
Ht. of anemometer head above ground: 14.5m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1954	12.1	14.3	15.2	14.7	13.0	14.3	16.1	16.5	21.0	17.0	18.3	16.1	21.0
1955	14.7	15.6	13.0	17.9	18.3	16.1	17.9	15.2	18.3	19.7	15.2	12.1	19.7
1956	13.0	13.4	13.9	13.0	14.3	19.7	20.1	20.1	16.5	14.7	14.7	15.6	20.1
1957	12.5	14.7	12.5	14.7	11.2	17.9	20.6	16.1	18.3	16.1	15.2	12.5	20.6
1958	12.1	15.6	12.1	10.3	18.8	14.7	17.9	17.4	18.3	NA	25.5	12.1	NA
1959	14.3	13.9	15.2	11.6	13.4	15.2	20.1	16.1	13.4	19.2	18.8	14.7	20.1
1960	15.6	13.4	10.7	13.0	18.3	21.9	14.3	17.4	21.0	21.5	12.1	12.1	21.9
1961	13.9	14.3	11.6	13.0	14.7	19.7	19.2	18.3	18.3	19.2	10.3	10.7	19.7
1962	16.5	16.1	13.4	11.2	13.9	14.3	19.7	21.9	14.3	14.7	17.0	16.5	21.9
1963	15.2	14.3	13.0	10.3	9.4	13.9	14.7	18.3	13.9	13.4	15.6	15.2	18.3
1964	NA	NA	NA	21.0	18.3	21.0	19.2	21.5	19.7	18.8	19.7	13.9	NA
1965	15.6	15.6	12.1	14.3	15.2	19.2	21.5	14.7	19.2	16.5	15.6	11.6	21.5
1966	14.3	12.5	10.7	14.7	21.9	17.0	16.5	14.7	14.3	13.4	13.9	14.7	21.9
1967	15.2	13.4	12.5	12.1	18.3	18.3	21.0	19.7	15.6	17.4	13.4	12.1	21.0
1968	12.0	12.5	12.9	10.5	12.6	13.0	21.7	21.0	16.3	17.1	14.5	15.1	21.7
1969	12.5	13.5	13.0	12.3	13.5	17.0	17.7	19.1	16.7	10.6	14.6	11.5	19.1
1970	14.2	14.0	10.2	9.5	11.0	12.3	16.0	15.0	16.1	19.0	11.3	12.5	19.0
1971	14.2	14.5	11.5	11.8	13.6	17.4	16.3	14.0	17.3	23.3	13.0	16.6	23.3
1972	13.3	14.8	13.3	9.8	13.2	17.7	21.0	17.8	16.4	11.1	13.4	12.6	21.0
1973	14.0	14.1	14.0	11.0	11.7	16.4	21.3	20.5	14.7	16.7	17.4	16.5	21.3
1974	14.3	14.4	12.3	13.2	12.5	27.7	12.9	20.3	16.5	22.4	15.7	14.9	27.7
1975	12.8	11.8	11.8	10.4	13.5	27.0	14.2	16.4	15.2	16.3	17.7	14.9	27.0

Note: NA-not available

Source: MMS

Table A15 MAXIMUM SURFACE WIND SPEED AT KOTA KINABALU (2/2)

Station: Kota Kinabalu International Airport
Lat. : 05°56'N
Long.: 116°03'E
Ht. of anemometer head above ground: 14.5m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1976	14.7	11.3	15.0	10.1	15.5	16.3	19.8	12.6	15.8	12.8	15.3	18.2	19.8
1977	11.0	14.3	16.9	10.0	9.0	14.8	19.6	13.6	21.0	12.8	12.2	13.1	21.0
1978	16.5	14.5	10.3	10.2	19.3	15.6	15.7	23.6	17.0	26.0	15.8	12.4	26.0
1979	16.3	19.5	12.5	9.6	13.3	16.6	18.8	20.2	15.9	20.8	13.0	11.0	20.8
1980	12.8	16.0	10.6	11.0	19.1	17.6	22.0	24.0	19.8	16.1	15.8	21.1	24.0
1981	15.0	12.9	11.1	11.5	11.6	22.5	17.7	19.8	26.5	15.7	15.0	16.5	26.5
1982	13.6	13.7	12.0	11.7	14.3	22.3	19.4	20.5	17.5	18.2	15.6	12.4	22.3
1983	16.2	11.2	11.7	10.3	19.8	22.4	14.1	14.0	23.6	17.3	21.0	15.8	23.6
1984	13.0	15.8	14.1	14.2	13.3	21.4	14.4	17.6	27.2	23.2	17.4	14.7	27.2
Extreme (1954-1984)	16.5	19.5	16.9	21.0	21.9	27.7	22.0	24.0	27.2	26.0	25.5	21.1	27.7
Year of Extreme	1962	1979	1977	1964	1966	1974	1980	1980	1984	1978	1958	1980	1974

Source: MMS

Table A16 MAXIMUM SURFACE WIND SPEED AT SANDAKAN AIRPORT (1/2)

Station: Sandakan Airport
Lat. : 05°54'N
Long.: 118°04'E
Ht. of anemometer head above ground: 12.2m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1954	12.1	11.2	13.0	12.1	11.2	14.3	15.6	15.6	17.9	9.8	11.6	11.6	17.9
1955	*	13.0	9.4	10.3	9.8	13.4	9.8	12.1	11.6	11.6	11.2	11.2	*
1956	11.6	9.4	9.4	12.1	11.6	11.2	10.3	15.2	13.4	8.9	11.6	12.5	15.2
1957	11.6	11.2	8.5	10.3	12.1	12.5	19.2	12.1	13.4	12.1	9.8	11.2	19.2
1958	14.7	10.3	12.1	8.9	10.3	11.2	11.2	12.5	12.1	10.3	13.0	10.3	14.7
1959	9.4	8.5	8.9	9.4	8.5	10.7	10.3	13.0	11.6	8.5	12.2	12.1	13.0
1960	12.1	11.2	8.9	9.4	9.8	10.7	13.0	17.0	21.0	16.1	11.2	11.6	21.0
1961	12.1	14.7	11.2	10.3	15.6	13.4	15.2	14.3	14.3	12.5	9.8	14.7	15.6
1962	12.5	12.1	10.7	9.8	9.4	9.8	15.2	13.4	14.3	13.0	13.0	13.9	15.2
1963	9.4	13.4	8.9	9.4	9.4	13.9	9.4	9.4	8.9	13.4	9.4	8.9	13.9
1964	8.9	9.4	8.9	8.9	14.3	9.4	11.6	12.1	15.2	10.7	11.6	11.6	15.2
1965	14.7	14.3	11.2	11.6	10.3	11.6	14.3	10.7	16.1	12.5	9.4	11.2	16.1
1966	13.5	10.8	10.4	7.5	7.6	11.2	9.0	9.0	10.6	9.0	9.4	7.5	13.5
1967	12.0	9.5	9.1	9.2	10.6	8.9	9.5	13.0	10.4	9.6	12.2	12.7	13.0
1968	13.2	10.5	10.1	8.6	16.3	13.1	14.7	16.5	12.3	10.1	10.0	10.9	16.5
1969	9.0	10.1	7.8	8.6	10.1	10.7	10.5	11.8	10.0	9.1	9.0	10.5	12.8
1970	9.9	11.5	11.8	8.8	9.2	11.5	11.1	11.6	10.5	15.2	11.2	10.7	15.2
1971	12.8	12.7	10.3	7.5	9.0	9.5	9.0	9.7	12.2	9.3	8.8	9.5	12.8
1972	10.0	10.9	11.4	7.1	10.5	9.3	19.0	12.8	11.2	10.7	11.1	11.5	19.0
1973	8.8	8.1	8.0	8.4	8.5	9.6	12.7	9.9	14.0	12.0	14.0	8.6	14.0
1974	9.0	13.0	9.6	9.6	9.6	12.8	13.3	14.0	10.7	10.6	12.5	8.9	14.0
1975	10.1	10.4	10.6	8.3	8.9	12.3	10.7	14.0	8.6	10.9	11.0	11.4	14.0

Source: MMS

Table A16 MAXIMUM SURFACE WIND SPEED AT SANDAKAN AIRPORT (2/2)

Station: Sandakan Airport
Lat. : 5°54'N
Long.: 118°04'E
Ht. of anemometer head above ground: 12.2m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Extreme
1976	11.1	9.7	9.5	8.5	16.8	9.4	10.7	18.0	12.8	10.0	10.3	9.6	16.0
1977	9.9	12.3	12.6	11.0	11.6	10.3	10.6	12.6	17.9	8.5	9.5	11.6	17.9
1978	10.1	10.5	7.1	9.4	11.1	10.1	9.6	14.6	12.5	10.0	10.8	11.5	14.6
1979	12.2	8.4	9.4	7.7	9.4	11.3	13.4	16.5	9.8	10.7	11.5	10.0	16.5
1980	13.0	11.5	7.5	8.5	9.8	10.0	12.5	9.3	9.0	9.9	8.8	11.2	13.0
1981	17.1	10.7	9.9	7.3	9.2	13.5	15.5	10.0	10.7	10.5	8.0	9.5	17.1
1982	10.3	9.3	12.5	10.8	9.0	10.9	18.0	10.5	12.8	10.0	10.3	9.5	18.0
1983	10.7	8.4	9.2	7.8	8.6	13.0	14.9	15.4	15.7	12.6	13.7	10.4	15.7
1984	9.1	11.5	10.7	9.6	8.9	11.5	12.3	10.0	10.4	10.5	9.5	12.8	12.8
Extreme (1954 -1984)	17.1	14.7	13.0	12.1	16.8	14.3	19.2	18.0	21.0	16.1	14.0	14.7	21.0
Year Extreme	1981	1961	1954	1954 1956	1976	1954	1957	1976	1960	1960	1973	1961	1960

Source: MMS

Table A17 MAXIMUM SURFACE WIND SPEED AT LABUAN AERODROME

Station: Labuan Aerodrome
Lat. : 05°18'N
Lont.: 115°15'E
Ht. of anemometer head above ground: 14.1m

(Unit: m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Extreme
1939	17.4	14.3	18.3	16.5	18.3	14.3	16.5	22.8	16.1	17.0	15.6	17.4	22.8
1940	17.0	14.0	13.5	12.0	16.0	17.0	18.0	22.5	14.6	19.1	13.2	15.3	22.5
1941	15.2	15.5	23.1	14.5	18.2	19.8	16.9	19.4	24.4	15.2	16.3	*	*
1953	17.4	19.2	15.6	13.4	15.6	26.4	15.6	26.4	19.2	14.3	16.5	17.9	26.4
1954	17.4	17.0	13.9	15.6	14.3	17.4	19.2	18.3	21.5	18.8	17.0	13.0	21.5
1955	16.1	14.7	14.3	13.0	15.6	17.9	13.9	16.1	14.7	20.6	19.7	14.7	20.6
1956	16.5	14.7	14.3	14.3	15.6	16.5	18.3	21.0	18.3	14.7	14.7	16.1	21.0
1957	15.6	14.7	13.9	12.5	18.8	18.3	22.3	17.4	17.0	17.4	12.5	15.6	22.3
1958	16.5	14.7	14.3	12.1	21.0	15.2	23.2	21.0	17.9	18.3	23.7	15.6	23.7
1959	17.9	15.2	14.7	13.4	15.6	14.3	15.2	17.0	13.4	18.3	21.5	15.2	21.5
1960	18.3	15.6	12.5	14.7	17.4	18.3	24.6	18.8	17.4	19.7	14.7	17.0	24.6
1961	17.0	15.2	15.2	13.9	13.9	16.5	17.0	14.7	18.3	15.2	16.1	13.4	18.3
1962	17.0	17.4	14.7	13.0	17.0	14.7	20.6	21.5	17.0	16.5	16.5	19.7	21.5
1978	---------- Not Available ----------										16.8	15.9	*
1979	16.6	13.0	13.6	13.5	13.4	17.7	17.7	17.2	15.5	19.3	18.5	13.0	19.3
1980	15.0	13.6	10.7	17.0	18.3	17.7	16.1	19.3	18.1	17.7	7.4	19.7	19.7
1981	14.6	17.0	13.5	11.2	15.2	17.2	16.4	18.3	19.0	12.8	13.5	15.4	19.0
1982	13.2	13.6	12.5	12.1	23.4	15.6	18.0	14.9	16.9	13.0	12.2	13.4	23.4
1983	14.5	12.1	11.8	16.2	13.1	15.5	13.0	14.0	13.4	14.7	15.6	14.8	16.2
1984	14.2	14.3	13.3	14.6	13.3	20.0	14.4	17.6	15.4	18.8	13.8	14.9	20.0
Extreme (1939-1941), (1953-1962), (1979-1982)													
	18.3	19.2	23.1	17.0	23.4	26.4	24.6	26.4	24.4	20.6	23.7	19.7	26.4
Year of Extreme													
	1960	1953	1941	1980	1982	1953	1960	1953	1941	1955	1958	1962 1980	1953

Source: MMS

Table A18 HISTORICAL ANNUAL RAINFALL IN PADAS RIVER BASIN (1/3)

(Unit: mm)

Year	Sapong Estate 5059002	Melalap Estate 5260001	Keningau 5361001	Tulid 5364001	Tenom 5159001	Tambunan -
1918			1,985			2,326
1919			1,341			1,549
1920			1,616			1,568
1921			1,544		1,687	1,706
1922			1,498			1,646
1923			1,147			1,514
1924	1,648		1,987		1,426	1,747
1925	2,313		2,231		2,127	2,346
1926	1,638		1,822		1,980	1,947
1927	1,862		1,826		1,942	2,199
1928			1,349			
1929			1,320			
1930	1,498		1,235		1,413	1,491
1931	1,681		1,660		1,642	1,626
1932	2,007		2,060		1,961	2,298
1933	2,159		1,866		1,940	2,035
1934	2,668		1,525		1,799	2,104
1935	1,957		1,468		1,747	1,543
1936	1,873		1,539		1,616	1,985
1937	2,283		1,961		1,851	1,886
1938	2,029		1,558		1,728	1,751
1939	2,241		1,500		1,786	1,541
1940			1,181			1,704

Table A18 HISTORICAL ANNUAL RAINFALL IN PADAS RIVER BASIN (2/3)

(Unit: mm)

Year	Sapong Estate 5059002	Melalap Estate 5260001	Keningau 5361001	Tulid 5364001	Tenom 5159001	Tambunan -
1941			889			
1942			1,570			
1943			1,604			
1944			1,573			
1945						
1946						
1947						
1948						
1949						
1950			1,851			2,177
1951			2,205			1,986
1952	1,864	1,864	2,384		1,850	1,829
1953	1,851	1,609	2,573	2,194	1,948	1,942
1954	1,948	1,583	2,262	2,406	1,578	2,009
1955	2,077	1,867	2,058	2,005	1,799	1,934
1956	1,922	1,945	1,792	2,323	1,666	2,038
1957	1,865	1,490	1,484	2,271	1,518	2,294
1958	1,587	1,675	1,333	3,112	1,852	1,641
1959	1,663	1,542	1,241	3,130	1,856	1,525
Mean (1918-1959)	1,938	1,697	1,677	2,492	1,770	1,867

Table A18 HISTORICAL ANNUAL RAINFALL IN PADAS RIVER BASIN (3/3)

(Unit: mm)

Year	Sapong E. 5059002	Kembabong 4959001	Melalap E. 5260001	Keningau 5361001	Tulid 5364001	Tenom 5159001	Tambunan 5663001	Apin Apin 5462003 5460001	Kg. Sook 5163002	Scheme Biah 5261001	Babawan 5164001
1960	1,510		1,547	1,523	2,605	1,824	1,842				
1961	1,496		1,424	1,424	1,753	1,514	1,398	1,891			
1962	1,896		2,020	2,104	1,502	2,025	1,995	3,458			
1963	1,640		1,549	1,496	1,728	1,549	1,841	2,796			
1964	1,671		1,640	1,896	1,365	2,108	1,528	2,350			
1965	1,700	427*	1,744	1,697	1,764	1,773	1,386	1,578	2,009		
1966	1,621	1,536*	1,330	1,444	2,173*	1,834	-	2,592	1,853		
1967	1,161	1,298*	1,309	1,475	1,920	1,396	-	1,418*	1,422*	1,083*	
1968	1,660	1,704	1,649	1,889	1,911		1,778*	1,027*	2,227	2,013	
1969	1,643	1,145*	1,360	1,480	1,759	1,152	1,321*	1,150*	1,544*	1,454	
1970	2,024	1,876*	1,718	1,683	1,960*	1,958	1,961*	911*	2,000*	1,431*	2,086*
1971	1,966	1,652*	1,940	-	2,195*	1,959	1,608*	-	1,818*	-	2,323*
1972	1,126	1,270*	1,237	1,280*	1,782*	1,322	1,511	-	1,641*	1,171*	3,343
1973	2,389*	1,365*	1,690	1,532*	1,985*	2,817	1,520*	1,357*	1,113*	1,449*	1,718*
1974	1,920	1,663*	2,052	1,551*	2,707	-	2,200*	1,580	1,200*	1,979	2,133
1975	2,034	1,821	1,719	1,761	2,138	1,803	2,111	1,730	998*	1,628*	2,625
1976	1,540	1,571*	1,296	1,185*	1,507	1,330	1,049*	1,302*	1,771*	1,634*	1,172*
1977	1,611*	1,644*	1,298*	1,740*	2,234	1,317	1,930*	1,203*	1,144*	2,204	1,492
1978	1,095	321*	-	1,290	2,014	1,128	263*	1,615	1,318*	1,583	1,956
1979	1,718*	1,618*	-	1,843	2,016	1,995	1,840*	2,260	1,369*	1,819	2,511
1980	922*	1,544*	984*	1,518*	2,390	1,486	796*	878*	1,619*	1,368*	2,585
1981		1,480*	1,423*	1,872	2,166		**	1,633	1,839*	864*	2,391
1982		1,305	892	1,130	1,622		**	1,180*	1,583*		1,580*
1983		1,558	1,121	1,463	1,863*		**	1,655	1,739*		952
1984		354*		1,660				2,251			1,262*
Mean1/	1,630	1,585	1,539	1,638	1,963	1,700	1,702	2,199	2,030	1,842	2,363
Mean2/	1,635	1,358	1,497	1,581	1,961	1,700	1,498	1,719	1,499	1,549	2,009

Note: Mark * shows lack of data.

/1: Mean over 1960 to 1984 excluding data attached with *

/2: Mean over 1960 to 1984 including data attached with *

Table A19 MEAN MONTHLY RAINFALL IN AND AROUND SOOK BASIN

(Unit: mm)

Month No.	Keningau 5361001	Biah Scheme 5261001	Kg. Sook 5163002	Tulid 5364001	Apin Apin 5462003	Mean
Jan.	154	160	119	168	216	163
Feb.	110	115	86	145	128	117
Mar.	140	160	143	135	133	142
Apr.	137	140	147	160	149	147
May	188	170	216	263	209	209
June	131	143	148	171	160	151
July	115	126	145	170	142	140
Aug.	110	113	146	168	138	135
Sept.	135	168	160	199	154	163
Oct.	157	171	221	171	164	177
Nov.	134	158	194	220	206	182
Dec.	149	156	160	181	207	171
Total	1,660	1,780	1,885	2,150	2,006	1,897

Note: Period of data for each station is as follows:

Keningau ..... 1918 - 1983
Biah Scheme ..... 1967 - 1981
Kg. Sook ..... 1965 - 1983
Tulid ..... 1953 - 1983
Apin Apin ..... 1961 - 1983

Table A20 MONTHLY RAINFALL AT KOTA KINBALU AIRPORT
STATION No. 5960001 (1/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1924	100	10	36	170	330	277	283	166	566	216	314	433	2901
1925	260	158	353	123	71	256	157	180	228	682	289	250	3007
1926	191	6	0	140	221	158	268	137	390	697	256	300	2764
1927	175	42	121	150	414	361	242	215	433	354	407	315	3229
1928	**	**	**	**	**	**	**	**	**	**	**	**	**
1929	124	87	72	137	263	353	298	216	297	285	320	64	2516
1930	42	0	4	122	220	297	70	172	244	167	411	282	2031
1931	27	5	9	109	111	269	351	116	308	444	259	162	2170
1932	138	57	41	125	369	300	246	291	367	282	428	564	3208
1933	44	15	77	180	379	265	284	120	465	520	373	552	3274
1934	286	74	278	199	132	445	245	333	232	660	441	248	3573
1935	61	29	97	93	190	394	152	235	268	303	321	142	2285
1936	232	46	92	174	290	215	431	231	344	479	133	272	2939
1937	120	31	21	201	281	353	170	156	193	294	268	273	2361
1938	73	14	279	391	314	92	270	146	450	290	334	277	2930
1939	126	32	173	114	93	290	129	101	207	457	470	618	2810
1940	**	**	**	**	**	**	**	**	**	**	**	**	**
1941	**	**	**	**	**	**	**	**	**	**	**	**	**
1942	**	**	**	**	**	**	**	**	**	**	**	**	**
1943	**	**	**	**	**	**	**	**	**	**	**	**	**
1944	**	**	**	**	**	**	**	**	**	**	**	**	**
1945	**	**	**	**	**	**	**	**	**	**	**	**	**
1946	**	**	**	**	**	**	**	**	**	**	**	**	**
1947	9	31	94	323	128	383	213	298	249	292	343	212	2575
1948	34	38	38	118	175	126	331	381	307	215	476	159	2398
1949	43	110	5	163	258	506	341	334	471	333	417	181	3162
1950	52	34	142	172	127	271	176	442	482	368	193	93	2552
1951	81	176	50	251	129	233	367	102	253	316	102	274	2334
1952	4	47	69	251	215	514	393	467	418	285	373	471	3507
1953	354	85	49	130	308	195	270	250	297	374	386	158	2856
1954	56	35	200	207	247	689	310	289	564	353	228	237	3415
1955	144	102	28	278	218	459	345	359	465	373	334	133	3238

(to be continued)

Table A20 MONTHLY RAINFALL AT KOTA KINABALU AIRPORT
STATION No. 5960001 (2/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1956	262	79	102	87	301	266	355	278	294	323	488	448	3283
1957	149	61	68	119	124	382	447	197	374	225	176	93	2415
1958	29	0	117	7	229	387	126	468	219	452	479	35	2548
1959	70	6	72	31	253	215	251	354	401	266	466	193	2578
1960	101	87	120	76	243	263	343	111	659	295	305	45	2648
1961	39	49	248	242	100	312	186	244	406	328	141	173	2468
1962	194	30	134	156	223	330	247	366	338	172	331	304	2825
1963	703	81	26	19	112	206	357	296	177	422	175	422	2996
1964	5	15	22	114	259	246	273	168	232	319	379	130	2162
1965	124	100	141	35	210	122	201	261	160	229	88	171	1842
1966	90	71	67	309	161	393	266	339	180	393	323	356	2948
1967	257	93	118	156	248	294	320	133	260	554	185	83	2701
1968	**	**	**	**	**	**	**	**	**	**	**	**	**
1969	33	53	149	15	313	289	350	427	289	128	488	333	2865
1970	78	12	9	99	315	312	149	251	279	678	198	190	2570
1971	68	72	9	36	398	289	231	274	370	436	322	467	2972
1972	39	19	32	156	200	254	216	278	31	225	175	0	1626
1973	**	1	12	264	201	410	390	231	439	274	465	466	3152*
1974	195	277	84	67	72	241	120	179	325	525	242	141	2468
1975	93	93	99	12	167	315	210	274	422	317	252	453	2705
1976	230	41	13	31	231	272	192	378	194	214	268	282	2348
1977	314	191	34	48	42	524	168	130	109	399	191	314	2464
1978	50	24	25	83	184	270	105	196	236	302	395	146	2016
1979	10	22	80	99	153	607	593	121	321	610	461	63	3137
1980	169	27	28	84	131	385	237	484	80	481	448	620	3274
Mean	129	48	86	139	216	318	264	254	321	367	319	262	2733
Size	47	48	48	48	48	48	48	48	48	48	48	48	12

(1) Figures with a mark * lack data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A21 MONTHLY RAINFALL AT SANDAKAN AIRPORT
STATION No. 5880201 (1/3)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1979	379	558	542	197	111	67	159	125	53	276	208	312	2987
1980	577	129	264	221	171	146	162	454	295	223	671	675	3988
1881	361	231	39	114	256	285	169	125	487	96	611	277	3051
1982	795	191	226	236	72	394	179	124	132	213	490	351	3403
1883	475	424	230	97	238	118	255	97	216	324	350	599	3423
1884	424	129	91	20	231	200	195	168	176	250	421	394	2699
1885	145	51	21	13	80	435	134	225	214	425	312	517	2572
1886	780	126	91	16	140	185	89	106	362	165	359	713	3132
1887	745	465	329	134	65	141	114	161	312	233	223	825	3747
1888	280	48	101	47	72	236	81	271	342	239	343	496	2556
1889	276	349	28	26	26	270	207	119	186	359	385	406	2637
1890	688	333	396	142	109	152	163	91	119	307	628	334	3462
1891	1005	122	133	23	52	177	303	488	230	243	208	388	3372
1892	498	29	216	237	207	142	187	347	168	292	661	699	3683
1893	186	485	386	93	171	275	87	353	156	303	419	519	3433
1894	1149	385	132	179	190	193	132	200	433	190	430	456	4069
1895	424	200	434	113	316	212	198	325	55	167	499	671	3614
1896	500	313	185	68	127	189	260	392	219	199	209	292	2953
1897	**	**	**	**	**	**	**	**	**	**	**	**	**
1898	**	**	**	**	**	**	**	**	**	**	**	**	**
1899	**	**	**	**	**	**	**	**	**	**	**	**	**
1900	**	**	**	**	**	**	**	**	**	**	**	**	**
1901	**	**	**	**	**	**	**	**	**	**	**	**	**
1902	759	220	97	276	306	105	153	204	233	335	502	426	3616
1903	8	10	19	8	46	65	379	460	266	350	194	401	2206
1904	772	409	170	162	79	73	108	105	113	437	213	518	3159
1905	**	**	**	**	**	**	**	**	**	**	**	**	**
1906	77	98	68	41	188	143	153	174	192	172	102	439	1847
1907	431	877	632	40	198	81	129	200	328	233	318	438	3905
1908	389	550	242	135	139	142	188	118	253	345	354	581	3436
1909	420	170	40	135	124	193	230	237	230	326	187	205	2497
1910	648	508	233	89	201	345	197	186	203	203	109	209	3131
1911	353	275	112	138	75	133	150	231	518	225	480	475	3165
1912	47	25	44	136	26	109	124	193	460	171	348	375	2058
1913	157	219	161	107	205	126	147	245	176	229	440	401	2613
1914	203	4	32	43	144	177	113	112	221	176	110	147	1482
1915	**	**	**	**	**	**	**	**	**	**	**	**	**

(to be continued)

Table A21 MONTHLY RAINFALL AT SANDAKAN AIRPORT
STATION No. 5880201 (2/3)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1916	**	**	**	**	**	**	**	**	**	**	**	**	**
1917	**	**	**	**	**	**	**	**	**	**	**	**	**
1918	**	**	**	**	**	**	**	**	**	**	**	**	**
1919	**	**	**	**	**	**	**	**	**	**	**	**	**
1920	**	**	**	**	**	**	**	**	**	**	**	**	**
1921	933	482	414	140	117	188	171	251	170	318	218	790	4192
1922	**	**	**	**	**	**	**	**	**	**	**	**	**
1923	**	**	**	**	**	**	**	**	**	**	**	**	**
1924	275	339	164	102	425	124	284	209	200	270	650	213	3255
1925	682	388	290	209	115	256	208	145	318	307	435	628	3981
1926	753	209	26	66	115	221	149	98	277	458	313	1116	3801
1927	392	224	162	87	186	142	146	205	247	317	398	413	2919
1928	**	**	**	**	**	**	**	**	**	**	**	**	**
1929	**	**	**	**	**	**	**	**	**	**	**	**	**
1930	471	60	93	54	217	185	100	209	353	58	426	392	2618
1931	258	106	112	48	129	210	127	338	109	232	289	381	2339
1932	285	400	474	307	115	175	246	155	174	181	257	769	3538
1933	448	412	351	110	17	100	197	100	275	380	289	235	2914
1934	863	128	310	259	101	218	356	176	225	214	443	407	3700
1935	387	147	101	186	215	321	206	259	322	320	243	246	2953
1936	390	41	606	121	252	206	264	244	435	236	416	483	3764
1937	497	116	17	102	277	182	266	61	169	232	412	582	2913
1938	561	610	235	233	240	281	270	146	450	290	579	507	4402
1939	593	648	336	163	93	135	275	38	259	250	238	502	3530
1940	**	**	**	**	**	**	**	**	**	**	**	**	**
1941	**	**	**	**	**	**	**	**	**	**	**	**	**
1942	**	**	**	**	**	**	**	**	**	**	**	**	**
1943	**	**	**	**	**	**	**	**	**	**	**	**	**
1944	**	**	**	**	**	**	**	**	**	**	**	**	**
1945	**	**	**	**	**	**	**	**	**	**	**	**	**
1946	**	**	**	**	**	**	**	**	**	**	**	**	**
1947	218	503	175	300	72	261	60	145	142	300	330	460	2966
1948	464	130	159	55	230	182	282	260	235	343	328	274	2942
1949	106	256	46	150	129	238	164	255	135	374	258	397	2508
1950	307	215	272	166	100	144	204	158	281	399	260	809	3315

(to be continued)

Table A21 MONTHLY RAINFALL AT SANDAKAN AIRPORT
STATION No. 5880201 (3/3)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	471	477	73	109	205	122	177	230	150	183	383	535	3115
1952	126	359	137	152	97	366	75	365	169	191	280	614	2931
1953	770	240	308	38	121	170	317	195	241	302	149	252	3103
1954	344	141	557	40	169	265	161	260	188	263	330	545	3263
1955	711	119	89	116	187	180	105	265	77	271	301	336	2757
1956	775	246	237	269	231	132	56	147	352	305	410	632	3794
1957	324	122	84	45	15	284	347	225	447	278	345	443	2959
1958	114	194	130	34	56	125	195	269	149	306	436	450	2458
1959	261	177	255	86	143	161	261	188	318	223	359	364	2796
1960	415	286	109	125	101	193	155	250	328	386	403	480	3231
1961	218	111	102	129	366	163	104	262	175	430	269	562	2891
1962	640	185	232	93	61	200	133	320	334	252	221	692	3363
1963	1094	195	229	35	128	189	338	166	386	416	309	186	3673
1964	221	390	206	180	153	212	78	263	207	147	196	438	2691
1965	548	275	535	90	160	198	156	153	418	248	445	504	3730
1966	315	38	158	23	303	224	209	201	170	343	255	194	2433
1967	475	380	186	114	103	158	225	122	166	166	660	498	3253
1968	**	**	**	**	**	**	**	**	**	**	**	**	**
1969	162	58	72	0	100	142	189	151	183	60	461	617	2194
1970	391	365	67	274	102	278	106	243	325	215	392	351	3109
1971	672	597	180	122	118	237	96	363	67	213	278	353	3296
1972	669	346	397	147	179	128	436	240	339	229	219	280	3610
1973	110	27	44	374	83	197	176	94	349	153	309	828	2744
1974	517	526	155	256	99	116	124	128	32	152	205	450	2760
1975	372	380	181	74	148	216	158	232	127	149	487	385	2909
1976	591	342	196	54	252	169	152	278	126	161	320	431	3072
1977	175	1079	242	47	63	156	216	265	183	234	243	481	3384
1978	343	65	86	80	214	209	168	205	272	241	379	392	2654
1979	153	100	88	101	148	437	311	216	254	346	591	389	3134
1980	694	184	69	100	165	226	207	258	333	398	390	649	3673
Mean	455	274	198	121	151	194	187	213	243	262	355	468	3121
Size	78	78	78	78	78	78	78	78	78	78	78	78	78

(1) Figures with a mark * lack data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A22 MONTHLY RAINFALL AT PENSIANGAN
STATION No. 4562001 (1/2)

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1922	252	132	297	250	189	269	89	254	394	224	148	218	2716
1923	**	**	**	**	**	**	**	**	**	**	**	**	**
1924	164	214	261	201	231	191	305	267	214	143	174	66	2431
1925	227	218	308	340	168	354	146	88	279	311	321	295	3055
1926	149	57	275	248	196	185	323	157	296	347	302	235	2770
1927	178	218	225	151	241	363	62	156	170	276	389	200	2629
1928	**	**	**	**	**	**	**	**	**	**	**	**	**
1929	**	**	**	**	**	**	**	**	**	**	**	**	**
1930	334	18	192	263	248	313	313	253	236	280	199	183	2832
1931	121	124	162	216	350	197	433	221	255	127	252	142	2600
1932	142	156	414	415	383	424	267	281	160	485	187	268	3582
1933	223	108	196	401	257	168	264	147	279	213	143	59	2456
1934	445	373	272	387	233	322	296	171	259	356	218	175	3507
1935	137	186	229	192	464	335	140	273	154	341	179	340	2970
1936	373	128	183	481	549	479	163	163	138	340	194	273	3464
1937	173	84	205	359	599	247	125	338	215	299	226	176	3046
1938	**	**	**	**	**	**	**	**	**	**	**	**	**
1939	158	131	230	370	299	453	143	142	444	362	215	162	3129
1940	**	**	**	**	**	**	**	**	**	**	**	**	**
1941	**	**	**	**	**	**	**	**	**	**	**	**	**
1942	**	**	**	**	**	**	**	**	**	**	**	**	**
1943	**	**	**	**	**	**	**	**	**	**	**	**	**
1944	**	**	**	**	**	**	**	**	**	**	**	**	**
1945	**	**	**	**	**	**	**	**	**	**	**	**	**
1946	**	**	**	**	**	**	**	**	**	**	**	**	**
1947	**	**	**	**	**	**	**	**	**	**	**	**	**
1948	**	**	**	**	**	**	**	**	**	**	**	**	**
1949	**	**	**	**	**	**	**	**	**	**	**	**	**
1950	**	**	**	**	**	**	**	**	**	**	**	**	**
1951	**	**	**	**	**	**	**	**	**	**	**	**	**
1952	**	**	**	**	**	**	**	**	**	**	**	**	**
1953	211	231	199	536	255	153	366	113	354	218	181	130	2947
1954	243	403	474	103	473	346	416	323	218	322	222	322	3865
1955	265	198	104	594	210	333	203	257	523	445	243	384	3759

(to be continued)

Table A22 MONTHLY RAINFALL AT PENSIANGAN
STATION No. 4562001 (2/2)

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1956	319	231	177	356	339	171	293	281	208	240	263	268	3146
1957	155	122	157	185	230	270	302	258	499	389	483	148	3198
1958	2	219	130	459	507	188	124	211	145	127	211	149	2472
1959	23	60	378	347	353	217	358	399	248	279	289	181	3132
1960	225	258	108	418	194	286	244	354	261	228	394	99	3069
1961	67	240	334	414	260	299	160	201	268	230	106	298	2877
1962	333	198	463	236	266	312	227	322	449	250	269	275	3600
1963	269	100	290	156	289	214	355	347	188	288	194	125	2815
1964	156	301	255	226	316	393	100	162	198	168	199	329	2803
1965	171	155	313	235	460	139	160	186	236	314	283	628	3280
1966	116	201	349	227	253	315	87	94	221	433	440	206	2942
1967	188	108	219	185	373	347	199	284	359	187	373	149	2971
1968	**	**	**	**	**	**	**	**	**	**	**	**	**
1969	138	48	349	547	232	278	275	263	198	232	204	235	2998
1970	337	52	462	301	237	331	252	434	242	252	377	159	3435
1971	144	389	160	146	399	311	136	274	183	216	302	220	2880
1972	223	128	356	348	285	172	202	571	439	164	337	260	3484
1973	83	82	217	269	264	278	291	272	402	294	283	225	2959
1974	88	204	125	287	524	292	194	135	159	**	79	77	2161*
1975	325	149	258	198	387	217	265	286	396	143	316	288	3226
1976	404	60	298	282	126	339	144	309	122	243	361	340	3027
1977	239	296	327	349	341	404	204	221	199	254	442	336	3613
1978	154	153	72	333	338	353	67	161	404	97	272	216	2619
1979	49	83	243	130	107	135	372	45	91	455	810	90	2610
1980	2	74	478	88	44	5	4	2	2	48	191	234	1172
Mean	195	168	262	298	304	278	221	236	261	266	275	224	2988
Size	41	41	41	41	41	41	41	41	41	40	41	41	12

(1) Figures with a mark * lack data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A23 MONTHLY RAINFALL AT ULU TOMANI (4358001)

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1964	**	**	**	**	**	**	**	**	238	152	228	199	817*
1965	145	226	213	106	243	190	30	258	121	167	163	191	2053
1966	113	72	96	135	68	206	332	386	190	150	100	152	2000
1967	164	118	216	111	180	194	163	79	24	44	208	224	1725
1968	211	76	251	328	300	170	160	62	107	186	61	125	2036
1969	30	30	173	51	63	107	36	285	48	107	173	221	1323
1970	282	51	201	348	680	84	109	348	9	18	204	16	2349
1971	54	165	41	20	38	33	64	330	172	55	66	126	1255
1972	86	81	43	91	160	152	31	164	212	76	173	37	1306
1973	**	**	76	229	127	249	124	25	668	363	239	467	2568
1974	297	371	53	254	**	493	277	43	157	152	41	112	2250*
1975	51	104	254	**	**	**	**	**	**	18	15	**	442*
1976	**	**	**	**	**	**	**	**	**	**	**	**	**
1977	58	146	**	192	108	135	6	16	3	5	34	142	844*
1978	76	**	46	127	61	89	10	48	34	74	155	84	803*
1979	13	23	**	7	79	74	84	50	250	275	220	221	1295*
1980	186	29	184	161	261	192	316	130	58	208	348	312	2384
Mean	126	115	142	154	182	169	124	159	153	128	152	181	1785
Size	14	13	13	14	13	14	14	14	15	16	16	15	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shos no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A24 MONTHLY RAINFALL AT KEMABONG (4959001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1965	**	**	**	**	**	**	**	**	**	191	78	158	427*
1966	108	64	92	216	112	138	85	134	85	246	93	163	1535
1967	254	139	144	134	260	**	**	60	127	113	**	67	1297*
1968	180	40	178	213	197	154	110	94	84	276	25	153	1703
1969	56*	95*	27*	2*	121*	122*	47*	149*	50*	201*	115	160*	1145*
1970	221*	58	180	261	361	133	69*	43*	122	148	135	145	1876*
1971	101	248	77	64	125	126	50	245	69	152*	138*	257	1652*
1972	212	98	125	226	46*	152	2*	108	152	32*	33*	84*	1270*
1973	7	18	118	**	50*	122*	173	191	274*	110	145*	157*	1366*
1974	79*	161	72	197	104	124*	98	175	255	191	138	69	1663*
1975	223	106	213	143	207	96	181	132	171	40	99	210	1821
1976	225	110	114*	99	103	101	111	65	103*	135*	183*	222	1572*
1977	34*	219	133	218	117	148	56	70	80	108	206	255	1644*
1978	87*	73	87	74*	**	**	**	**	**	**	**	**	321*
1979	**	**	178*	98	241	263	141	255	55*	198	185	4*	1618*
1980	59	50	139	201	159	112	118	128*	48	171	160	199	1543*
1981	**	96*	144	213	254	134	180	**	12*	300*	117*	30*	1480*
1982	108	42	62	133	179	42	98	68	184	142	72	175	1303
1983	142	86	4	41	132	127	217	246	186	146	149	82	1555
1984	240	114*	**	**	**	**	**	**	**	**	**	**	354*
Mean	155	101	118	164	182	133	124	142	130	160	121	166	1695
Size	12	15	15	15	14	13	13	13	12	13	12	13	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A25 MONTHLY RAINFALL AT BATU BAJAU (5059001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1966	177	**	**	123	119	130	151	280	61	231	182	99	1553*
1967	232	139	141	102	150	161	186	44	106	117	151	117	1646
1968	168	87	82	231	298	133	195	63	83	236	85	148	1809
1969	54	59	204	62	133	158	206	239	73	202	148	140	1677
1970	164	30	84	142	328	266	211	204	119	268	187	271	2274
1971	66	235	68	60	123	119	72	277	162	229	191	168	1769
1972	170	93	168	89	202	83	24	83	96	160	195	75	1437
1973	**	10	59	131	200	156	**	**	**	121	124	133	934*
1974	102	291	107	144	249	210	108	159	230	226	150	96	2069
1975	159	140	223	58	228	102	233	141	222	82	122	249	1956
1976	109	89	77	124	120	104	63	152	51	152	288	159	1488
1977	101	267	84	160	213	200	100	141	121	294	112	118	1910
1978	65	142	31	189	204	226	106	85	148	138	193	138	1667
1979	28	23	255	144	215	181	239	161	270	316	172	149	2152
1980	122	108	107	152	149	198	113	152	7	60	76	139	1381
1981	133	50	37	201	216	143	216	36	173	78	249	56	1589
1982	**	146	55	133	175	55	68	106	46	108	52	96	1039*
1983	53	19	47	52	168	157	138	172	265	122	160	158	1511
1984	**	118	146	361	267	199	151	39	228	183	84	181	1957*
1985	55	50	73	151	**	**	**	**	**	**	**	**	329*
Mean	115	110	108	141	198	157	143	141	137	175	154	142	1719
Size	17	19	19	20	19	19	18	18	18	19	19	19	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A26 MONTHLY RAINFALL AT SAPONG ESTATE (5059002)(1/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1924	127	125	163	222	220	147	115	122	184	56	88	79	1648
1925	301	264	532	133	69	103	69	114	224	148	197	158	2312
1926	255	46	62	189	90	125	118	58	131	176	198	190	1638
1927	324	202	159	169	145	145	116	77	220	77	68	160	1862
1930	79	49	227	217	178	219	50	66	87	197	26	103	1498
1931	79	132	46	84	247	223	172	110	214	183	77	114	1681
1932	169	116	235	262	159	136	107	172	137	201	132	181	2007
1933	183	93	157	211	188	87	117	212	219	244	204	244	2159
1934	208	399	297	139	64	323	136	67	131	291	355	258	2668
1935	34	74	171	179	200	256	123	296	55	209	194	166	1957
1936	262	44	183	140	315	135	139	155	150	193	65	92	1873
1937	292	114	119	185	267	276	79	125	129	208	188	301	2283
1938	64	127	365	153	184	190	181	264	209	81	99	112	2029
1939	188	191	101	173	235	254	29	136	199	185	173	377	2241
1952	44	139	245	170	195	118	87	100	137	195	106	328	1864
1953	108	225	188	132	128	157	151	53	189	224	161	135	1851
1954	42	77	116	322	141	208	125	140	152	252	113	260	1948
1955	232	109	13	101	275	226	132	170	155	214	208	242	2077
1956	154	83	149	98	130	162	120	124	195	198	230	279	1922
1957	318	198	158	78	183	167	168	103	148	183	82	79	1865
1958	157	61	44	81	230	145	165	148	96	114	257	89	1587
1959	29	113	271	105	239	89	142	117	138	197	145	78	1663
1960	92	117	88	76	143	136	164	85	100	187	133	189	1509
1961	114	159	135	183	118	137	145	59	111	88	89	158	1495
1962	198	104	225	187	184	230	72	129	181	105	107	174	1896
1963	136	156	223	30	321	36	68	102	102	170	179	117	1638
1964	62	110	138	219	221	162	200	60	187	64	154	94	1669
1965	134	144	200	229	198	102	57	151	110	181	78	116	1699
1966	82	70	131	145	166	166	113	108	101	214	178	147	1621
1967	230	146	100	38	85	59	107	41	69	105	118	63	1160
1968	160	105	184	175	138	118	64	83	103	249	82	199	1658
1969	96	70	181	73	164	243	172	147	67	124	144	162	1642
1970	81	36	175	155	446	121	164	147	149	241	155	154	2024
1971	177	420	62	47	108	47	67	237	125	204	255	217	1965

(to be continued)

Table A26 MONTHLY RAINFALL AT SAPONG ESTATE (5059002)(2/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1972	100	125	115	181	17	117	11	71	133	66	153	37	1126
1973	**	20	48	408	203	160	130	72	487	338	291	232	2388*
1974	195	228	60	97	200	109	159	125	238	261	133	115	1919
1975	310	81	145	122	198	188	219	70	253	96	128	224	2033
1976	184	145	75	79	110	66	62	69	185	155	120	290	1541
1977	181	176	121	179	136	157	86	94	77	87	**	317	1610*
1978	53	44	77	109	93	101	101	78	89	155	82	113	1094
1979	**	**	107	50	130	133	175	121	269	268	284	181	1718*
1980	133	78	135	168	112	144	**	116	36	**	**	**	922*
1981	318	123	132	102	**	78	**	11	195	179	215	137	1489*
1982	60	98	53	206	189	31	27	71	108	94	104	140	1181
1983	59	29	42	2	95	113	172	198	174	133	102	259	1379
Mean	143	121	123	136	164	123	115	102	152	164	149	167	1658
Size	22	23	24	24	23	24	22	24	24	23	22	23	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A27 MONTHLY RAINFALL AT TENOM (5159001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1921	73	268	171	34	227	148	160	102	155	133	86	130	1687
1924	123	97	138	111	269	105	78	105	142	62	93	102	1425
1925	296	276	402	173	72	90	80	90	197	150	152	149	2127
1926	262	25	17	223	105	141	103	141	301	228	214	220	1980
1927	227	132	255	152	259	116	63	118	242	127	104	147	1942
1930	133	37	131	129	206	153	62	125	37	196	61	143	1413
1931	180	84	50	32	148	333	192	71	168	118	97	169	1642
1932	209	167	163	289	158	160	87	195	92	175	125	141	1961
1933	129	73	123	204	202	90	147	204	186	197	174	211	1940
1934	156	49	222	124	52	215	75	30	133	242	206	295	1799
1935	65	144	241	106	174	147	122	228	73	114	150	183	1747
1936	235	23	152	88	241	104	149	138	84	207	58	137	1616
1937	289	70	163	109	165	147	61	93	223	197	146	188	1851
1938	78	75	269	114	147	167	178	162	161	106	96	175	1728
1939	106	135	88	161	174	191	32	129	133	132	130	375	1786
1952	28	165	316	108	212	128	88	133	154	54	113	351	1850
1953	155	312	187	139	201	124	142	69	117	230	101	171	1948
1954	59	87	102	180	110	146	78	64	225	183	127	217	1578
1955	201	72	23	107	292	192	78	89	154	164	166	261	1799
1956	114	79	73	110	122	174	77	112	93	186	275	251	1666
1957	180	30	180	67	237	97	128	103	146	221	72	57	1518
1958	88	27	66	57	214	154	203	172	168	195	397	111	1852
1959	6	66	229	144	218	299	220	91	83	187	214	99	1856
1960	102	172	95	119	164	135	182	182	124	199	156	194	1824
1961	118	137	206	167	112	134	118	70	121	121	65	145	1514
1962	261	130	127	254	201	146	163	131	177	88	148	199	2025
1963	251	152	98	27	331	40	29	149	94	151	150	77	1549
1964	75	204	189	293	272	214	179	33	242	104	194	109	2108
1965	107	92	252	267	239	156	81	157	64	142	109	107	1773
1966	37	38	146	161	574	153	64	136	101	198	138	88	1834
1967	284	201	105	130	36	69	107	33	52	219	111	49	1396
Mean	149	117	161	141	198	151	114	118	143	162	143	169	1766
Size	31	31	31	31	31	31	31	31	31	31	31	31	12

(1) Figures with a mark * lack data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A28 MONTHLY RAINFALL AT TENOM COCOA RESEARCH STATION (5159001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1983	105	48	43	15	129	97	151	209	202	92	107	223	1421
Mean	105	48	43	15	129	97	151	209	202	92	107	223	1421
Size	1	1	1	1	1	1	1	1	1	1	1	1	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A29 MONTHLY RAINFALL AT KG. SOOK (5163001)

No records collected.

Table A30 MONTHLY RAINFALL AT KG. SOOK (5163002)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1965	158	54	396	195	238	119	31	279	113	201	114	111	2008
1966	98	76	250	150	146	121	124	187	94	332	104	171	1853
1967	88	147	176	173	201	63	254	31	157	93	188	100	1673
1968	176	30	261	129	323	154	257	134	225	225	74	239	2227
1969	62*	33	76	158	155	115	164	190	103*	156*	186	146*	1544*
1970	86*	16	119*	89*	342	296	149	145	172	312	162	112	2000*
1971	80	299	160	50*	**	36*	38*	300*	187	137	350	181	1818*
1972	134	136*	254*	162*	112*	169	5	156	164*	154	120	75	1641*
1973	46	10*	23*	20*	155	161	62*	25*	26*	235*	140*	208*	1113*
1974	26*	46*	66	97*	191*	185	73*	198	138*	17*	174	9	1220*
1975	93	158	91*	103	105*	39*	4*	40*	12*	3*	273	77*	998*
1976	176*	135*	126*	92*	132*	135*	283	175*	66*	205*	114*	112*	1771*
1977	**	**	**	**	**	**	295*	97	116	208	272	156*	1143*
1978	**	**	49	157*	152*	216	70	78	99	66*	247	184	1316*
1979	7	**	2*	13*	142*	108*	79*	138	310	329	136	105	1367*
1980	141*	77*	54*	**	47*	145	179	171	43	163*	270*	329	1618*
1981	408	23	100	82	240*	104	121	**	38*	384	317	22	1836*
1982	97	65	4	174	268	62	75	100	53	207	173*	305	1579*
1983	39	44	33	158	201	57	277	182*	346	73	16*	294	1737*
Mean	119	86	143	147	216	148	153	146	159	221	194	160	1892
Size	12	11	11	9	9	14	13	13	12	12	14	14	12

Note:
(1) Figure with * is not complete monthly rain but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A31 MONTHLY RAINFALL AT NABAWAN (5164001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1970	**	**	125*	174	419	201	101	345	79	237	259	146	2,086*
1971	174	290	199	75	245	**	109	442	172	240	377	**	2,323*
1972	157	131	342	145	281	180	8	388	316	573	434	388	3,343
1973	101	30	75	336	153	141	43	135	**	246	285	173	1,717*
1974	34	201	94	113	280	227	253	173	161	216	209	172	2,132
1975	256	175	150	137	392	64	142	228	375	162	201	343	2,624
1976	156	193	261	286	102	61	113	**	**	**	**	**	1,171*
1977	**	**	**	**	**	**	335	171	61	370	351	204	1,492*
1978	243	50	53	258	256	355	259	50	111	**	233	88	1,953*
1979	70	78	183	108	173	407	231	131	385	232	331	182	2,510
1980	217	94	259	188	196	221	185	246	96	225	398	260	2,583
1981	491	194	65	102	370	190	163	121	151	231	193	120	2,391
1982	149	184	39	264	**	109	81	336	59	93	120	146	1,579*
1983	39	24	25	46	60	86	127	154	91	65	116	119	951
1984	129	111	130	121	172	90	**	52	174	29	113	141	1,261*
Mean	170	135	144	168	238	179	153	212	171	225	258	191	2,246
Size	13	13	13	14	13	13	14	14	13	13	14	13	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A32 MONTHLY RAINFALL AT MELALAP ESTATE (5260001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1960	150	66	62	146	88	89	155	93	120	296	124	158	1,547
1961	64	130	202	89	86	224	112	116	51	153	62	135	1,423
1962	285	144	163	178	167	169	79	93	258	109	213	162	2,021
1963	245	156	128	23	189	43	79	82	88	103	214	199	1,547
1964	76	99	195	187	267	124	143	38	165	88	183	75	1,640
1965	159	77	210	194	235	160	101	110	59	158	112	169	1,742
1966	73	97	108	107	128	148	72	88	68	174	86	181	1,331
1967	133	140	159	114	124	82	54	54	134	148	76	91	1,308
1968	145	72	148	108	283	105	102	119	102	284	55	126	1,648
1969	96	90	120	55	102	133	99	208	37	145	124	151	1,358
1970	144	31	147	131	326	109	169	71	137	227	98	128	1,717
1971	107	366	52	74	117	62	63	366	57	180	315	181	1,940
1972	179	158	124	128	52	213	15	90	58	43	135	42	1,235
1973	9	8	116	257	195	238	117	17	288	118	152	175	1,689
1974	140	223	56	155	255	294	52	120	231	207	94	225	2,053
1975	216	74	94	98	141	115	177	85	225	103	76	311	1,715
1976	199	93	106	113	130	62	50	84	72	169	115	103	1,295
1977	185	**	145	157	97	188	82	84	62	46	90	162	1,296*
1978	**	**	**	**	**	**	**	**	**	**	**	**	**
1979	**	**	**	**	**	**	**	**	**	**	**	**	**
1980	104	84	141	70	74	162	114	70	67	**	98	**	984*
1981	357	49	115	45	114	41	103	**	215	127	154	103	1,424*
1982	107	95	37	79	73	41	42	66	72	104	89	87	891
1983	43	11	24	5	62	108	127	208	188	50	79	216	1,122
Mean	146	108	121	114	150	132	96	108	125	144	125	151	1,520
Size	22	21	22	22	22	22	22	21	22	21	22	21	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A33 MONTHLY RAINFALL AT BIAH SCHEME (5261001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1967	**	**	**	172	123	57	104	67	236	95	89	140	1,081*
1968	203	14	368	164	354	156	106	84	174	171	104	115	2,012
1969	66	34	215	150	86	112	92	216	36	140	195	112	1,453
1970	199	14	**	114	261	142	134	**	114	**	194	259	1,429*
1971	**	**	**	**	**	**	**	**	**	**	**	**	**
1972	**	90	146	216	131	165	17	95	**	159	152	**	1,172*
1973	**	**	85	139	99	121	179	124	340	181	**	181	1,449*
1974	95	411	70	99	131	160	98	152	363	155	115	130	1,979
1975	150	116	96	135	208	105	177	155	211	65	210	**	1,628*
1976	180	**	166	84	90	70	231	136	79	293	189	116	1,634*
1977	113	246	213	204	249	264	123	75	41	219	220	237	2,204
1978	99	139	10	137	202	111	211	102	148	151	104	169	1,582
1979	45	76	266	80	159	238	149	153	172	260	124	97	1,818
1980	146	10	236	164	207	138	11	2	97	163	194	**	1,368*
1981	459	**	51	99	81	157	**	397	**	**	**	**	1,244*
Mean	159	115	160	140	170	142	126	135	168	171	158	155	1,799
Size	11	10	12	14	14	14	13	13	12	12	12	10	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A34 MONTHLY RAINFALL AT KENINGAU (5361001)(1/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1918	351	143	208	248	167	38	16	124	113	215	164	198	1,985
1919	46	56	179	136	253	21	142	25	117	170	74	122	1,341
1920	190	69	100	192	91	81	17	76	174	256	180	190	1,616
1921	73	269	131	98	199	171	123	24	77	188	101	90	1,544
1922	186	119	151	84	120	187	25	52	140	223	76	135	1,498
1923	155	115	55	128	77	61	102	44	169	82	94	65	1,147
1924	183	87	197	243	354	154	127	151	223	107	124	37	1,987
1925	328	215	363	258	81	74	61	107	259	127	199	159	2,231
1926	329	24	40	164	155	57	94	42	327	151	182	257	1,822
1927	181	103	170	252	195	123	108	42	251	132	154	115	1,826
1928	128	66	148	133	85	174	146	129	45	81	113	101	1,349
1929	147	77	115	65	305	126	8	105	195	48	96	33	1,320
1930	79	12	158	116	173	129	9	88	63	207	121	80	1,235
1931	91	40	34	95	165	287	312	71	167	124	80	194	1,660
1932	163	161	175	192	331	158	150	174	141	186	107	122	2,060
1933	122	21	114	237	190	136	144	152	122	135	240	253	1,866
1934	121	39	296	188	35	147	119	50	95	153	176	106	1,525
1935	59	43	197	86	149	187	87	248	33	195	106	78	1,468
1936	236	31	115	220	176	111	99	77	177	174	65	58	1,539
1937	239	17	77	123	223	173	117	121	208	372	89	202	1,961
1938	81	97	208	142	277	105	150	228	98	47	71	54	1,558
1939	75	58	60	124	280	101	83	80	194	137	95	213	1,500
1940	85	92	96	186	138	139	100	129	44	43	94	35	1,181
1941	58	15	94	84	108	38	44	55	82	89	82	140	889
1942	107	23	125	168	179	195	73	153	65	70	184	228	1,570
1943	168	245	114	103	115	49	80	146	26	308	75	175	1,604
1944	116	101	69	95	262	220	61	90	140	109	226	84	1,573
1950	89	74	68	218	306	245	74	172	161	139	69	236	1,851
1951	182	319	277	219	185	159	115	75	155	236	158	125	2,205
1952	53	236	302	137	288	110	103	184	121	317	133	400	2,384
1953	172	345	113	225	387	173	140	62	253	385	256	62	2,573
1954	99	136	162	220	230	140	188	193	169	339	71	315	2,262
1955	471	183	92	121	148	114	172	131	172	147	136	171	2,058
1956	221	173	107	91	140	181	155	63	171	133	149	208	1,792
1957	146	135	184	71	223	105	190	119	69	154	28	60	1,484
1958	58	77	177	31	257	135	115	90	41	89	200	63	1,333
1959	12	19	99	170	129	119	122	107	108	92	150	114	1,241
1960	103	133	63	58	173	83	183	54	116	141	325	91	1,522

(to be continued)

Table A34 MONTHLY RAINFALL AT KENINGAU (5361001)(2/2)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1961	83	173	120	68	112	143	139	48	53	178	95	212	1,424
1962	327	156	107	264	263	201	29	248	101	55	110	243	2,105
1963	372	171	145	43	191	32	100	33	65	55	127	162	1,495
1964	26	288	228	156	218	174	218	19	141	147	142	139	1,896
1965	114	57	270	114	214	81	37	223	115	203	137	132	1,696
1966	50	42	182	115	106	137	187	116	111	175	49	174	1,444
1967	226	133	137	39	125	93	103	52	160	129	126	152	1,475
1968	196	60	150	190	245	155	184	86	126	274	106	117	1,888
1969	125	67	174	47	184	160	86	235	13	82	158	149	1,480
1970	152	45	140	119	251	134	74	101	130	210	163	164	1,683
1971	**	**	**	**	**	**	**	**	**	**	**	**	**
1972	151	109	150	253	111	163	50	120	**	**	134	39	1,280*
1973	27	3	95	165	172	199	119	142	394	80	**	136	1,532*
1974	105	234	109	151	195	148	84	118	**	133	137	137	1,551*
1975	175	135	116	54	319	134	128	128	148	64	115	245	1,762
1976	**	47	144	55	74	81	204	118	34	203	161	64	1,187*
1977	189	236	142	144	193	204	**	112	40	136	181	163	1,741*
1978	**	104	19	113	206	98	176	19	212	125	87	131	1,290*
1979	93	78	253	64	168	160	173	71	164	234	222	163	1,843
1980	172	52	168	131	**	175	118	**	56	130	202	314	1,518*
1981	371	128	72	109	144	58	111	102	215	175	205	182	1,872
1982	163	86	26	94	171	62	127	50	51	104	83	123	1,128
1983	88	24	14	3	96	76	185	325	251	56	131	214	1,461
Mean	157	111	131	111	179	128	128	115	128	140	145	158	1,633
Size	21	23	23	23	22	23	22	22	21	22	22	23	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

(4) Rainfall records for the period from 1918 to 1959 are based on monthly records and those for the period from 1960 to 1983 are based on daily records.

Table A35 MONTHLY RAINFALL AT KENINGAU METEOROLOGICAL STATION (5361002)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	190	67	122	207	243	146	87	84	113	247	127	147	1,779
1969	118*	37*	160	24	160	155	71	144	39	126	142	124	1,300*
1970	110*	17	130	145	190*	136	150	59	160	216	163	136	1,612*
1971	100	185	27	73	39	33	27	263	98	142	235	211	1,433
1972	140	101	134	206	94	117	39	104	85	93	122	26*	1,261*
1973	24	**	84	166	160	192	31*	134	254*	100	122*	104*	1,371*
1974	108	253*	101	73*	171	113*	57*	78*	97*	119*	131	69*	1,370*
1975	160	134	82*	55	287	118	115	120	151	55	112	237	1,626*
1976	209	50	120	45	68	46*	161	104*	32	146	146	132*	1,259*
1977	82	281	64	143*	161	175*	63*	93*	38	106	196	135	1,537*
1978	85	100	16	100	49*	84	135*	14	90*	107	75	113	967*
1979	84	62*	196*	53	155	49*	151	71	140	218	189	62	1,429*
1980	157	43	124	151	111	73	106	50	54	112	174*	276*	1,430*
1981	**	**	**	93*	141	63	119	101	206	12*	**	**	734*
1982	156	77	25	92	176	29	116	62	55	67	43	118	1,012
1983	72	13	11	1	86	82	175	300	125	**	118	197	1,177
1984	336	169	126	261	371	192	166	74	128	122	120	143	2,206
1985	49	76	49	96	159	**	**	**	**		**	**	429*
Mean	130	101	86	112	161	109	114	113	102	133	137	147	1,445
Size	15	13	15	15	16	13	13	14	14	14	14	11	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A36 MONTHLY RAINFALL AT TULID (5364001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1960	321	273	81	93	354	39	447	230	246	109	337	75	2,605
1961	131	68	84	209	46	52	89	160	375	117	99	323	1,752
1962	234	82	79	206	410	47	8	128	25	79	51	153	1,501
1963	339	427	71	22	389	38	196	**	10	165	13	58	1,727
1964	20	203	84	157	142	43	102	13	287	58	185	71	1,366
1965	71	84	363	142	253	91	5	284	46	188	137	100	1,765
1966	124	112	130	30	275	**	230	143	184	240	326	379	2,172
1967	386	142	214	141	143	89	231	46	205	69	174	80	1,920
1968	229	35	151	62	352	169	170	145	226	193	71	108	1,910
1969	120	3	78	136	152	155	163	178	199	180	225	170	1,760
1970	**	18	205	**	479	395	159	117	155	210	222	**	1,959*
1971	**	317	264	**	193	192	127	275	172	338	317	**	2,195*
1972	259	241	186	73	328	47	6	257	257	**	128	**	1,782*
1973	36	**	61	173	78	174	152	**	563	212	271	265	1,985*
1974	111	266	156	117	366	228	260	120	329	139	284	331	2,708
1975	176	137	124	99	305	166	157	196	265	46	306	161	2,139
1976	188	27	139	169	76	86	84	149	144	205	92	148	1,505
1977	166	336	49	188	191	199	224	89	32	280	370	110	2,235
1978	124	99	45	522	219	156	138	52	178	96	224	161	2,015
1979	40	28	290	81	349	140	220	125	262	273	120	88	2,016
1980	260	69	372	65	190	268	224	105	76	134	217	410	2,390
1981	461	143	72	157	242	114	154	44	195	199	218	167	2,167
1982	85	149	5	152	265	90	84	133	120	197	138	204	1,623
1983	20	53	55	**	161	81	219	322	281	136	306	229	1,861
Mean	177	144	140	143	248	133	160	151	201	168	201	181	2,047
Size	22	23	24	21	24	23	24	22	24	23	24	21	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A37 MONTHLY RAINFALL AT APIN APIN (5462001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1966	99	81	149	232	141	175	279	265	76	289	141	161	2,088
1967	196	123	198	96	126	151	80	60	198	154	179	167	1,728
1968	224	55	108	145	240	152	113	74	57	241	78	186	1,673
1969	14*	61	121	67	158	137	157	215	55	170	214	94	1,463*
1970	151	30	81	275	389	202	201	141	122	169	259	263	2,283
1971	125	230	46	79	120*	65	75	261	102*	122*	277	274	1,776*
1972	234	167	117	113	173	86	15	79*	118	184	208	80	1,574*
1973	2	**	120	186	181	256	87	128	462	158	152	190	1,922*
1974	55*	298*	97	175	280	209	127	233	241	255	179	96	2,245*
1975	198	128	162	40	254	100	177	93	230	84	143	218	1,827
1976	205*	53*	88	89*	116	61*	156	65*	59*	160*	307	161	1,520*
1977	140	365	187	83*	143	245*	126	142	114	209	189*	110	2,053*
1978	124	39	62	158	275	55*	200	33*	91*	26*	195*	**	1,258*
1979	14*	53*	17*	83	91*	60*	128*	198	252	204	191	191	1,482*
1980	157*	41	153*	30*	**	135	72*	115*	17*	79	202	391	1,392*
1981	390	136*	25*	118	239	110	170	44*	207	185	142	88	1,854*
1982	148	112	32	174	238	69	95	85	6*	**	44*	91	1,094*
1983	47	35	3	17	51	67	135	396	311	84	191	175	1,512
1984	369	205	77	361	453	253	92	25	114	72	51	179	2,251
1985	125	27	52	86	242	**	**	**	**	**	**	**	532*
Mean	171	113	100	141	218	144	134	165	183	169	182	173	1,893
Size	15	15	17	17	17	15	17	14	14	15	16	18	12

Note:

(1) Figures with a mark * lack data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A38 MONTHLY RAINFALL AT APIN APIN (5462003)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1961	167	299	63	211	78	158	185	71	81	168	142	268	1,890
1962	551	310	332	202	434	297	97	214	301	173	115	432	3,457
1963	687	263	349	435	140	29	206	54	148	105	156	224	2,796
1964	77	103	192	177	296	227	309	53	197	131	311	277	2,349
1965	120	145	186	109	269	100	11	242	109	61	87	139	1,577
1966	74	69	150	124	274	191	157	201	54	598	537	163	2,591
1967	159	131	112	79	168	175	99	33	93	140	**	229	1,417*
1968	191	131	102	158	187	142	116	**	**	**	**	**	1,026*
1969	162	113	126	50	186	110	151	199	53	**	**	**	1,148*
1970	**	34	**	246	**	201	**	**	**	176	**	254	910*
1971	**	**	**	**	**	**	**	**	**	**	**	**	**
1972	**	**	**	**	**	**	**	**	**	**	**	**	**
1973	**	**	141	131	209	241	92	**	419	124	**	**	1,356*
1974	**	**	**	180	282	210	132	230	**	248	194	104	1,581*
1975	197	118	109	92	231	106	169	73	205	76	160	194	1,730
1976	**	47	65	83	101	100	120	141	85	165	296	99	1,302*
1977	**	**	**	**	153	251	**	137	103	189	259	111	1,203*
1978	**	55	64	148	229	168	130	35	213	121	270	182	1,613*
1979	56	77	187	95	345	226	286	202	278	170	211	127	2,259
1980	**	**	**	**	**	127	55	43	8	27	143	475	878*
1981	345	139	72	113	207	124	151	51	45	200	146	40	1,632
1982	188	111	3	140	148	74	108	97	64	141	50	56*	1,180*
1983	54	32	2	62	42	95	127	408	313	106	218	196	1,654
Mean	216	128	133	149	209	160	142	138	154	164	206	207	2,005
Size	14	17	17	19	19	21	19	18	18	19	16	17	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A39 MONTHLY RAINFALL AT TAMBUNAN AGRICULTURAL STATION (5663001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1966	152	182	116	102	31*	100*	44*	106*	19*	160*	101*	112	1,224*
1967	29*	71*	80	53*	117*	121*	46*	49	99*	143*	25*	119*	952*
1968	180*	36*	**	144*	272*	100	185*	65	86	110*	**	**	1,177*
1969	11*	62	181	65	125	156	210	14*	51*	168	142	136*	1,321*
1970	39*	37	71	141	382	127*	190	184	71*	277*	149	293	1,961*
1971	92	197	75	68	96	96*	45*	305	168	229	173	64*	1,608*
1972	171	102	165	73	224	86	10	101	112	176	188	103	1,511
1973	**	6	54	144	192	127*	100*	113	393	92*	98*	201*	1,520*
1974	124	263	131	161	293	243	119	160	256	173*	183	94	2,200*
1975	169	143	233	61	248	91	237	162	234	89	133	311	2,111
1976	112*	89	79*	105*	159	**	31*	**	**	91*	287	96*	1,048*
1977	93	279	84	143	223	176*	116	152	125	314	98*	127*	1,930*
1978	75*	124	35	29*	**	**	**	**	**	**	**	**	263*
1979	**	13*	325	181	249	207	197	54*	258	232*	124	1*	1,839*
1980	39*	93	125	95	76*	54*	**	143*	17*	115*	39*	**	794*
Mean	134	131	129	112	219	147	154	143	204	195	172	183	1,924
Size	6	12	13	11	10	6	7	9	8	5	8	5	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A40 MONTHLY RAINFALL AT TAMBUNAN (MANUAL)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1918	371	211	68	268	282	224	41	130	120	174	266	171	2,326
1919	23	6	231	174	297	67	144	16	131	145	179	136	1,549
1920	215	66	62	136	227	170	26	70	215	170	143	68	1,568
1921	81	227	135	82	223	156	134	146	147	189	103	83	1,706
1922	166	165	201	94	114	116	63	70	147	249	149	112	1,646
1923	189	62	89	202	139	167	115	77	119	144	133	78	1,514
1924	123	104	118	276	330	120	103	111	158	119	118	67	1,747
1925	208	182	271	104	128	169	115	153	154	269	483	110	2,346
1926	96	22	62	261	152	213	97	93	276	229	181	265	1,947
1927	226	75	277	181	240	149	133	92	284	123	120	299	2,199
1930	69	15	105	160	216	226	4	163	59	183	172	119	1,491
1931	70	15	103	87	206	206	194	88	225	141	203	88	1,626
1932	137	177	171	288	327	164	136	141	172	156	225	204	2,298
1933	210	64	106	251	201	218	149	157	245	152	130	152	2,035
1934	264	60	309	269	77	195	112	140	82	231	179	186	2,104
1935	18	35	192	69	147	227	192	132	53	176	149	153	1,543
1936	146	71	150	245	191	182	155	148	162	248	151	136	1,985
1937	288	27	119	107	165	231	129	73	169	224	137	217	1,886
1938	100	64	252	164	260	130	185	160	124	126	116	70	1,751
1939	79	65	162	99	152	132	57	83	174	148	143	248	1,542
1940	170	150	97	175	142	223	77	147	117	107	181	118	1,704
1950	140	58	190	330	178	280	180	208	135	120	154	204	2,177
1951	131	164	104	181	232	87	165	107	206	192	213	204	1,986
1952	35	120	134	271	247	154	73	94	185	160	143	213	1,829
1953	127	178	137	211	178	199	158	131	190	219	137	77	1,942
1954	85	107	125	204	202	341	207	203	171	161	105	98	2,009
1955	24	114	45	150	231	286	164	198	203	177	203	139	1,934
1956	130	82	85	298	287	98	103	129	138	138	289	261	2,038
1957	244	69	141	202	283	276	349	110	132	263	98	127	2,294
1958	60	86	73	40	308	167	125	223	83	126	255	95	1,641
1959	30	30	90	88	208	229	117	84	172	93	264	120	1,525
1960	119	177	121	125	277	116	162	72	212	151	194	116	1,842
1961	82	78	100	142	134	181	165	61	91	86	134	144	1,398
1962	252	92	229	104	310	187	70	133	126	118	154	220	1,995
1963	411	180	153	66	176	65	143	105	54	165	89	234	1,841
1964	17	73	127	144	212	138	184	65	200	144	117	107	1,528
1965	50	184	223	111	166	79	87	111	85	94	96	100	1,386
1966	84	160	164	201	130	219	134	246	38	226	148	100	1,850
1967	109	96	147	136	195	95	60	38	58	89	53	128	1,204
Mean	138	100	145	172	209	176	128	121	149	165	167	148	1,819
Size	39	39	39	39	39	39	39	39	39	39	39	39	12

Note: Mean annual rainfall is computed as the sum of mean monthly rainfall.

Table A41 MONTHLY RAINFALL AT SUNSURON AGRICULTURAL STATION (5763001)

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1965	108	183	230	113	149	145	83	136	126	103	139	110	1,626
1966	**	91	169	95	132	189	140	227	79	349	159	136	1,765*
1967	125	107	182	126	220	92	149	64	219	185	169	103	1,741
1968	192	32	112	211	247	129	223	104	112	236	89	109	1,794
1969	112	40	167	95	322	108	179	214	68	198	118	147	1,769
1970	269	13	116	161	245	164	112	154	213	274	168	212	2,103
1971	112	213	115	91	86	94	67	266	271	237	158	168	1,878
1972	98	96	135	139	211	95	28	64	124	247	190	41	1,470
1973	17	**	78	182	132	130	**	**	**	149	131	106	925*
1974	211	242	140	8	275	197	193	133	341	342	200	87	2,367
1975	191	134	192	33	203	76	114	114	298	133	196	317	2,000
1976	255	107	67	127	117	159	109	107	126	218	175	227	1,794
1977	174	195	88	135	205	186	217	201	204	93	284	144	2,124
1978	142	145	22	328	165	216	125	83	246	150	169	78	1,869
1979	39	33	124	165	156	209	205	158	**	277	146	188	1,699*
1980	78	109	124	221	178	111	153	136	62	216	217	262	1,866
1981	210	34	45	86	280	53	119	76	124	209	253	43	1,530
1982	157	178	91	231	201	29	212	209	152	61	118	96	1,734
1983	22	19	23	47	210	236	304	290	281	93	220	242	1,985
1984	**	75	84	300	280	52	46	158	208	197	76	153	1,628*
Mean	139	108	115	145	201	133	146	152	181	198	169	148	1,836
Size	18	19	20	20	20	20	19	19	18	20	20	20	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A42 MONTHLY RAINFALL AT PANGI DAMSITE

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1981	**	**	**	**	**	**	**	**	**	**	**	49*	49*
1982	91	223	107	182	375	85	98	215	4*	**	**	**	1,379*
Mean	91	223	107	182	375	85	98	215	*	*	*	*	1,376*
Size	1	1	1	1	1	1	1	1	*	*	*	*	8

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A43 MONTHLY RAINFALL AT MINI SECRETIAT TENOM

(Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1983	**	**	**	**	**	110	148	164	161	163	158	130	1,033*
1984	220	139	74	281	114	395	123	183	189	206	91	292	2,305
1985	63	104	50	134*	**	**	**	**	**	**	**	**	351*
Mean	142	121	62	281	114	252	135	174	175	184	125	211	1,975
Size	2	2	2	1	1	2	2	2	2	2	2	2	12

Note:

(1) Figure with * is not complete monthly rain but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual rain is computed as a sum of the mean monthly rainfalls.

Table A44 NUMBER OF RAINY DAYS AT KENINGAU METEOROLOGICAL STATION (53611002)

(Unit: day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	15	5	9	11	24	21	16	18	15	24	11	13	182
1969	8*	6*	14	5	19	14	13	9	9	15	19	18	149*
1970	13*	4	11	17	17*	20	17	15	22	21	18	18	193*
1971	19	22	5	8	11	11	10	22	12	21	22	25	188
1972	14	17	19	16	20	15	3	13	13	10	22	5*	167*
1973	4	0	5	15	23	16	6*	14	20*	19	21*	15*	158*
1974	14	21	14	11*	17	15*	9*	11*	14*	17*	17	9*	169*
1975	17	14	14	13	22	13	22	13	22	6	19	23	198
1976	22	10	16	13	8	6*	14	11*	6	25	13	21*	165*
1977	15	23	18	12*	11	24*	14*	13*	9	21	24	21	205*
1978	12	6	6	13	10*	15	18*	4	10*	12	20	18	144*
1979	9	9*	10*	13	16	15*	20	8	21	23	21	7	172*
1980	14	9	16	13	14	6	9	17	10	18	20	19*	165*
1981	-	-	-	9*	19	16	12	4	18	4*	-	-	82*
1982	13	9	4	15	18	8	10	15	6	10	7	13	128
1983	9	5	1	1	11	9	15	16	9	0	16	22	114
1984	27	22	18	21	27	18	20	10	16	22	16	18	235
1985	10	11	11	16	16	-	-	-	-	-	-	-	64*
Mean	13.8	11.4	11.2	12.3	16.8	14.2	13.4	12.5	13.6	15.8	17.9	16.6	159.9

Table A45 MAXIMUM DAILY RAINFALL RECORDED IN PADAS BASIN

(Unit: mm)

Year	Kemabang 4959001 (1)	Kg. Sook 5163002 (2)	Keningau M.S. 5361002 (3)	Apin Apin 5462001 (4)	Tambunan A.S. 5663001 (5)	Ulu Tomani 4358001 (6)	Batu Bajau 5059001 (7)	Sapong E. 5059002 (8)	Nabawan 5164001 (9)	Melalap E. 5260001 (10)	Biah Scheme 5261001 (11)	Keningau 5364001 (12)	Tulid 5364001 (13)	Apin Apin 5462003 (14)	Sunsuron A.S. 5763001 (15)
1960	-	-	-	-	-	-	-	99	-	59	-	69	89	-	-
1961	-	-	-	-	-	-	-	68	-	67	-	90	142	86	-
1962	-	-	-	-	-	-	-	57	-	69	-	111	89	91	-
1963	-	-	-	-	-	-	-	69	-	152	-	67	89	156	-
1964	-	-	-	-	-	72	-	62	-	78	-	110	76	90	-
1965	52	103	-	-	-	67	-	93	-	100	-	127	69	44	90
1966	97	67	-	98	121	109	65	50	-	60	-	84	97	109	74
1967	38	83	-	66	38	53	57	53	-	52	83	47	76	51	62
1968	59	87	63	54	52	48	46	58	-	98	82	82	76	97	57
1969	73	70	62	67	89	41	97	117	-	87	67	62	91	69	78
1970	117	124	63	91	69	76	97	107	83	59	55	60	89	104	63
1971	96	76	68	60	43	76	41	84	93	86	0	0	94	0	58
1972	95	82	51	82	44	51	51	39	162	56	112	100	70	0	58
1973	62	58	68	89	74	61	37	152	110	88	66	64	106	83	48
1974	46	72	64	69	64	66	94	112	84	78	74	58	112	57	74
1975	60	95	85	70	73	48	60	70	91	120	61	86	77	75	51
1976	56	89	78	76	48	33	49	61	62	53	61	113	94	70	25
1977	59	86	70	81	96	26	86	74	95	87	61	82	128	62	46
1978	38	67	50	89	33	38	55	49	81	0	61	67	154	86	25
1979	69	73	116	101	87	36	68	114	72	0	51	135	103	107	66
1980	74	122	66	76	56	36	54	46	117	43	75	67	96	90	38
1981	143	129	73	65	-	-	52	75	65	94	109	60	117	55	33
1982	72	79	57	51	-	-	53	69	125	51	-	57	84	56	39
1983	73	87	60	114	-	-	48	81	31	49	-	60	85	120	41
1984	45	-	81	90	-	-	54	-	49	-	-	-	-	-	39
1985	-	-	57	80	-	-	43	-	-	-	-	-	-	-	-
Max.	143	129	116	114	121	109	97	152	162	152	112	135	154	156	90
Size	20	19	18	20	15	17	20	24	15	24	15	24	24	23	20

Table A46 PROBABLE DAILY RAINFALL OF PADAS BASIN

(Unit: mm)

Return Period	Kemabong 4959001	Kg. Sook 5163002	Keningau M.S. 5361002	Apin Apin 5462001	Tambunan A.S. 5663001	Ulu Tomani 4358001	Batu Bajau 5059001	Sapong E. 5059002	Nabawan 5164001	Melalap E. 5260001	Biah Scheme 5261001	Keningau 5364001	Tulid 5364001	Apin Apin 5462003	Sunsuron A.S. 5763001
(yr)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
100	166	153	124	125	149	125	129	172	201	168	140	165	171	166	116
50	147	141	112	118	134	113	114	154	188	150	126	149	156	153	105
30	134	132	104	113	123	103	104	141	171	137	116	138	146	143	97
20	123	125	98	108	114	96	97	131	159	127	109	128	137	134	91
10	107	113	87	101	100	83	85	114	138	111	97	113	124	120	80
5	89	101	78	92	84	70	73	97	115	95	85	98	111	104	68
2	66	83	65	77	62	51	56	72	82	71	69	76	91	80	50

Table A47 RECORDED MAXIMUM DEPTH - DURATION IN AND AROUND SOOK BASIN (FOR DURATIONS FROM 1 DAY TO 6 WEEKS)

Station	Duration (day)											
	1	2	3	4	5	6	7	14	21	28	35	42
Ulu Tomani (4358001)	109	147	178	211	234	264	279	447	566	673	762	858
Kamabong (4959001)	143	144	146	154	167	185	226	270	319	372	419	535
Batu Bajau (5959001)	97	133	145	151	168	172	173	247	318	409	458	543
Sapong E. (5059002)	152	180	188	198	219	220	253	356	411	513	551	617
Kg. Sook (5163002)	129	159	211	225	225	282	286	429	488	522	570	614
Nabawan (5164001)	162	200	201	230	235	247	252	318	453	575	697	799
Melalap E. (5260001)	152	177	178	193	211	218	242	312	366	412	436	494
Biah Scheme (5261001)	112	152	224	301	326	326	326	331	373	442	490	612
Keningau (5361001)	135	143	170	179	197	207	215	275	316	394	493	518
Keningau M.S. (5361002)	116	122	166	170	172	176	181	238	306	393	470	529
Tulid (5364001)	154	209	209	246	284	302	302	392	508	578	654	687
Apin Apin (5462001)	114	178	178	178	180	219	219	284	367	515	561	648
Apin Apin (5462003)	156	253	306	335	387	424	434	482	613	669	751	956
Tambunen (5663001)	121	146	168	169	172	173	173	260	329	389	460	504
Sunsuron A.S. (5763001)	90	113	136	145	160	164	169	257	323	397	473	545
Max.	162	253	306	335	387	424	434	482	613	669	751	956

Table A48 RECORDED MAXIMUM DEPTH - DURATION IN AND AROUND SOOK BASIN
(FOR DURATIONS FROM 1 HOUR TO 24 HOURS)

Duration (hr)	Maximum Point Depth (Unit: mm)				
	Kemabong 4959001	Kg. Sook 5163002	Keningau M.S. 5361002	Apin Apin 5452001	Tembunan A.S. 5663001
1.	64	58	39	19	42
2.	104	74	59	25	42
3.	124	86	74	27	42
4.	131	119	78	39	42
5.	135	142	79	40	42
6.	135	146	83	41	46
7.	135	147	85	41	53
8.	135	147	85	42	58
9.	138	147	85	42	61
10.	140	147	85	42	61
11.	140	147	85	42	61
12.	142	147	85	43	61
13.	142	147	85	49	61
14.	142	147	85	55	61
15.	142	147	85	64	61
16.	142	147	85	66	61
17.	142	147	85	67	61
18.	142	147	85	74	61
19.	142	147	85	75	61
20.	142	147	85	75	61
21.	142	147	85	76	61
22.	142	147	85	76	61
23.	142	147	85	76	61
24.	142	157	85	76	61

Table A49 MEAN DEPTH - DURATION PATTERN FOR SOOK BASIN
(FOR DURATION FROM 1 HOUR TO 24 HOURS)

(Unit: %)

Duration (hr)	Name of Station					Mean
	Kg. Sook	Keningau	Apin Apin	Kemabong	Tambunan	
0	0	0	0	0	0	0
1	40.3	46.2	47.3	51.3	52.0	47.4
2	56.3	65.7	59.3	67.0	62.5	62.2
3	64.8	73.8	64.0	73.3	68.5	68.9
4	72.5	78.7	71.8	79.5	75.3	75.6
5	79.8	82.8	73.0	85.0	82.0	80.5
6	83.8	86.0	73.8	87.3	88.0	83.8
7	85.2	86.3	"	87.5	91.5	84.9
8	91.2	87.5	74.5	91.6	93.9	87.7
9	93.4	88.3	76.8	98.1	96.9	90.7
10	95.4	"	77.8	98.9	98.7	91.8
11	95.9	"	"	99.3	99.5	92.2
12	"	"	82.2	99.6	"	93.1
13	"	89.0	84.7	"	"	93.7
14	"	"	86.7	100.0	"	94.2
15	"	"	89.7	"	"	94.8
16	"	"	91.8	"	"	95.2
17	"	"	93.3	"	"	95.5
18	"	"	95.5	"	"	96.0
19	96.2	93.2	96.5	"	"	97.1
20	"	98.0	98.2	"	100.0	98.5
21	"	99.5	98.7	"	"	98.9
22	"	"	99.3	"	"	99.0
23	"	99.8	99.7	"	"	99.1
24	100.0	100.0	100.0	100.0	100.0	100.0

Table A50 AREA REDUCTION FACTOR FOR STORM No. 70-4

Data	Point Rainfall at Kg.Sook	Tulid	Nabawan	Kemabong	Keningau	Mean (mm)	Max.Point Rain (mm)	A.R.F.
27	0	0	5.8	0	0	1.2	5.8	-
28	3.0	0	0	0	1.3	0.9	3.0	-
29	0	0	0	0	0.5	0.1	0.5	-
30	0	0	0	0	0	0	0	-
1	107.0	0	49.3	7.0	0	32.7	107.0	0.31
2	20.0	0	4.8	12.0	49.0	17.2	49.0	0.35
3	3.0	0	9.1	21.0	19.8	10.6	21.0	0.50
4	8.0	0	21.1	7.0	15.5	10.3	21.1	0.49
5	0	10.2	0	7.0	28.2	9.1	28.2	0.32
6	1.0	17.8	0	4.0	0	4.6	17.8	0.26
7	26.0	22.9	28.2	7.0	0.5	16.9	28.2	0.33
8	7.0	33.0	13.0	0	1.3	10.9	33.0	0.33
9	9.0	20.3	0	0	0	5.9	20.3	0.29
10	41.0	0	0	4.0	10.9	11.2	41.0	0.27
							Mean	0.37

Duration (day)								
2	127.0	0	54.1	19.0	49.0	49.8	127.0	0.39
3	130.0	0	63.2	40.0	68.8	60.4	130.0	0.46
4	138.0	0	84.3	47.0	84.3	70.7	138.0	0.51
5	138.0	10.2	84.3	54.0	112.5	79.8	138.0	0.58
6	139.0	28.0	84.3	58.0	112.5	84.4	139.0	0.61
7	165.0	50.9	112.5	65.0	113.0	101.3	165.0	0.61
14	225.0	104.2	131.3	69.0	127.0	131.3	225.0	0.58

Table A51 AREA REDUCTION FACTOR FOR STORM No. 81-1

Data	Point Rainfall at Kg.Sook	Tulid	Nabawan	Kemabong	Keningau	Mean (mm)	Max.Point Rain (mm)	A.R.F.
6	25.5	7.1	35.8	5.1	6.4	16.0	35.8	0.45
7	0.5	7.6	22.4	12.7	2.0	9.0	22.4	0.40
8	17.5	8.1	11.4	10.2	23.1	14.1	23.1	0.61
9	5.5	4.3	9.1	1.5	16.0	7.3	16.0	0.46
10	37.5	0	8.9	1.0	16.5	12.8	37.5	0.34
11	48.0	27.9	8.4	10.2	26.7	24.2	48.0	0.51
12	17.5	88.9	52.1	5.1	11.4	35.0	88.9	0.39
13	21.0	32.5	38.9	7.6	29.6	25.9	38.9	0.67
14	5.5	16.0	36.3	5.1	3.6	13.3	36.3	0.37
15	3.0	5.6	11.9	17.8	5.6	8.8	17.8	0.49
16	6.8	12.4	1.8	109.2	25.4	31.1	109.2	0.28
17	9.7	9.7	5.1	63.5	8.1	19.2	63.5	0.30
18	0	20.3	22.1	2.5	0	9.0	22.1	0.41
19	0	17.8	0	15.2	0.5	6.7	17.8	0.38
						Mean		0.43

Duration (day)								
2	38.5	121.4	91.0	12.7	41.0	60.9	121.4	0.50
3	86.5	149.3	99.4	22.9	67.7	85.2	149.3	0.57
4	92.0	165.3	135.7	28.0	71.3	98.5	165.3	0.60
5	129.5	165.3	144.6	29.0	87.8	111.2	165.3	0.67
6	132.5	170.9	156.5	46.8	93.4	120.0	170.9	0.70
7	139.3	183.3	158.3	156.0	118.8	151.1	183.3	0.82
14	198.0	258.2	264.2	266.7	174.9	232.4	266.7	0.87

Table A52 AREA REDUCTION FACTOR FOR STORM No. 81-5

Data	Point Rainfall at Kg.Sook	Tulid	Nabawan	Kemabong	Keningau	Mean (mm)	Max.Point Rain (mm)	A.R.F.
22	129.0	58.9	7.1	8.0	60.1	52.6	129.0	0.41
23	3.0	6.6	26.9	0	1.0	7.5	26.9	0.28
24	2.5	0	9.1	18.0	0	5.9	18.0	0.33
25	21.5	0	6.3	67.5	36.0	26.3	67.5	0.39
26	27.0	6.6	11.4	4.0	11.0	12.0	27.0	0.44
27	15.5	12.2	12.7	2.0	0	8.5	15.5	0.55
28	6.0	19.8	39.6	8.5	5.0	15.8	29.6	0.40
29	0	0	0.8	0	0	0.16	0.8	-
30	3.0	0	0.5	1.0	0	0.9	3.0	-
31	39.5	0	0	142.5	43.0	45.0	142.5	0.32
1	43.0	0	5.6	1.5	5.5	11.1	43.0	0.26
2	108.5	22.3	2.3	1.5	2.0	27.3	108.5	0.25
3	9.5	0	0	8.5	0	3.6	9.5	0.38
4	17.0	10.2	16.5	6.5	79.0	22.5	79.0	0.29
							Mean	0.36

Duration (day)								
2	82.5	0	5.6	144.0	48.5	56.1	144.0	0.39
3	191.0	22.3	7.9	145.5	50.5	83.4	191.0	0.44
4	200.5	22.3	7.9	154.0	50.5	87.0	200.5	0.43
5	217.5	32.5	24.4	160.5	129.5	112.9	217.5	0.52
6	220.5	32.5	24.9	161.5	129.5	113.8	220.5	0.52
7	220.5	32.5	25.7	161.5	129.5	113.9	220.5	0.52
14	425.0	136.6	138.8	269.5	242.6	242.5	425.0	0.57

Table A53 DAILY RAINFALL DURING THE LARGEST FLOODS

(Unit: mm)

Station Name	Recorded Maximum Flood in January 1981			
	11	12	13	14
Kemabong	-	-	-	-
Kg. Sook	48.0	17.5	21.0	3.5
Keningau M.S.	-	-	-	-
Apin Apin	56.7	18.1	42.6	6.0
Tambunan A.S.	-	-	-	-
Batu Bajau	10.9	9.4	6.6	11.4
Sapong E.	35.8	4.1	12.2	47.7
Nabawan	8.4	52.1	38.9	36.3
Melalap E.	12.4	16.5	52.6	1.5
Biah Scheme	10.2	5.1	7.6	5.1
Keningau	26.7	11.4	29.6	3.6
Tulid	27.9	88.9	32.5	16.0
Apin Apin	10.1	35.1	55.0	20.0
Sunsuron A.S.	24.1	13.2	24.4	8.9
Mean	24.7	24.7	29.4	14.7

Station Name	Second Maximum Flood in December 1977			
	9	10	11	12
Kemabong	0.4	13.9	18.8	4.3
Kg. Sook	16.5	0	0.5	0
Keningau M.S.	7.8	0.5	3.1	2.8
Apin Apin	19.2	0	5.8	17.1
Tambunan A.S.	2.4	0.3	7.9	4.4
Batu Bajau	0	0	0	0
Sapong E.	15.2	37.6	26.4	0
Nabawan	0	0	7.6	0
Melalap E.	9.4	6.1	33.5	0
Biah Scheme	5.8	0	20.3	22.9
Keningau	12.4	8.9	0	4.6
Tulid	2.0	18.8	0	0
Apin Apin	1.8	15.7	0	6.3
Sunsuron A.S.	14.2	0	0	16.8
Mean	7.7	7.3	8.9	5.7

Table A54 RESULTS OF DISCHARGE MEASUREMENT
AT TENOM LAMA ON PADAS RIVER (1/2)

No.	Year	Month	Day	Gauge Height (m)	Discharge	Remarks
1	1980	1	10	2.83	155	
2			10	2.85	177	
3			23	3.30	233	
4			23	3.34	225	
5		2	27	2.19	93	
6			28	2.13	83	
7		3	11	2.62	245	
8			26	3.72	298	
9			26	2.75	298	
10		4	9	2.75	186	
11		5	15	3.26	210	
12			15	3.26	216	
13		6	26	3.14	218	
14			26	3.28	232	
15		7	16	2.28	90	
16			16	2.26	87	
17			30	4.74	487	
18			30	4.79	496	
19		8	27	4.12	347	
20			27	4.00	320	
21		9	17	1.88	62	
22			17	1.86	61	
23			18	1.73	49	
24		11	26	4.86	514	

source of data: DID Kota Kinabalu

Table A54 RESULTS OF DISCHARGE MEASUREMENT
AT TENOM LAMA ON PADAS RIVER (2/2)

No.	Year	Month	Day	Gauge Height (m)	Discharge	Remarks
1	1981	5	22	2.07	179	
2			22	2.41	223	
3		6	26	1.78	137	
4			26	1.74	132	
5		10	1	2.30	96	
6			1	2.29	90	
7			22	2.44	113	
8			22	2.44	116	
9		12	9	4.69	483	
1	1982	4	1	1.56	41	
2			1	1.56	36	
3			2	1.64	43	
4			3	1.65	45	
5			3	1.65	45	
6			14	2.17	89	
7			14	2.17	87	
8		5	25	3.81	316	
9			25	3.82	318	

Table A55 HISTORICAL ANNUAL RUNOFF OF PADAS RIVER SYSTEM

Year	Annual Flow (m^3/s)				
	Biah	Ansip	Kemabong	Tenom Lama	Residual
1968	19.8	-	110	-	-
1969	16.3	38	95	147	-2.3
1970	30.0	68	119	234	17.0
1971	29.0	66	114	225	16.0
1972	25.6	47	103	189	13.4
1973	30.1	43	117	205	14.9
1974	34.1	79	111	230	5.9
1975	32.8	61	121	216	1.2
1976	20.9	36	114	185	14.1
1977	33.7	59	184	287	10.3
1978	13.8	38	92	141	-2.8
1979	28.3	47	137	236	23.7
1980	27.8	42	104	204	30.2
1981	34.5	44	138	228	11.5
1982	17.8	32	91	147	6.2
1983	27.9	53	101	166	-15.9
1984	77.2	120	187	331	-53.2
Size	17	16	17	16	16
Mean	29.4	55	120	210	5.6
S.D.	13.5	21.2	27.2	49.1	18.6

Note: S.D. means standard deviation.

Table A56 MONTHLY RUNOFF OF PADAS RIVER AT KEMABONG (4959401)

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	49*	39	50*	***	155*	114*	***	89*	156	162	101	***	110*
1969	33*	57	103	67	98	109	116	71	52	106	150	135*	95*
1970	213*	45	48	75*	***	***	93*	148	107*	166	159	92*	119*
1971	101	284	111	55	67	118*	27*	157	114	46*	137*	131	114*
1972	151	103	84	137	125*	57*	21	54	129	145	131*	116	103*
1973	19	12	30	143*	144	102	114*	62	356	145*	118*	174	117*
1974	133	172	77	134	116	110*	90	71*	32*	179*	85	94	111*
1975	183	33	123	74	149*	81	118*	78	228	51*	90*	206*	121*
1976	309	114*	135	121*	114	63*	37*	117*	39	114	174	72	114*
1977	135*	277*	201*	***	208*	213*	161*	122*	52*	***	202*	233	184*
1978	70*	103*	33	18*	***	130*	208	34*	***	***	57*	92	92*
1979	25*	33	130*	53	170	199	150	35*	253*	116	318	180*	137*
1980	139*	65	103	80	114	99	85	127	30*	***	***	259*	104*
1981	1,302*	76*	23	48	83*	54	44	11*	***	***	***	***	138*
1982	***	***	***	137*	171	71*	18*	52	32	93	66*	112*	91*
1983	20*	***	2*	1*	14*	31	120	213	136	71	169	201	101*
1984	261	135*	107*	314	292	341*	136*	46	114	179*	88*	161	187*
Mean	151	84	79	107	143	96	104	101	136	122	165	142	119
Size	7	10	11	9	9	7	8	10	10	8	7	9	12

Note:

(1) Figure with * is not complete monthly mean but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual is computed as a mean of the mean monthly data.

Table A57 MONTHLY RUNOFF OF PADAS RIVER AT TENOM LAMA (5159401)

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	***	***	***	***	***	***	***	***	***	314*	161	145	156*
1969	99*	79	123*	91	153	176	201	117	107	181	226	206	149*
1970	278	82	75	224	397*	336	177	246	206	282	274	235	231*
1971	160	451	249*	93*	158*	111	33*	363*	212	187	371*	318*	234*
1972	354*	226	172*	218*	229	119*	40	79	201	251	198	188	163*
1973	29*	16*	36*	213	217	153	168	120	626*	219*	391*	282*	206*
1974	150*	447	201	230	197*	197	205	157	236	345*	195	206	232*
1975	366	96	182*	***	***	***	212*	137*	***	103*	203	342*	218*
1976	473*	203	183	171	196	89	94	140	71	174*	289	132	170*
1977	228	371	298	406	311*	354	274	121*	55*	213*	258	480*	272*
1978	107*	61*	***	***	***	199*	265*	61	120	109	315*	153*	143*
1979	55	63*	179	84	245*	***	321*	118	269*	374*	553	458	247*
1980	270*	169*	104*	171	221	212	140	215	67*	150*	314*	422*	189*
1981	***	117*	19	40	37	56	77	56	118	183	409	224	121*
1982	158	216	71	160	285*	206	84	80	55	153	118	199	147*
1983	73	39	13*	6	19	61	166	329	329	147	347*	441*	155*
1984	510	356	276*	499	440	321	261	123	266	372	189*	364	345*
Mean	229	233	147	191	189	189	157	142	174	207	262	235	196
Size	8	11	7	12	8	12	12	13	11	9	11	10	12

Note:
(1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.
(4) Monthly runoff used for reservoir operation to determine an optimum scale of the Sook project is obtained as shown below by adjusting the monthly runoff shown above.

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	99	79	123	91	153	176	201	117	107	181	226	205	147
1970	278	82	75	224	397	336	177	246	206	282	274	235	234
1971	160	451	249	93	152	111	33	363	212	187	371	318	225
1972	354	226	172	218	229	119	40	79	201	251	198	183	189
1973	28	15	35	212	216	152	167	119	625	218	390	281	205
1974	150	447	200	230	197	197	205	157	226	345	195	206	230
1975	365	95	181	135	290	193	211	136	341	102	202	341	216
1976	473	203	183	171	196	89	94	140	71	174	289	132	185
1977	228	371	298	406	388	354	274	121	55	213	258	480	287
1978	107	61	52	55	195	199	265	61	120	109	315	153	141
1979	55	63	179	84	245	107	321	118	269	374	553	458	236
1980	270	169	93	171	221	212	140	215	67	150	314	422	204
1981	895	233	77	112	108	137	110	140	117	182	405	225	228
1982	158	217	71	160	268	205	85	80	56	154	117	198	147
1983	73	39	11	6	20	61	171	332	326	148	364	439	166
1984	510	356	274	492	443	321	260	123	266	372	187	365	331
Mean	263	194	142	179	232	186	172	159	204	215	291	290	210
Size	16	16	16	16	16	16	16	16	16	16	16	16	12

Table A58 MONTHLY RUNOFF OF PEGALAN RIVER AT ANSIP (5261401)

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	32*	14	17	12	31*	41	71	39	33	49	62	50	38*
1970	66	24	15	41	142*	146*	57	86*	44	58*	84	99*	68*
1971	47*	167*	57	27*	25*	30*	23*	61	57*	67	102	85	66*
1972	78	61	48	71	63*	31*	16	14	37	51	50	45	47*
1973	12	7	6	12	32	28	40	30	166*	64*	150*	77	43*
1974	81*	142*	***	50*	61*	75*	63*	60*	73*	93*	65	63*	79*
1975	37*	38	48*	***	103*	57	48*	39	99	95*	61*	71*	61*
1976	121*	42*	29	30	57*	25*	22*	23*	16	26*	55*	36	36*
1977	49	110	67	31	44	84	61	25*	32*	68*	63*	69*	59*
1978	25	22	***	20*	55	40*	34*	17	34	39	82	47	38*
1979	20*	14	29	23	48	66*	94	34	84	72*	***	85*	47*
1980	64*	57*	55	41	48	58	34	40	18	35	33*	***	42*
1981	***	68*	47*	32*	75*	32*	39*	23*	***	***	68*	50	44*
1982	44	47*	18	19	54	38*	22	25	16*	***	32*	38	32*
1983	13	9	8*	***	***	17*	31	68	117	51*	67*	111	53*
1984	168	114*	***	***	204*	***	87*	50*	83	147	77*	100	120*
Mean	57	33	34	31	47	54	47	37	57	65	74	64	50
Size	8	9	10	9	6	5	9	10	10	6	6	10	12

Note:

(1) Figure with * is not complete monthly mean but has lack of data.

(2) Mark ** shows no data at all for the period.

(3) Mean annual is computed as a mean of the mean monthly data.

Table A59 MONTHLY RUNOFF OF SOOK RIVER AT BIAH (5261402)

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	11*	9	13	28*	***	21*	17*	12	27	34	19	10	19*
1969	10*	5*	9	9	15	25	25	14	11	24*	17*	27*	15*
1970	17	7	7	10*	62*	50	35	37	18	39*	32	39	28*
1971	11*	83	40	10*	7*	9	3*	36*	25	12*	57*	46*	29*
1972	28*	24	27	40*	31	23	4*	7	17	33	25	41*	24*
1973	3*	1*	1*	8*	15*	12*	13	12	117	56	73*	44	33*
1974	28*	48*	32*	10*	59*	22	33	17	47*	43*	25	35	33*
1975	61	15*	16*	15*	63	48	21	17	43	27	25	38*	32*
1976	38	31	25	14*	28*	14*	8*	9	6	21*	37	11	21*
1977	21	45	38	27	30	49	55	11	5	20*	30	59*	32*
1978	12	12	5*	13	16*	23*	26	6	6	3*	23	15	13*
1979	5	4	15	5	17	52	40	11	45	32	77	27*	28*
1980	32*	23	32	35	35	33	11	21	5*	8	31	60	29*
1981	194*	25*	***	***	30*	22	13	6	10	17	54*	***	36*
1982	***	10*	6	9	39	20	7	8	8	19	23	45	18*
1983	8	5	3	2	4*	8*	22	49	58	16	72*	***	22*
1984	135*	81*	54	89	120*	153	59*	24*	48	64*	25*	67	76*
1985	22	22	14	13	30	17	11*	***	***	***	***	***	18*
Mean	23	24	22	22	33	40	25	16	30	27	32	36	27
Size	8	11	13	9	8	13	12	15	15	9	11	9	12

Note:
(1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.
(4) Monthly runoff used for pondage operation to determine an optimum scale of the Tenom Pangi Extension project is obtained as shown below by adjusting the monthly runoff shown above.

(Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	10.6	9.1	12.7	28.2	36.3	21.2	16.8	11.7	27.0	34.0	19.0	10.4	19.8
1969	10.2	5.5	8.8	8.9	15.6	25.7	25.3	14.4	11.3	24.2	17.7	28.2	16.3
1970	17.1	6.7	6.7	10.6	64.2	51.1	35.5	37.5	18.8	39.7	32.5	39.7	30.0
1971	11.1	85.0	40.6	10.5	7.4	9.4	2.7	37.2	25.1	12.0	58.9	47.5	29.0
1972	28.4	24.3	28.3	41.2	31.9	23.2	4.0	7.4	17.4	33.7	25.8	41.8	25.6
1973	2.7	0.4	1.1	6.9	14.8	12.5	13.8	12.0	120.0	57.4	74.8	45.0	30.1
1974	28.5	49.0	32.9	10.3	60.7	22.1	34.1	17.9	47.9	44.1	25.7	36.1	34.1
1975	63.1	15.3	15.9	15.3	64.9	43.8	21.2	17.1	44.3	27.4	25.7	39.0	32.8
1976	39.4	32.4	25.4	14.1	28.7	14.4	8.1	9.8	6.6	21.3	38.5	11.7	20.9
1977	21.6	46.0	39.6	28.1	31.0	50.4	58.7	11.5	4.8	20.7	31.1	61.0	33.7
1978	12.8	12.5	4.7	13.2	16.3	23.3	26.6	6.4	6.6	2.7	24.1	15.8	13.8
1979	5.6	4.0	16.0	4.7	17.8	53.9	40.6	11.1	46.3	32.5	79.5	28.0	28.3
1980	33.3	23.7	32.4	35.6	35.7	34.4	11.3	21.3	4.9	8.2	31.7	61.5	27.8
1981	195.0	24.9	4.2	8.9	29.5	21.2	12.7	5.6	10.1	17.2	54.3	30.6	34.5
1982	21.6	9.7	5.7	8.7	39.1	19.0	7.3	8.3	8.1	18.2	22.3	45.4	17.8
1983	7.5	5.0	3.0	1.4	3.3	8.1	22.1	49.0	58.0	15.3	72.5	89.4	27.9
1984	137.9	81.7	54.2	89.3	121.5	156.1	59.8	23.6	48.0	63.6	24.1	67.0	77.2
Mean	38.0	25.6	19.5	19.8	36.4	34.7	23.6	17.8	29.7	27.8	38.7	41.1	29.4
Size	17	17	17	17	17	17	17	17	17	17	17	17	12

Table A60 Generated Monthly Runoff Series of Padas River at Tenom Lama

(Unit: m^3/sec)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1952	65.2	179.5	332.9	261.9	326.3	204.3	89.3	96.0	171.6	230.7	148.0	469.4	214.6
1953	231.0	434.9	242.7	192.4	250.2	238.5	229.7	68.7	192.8	342.8	261.5	154.7	236.7
1954	63.2	72.7	77.2	343.0	242.5	322.1	201.4	183.7	223.6	325.1	188.6	346.3	215.8
1955	373.9	220.1	48.8	59.4	288.6	325.2	190.3	207.4	207.7	229.5	277.7	327.9	229.7
1956	251.9	159.8	141.0	132.8	214.2	212.0	145.8	118.2	209.9	231.8	349.0	440.4	217.2
1957	448.9	285.3	210.1	115.9	293.0	288.9	315.4	175.1	178.6	283.0	136.1	74.6	233.7
1958	149.8	97.2	65.0	46.8	353.7	302.4	206.8	224.3	151.9	179.2	477.6	162.7	201.4
1959	57.8	50.1	180.5	195.8	304.3	294.4	227.5	187.4	203.1	241.6	340.4	212.1	207.9
1960	195.2	240.2	91.0	85.0	229.8	154.7	283.6	148.5	177.6	264.7	306.2	253.8	202.5
1961	177.0	239.8	204.5	248.5	161.4	221.4	207.3	99.3	168.9	154.7	122.6	271.0	189.7
1962	375.1	205.7	226.8	283.9	352.1	311.9	95.4	143.0	195.2	99.0	133.5	246.1	222.3
1963	395.2	385.4	270.4	76.1	396.8	88.4	85.8	85.4	68.7	171.5	209.5	191.5	202.1
1964	58.5	183.0	181.6	298.9	345.6	256.2	265.0	111.7	286.8	124.9	227.9	131.4	206.0
1965	148.5	175.7	335.8	325.9	346.6	192.0	77.0	198.0	107.0	224.2	141.7	152.3	202.1
1966	81.4	81.1	140.1	157.7	290.1	282.7	188.5	167.7	119.4	294.9	270.4	268.7	195.2
1967	414.8	336.0	234.1	141.1	159.9	113.0	155.5	57.9	106.8	165.1	177.0	123.8	182.1
1968	237.5	113.7	192.0	182.1	321.5	205.1	136.8	102.0	135.2	359.7	127.9	209.1	193.6
1969	141.8	80.0	184.1	75.8	164.7	286.6	245.2	255.3	118.4	192.3	239.3	249.2	186.1
	(99.0)	(79.0)	(123.0)	(91.0)	(153.0)	(176.0)	(201.0)	(117.0)	(107.0)	(181.0)	(226.0)	(205.0)	(146.5)
1970	147.8	49.2	113.9	143.9	601.0	314.6	229.2	163.2	166.6	298.4	229.4	265.3	226.9
	(278.0)	(82.0)	(75.0)	(224.0)	(397.0)	(336.0)	(177.0)	(246.0)	(206.0)	(282.0)	(274.0)	(235.0)	(234.3)
1971	200.8	642.8	148.9	70.4	71.3	49.3	32.5	322.8	137.5	286.4	435.3	348.0	228.8
	(160.0)	(451.0)	(249.0)	(93.0)	(152.0)	(111.0)	(33.0)	(363.0)	(212.0)	(187.0)	(371.0)	(318.0)	(225.0)
1972	316.8	299.8	225.9	295.4	169.6	209.8	61.7	105.1	169.4	123.9	225.7	82.2	190.4
	(354.0)	(226.0)	(172.0)	(218.0)	(229.0)	(119.0)	(40.0)	(79.0)	(201.0)	(251.0)	(198.0)	(183.0)	(189.2)
1973	17.8	9.5	4.0	304.9	201.1	213.2	120.7	40.1	639.2	410.0	433.8	475.9	239.2
	(28.0)	(15.0)	(35.0)	(212.0)	(216.0)	(152.0)	(167.0)	(119.0)	(625.0)	(218.0)	(390.0)	(281.0)	(204.8)
1974	273.7	418.7	108.4	122.1	289.1	262.7	170.3	136.1	360.8	313.8	217.3	226.2	241.6
	(150.0)	(447.0)	(200.0)	(230.0)	(197.0)	(197.0)	(205.0)	(157.0)	(226.0)	(345.0)	(195.0)	(206.0)	(229.6)
1975	379.4	176.5	159.5	92.6	268.3	225.4	264.0	113.8	323.5	109.6	166.7	357.5	219.7
	(365.0)	(95.0)	(181.0)	(135.0)	(290.0)	(193.0)	(211.0)	(136.0)	(341.0)	(102.0)	(202.0)	(341.0)	(216.0)
1976	336.7	219.0	134.5	127.8	161.3	89.8	85.6	85.0	162.8	252.2	236.4	314.7	183.8
	(473.0)	(203.0)	(183.0)	(171.0)	(196.0)	(89.0)	(94.0)	(140.0)	(71.0)	(174.0)	(289.0)	(132.0)	(184.6)
1977	267.8	375.7	166.8	239.6	213.6	267.7	138.2	100.2	56.8	123.7	274.7	320.5	212.1
	(228.0)	(371.0)	(298.0)	(406.0)	(388.0)	(354.0)	(274.0)	(121.0)	(55.0)	(213.0)	(258.0)	(480.0)	(287.2)
1978	142.3	125.2	71.1	252.6	221.9	179.5	168.7	83.8	200.6	204.5	200.0	190.2	170.0
	(107.0)	(61.0)	(52.0)	(55.0)	(195.0)	(199.0)	(265.0)	(61.0)	(120.0)	(109.0)	(315.0)	(153.0)	(141.0)
1979	54.2	18.8	154.3	41.9	176.8	240.1	251.3	123.9	342.0	397.8	413.9	260.0	206.3
	(55.0)	(63.0)	(179.0)	(84.0)	(245.0)	(107.0)	(321.0)	(118.0)	(269.0)	(374.0)	(553.0)	(458.0)	(235.5)
1980	273.2	141.5	235.5	202.8	157.2	249.8	187.6	125.3	57.4	125.6	212.9	371.0	194.9
	(270.0)	(169.0)	(93.0)	(171.0)	(221.0)	(212.0)	(140.0)	(215.0)	(67.0)	(150.0)	(314.0)	(422.0)	(203.7)
1981	608.5	258.2	147.5	100.6	250.6	90.6	161.2	34.3	213.8	216.9	289.8	192.8	213.7
	(895.0)	(233.0)	(77.0)	(112.0)	(108.0)	(137.0)	(110.0)	(140.0)	(117.0)	(182.0)	(405.0)	(225.0)	(228.4)
1982	153.3	194.8	60.2	214.6	291.7	104.8	72.4	91.6	129.9	174.8	174.2	226.4	157.4
	(158.0)	(217.0)	(71.0)	(160.0)	(268.0)	(205.0)	(85.0)	(80.0)	(56.0)	(154.0)	(117.0)	(198.0)	(147.4)
1983	78.4	48.4	18.3	10.5	43.9	93.8	223.6	366.7	368.3	193.9	229.4	396.6	172.7
	(73.0)	(39.0)	(11.0)	(6.0)	(20.0)	(61.0)	(171.0)	(332.0)	(326.0)	(148.0)	(364.0)	(439.0)	(165.8)
1984	(510.0)	(356.0)	(274.0)	(492.0)	(443.0)	(321.0)	(260.0)	(123.0)	(266.0)	(372.0)	(187.0)	(365.0)	(330.7)
MEAN	240.2	199.0	165.1	182.0	260.4	211.6	177.4	149.1	187.0	223.2	259.2	262.9	209.8

Note: - Figures in parentheses are recorded and/or partly estimated runoff.

- For the calculation of mean monthly values, figures in parentheses are used for the period between 1969 and 1984.

Table A61 Generated Monthly Runoff Series of Sook River at Binh

(Unit: m^3/sec)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1952	7.4	16.8	30.7	38.0	60.3	26.7	12.3	10.8	10.8	40.2	22.7	74.1	29.2
1953	34.6	72.4	18.5	26.4	65.2	49.8	41.0	14.5	26.4	67.5	56.6	16.4	40.8
1954	11.3	11.6	9.2	23.6	43.5	51.6	38.8	37.7	31.6	51.6	21.6	49.6	31.8
1955	74.2	49.2	14.9	13.9	17.0	38.2	33.6	30.3	36.8	24.9	27.0	28.4	32.4
1956	38.9	32.1	15.0	18.0	45.4	30.3	20.2	13.3	15.7	14.7	38.9	54.3	28.1
1957	46.2	22.0	18.6	14.6	45.4	47.1	68.3	34.9	18.8	39.5	17.4	12.4	32.1
1958	11.0	11.3	12.2	7.6	69.4	62.5	22.0	23.6	13.1	11.3	51.4	12.4	25.7
1959	5.4	2.9	1.4	19.4	27.6	39.4	17.9	24.2	24.9	14.7	62.9	49.1	24.2
1960	36.4	44.6	13.3	8.4	34.8	9.4	40.1	11.2	21.2	16.4	71.3	20.2	27.3
1961	14.8	19.4	11.9	12.7	9.9	14.1	18.2	9.2	11.7	17.3	13.6	47.8	16.7
1962	76.8	36.3	17.4	36.5	77.4	46.5	13.3	19.6	11.8	6.6	5.8	27.4	31.3
1963	103.0	89.3	33.6	13.5	38.3	11.6	10.9	7.2	3.6	3.4	3.1	9.6	27.3
1964	9.6	29.6	22.6	21.0	35.8	23.2	34.2	6.6	20.6	13.9	20.9	13.0	20.9
1965	9.5	8.6	62.4	33.9	44.4	16.5	7.7	27.8	8.7	15.3	11.5	8.2	21.2
1966	7.3	7.1	10.4	8.5	13.1	24.2	17.5	26.7	9.6	46.9	35.1	40.0	20.5
1967	38.8	30.8	31.3	31.3	33.8	14.3	14.5	7.9	12.7	7.9	10.5	10.8	20.4
1968	30.5	6.8	19.9	7.3	59.2	31.1	27.1	11.7	21.2	30.4	11.4	11.1	22.3
	(10.6)	(9.1)	(12.7)	(28.2)	(36.3)	(21.2)	(16.8)	(11.7)	(27.0)	(34.0)	(19.0)	(10.4)	(19.8)
1969	9.2	4.3	4.3	5.7	7.4	11.8	22.5	28.8	12.4	22.3	38.5	24.3	16.0
	(10.2)	(5.5)	(8.8)	(8.9)	(15.6)	(25.7)	(25.3)	(14.4)	(11.3)	(24.2)	(17.7)	(28.2)	(16.3)
1970	28.9	7.3	5.3	4.5	61.0	59.3	19.8	20.7	11.7	38.9	40.8	41.1	28.3
	(17.1)	(6.7)	(6.7)	(10.6)	(64.2)	(51.1)	(35.5)	(37.5)	(18.8)	(39.7)	(32.5)	(39.7)	(30.0)
1971	14.4	60.4	30.1	11.6	10.3	9.3	4.2	61.0	28.7	31.4	76.2	46.3	32.0
	(11.1)	(85.0)	(40.6)	(10.5)	(7.4)	(9.4)	(2.7)	(37.2)	(25.1)	(12.0)	(58.9)	(47.5)	(29.0)
1972	34.1	25.1	30.0	23.1	36.6	21.2	6.3	19.5	20.6	51.5	46.5	29.8	28.7
	(28.4)	(24.3)	(29.3)	(41.2)	(31.9)	(23.2)	(4.0)	(7.4)	(17.4)	(33.7)	(25.8)	(41.8)	(25.7)
1973	11.4	4.2	2.0	9.7	4.1	7.4	7.2	4.8	93.0	54.9	54.5	46.7	25.0
	(2.7)	(0.4)	(1.1)	(6.9)	(14.8)	(12.5)	(13.8)	(12.0)	(120.0)	(57.4)	(74.8)	(45.0)	(30.1)
1974	14.3	71.6	14.7	11.1	22.0	31.2	25.3	16.6	60.8	32.3	36.5	26.1	30.2
	(28.5)	(49.0)	(32.9)	(10.3)	(60.7)	(22.1)	(34.1)	(17.9)	(47.9)	(44.1)	(25.7)	(36.1)	(34.1)
1975	27.5	23.9	12.5	9.6	37.4	12.4	14.1	19.5	49.8	11.8	40.0	57.0	26.3
	(63.1)	(15.3)	(15.9)	(15.3)	(64.9)	(43.8)	(21.2)	(17.1)	(44.3)	(27.4)	(25.7)	(39.0)	(32.8)
1976	44.2	18.1	23.5	23.6	12.6	8.6	13.9	12.5	8.8	38.5	46.0	23.2	22.8
	(39.4)	(32.4)	(25.4)	(14.1)	(28.7)	(14.4)	(8.1)	(9.8)	(6.6)	(21.3)	(38.5)	(11.7)	(20.9)
1977	13.5	61.0	17.1	22.3	38.4	43.5	35.7	13.9	6.0	31.5	64.3	41.2	32.4
	(21.6)	(46.0)	(39.6)	(28.1)	(31.0)	(50.4)	(58.7)	(11.5)	(4.8)	(20.7)	(31.1)	(61.0)	(33.7)
1978	27.0	17.1	6.1	36.3	41.4	45.1	33.4	11.6	10.8	9.5	26.6	22.7	24.0
	(12.8)	(12.5)	(4.7)	(13.2)	(16.3)	(23.3)	(26.6)	(6.4)	(6.6)	(2.7)	(24.1)	(15.8)	(13.8)
1979	7.0	3.9	22.1	5.0	13.7	45.2	32.3	13.5	52.6	61.0	43.4	18.5	26.5
	(5.6)	(4.0)	(16.0)	(4.7)	(17.8)	(53.9)	(40.6)	(11.1)	(46.3)	(32.5)	(79.5)	(28.0)	(28.3)
1980	31.1	11.9	34.1	16.1	25.4	31.2	17.8	11.5	6.9	8.6	40.1	78.7	26.1
	(33.0)	(23.7)	(32.4)	(35.6)	(35.7)	(34.4)	(11.3)	(21.3)	(4.9)	(8.2)	(31.7)	(61.5)	(27.8)
1981	127.9	40.9	14.5	10.0	12.3	10.8	8.7	27.4	30.8	57.2	59.6	14.6	34.6
	(195.0)	(24.9)	(4.2)	(8.9)	(29.5)	(21.2)	(12.7)	(5.6)	(10.1)	(17.2)	(54.3)	(30.6)	(34.5)
1982	13.1	14.8	4.4	14.2	45.9	11.5	7.8	11.4	6.8	12.8	10.7	42.5	16.3
	(21.6)	(9.7)	(5.7)	(8.7)	(39.1)	(19.0)	(7.3)	(8.3)	(8.1)	(18.2)	(22.3)	(45.4)	(17.8)
1983	(7.5)	(5.0)	(3.0)	(1.4)	(3.3)	(8.1)	(22.1)	(49.0)	(58.0)	(15.3)	(72.5)	(89.4)	(27.9)
1984	(137.9)	(81.7)	(54.2)	(89.3)	(121.5)	(156.1)	(59.8)	(23.6)	(48.0)	(63.6)	(24.1)	(67.0)	(77.2)
MEAN	35.5	27.9	19.9	20.1	38.8	33.2	24.6	18.4	23.7	26.2	34.2	35.5	28.2

Note: - Figures in parentheses are recorded and/or partly estimated runoff.

- For the calculation of mean monthly values, figures in parentheses are used for the period between 1968 and 1984.

Table A62 DROUGHT RECORDS OF PADAS RIVER AT TENOM LAMA

(Unit: m^3/s)

Year	Duration (month)				
	1	2	3	4	5
1969	79	89	98	98	109
1970	75	79	127	165	211
1971	33	72	99	97	128
1972	40	60	79	110	134
1973	15	22	26	73	101
1974	150	181	186	189	196
1975	95	138	137	175	179
1976	71	92	102	99	114
1977	55	88	130	162	184
1978	52	54	56	69	94
1979	55	59	99	95	125
1980	67	109	141	143	157
1981	77	95	99	109	109
1982	56	68	74	94	98
1983	6	13	12	19	27
1984	123	192	216	316	241

Table A63 DROUGHT RECORDS OF PADAS RIVER AT TENOM LAMA IN DESCENDING ORDER

(Unit: m^3/s)

Order	Plotting Position(%)	Duration (Month)				
		1	2	3	4	5
1	94.12	150	192	216	237	242
2	88.24	123	181	187	189	211
3	82.35	95	138	141	175	196
4	76.47	79	109	137	165	184
5	70.59	77	95	130	162	179
6	64.71	75	92	127	128	157
7	58.82	71	89	102	110	134
8	52.94	67	88	99	109	128
9	47.06	56	79	99	99	125
10	41.18	55	72	99	98	114
11	35.29	55	68	98	97	109
12	29.41	52	60	80	95	109
13	23.53	40	59	74	94	101
14	17.65	33	54	56	73	98
15	11.76	15	22	26	69	94
16	5.88	6	13	19	26	34

Weibull's plotting position.

$$P = \frac{m}{n+1} \quad \text{or} \quad Tr = \frac{n+1}{m}$$

where, n = number of years of record

m = rank of the event in order of magnitude, the largest event having m = 1

Table A64 TYPICAL FLOODS OF SOOK RIVER AT BIAH G.S. (1/2)

Flood No.	Year	Period From	Period To	Peak Flow (m^3/s)	Remarks
70-1	1970	Jan. 23	Jan. 26	68	
70-2	1970	Mar. 4	Mar. 10	53	
70-3	1970	Jul. 16	Jul. 18	82	
70-4	1970	Oct. 1	Oct. 8	110	
71-1	1971	Mar. 15	Mar. 18	114	
71-2	1971	Aug. 25	Aug. 28	118	
73-1	1973	Nov. 1	Nov. 14	197	
73-2	1973	Dec. 2	Dec. 4	185	
74-1	1974	Mar. 6	Mar. 11	121	
74-2	1974	May 9	May 14	72	
74-3	1974	May 18	May 26	162	
74-4	1974	Sep. 25	Sep. 29	222	
74-5	1974	Oct. 18	Oct. 23	123	
74-6	1974	Nov. 15	Nov. 20	47	
75-1	1975	Jan. 9	Jan. 19	212	
75-2	1975	May 18	Jun. 7	186	
75-3	1975	Oct. 8	Oct. 12	109	
76-1	1976	Jan. 11	Jan. 15	87	
76-2	1976	Feb. 24	Feb. 27	89	
76-3	1976	Mar. 7	Mar. 13	114	
76-4	1976	Apr. 7	Apr. 11	42	
76-5	1976	Jul. 24	Jul. 28	20	
76-6	1976	Aug. 2	Aug. 5	47	
78-1	1978	Dec. 12	Dec. 16	105	
79-1	1979	Mar. 16	Mar. 20	60	
79-2	1979	May 7	May 10	104	
79-3	1979	May 10	May 17	65	
79-4	1979	May 22	May 27	35	
79-5	1979	Jun. 17	Jun. 27	151	
79-6	1979	Jul. 20	Jul. 28	109	
79-7	1979	Sep. 25	Oct. 1	162	
79-8	1979	Oct. 20	Oct. 25	115	
79-9	1979	Nov. 17	Nov. 23	148	

(to be continued)

Table A64 TYPICAL FLOODS OF SOOK RIVER AT BIAH G.S. (2/2)

Flood No	Year	Period		Peak Flow (m^3/s)	Remarks
		From	To		
80-1	1980	Jan. 27	Feb. 3	125	
80-2	1980	Feb. 19	Feb. 26	60	
80-3	1980	Mar. 16	Mar. 19	67	
80-4	1980	Mar. 24	Mar. 26	120	
80-5	1980	Apr. 13	Apr. 16	90	
80-6	1980	May 3	May 6	106	
80-7	1980	Jun. 2	Jun. 13	114	
80-8	1980	Nov. 2	Nov. 6	56	
81-1	1981	Jan. 1	Jan. 20	410	
81-2	1981	May 23	May 30	93	
81-3	1981	May 31	Jun. 11	105	
81-4	1981	Jul. 20	Jul. 23	40	
81-5	1981	Nov. 1	Nov. 10	174	
81-6	1981	Nov. 11	Nov. 15	101	
81-7	1981	Nov. 19	Nov. 22	260	
82-1	1982	Dec. 3	Dec. 4	61	
82-2	1982	Dec. 11	Dec. 15	104	
82-3	1982	Dec. 15	Dec. 31	140	
83-1	1983	Jun. 18	Jun. 21	280	
83-2	1983	Jul. 23	Jul. 30	98	
83-3	1983	Oct. 22	Oct. 30	58	
83-4	1983	Nov. 4	Nov. 18	318	
84-1	1984	Jan. 20	Feb. 10	305	
85-1	1985	May 27	May 31	9	

Table A65 MAXIMUM FLOODS RECORDED ON PADAS RIVER SYSTEM

(Unit: m^3/s)

Year	Kemabong		Tenom Lama		Ansip		Biah	
	Date/1	Qp	Date	Qp	Date	Qp	Date	Qp
1966			10/13	718				
1967			05/21	612				
1968	09/14	1,635	01/04	780			03/31	141
1969	12/25	1,048	08/30	652	07/21	262	03/31	115
1970	01/08	2,226	04/22	981	05/25	245	05/27	124
1971	02/09	2,200	02/11	882	08/26	490	02/13	217
1972	12/03	1,972	12/04	787	04/01	246	06/17	165
1973	09/16	2,138	09/27	821	09/17	434	09/38	296
1974	04/19	1,576	10/06	779	02/14	750	09/26	236
1975	12/30	1,802	12/31	1,125	09/12	339	01/13	221
1976	02/25	1,413	01/19	1,115	01/29	264	11/03	161
1977	12/12	2,063	05/15	1,340	03/01	330	03/01	213
1978	07/14	1,117	11/11	641	05/17	397	12/14	104
1979	03/16	1,754	12/22	854	09/21	326	11/03	198
1980	12/29	1,477	01/28	772	08/27	185	12/04	153
1981	01/13	4,250/2	01/14	2,100/3	01/-	670/4	01/14	410
1982	10/18	1,140	10/19	554	01/30	162	12/21	139
1983	11/14	1,300	11/14	675	09/22	295	11/14	340
1984	01/25	1,415	01/26	900	01/28	523	01/26	320

/1: Qp shows momentary peak flow of annual maximum flood.

/2: Maximum gauge height of 9.96 m is converted using a rating curve simply extrapolated on semi-log-paper.

/3: After Ref. 9.

/4: Estimated referring to the flood data of Sook at Biah as follows.

$QA = a \times QB = 670\ m^3/s$, $a = 523/320$, $QB = 410\ m^3/s$

where, 523 = flood at Ansip on January 28, 1984
320 = flood at Biah on January 26, 1984

Table A66 PROBABLE FLOODS OF PADAS RIVER SYSTEM

(Unit: m^3/s)

Station Name	Biah	Ansip	Tenom Lama
River	Sook	Pegalan	Padas
Drainage Area (Km^2)	1,683	2,175	7,715
Sample size	17	16	18
Return Period (Yr)			
1.0101	83	131	517
1.25	138	245	666
2	190	350	796
5	269	499	977
10	327	601	1,100
25	406	733	1,260
50	468	833	1,380
100	535	934	1,510
200	605	1,040	1,630

Table A67 MAXIMUM FLOOD VOLUME RECORDED AT BIAH ON SOOK RIVER

(Unit: 10^6 m^3)

Year	Duration (day)					
	1	2	3	7	14	30
1968	10	19	27	53	73	109
1969	7	12	15	33	53	71
1970	10	18	26	53	93	157
1971	14	26	39	79	141	212
1972	9	16	23	41	67	104
1973	24	46	67	137	206	336
1974	14	24	33	62	91	122
1975	17	30	46	95	128	223
1976	13	21	29	51	76	123
1977	16	30	41	76	109	181
1978	7	11	16	28	48	70
1979	16	30	44	86	123	213
1980	12	21	27	46	79	157
1981	32	59	89	161	250	352
1982	11	20	30	53	83	121
1983	19	31	41	73	102	167
1984	31	55	75	146	259	438
1985	12	24	29	48	69	97

Table A68 PROBABLE FLOOD VOLUME OF SOOK RIVER AT BIAH

(Unit: 10^6 m^3)

Return Period (yr)	Duration (day)					
	1	2	3	7	14	30
1.0101	6	10	13	62	41	54
1.25	10	8	23	43	67	102
2	13	24	34	63	96	154
5	20	36	51	97	149	243
10	24	45	65	124	193	314
50	37	68	99	196	321	506
100	44	79	117	232	390	605
200	51	91	134	272	471	716

Table A69 HYDROGRAPH OF RECORDED MAXIMUM FLOOD OF SOOK RIVER

(Unit: m^3/s)

Time (Hr)	Day (January 1981)									
	11	12	13	14	15	16	17	18	19	20
1	116	142	204	299	335	347	296	222	173	139
2	117	144	204	326	334	350	292	219	170	139
3	118	146	204	355	333	352	288	217	168	138
4	119	148	204	380	331	352	283	214	167	138
5	120	150	204	395	329	352	279	212	166	137
6	121	152	204	407	327	353	275	209	166	137
7	122	155	204	411	325	354	271	207	165	137
8	123	158	204	404	323	355	268	205	164	137
9	127	161	205	398	321	356	264	204	164	137
10	131	164	205	391	319	356	260	202	163	137
11	135	168	205	385	318	356	259	200	162	137
12	140	171	205	381	317	352	257	198	161	137
13	141	175	206	377	315	352	255	196	160	137
14	143	180	206	373	313	350	254	195	158	136
15	142	184	206	369	312	354	252	193	156	136
16	141	189	207	366	310	357	249	191	155	136
17	141	194	210	362	308	354	245	190	151	136
18	140	198	213	358	306	350	242	188	146	135
19	137	203	217	354	305	342	239	186	144	135
20	137	207	220	350	305	335	236	184	143	135
21	137	206	228	347	313	327	233	182	142	135
22	137	205	238	343	322	320	230	180	142	134
23	139	205	256	339	331	313	227	178	141	134
24	141	204	277	336	340	305	224	176	140	138

Note: Time in SST.

Table A70 HYDROGRAPH OF 10-YEARS PROBABLE FLOOD OF SOOK RIVER

(Unit: m^3/s)

Time (hr)	Day									
	1	2	3	4	5	6	7	8	9	10
1	92	113	162	238	267	276	236	177	138	111
2	93	115	162	259	266	278	232	174	135	111
3	94	116	162	282	265	280	229	173	134	110
4	95	118	162	302	263	280	225	170	133	110
5	95	119	162	314	262	280	222	169	132	109
6	96	121	162	324	260	281	219	166	132	109
7	97	123	162	327	259	282	216	165	131	109
8	98	126	162	321	257	282	213	163	130	109
9	101	128	163	317	255	283	210	162	130	109
10	104	130	163	311	254	283	207	161	130	109
11	107	134	163	306	253	283	206	159	129	109
12	111	136	163	303	252	280	204	158	128	109
13	112	139	164	300	251	280	203	156	127	109
14	114	143	164	297	249	278	202	155	126	108
15	113	146	164	294	248	282	200	154	124	108
16	112	150	165	291	247	284	198	152	123	108
17	112	154	167	288	245	282	195	151	120	108
18	111	158	169	285	243	278	193	150	116	107
19	109	162	173	282	243	272	190	148	115	107
20	109	165	175	278	243	267	188	146	114	107
21	109	164	181	276	249	260	185	145	113	107
22	109	163	189	273	256	255	183	143	113	107
23	111	163	204	270	263	249	181	142	112	107
24	112	162	220	267	271	243	178	140	111	110

Note: Obtained as (Table 69/411) x 327.

Table A71 HYDROGRAPH OF 50-YEARS PROBABLE FLOOD OF SOOK RIVER

(Unit: m^3/s)

Time (hr)	Day									
	1	2	3	4	5	6	7	8	9	10
1	132	162	232	340	381	395	337	253	197	158
2	133	164	232	371	380	399	332	249	194	158
3	134	166	232	404	379	401	328	247	191	157
4	136	169	232	433	377	401	322	244	190	157
5	137	171	232	450	375	401	318	241	189	156
6	138	173	232	463	372	402	313	238	189	156
7	139	176	232	468	370	403	309	236	188	156
8	140	180	232	460	368	404	305	233	187	156
9	145	183	233	453	366	405	301	232	187	156
10	149	187	233	445	363	405	296	230	186	156
11	154	191	233	438	362	405	295	228	184	156
12	159	195	233	434	361	401	293	225	183	156
13	161	199	235	429	359	401	290	223	182	156
14	163	205	235	425	356	399	289	222	180	155
15	162	210	235	420	355	403	287	220	178	155
16	161	215	236	417	353	407	284	217	176	155
17	161	221	239	412	351	403	279	216	172	155
18	159	225	243	408	348	399	276	214	166	154
19	156	231	247	403	347	389	272	212	164	154
20	156	236	251	399	347	381	269	210	163	154
21	156	235	260	395	356	372	265	207	162	154
22	156	233	271	391	367	364	262	205	162	153
23	158	233	292	386	377	356	258	203	161	153
24	161	232	315	383	387	347	255	200	159	157

Note: Obtained as (Table 69/411) x 468.

Table A72 HYDROGRAPH OF 100-YEARS PROBABLE FLOOD OF SOOK RIVER

(Unit: m^3/s)

Time (hr)	Day									
	1	2	3	4	5	6	7	8	9	10
1	151	185	266	389	436	452	385	289	225	181
2	152	187	266	424	435	456	380	285	221	181
3	154	190	266	462	433	458	375	282	219	180
4	155	193	266	495	431	458	368	279	217	180
5	156	195	266	514	428	458	363	276	216	178
6	158	198	266	530	426	460	358	272	216	178
7	159	202	266	535	423	461	353	269	215	178
8	160	206	266	526	420	462	349	267	213	178
9	165	210	267	518	418	463	344	266	213	178
10	171	213	367	509	415	463	338	263	212	178
11	176	219	267	501	414	463	337	260	211	178
12	182	223	267	496	413	458	335	258	210	178
13	184	228	268	491	410	458	332	255	208	178
14	186	234	268	486	407	456	331	254	206	177
15	185	240	268	480	406	461	328	251	203	177
16	184	246	269	476	404	465	324	249	202	177
17	184	253	273	471	401	461	319	247	197	177
18	182	258	277	466	398	456	315	245	190	176
19	178	264	282	461	397	445	311	242	187	176
20	178	269	286	456	397	436	307	240	186	176
21	178	268	297	452	407	426	303	237	185	176
22	178	267	310	446	419	417	299	234	185	174
23	181	267	333	441	431	407	295	232	184	174
24	184	266	361	437	443	397	292	229	182	180

Note: Obtained as (Table 69/411) x 535.

Table A73 PROBABLE MAXIMUM PRECIPITATION OF SOOK BASIN (1/4)

Case 1

Time (hr)	DD Curve (mm)	Max. DD (mm)	Area DD (mm)	R incre. (mm)	PMP (mm)
0	0.0	0.0	0.0	0.0	0.0
1	76.8	99.8	35.3	35.3	1.2
2	100.8	131.0	46.7	11.4	1.2
3	111.6	145.1	52.2	5.5	1.2
4	122.5	159.2	57.8	5.6	1.2
5	130.4	169.5	62.2	4.3	1.2
6	135.8	176.5	65.3	3.1	1.2
7	137.5	178.8	66.8	1.5	1.2
8	142.1	184.7	69.6	2.8	1.2
9	146.9	191.0	72.6	3.0	1.2
10	148.7	193.3	74.1	1.5	1.2
11	149.4	194.2	75.1	1.0	1.2
12	150.8	196.1	76.5	1.4	1.2
13	151.8	197.3	77.6	1.2	1.2
14	152.6	198.4	78.7	1.1	1.2
15	153.6	199.6	79.9	1.2	1.2
16	154.2	200.5	80.9	1.0	1.2
17	154.7	201.1	81.8	0.9	1.2
18	155.5	202.2	82.9	1.1	1.2
19	157.3	204.5	84.5	1.6	1.2
20	159.6	207.4	86.4	1.9	2.1
21	160.2	208.3	87.5	1.0	2.1
22	160.4	208.5	88.3	0.8	2.1
23	160.5	208.7	89.0	0.8	2.1
24	162.0	210.6	90.6	1.5	2.1
25	166.3	216.2	93.6	3.0	2.1
26	170.6	221.7	96.6	3.0	2.1
27	174.7	227.2	99.7	3.0	2.1
28	178.9	232.5	102.7	3.0	2.1
29	183.0	237.9	105.7	3.0	2.1
30	187.0	243.1	108.8	3.0	2.1
31	191.0	248.3	111.8	3.0	2.1
32	194.9	253.4	114.9	3.0	2.1
33	198.8	258.5	117.9	3.0	2.1
34	202.7	263.5	121.0	3.1	2.1
35	206.5	268.4	124.0	3.1	2.1
36	210.3	273.3	127.1	3.1	2.1
37	214.0	278.2	130.2	3.1	2.1
38	217.7	283.0	133.3	3.1	2.3
39	221.4	287.8	136.3	3.1	2.3
40	225.0	292.5	139.4	3.1	2.3
41	228.6	297.2	142.5	3.1	2.3
42	232.2	301.8	145.6	3.1	2.3
43	235.7	306.4	148.7	3.1	2.3

Table A73 PROBABLE MAXIMUM PRECIPITATION OF SOOK BASIN (2/4)

Case 1

Time (hr)	DD Curve (mm)	Max. DD (mm)	Area DD (mm)	R incre. (mm)	PMP (mm)
44	239.2	311.0	151.9	3.1	2.3
45	242.7	315.5	155.0	3.1	2.3
46	246.2	320.0	158.1	3.1	2.3
47	249.6	324.5	161.3	3.1	2.3
48	253.0	328.9	164.4	3.2	2.3
49	255.5	332.1	166.8	2.4	2.3
50	257.9	335.3	169.2	2.4	2.3
51	260.3	338.4	171.6	2.4	2.3
52	262.7	341.5	174.0	2.4	2.3
53	265.0	344.5	176.4	2.4	2.3
54	267.4	347.6	178.7	2.4	2.3
55	269.7	350.6	181.1	2.4	2.3
56	272.0	353.6	183.5	2.4	2.3
57	274.2	356.5	185.9	2.4	2.3
58	276.5	359.4	188.3	2.4	2.3
59	278.7	362.3	190.6	2.4	2.3
60	280.9	365.2	193.0	2.4	2.3
61	283.1	368.0	195.4	2.4	2.3
62	285.3	370.9	197.8	2.4	2.3
63	287.4	373.6	200.1	2.4	2.3
64	289.6	376.4	202.5	2.4	2.3
65	291.7	379.2	204.9	2.4	2.3
66	293.8	381.9	207.3	2.4	2.3
67	295.8	384.6	209.7	2.4	2.3
68	297.9	387.3	212.0	2.4	2.3
69	300.0	389.9	214.4	2.4	2.3
70	302.0	392.6	216.8	2.4	2.3
71	304.0	395.2	219.2	2.4	2.3
72	306.0	397.8	221.6	2.4	2.3
73	308.0	400.4	223.9	2.3	2.3
74	310.0	403.0	226.2	2.3	2.4
75	311.9	405.5	228.5	2.3	2.4
76	313.9	408.0	230.8	2.3	2.4
77	315.8	410.6	233.1	2.3	2.4
78	317.7	413.1	235.4	2.3	2.4
79	319.7	415.6	237.8	2.3	2.4
80	321.6	418.0	240.1	2.3	2.4
81	323.4	420.5	242.4	2.3	2.4
82	325.3	422.9	244.7	2.3	2.4
83	327.2	425.3	247.0	2.3	2.4
84	329.0	427.7	249.4	2.3	2.4
85	330.9	430.1	251.7	2.3	2.4
86	332.7	432.5	254.0	2.3	2.4
87	334.5	434.8	256.3	2.3	2.4

Table A73 PROBABLE MAXIMUM PRECIPITATION OF SOOK BASIN (3/4)

Case 1

Time (hr)	DD Curve (mm)	Max. DD (mm)	Area DD (mm)	R incre. (mm)	PMP (mm)
88	336.3	437.2	258.7	2.3	2.4
89	338.1	439.5	261.0	2.3	2.4
90	339.9	441.8	263.3	2.3	2.4
91	341.6	444.1	265.7	2.3	2.4
92	343.4	446.4	268.0	2.3	3.2
93	345.2	448.7	270.3	2.3	3.1
94	346.9	451.0	272.7	2.3	3.1
95	348.6	453.2	275.0	2.3	3.1
96	350.4	455.5	277.4	2.3	3.1
97	352.1	457.7	279.7	2.3	3.1
98	353.8	459.9	282.0	2.3	3.1
99	355.5	462.1	284.3	2.3	3.1
100	357.2	464.3	286.5	2.3	3.1
101	358.8	466.5	288.8	2.3	3.1
102	360.5	468.6	291.1	2.3	3.1
103	362.2	470.8	293.4	2.3	3.0
104	363.8	472.9	295.7	2.3	3.0
105	365.4	475.1	298.1	2.3	3.0
106	367.1	477.2	300.4	2.3	3.0
107	368.7	479.3	302.7	2.3	3.0
108	370.3	481.4	305.0	2.3	3.0
109	371.9	483.5	307.3	2.3	3.0
110	373.5	485.6	309.6	2.3	1.5
111	375.1	487.7	311.9	2.3	0.8
112	376.7	489.7	314.2	2.3	1.0
113	378.3	491.8	316.6	2.3	1.9
114	379.9	493.8	318.9	2.3	1.1
115	381.4	495.9	321.2	2.3	0.9
116	383.0	497.9	323.5	2.3	1.0
117	384.5	499.9	325.9	2.3	1.1
118	386.1	501.9	328.2	2.3	1.2
119	387.6	503.9	330.5	2.3	1.4
120	389.1	505.9	332.9	2.3	1.5
121	390.7	507.9	334.9	2.1	3.0
122	392.2	509.8	337.0	2.1	2.8
123	393.7	511.8	339.1	2.1	3.1
124	395.2	513.8	341.1	2.1	4.3
125	396.7	515.7	343.2	2.1	5.6
126	398.2	517.6	345.3	2.1	11.4
127	339.7	519.6	347.3	2.1	35.3
128	401.1	521.5	349.4	2.1	5.5
129	402.6	523.4	351.5	2.1	1.5
130	404.1	525.3	353.5	2.1	1.0
131	405.5	527.2	355.6	2.1	1.2
132	407.0	529.1	357.7	2.1	1.6

Table A73 PROBABLE MAXIMUM PRECIPITATION OF SOOK BASIN (4/4)

Case 1

Time (hr)	DD Curve (mm)	Max. DD (mm)	Area DD (mm)	R incre. (mm)	PMP (mm)
133	408.4	531.0	359.7	2.1	0.8
134	409.9	532.8	361.8	2.1	3.0
135	411.3	534.7	363.9	2.1	3.0
136	412.7	536.6	365.9	2.1	3.1
137	414.2	538.4	368.0	2.1	3.1
138	415.6	540.3	370.1	2.1	3.1
139	417.0	542.1	372.2	2.1	3.1
140	418.4	543.9	374.2	2.1	2.4
141	419.8	545.8	376.3	2.1	2.4
142	421.2	547.6	378.4	2.1	2.4
143	422.6	549.4	380.5	2.1	2.4
144	424.0	551.2	382.5	2.1	2.4
145	424.4	551.8	383.7	1.2	2.4
146	424.9	552.4	384.9	1.2	2.3
147	425.3	552.9	386.1	1.2	2.3
148	425.8	553.5	387.3	1.2	2.3
149	426.2	554.1	388.4	1.2	2.3
150	426.6	554.6	389.6	1.2	2.3
151	427.1	555.2	390.8	1.2	2.3
152	427.5	555.7	392.0	1.2	2.3
153	427.9	556.3	393.1	1.2	2.3
154	428.3	556.8	394.3	1.2	2.3
155	428.7	557.4	395.5	1.2	2.3
156	429.2	557.9	396.7	1.2	2.3
157	429.6	558.5	397.9	1.2	2.3
158	430.0	559.0	399.0	1.2	2.1
159	430.4	559.5	400.2	1.2	2.1
160	430.8	560.1	401.4	1.2	2.1
161	431.2	560.6	402.5	1.2	2.1
162	431.6	561.1	403.7	1.2	2.1
163	432.0	561.6	404.9	1.2	2.1
164	432.4	562.1	406.1	1.2	1.2
165	432.8	562.7	407.2	1.2	1.2
166	433.2	563.2	408.4	1.2	1.2
167	433.6	563.7	409.6	1.2	1.2
168	434.0	564.2	410.7	1.2	1.2

Note: (1) DD Curve means the recorded maximum point depth-duration.

(2) Max. DD means the maximized point depth-duration with an overall adjustment factor of 1.30.

(3) Area DD means the PMP for Sook basin after adjustment by area reduction factor.

(4) R incre. means hourly increment of the PMP.

(5) PMP is obtained by re-arranging R incre. with the peak rainfallat time 126 to 127 hr.

Table A74 UNITGRAPH FOR SOOK BASIN WITHOUT SOOK DAM

Time (hr)	Ordinate (m^3/s)	Time (hr)	Ordinate (m^3/s)	Time (hr)	Ordinate (m^3/s)	Time (hr)	Ordinate (m^3/s)
0	0.00	25	9.29	50	1.49	75	0.24
1	0.62	26	8.63	51	1.39	76	0.22
2	1.65	27	8.02	52	1.29	77	0.21
3	3.15	28	7.46	53	1.20	78	0.19
4	5.30	29	6.93	54	1.11	79	0.18
5	7.88	30	6.44	55	1.03	80	0.17
6	10.89	31	5.99	56	0.96	81	0.15
7	14.15	32	5.57	57	0.89		
8	17.46	33	5.17	58	0.83		
9	20.61	34	4.81	59	0.77		
10	22.33	35	4.47	60	0.72		
11	23.45	36	4.15	61	0.67		
12	23.37	37	3.86	62	0.62		
13	22.44	38	3.59	63	0.58		
14	20.73	39	3.34	64	0.54		
15	19.30	40	3.10	65	0.50		
16	17.94	41	2.88	66	0.46		
17	16.68	42	2.68	67	0.43		
18	15.50	43	2.49	68	0.40		
19	14.41	44	2.31	69	0.37		
20	13.39	45	2.15	70	0.35		
21	12.44	46	2.00	71	0.32		
22	11.57	47	1.86	72	0.30		
23	10.75	48	1.73	73	0.28		
24	9.99	49	1.60	74	0.26		

Note: (Lg + D/2) = 13 hr.
Unit rain = 1 mm
Drainage area = 1,732 km^2

Table A75 UNITGRAPH FOR SOOK BASIN WITH SOOK DAM

Time (hr)	Ordinate (m^3/s)	Time (hr)	Ordinate (m^3/s)	Time (hr)	Ordinate (m^3/s)
0	0.00	25	8.83	50	1.22
1	0.75	26	8.16	51	1.12
2	2.05	27	7.53	52	1.04
3	4.03	28	6.96	53	0.96
4	6.75	29	6.43	54	0.89
5	10.08	30	5.94	55	0.82
6	13.77	31	5.49	56	0.76
7	17.81	32	5.07	57	0.69
8	21.69	33	4.68	58	0.64
9	24.34	34	4.32	59	0.59
10	25.80	35	4.00	60	0.55
11	25.96	36	3.69	61	0.51
12	24.84	37	3.41	62	0.47
13	22.82	38	3.15	63	0.44
14	21.11	39	2.91	64	0.40
15	19.50	40	2.69	65	0.37
16	18.02	41	2.48	66	0.35
17	16.65	42	2.30	67	0.32
18	15.38	43	2.12	68	0.30
19	14.21	44	1.96	69	0.27
20	13.12	45	1.81	70	0.25
21	12.12	46	1.68	71	0.24
22	11.20	47	1.54	72	0.21
23	10.34	48	1.43	73	0.19
24	9.56	49	1.32	74	0.18

Note: $(Lg + D/2) = 12$ hr.

Unit rain = 1 mm

Drainage area = 1,712 km^2 excluding reservoir surface area of about 20 km^2.

Table A76 SUSPENDED AND TOTAL SOLIDS OF SOOK RIVER

No.	Date	Runoff (m^3/s)	Suspended Solid (ton/day)	Total Solid (ton/day)
1	28/02/78	7.7	21	64
2	15/03/78	3.6	10	29
3	05/02/79	4.5	19	33
4	30/04/79	4.4	3	34
5	30/07/79	27.8	72	192
6	03/01/80	20.7	39	146
7	30/06/80	9.7	18	192
8	31/07/80	20.3	234	409
9	06/09/80	4.2	5	24
10	29/09/80	2.9	11	30
11	21/04/82	18.2	191	367
12	09/07/82	6.2	10	63
13	27/07/82	10.0	62	161
14	11/09/85	4	-	47
15	27/09/85	12	-	357
16	03/10/85	41	-	2,820
17	05/10/85	38	-	1,330
18	08/10/85	43	-	2,750
19	18/11/85	40	-	1,440
20	20/11/85	39	-	842
21	22/11/85	34	-	3,400
22	25/11/85	31	-	271
23	27/11/85	27	-	1,380

Note: (1) Nos. 1 to 13 were sampled by DID. Nos. 14 to 23 corresponds to the samples presented in Section 2.7.

(2) Suspended solid = Suspended sediment

(3) Total solid = (suspended solid) + (dissoved solid)

Table A77 COMPUTED MONTHLY SUSPENDED SEDIMENT TRANSPORT OF UPPER PADAS RIVER AT KEMABONG

(Unit: ton/day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	159*	133	178*	**	1,215*	768*	**	539*	2,091	1,592	702	**	820*
1969	86*	340	1,289	410	849	897	1,249	717	243	766	1,578	1,267*	808*
1970	3,811*	162	257	446*	**	**	656*	1,282	759*	1,664	1,782	569*	1,139*
1971	811	4,532	786	214	382	868*	61*	1,911	790	172*	1,229*	1,028	1,065*
1972	1,441	779	520	1,192	934*	231*	35	240	1,205	1,661	1,090*	1,863	933*
1973	30	13	117	2,004*	1,257	759	1,070*	339	6,356	1,140*	875*	1,896	1,321*
1974	1,368	1,706	471	1,543	839	1,082*	585	496*	82*	2,525*	587	588	989*
1975	2,193	88	1,166	479	1,316*	517	1,061*	519	2,793	190*	551*	3,522*	1,200*
1976	2,601	1,201*	1,161	871*	980	268*	102*	1,023*	144	1,064	1,763	392	964*
1977	1,235*	3,971*	3,130*	**	3,415*	2,562*	1,751*	992*	181*	**	2,496*	3,481	2,321*
1978	314*	746*	95	27*	**	960*	2,240	98*	**	**	215*	607	589*
1979	51*	123	1,518*	250	2,403	2,644	1,718	107*	3,241*	1,015	4,912	1,634*	1,635*
1980	1,320*	374	787	458	840	718	712	991	71*	**	**	4,256*	1,053*
1981	70,043*	362*	48	238	638*	250	191	24*	**	**	**	**	8,974*
1982	**	**	**	1,560*	1,679	536*	45*	199	95	1,016	386*	931*	716*
1983	49*	**	1*	0*	33*	120	1,295	2,626	1,145	474	2,086	2,633	951*
1984	3,612	1,087*	675*	6,732	4,272	5,052*	1,169*	173	808	1,781*	536*	1,656	2,296*
Mean	1,722	825	609	1,280	1,500	844	1,003	900	1,567	1,157	1,916	1,572	1,241
Size	7	10	11	9	9	7	8	10	10	8	7	9	12

Note: (1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.

Table A78 COMPUTED MONTHLY SUSPENDED SEDIMENT TRANSPORT OF PADAS RIVER AT TENOM LAMA

(Unit: ton/day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	**	**	**	**	**	**	**	**	**	13,738*	3,589	3,126	6,818*
1969	1,212*	692	5,953*	798	4,225	4,316	8,042	4,520	1,095	3,981	8,822	6,838	4,208*
1970	20,476	558	808	6,585	33,205*	26,650	3,902	9,102	7,233	13,066	15,856	9,032	12,206*
1971	3,571	55,260	9,051*	568*	1,919*	1,565	75*	46,293*	6,894	7,102	29,947*	18,675*	1,5077*
1972	25,669*	10,124	3,915	9,133*	7,862	1,140*	49	549	9,505	19,793	5,563	16,257	9,130*
1973	20*	3*	183*	25,725	7,435	3,879	6,293	1,905	130,652*	8,791	45,979*	16,613*	20,623*
1974	2,148*	63,609	7,783	14,318	4,411	14,132	6,835	4,149	17,921	41,108*	6,634	5,544	15,716*
1975	47,501	865	3,602*	**	**	**	8,777*	3,100*	**	740*	5,384	49,362*	14,916*
1976	52,868*	10,509	5,533	3,684	7,264	640	646	3,339	437	6,484	16,378	1,822	9,134*
1977	9,499	36,413	26,963	49,193	32,143*	33,515	19,906	1,489	141*	8,538*	14,388	50,050*	23,520*
1978	829*	152*	**	**	**	5,421*	10,229*	192	1,705	1,293	23,171*	2,888*	5,098*
1979	137	333*	8,802	672	17,639*	*	27,225*	3,007	16,699*	30,337*	68,188	48,356	20,127*
1980	15,468*	3,562*	1,810*	3,154	7,931	8,661	3,718	6,960	260*	1,927*	19,613*	34,944*	9,001*
1981	**	**	**	**	**	**	**	**	**	**	**	**	**
1982	4,973	7,771	296	9,793	19,010*	11,515	454	432	142	10,045	1,669	7,514	6,135*
1983	1,102	84	2*	0	15	377	7,068	22,812	19,353	3,734	28,739*	46,377*	10,805*
1984	6,090	6,452	3,595*	1,246	7,505	2,735	1,831	287	871	3,849	1,215*	2,981	3,221*
Mean	11,669	17,485	7,729	10,470	5,831	9,817	5,340	4,519	6,516	7,814	14,647	11,280	9,426
Size	8	11	7	11	8	11	11	13	10	10	10	9	12

Note: (1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.

Table A79 COMPUTED MONTHLY SUSPENDED SEDIMENT TRANSPORT OF PEGALAN RIVER AT ANSIP

(Unit: ton/day)

Mean	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1969	205	14	132	12	327*	323	2,044	1,051	199	581	1,279	598	564*
1970	1,213	80	30	613	11,252*	13,103*	833	4,652*	607	1,179*	3,174	6,262*	3,583*
1971	380	17,964*	816	83*	64*	117*	66*	3,676	1,021*	1,374	4,372	2,503	2,703*
1972	1,934	868	666	2,146	901*	191*	22	16	373	752	600	691	763*
1973	10	2	2	26	145	121	392	137	18,497*	1,221*	11,404*	2,130	2,841*
1974	2,464*	33,342*	**	484*	829*	3,636*	1,077*	887*	4,109*	3,144*	1,158	844*	4,725*
1975	198*	432	447*	**	4,463*	1,286*	728*	283	4,518	4,858*	832*	1,529*	1,779*
1976	6,334*	612*	163	128	795*	95*	66*	154*	34	124*	816*	246	797*
1977	528	5,766	2,549	145	967	3,197	1,412	85	193*	1,404*	1,387*	1,727*	1,613*
1978	70	79	**	44*	2,113	334*	156*	29	213	311	2,496	510	578*
1979	53*	16	207	63	588	1,090*	4,018	279	3,016	1,163*	**	2,126*	1,147*
1980	846*	703*	718	301	513	1,030	225	426	29	246	162*	**	473*
1981	**	1,069*	368*	149*	2,093*	144*	550*	122*	**	**	1,103*	695	699*
1982	693	490*	30	52	697	275	77	204	21*	**	196*	328	278*
1983	11	4	3*	**	**	39*	215	1,507	5,909	1,043*	1,449*	4,585	1,477*
1984	27,943	4,628	**	**	22,001*	**	2,413*	453*	2,588	12,817	1,818*	4,150	8,746*
Mean	3,289	1,189	531	387	837	989	1,026	699	1,749	2,680	2,180	1,644	1,433
Size	10	10	10	9	6	5	9	11	10	6	6	10	12

Note: (1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.

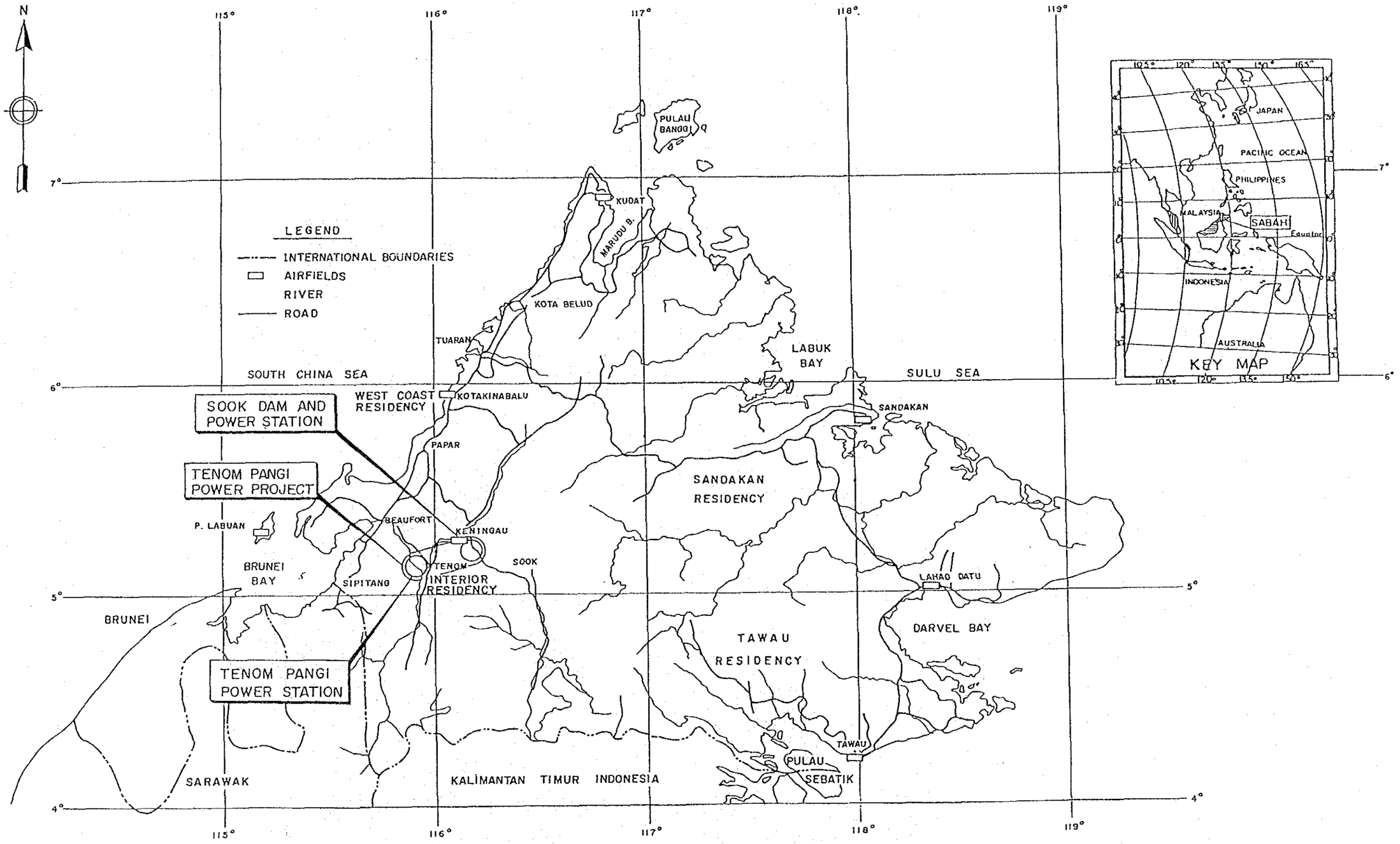
Table A80 COMPUTED MONTHLY SUSPENDED SEDIMENT TRANSPORT OF SOCK RIVER AT BIAH

(Unit: ton/day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	31*	25	114	314*	**	120*	74*	52	254	393	147	37	142*
1969	40*	10*	91	37	78	187	218	90	58	163*	82*	234*	107*
1970	88	16	21	39*	871*	711	326	352	131	431*	345	408	312*
1971	35*	1,606	425	31*	20*	35	3*	369*	175	62*	870*	508*	345*
1972	234*	160	232	468*	245	178	6*	21	127	326	188	473*	222*
1973	3*	0*	2*	35*	72*	70*	84	55	3,076	998	1,504*	572	539*
1974	245*	601*	320*	28*	928*	169	306	94	757*	550*	219	303	377*
1975	1,275	100*	70*	82*	1,122	675	147	87	511	265	206	390*	411*
1976	414	309	206	60*	194*	67*	20*	39	20	172*	464	50	168*
1977	131	571	577	236	359	764	955	38	7	119*	255	938*	413*
1978	46	71	7*	59	83*	127*	186	13	15	3*	197	109	76*
1979	10	6	99	8	121	788	486	40	627	336	1,469	209*	350*
1980	318*	159*	314	317	345	355	41	121	7*	25	286	824	259*
1981	7,150*	518*	**	**	282*	187	59	11	35	121	740*	**	971*
1982	**	28*	11	33	401	131	16	24	22	140	165	605	143*
1983	20	8	4	2	4*	28*	207	612	805	83	1,490*	**	297*
1984	4,094*	1,365*	787	2,031	3,018*	4,997	898*	161*	608	1,862*	186*	1,191	1,767*
Mean	283	308	240	340	382	765	253	110	431	299	358	455	352
Size	7	9	12	8	7	12	12	15	15	9	11	9	12

Note: (1) Figure with * is not complete monthly mean but has lack of data.
(2) Mark ** shows no data at all for the period.
(3) Mean annual is computed as a mean of the mean monthly data.

FIGURE NO.: A 1



SCALE 0 100Km
(1 : 2,000,000)

TENOM PANGI PHASE III

LOCATION MAP

SEB / JICA

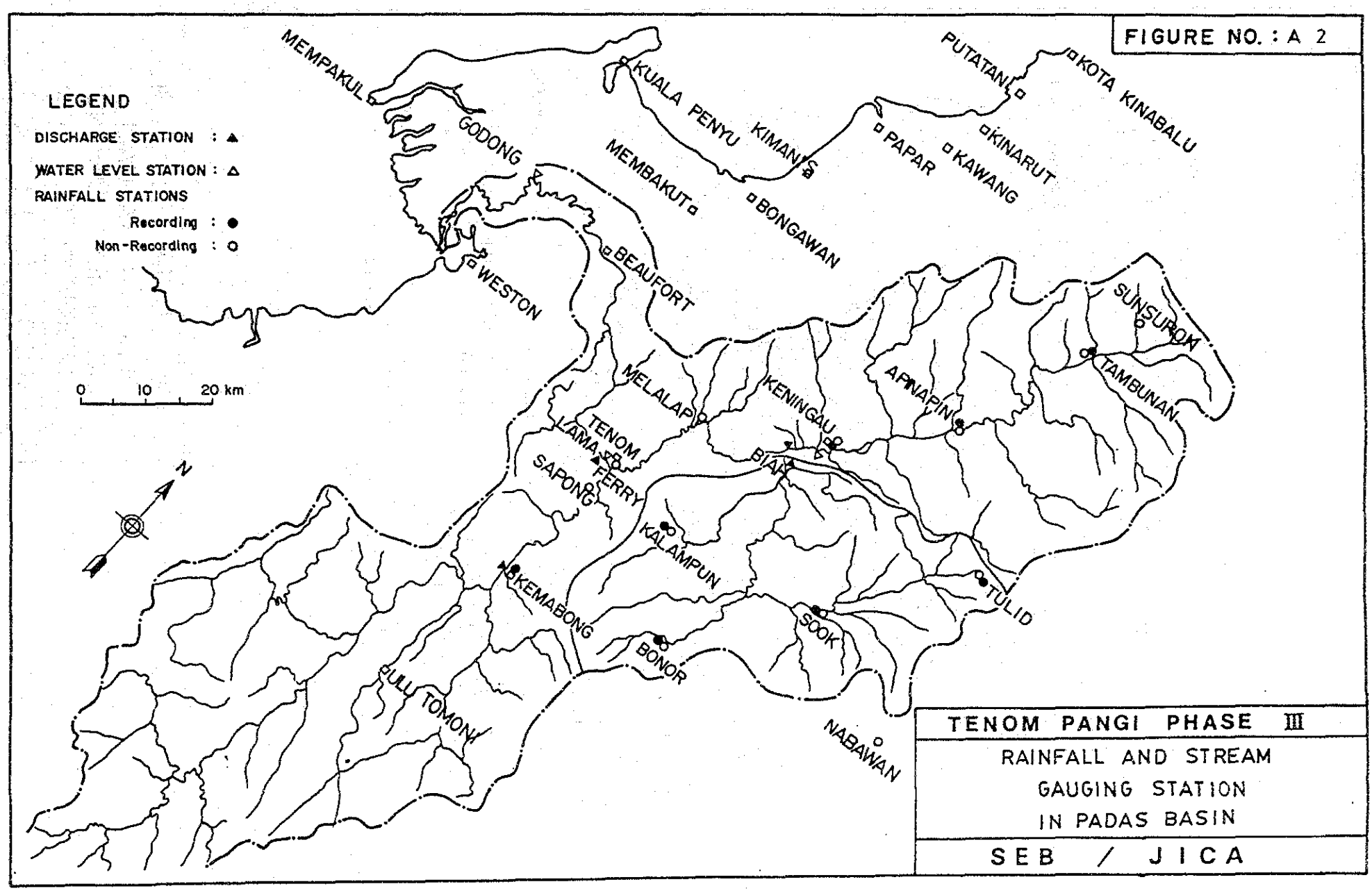
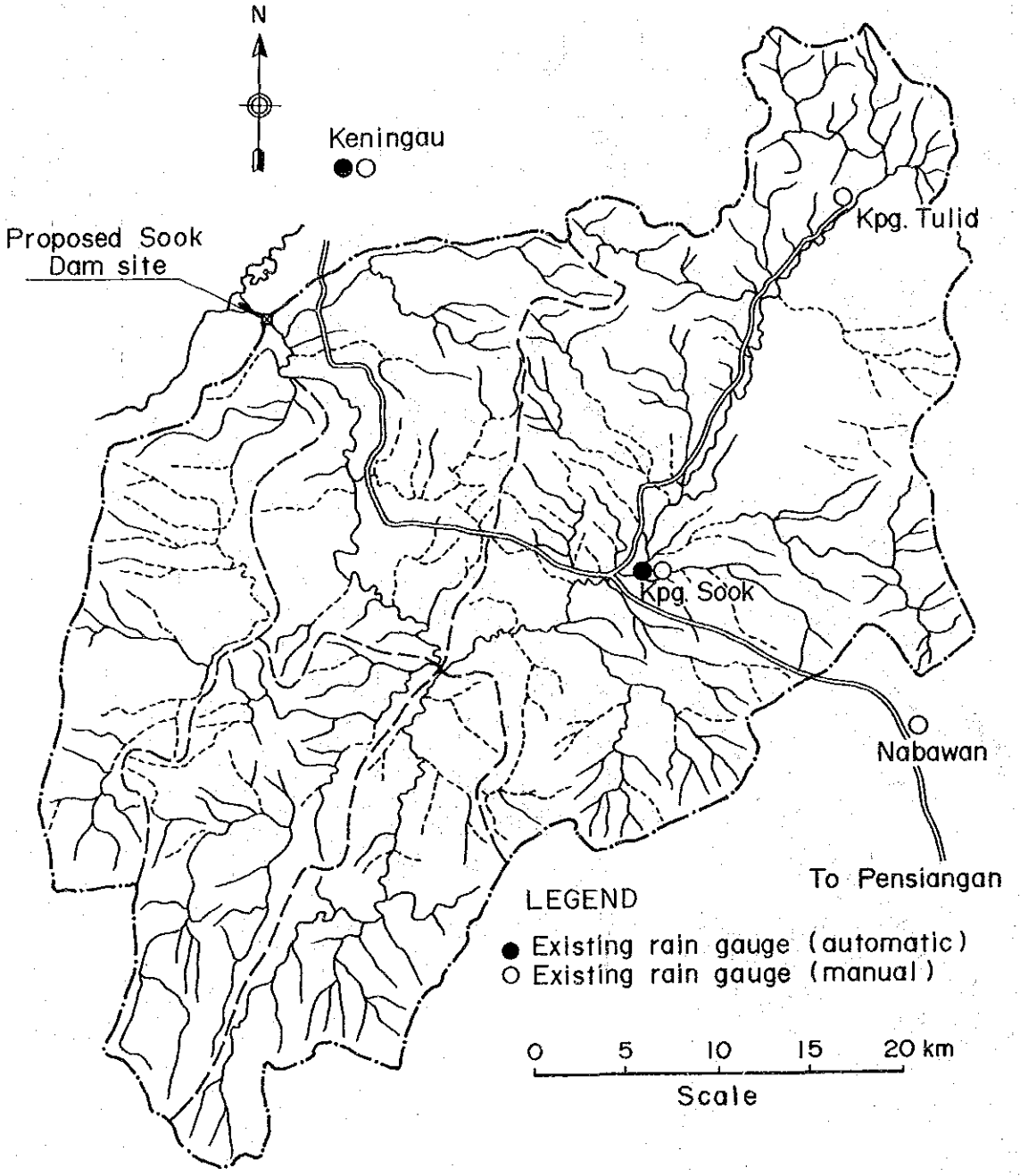


FIGURE NO. : A 2
LEGEND
DISCHARGE STATION : ▲
WATER LEVEL STATION : △
RAINFALL STATIONS
Recording : ●
Non-Recording : ○
0 10 20 km
N
MEMPAKUL
GODONG
KUALA PENYU
KIMANIS
MEMBAKUT
BONGAWAN
PUTATAN
KOTA KINABALU
PAPAR
KINARUT
KAWANG
WESTON
BEAUFORT
SUNSURON
TAMBUNAN
APINAPIN
KENINGAU
MELALAP
TENOM LAMA
FERRY
SAPONG
BIAS
KALAMPUN
KEMABONG
TULID
SOOK
BONOR
GULU TOMONI
NABAWAN
TENOM PANGI PHASE III
RAINFALL AND STREAM
GAUGING STATION
IN PADAS BASIN
SEB / JICA

FIGURE NO. : A 3



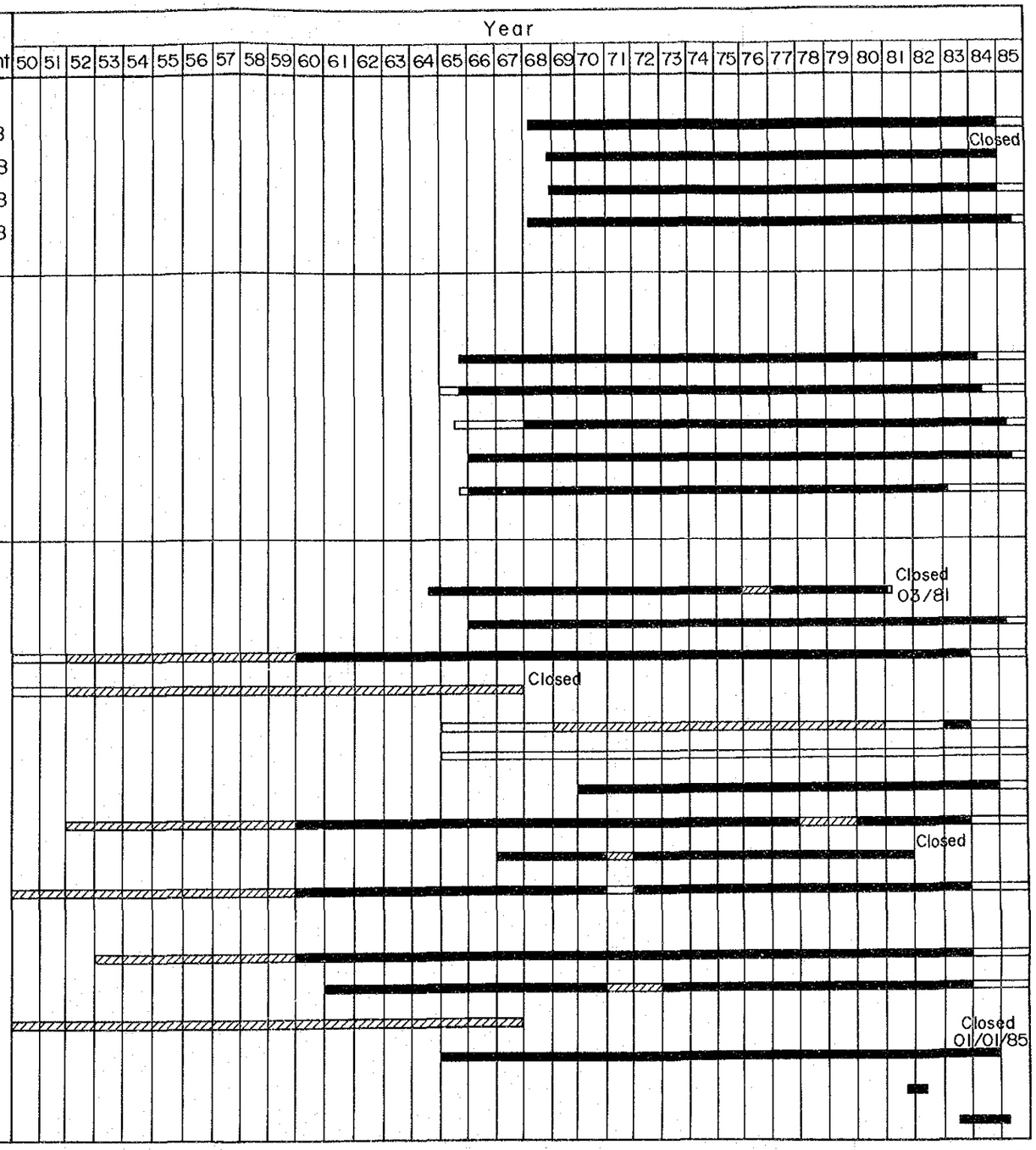
TENOM PANGI PHASE III

EXISTING RAINFALL
AND STREAM GANGING
STATIONS IN SOOK BASIN

SEB / JICA

FIGURE NO. : A4

Station No.	Station Name	Area (km³)/ Elevation(m)	Date of Establishment
RUNOFF RECORDS			
4959401	Kemabong on Padas	3184 km	29/01/68
5159401	Tenom Lama on Padas	7715 km	31/10/68
5261401	Ansip on Pegalan	2175 km	16/11/68
5261402	Biah on Sook	1683 km	27/01/68
RAINFALL RECORDS			
Recording Type (automatic gauge with manual gauge)			
4959001	Kemabong	183 m	01/66
5163002	Kg. Sook	350 m	01/65
5361002	Keningau Met. St.	290 m	05/65
5462001	Apin Apin	350 m	01/66
5663001	Tambunan Agr. St.	680 m	08/65
Non-recording Type (manual gauge only)			
4358001	Ulu Tomani	396 m	07/64
5059001	Batu Bajau	210 m	01/66
5059002	Sapong Estate	183 m	01/24
5159001	Tenom	195 m	01/21
5159001	Tenom Cocoa Research	195 m	01/65
5163001	Kg. Sook	244 m	01/65
5164001	Nabawan	579 m	01/70
5260001	Melalap Estate	183 m	01/52
5261001	Biah Scheme	259 m	06/67
5361001	Keningau	305 m	01/18
5364001	Tulid	366 m	01/53
5462003	Apin Apin	457 m	01/61
	Tambunan	572 m	01/18
5763001	Sunsuron Agr. St.	549 m	01/65
	Pangi Damsite		
	Mini Secretiat Tenom		



Daily records collected

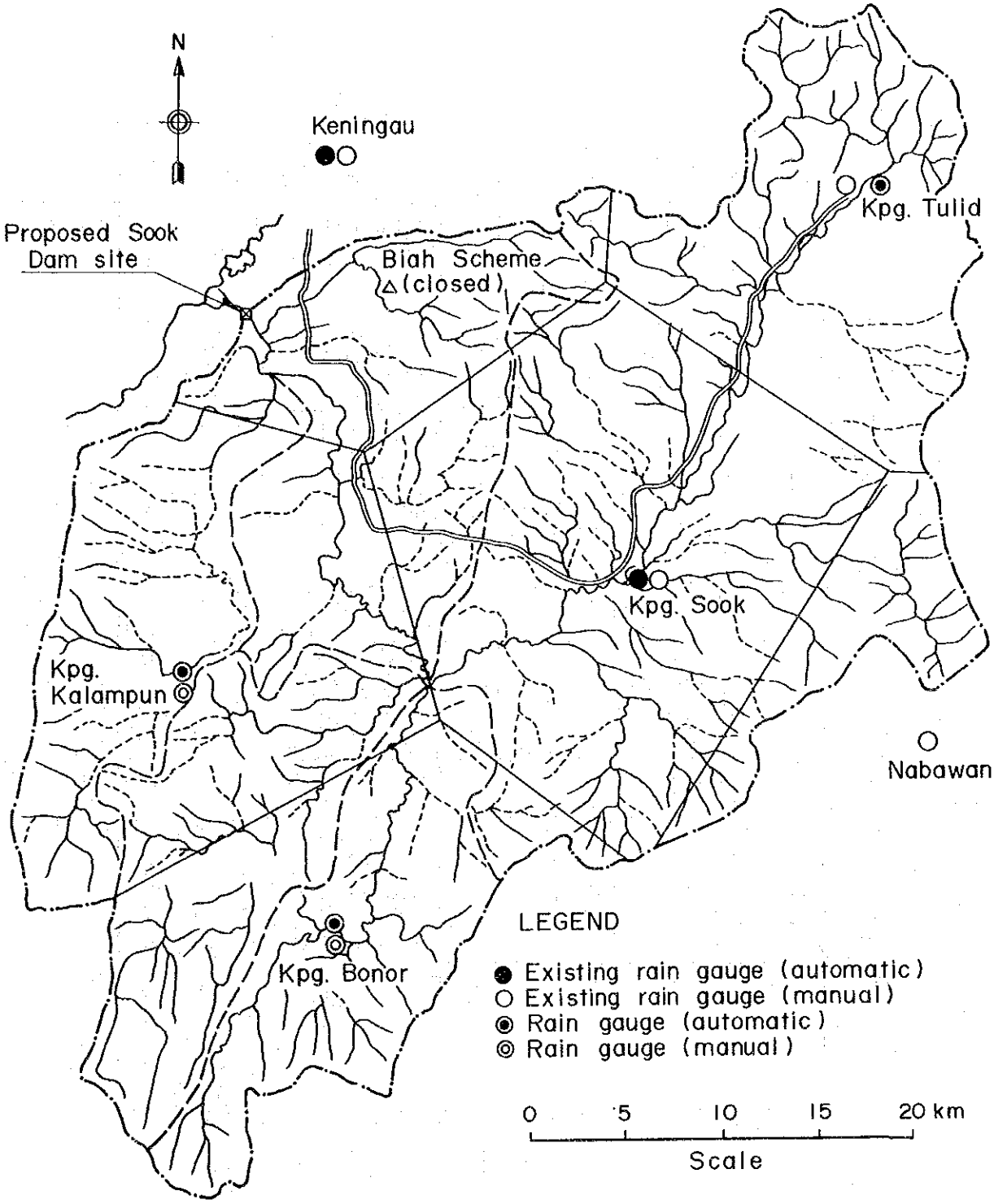
Only monthly records collected

TENOM PANGI PHASE III

AVAILABLE RAINFALL AND RUNOFF RECORDS

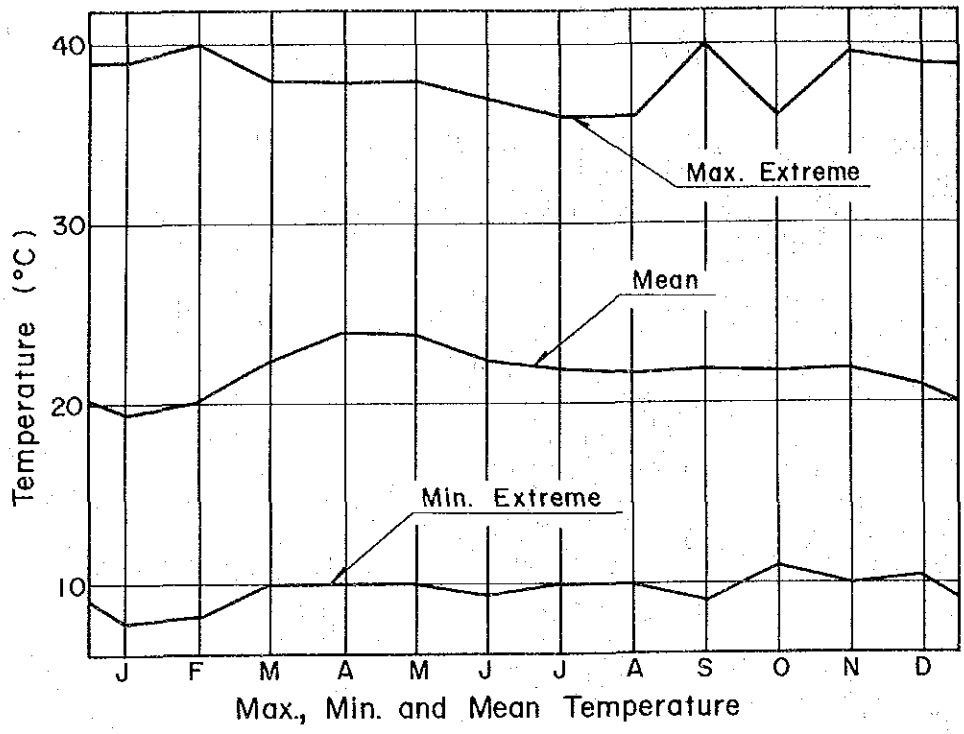
SEB / JICA

FIGURE NO. : A5

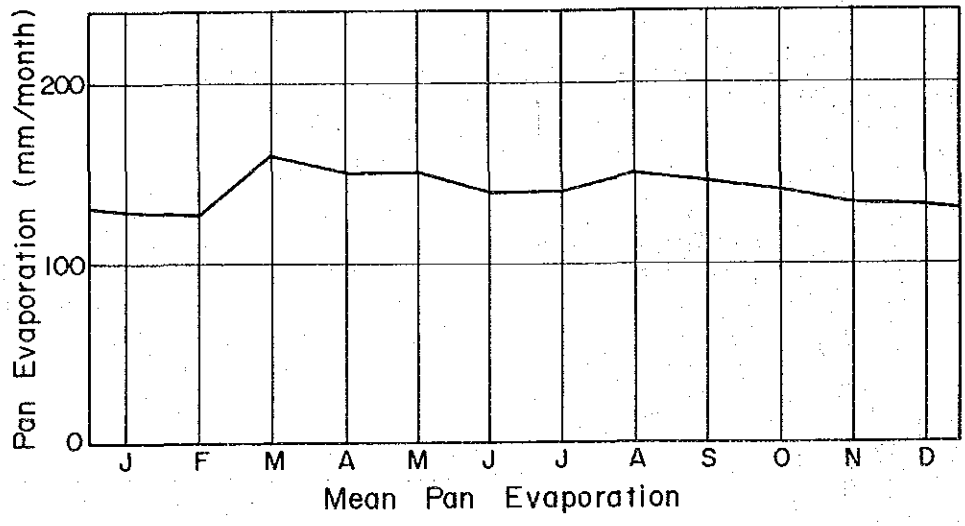


TENOM PANGI PHASE III
EXISTING AND PLANNED RAIN GAUGES IN SOOK BASIN
SEB / JICA

FIGURE NO. : A6



Max., Min. and Mean Temperature



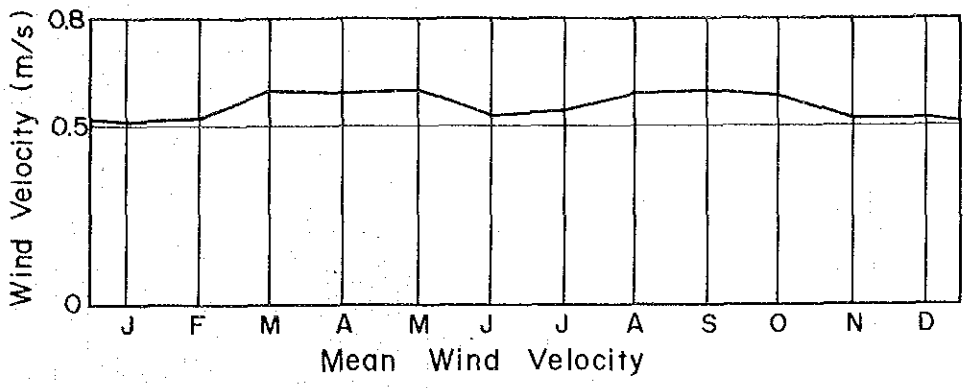
Mean Pan Evaporation

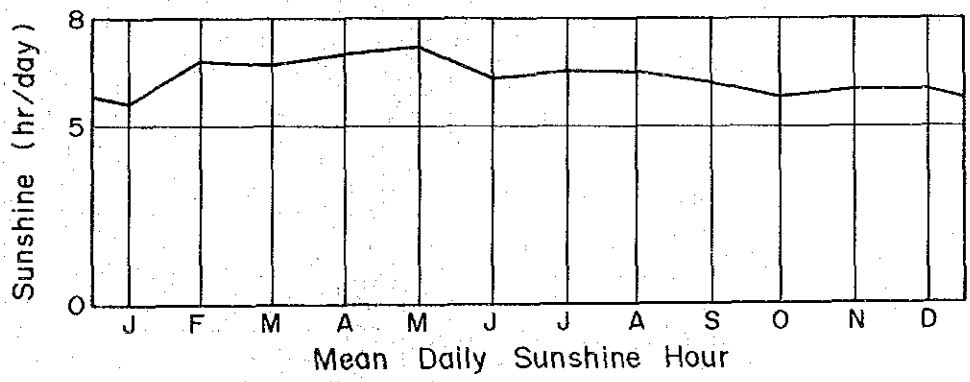
TENOM PANGI PHASE III

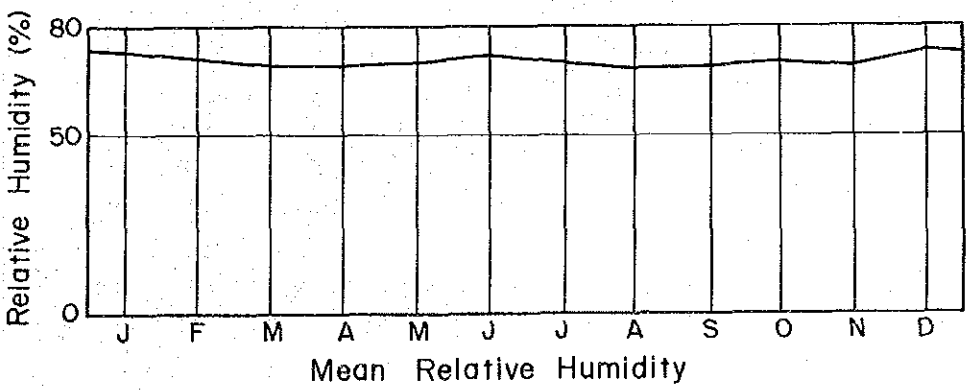
MEAN MONTHLY PATTERN OF TEMPERATURE AND PAN EVAPORATION AT KENINGAU

SEB / JICA

FIGURE NO. : A 7

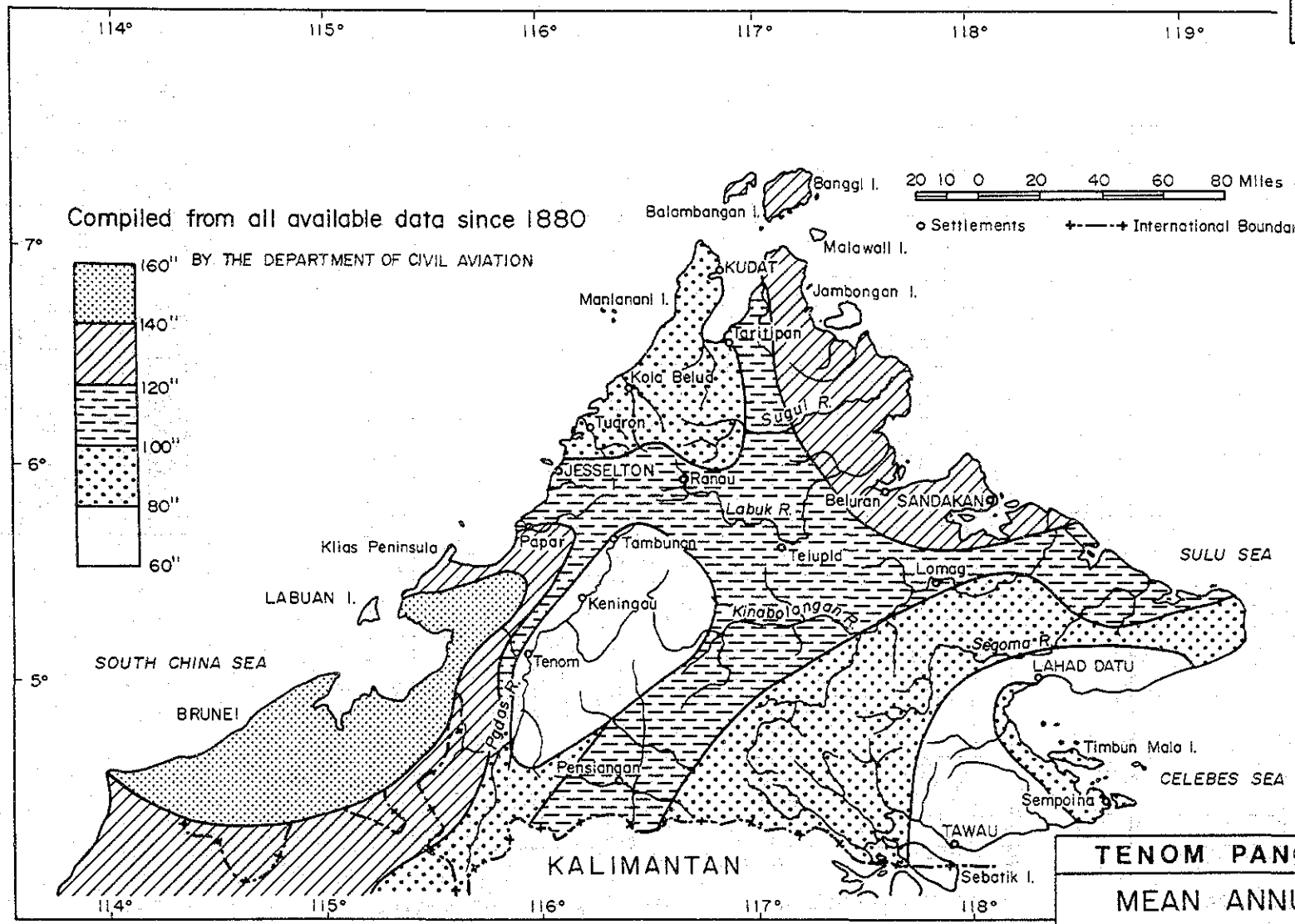






TENOM PANGI PHASE III
MEAN MONTHLY PATTERN OF WIND SPEED SUNSHINE HOUR AND RELATIVE HUMIDITY AT KENINGAU
SEB / JICA

FIGURE NO. :A 8

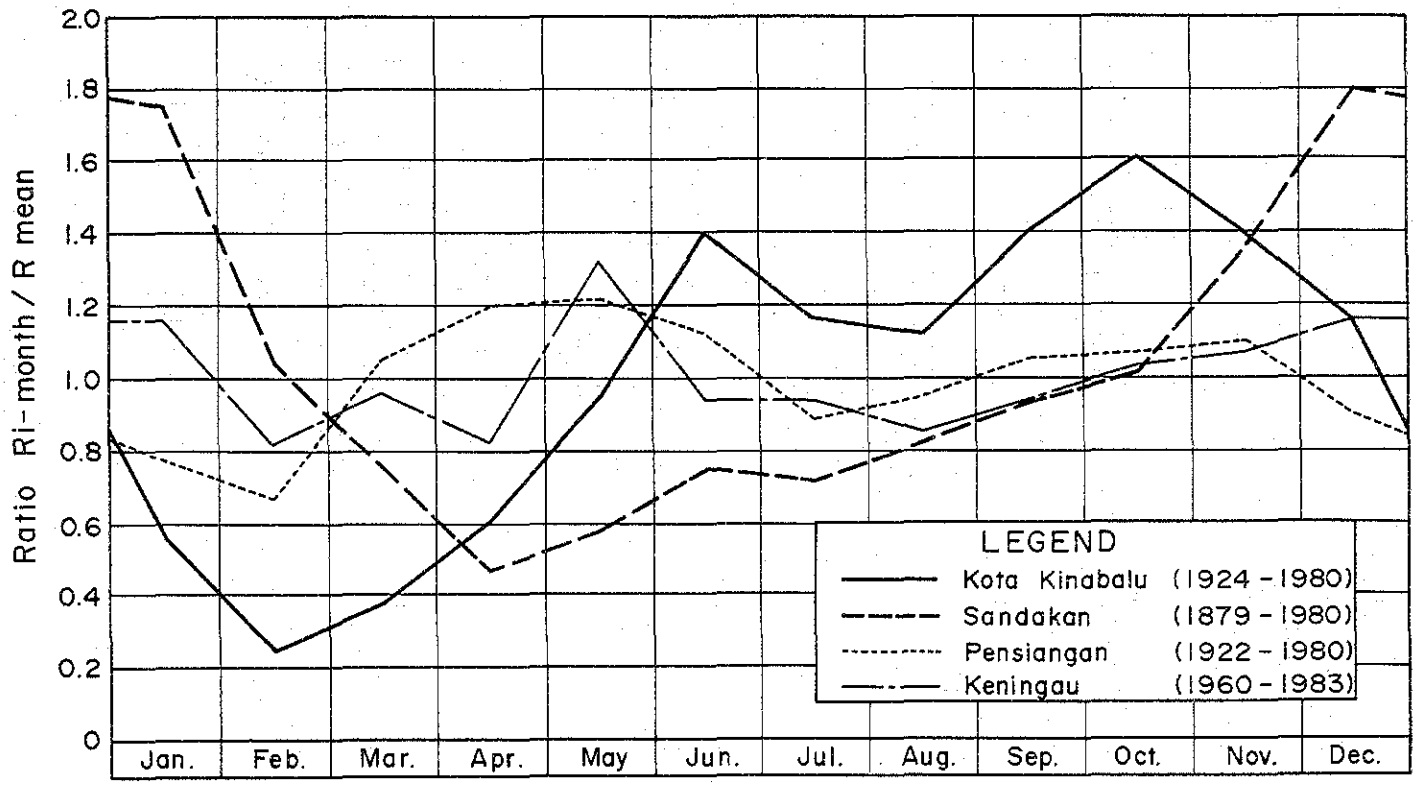


TENOM PANGI PHASE III

MEAN ANNUAL RAINFALL
IN
SABAH

SEB / JICA

FIGURE NO. : A 9

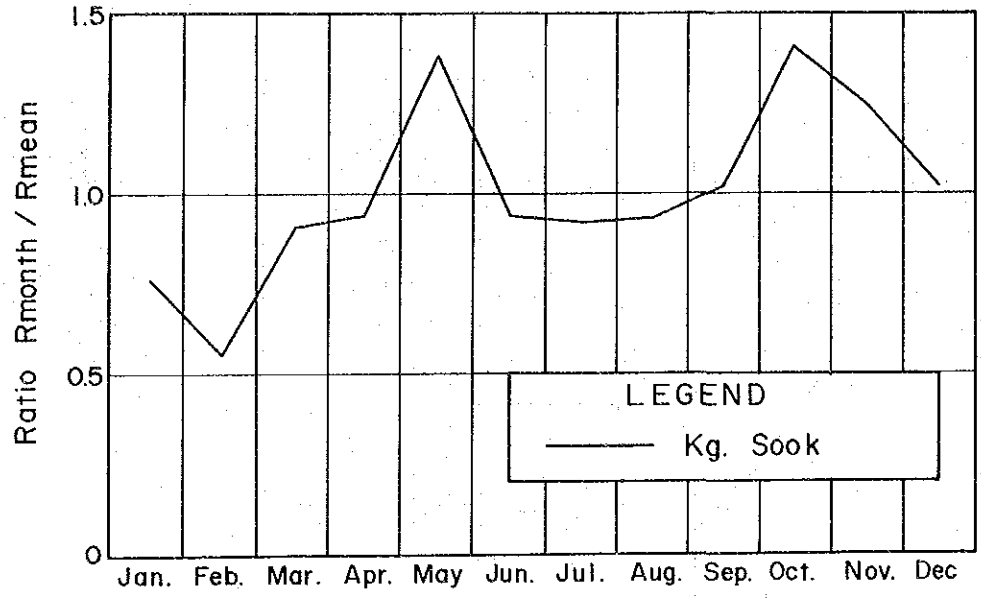


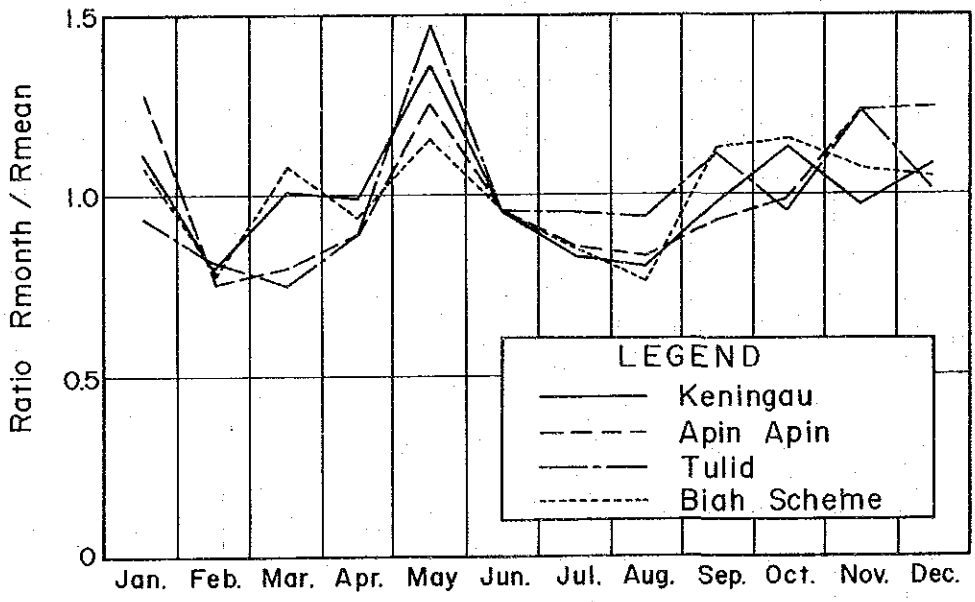
TENOM PANGI PHASE III

MEAN MONTHY PATTERN
OF
RAINFALL IN SABAH

SEB / JICA

FIGURE NO. :A10



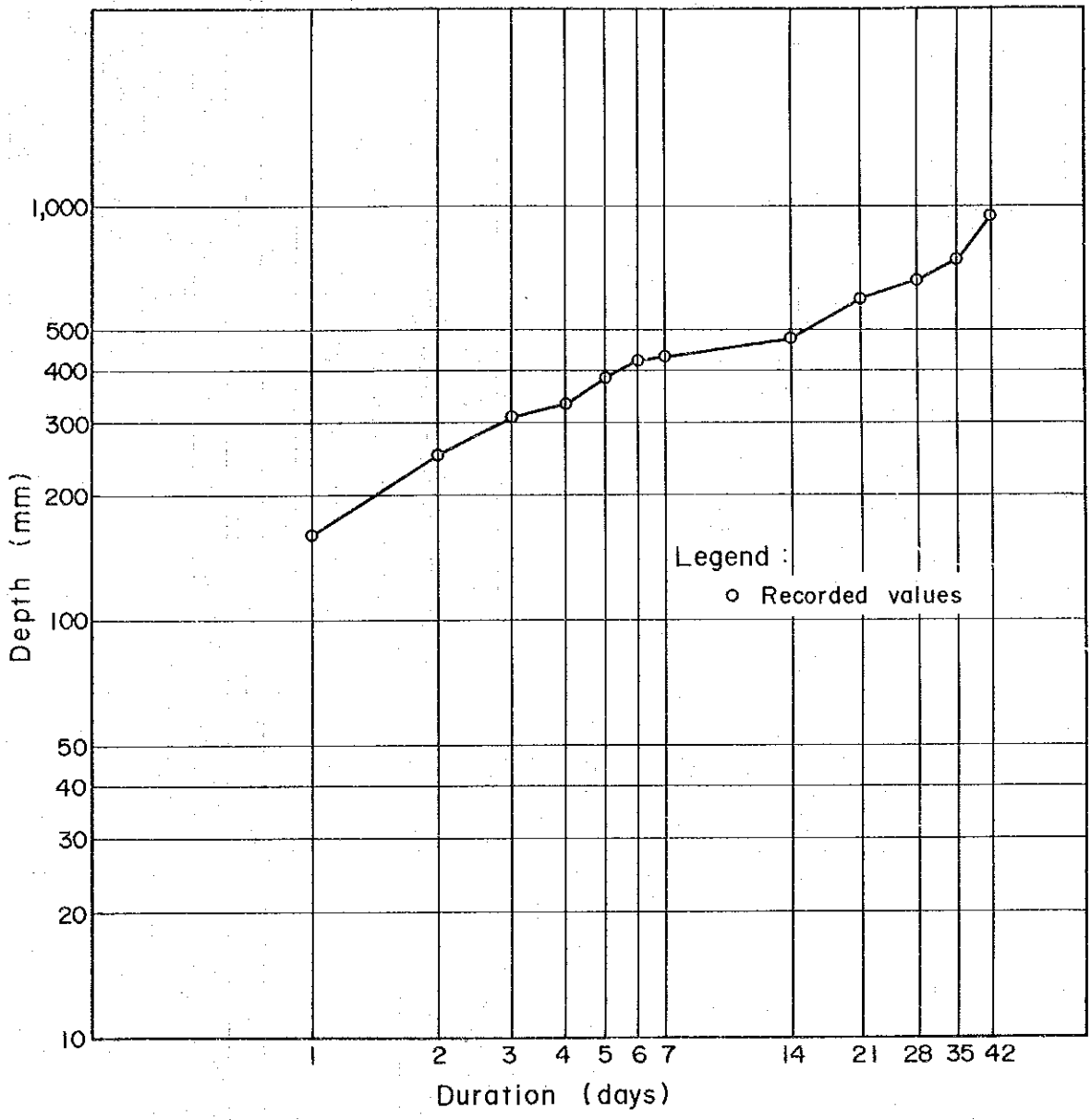


TENOM PANGI PHASE III

MEAN MONTHLY PATTERN OF RAINFALL IN PADAS BASIN

SEB / JICA

FIGURE NO. : A11

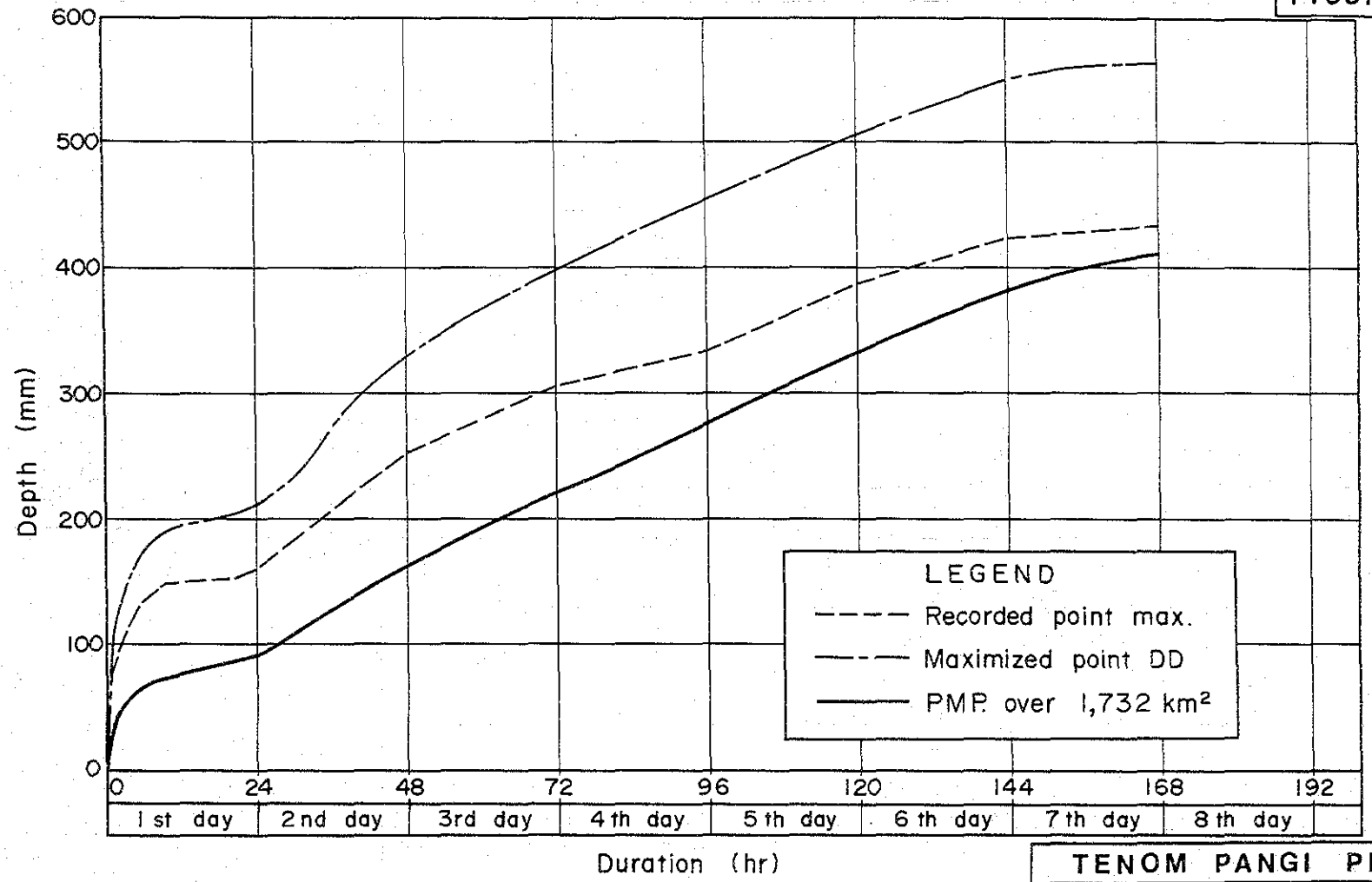


TENOM PANGI PHASE III

RECORDED MAXIMUM DEPTH-DURATION IN AND AROUND SOOK BASIN (FOR DURATIONS OF 1DAY TO 6 WEEKS)

SEB / JICA

FIGURE NO. : A 12

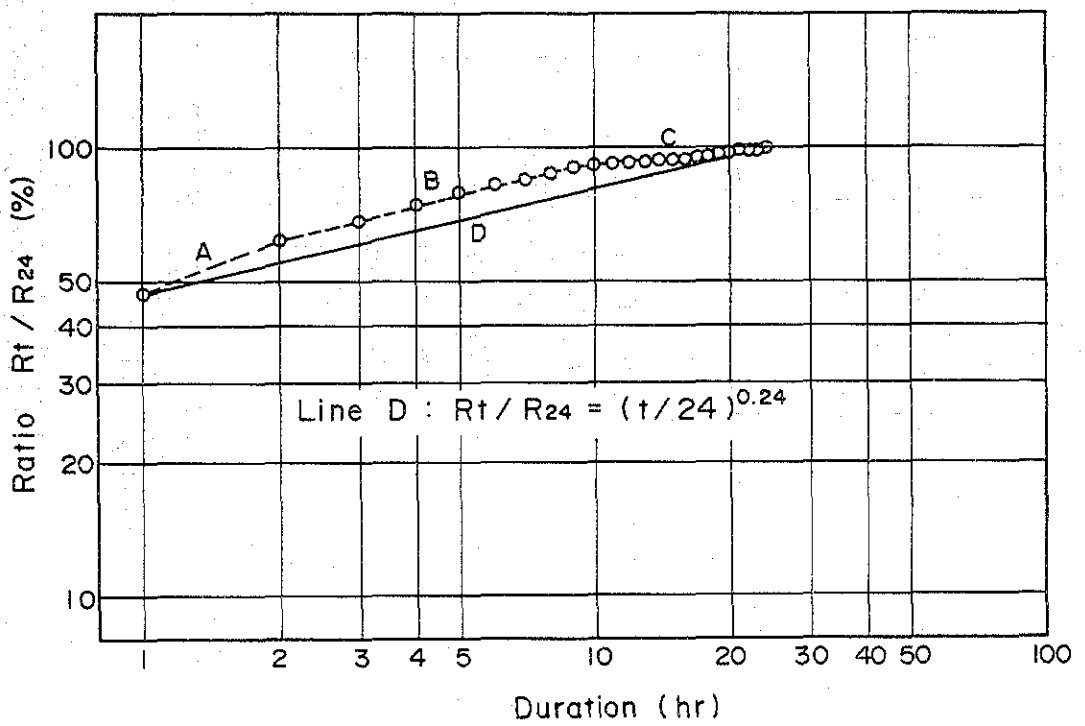


TENOM PANGI PHASE III

MAXIMUM DEPTH - DURATION
FOR
SOOK BASIN

SEB / JICA

FIGURE NO. :A13

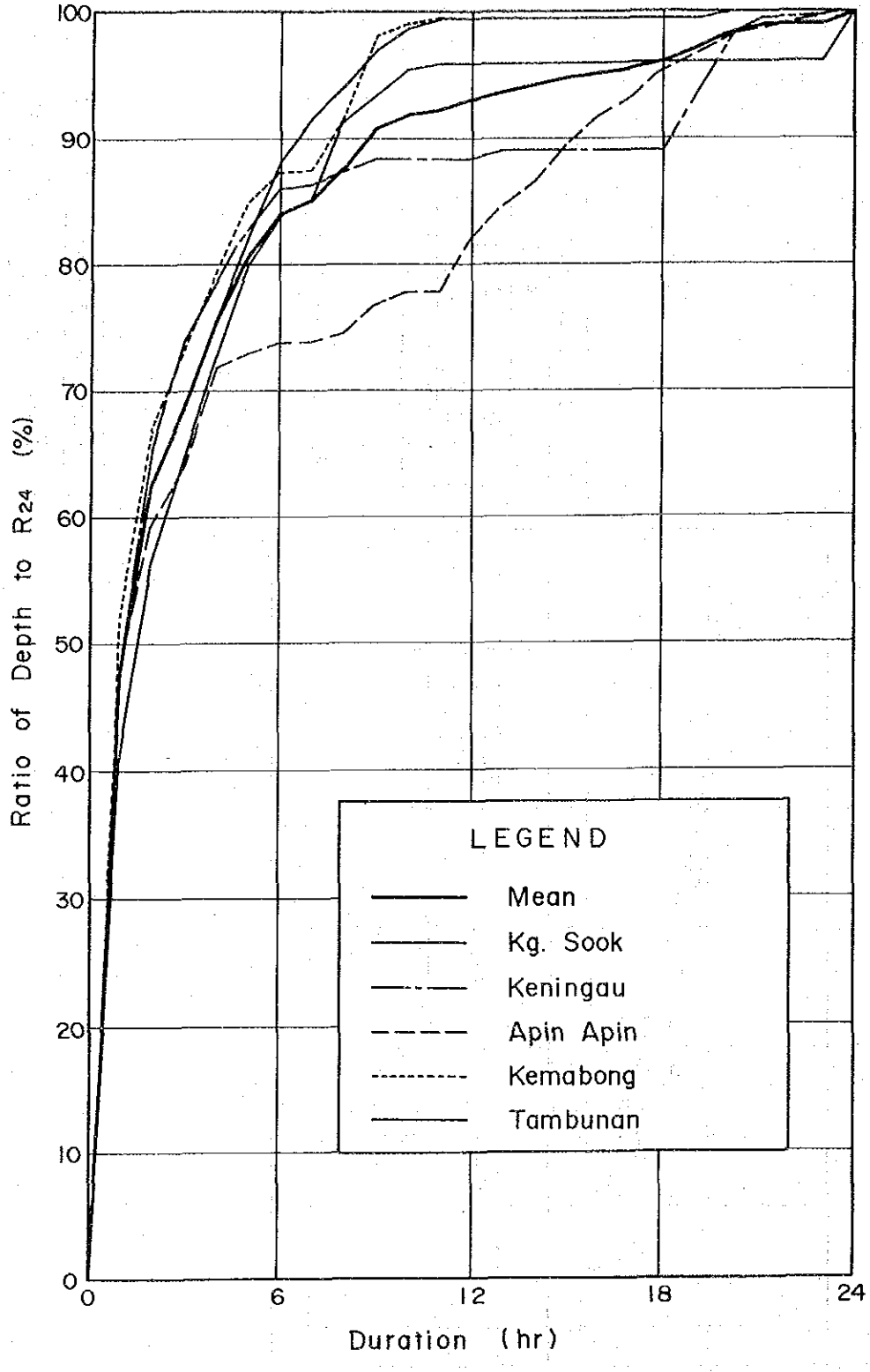


Line	Gradient
A	0.39
B	0.25
C	0.10
D	0.24

Note : Rt = rainfall in t hr

TENOM PANGI PHASE Ⅲ
MEAN DEPTH-DURATION PATTERN FOR 24 HOURS IN AND AROUND SOOK RIVER BASIN
SEB / JICA

FIGURE NO. : A14

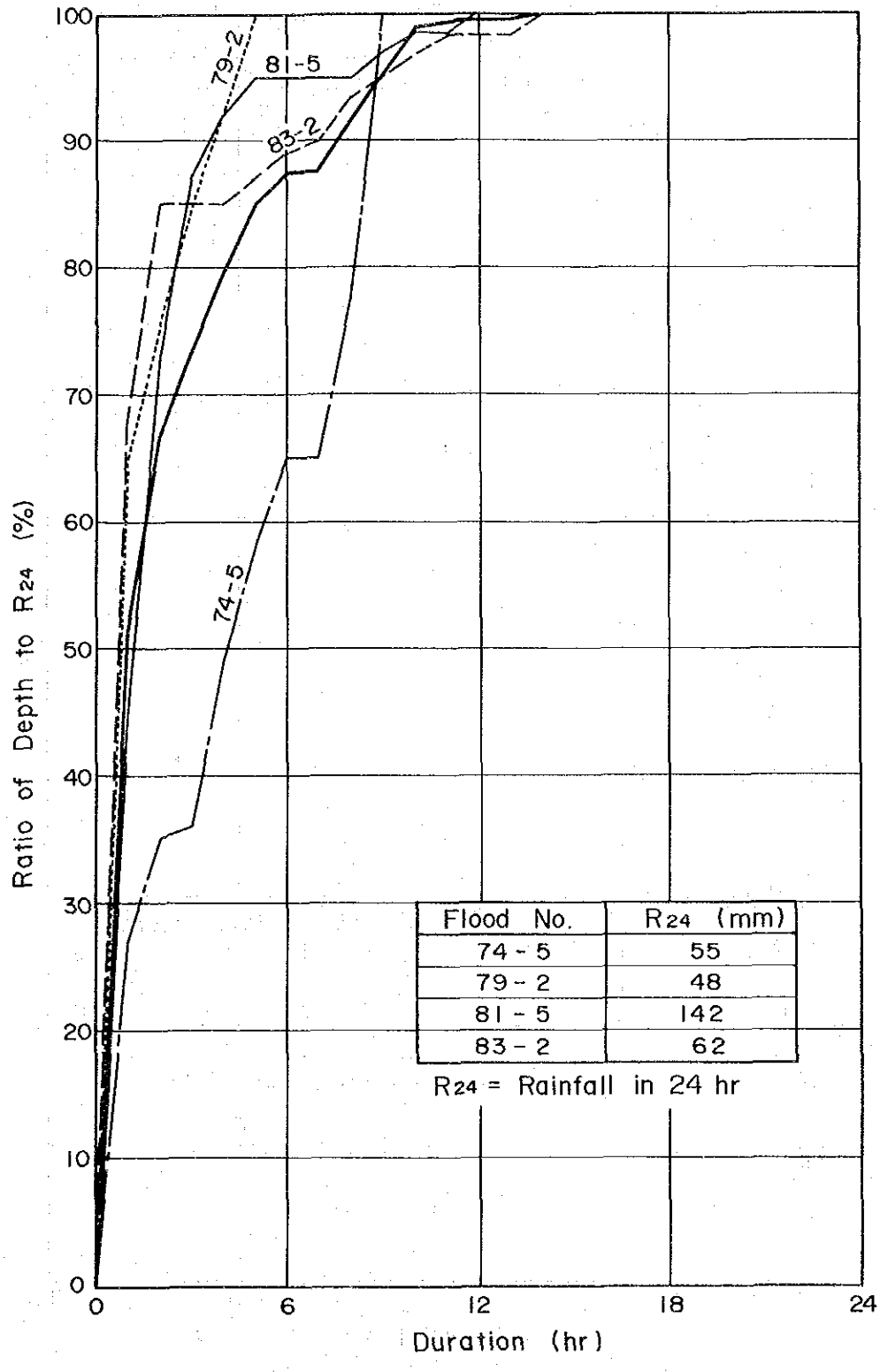


TENOM PANGI PHASE III

MEAN DEPTH-DURATION PATTERN AT 5 RAIN GAUGES IN PADAS BASIN (FOR DURATIONS FROM 1 HOUR TO 24 HOURS)

SEB / JICA

FIGURE NO. : A15

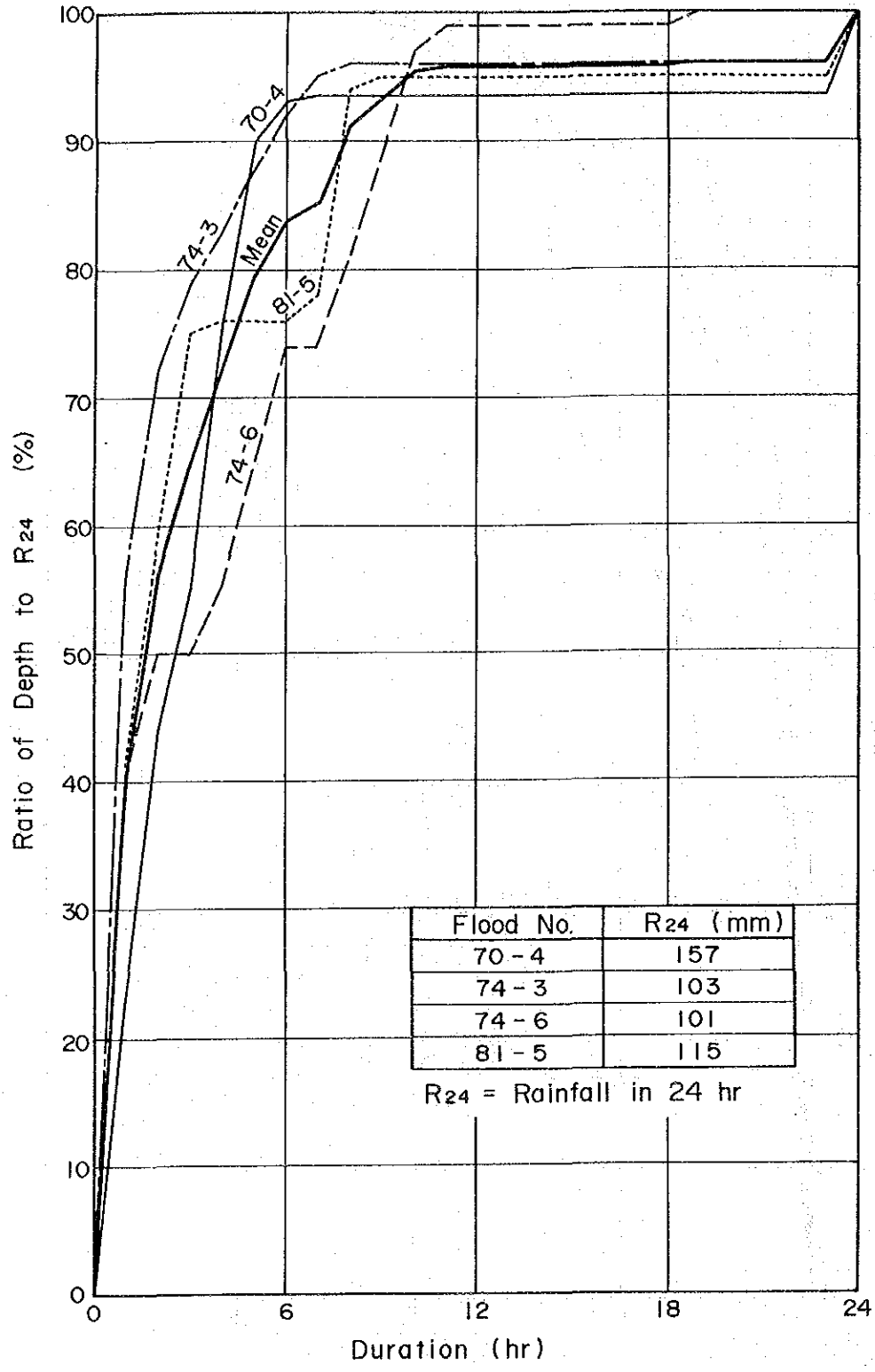


Flood No.	R24 (mm)
74 - 5	55
79 - 2	48
81 - 5	142
83 - 2	62

R24 = Rainfall in 24 hr

TENOM PANGI PHASE III
TYPICAL DEPTH-DURATION PATTERN FOR 24 HOURS AT KEMABONG (4959001)
SEB / JICA

FIGURE NO. : A16



Flood No.	R24 (mm)
70 - 4	157
74 - 3	103
74 - 6	101
81 - 5	115

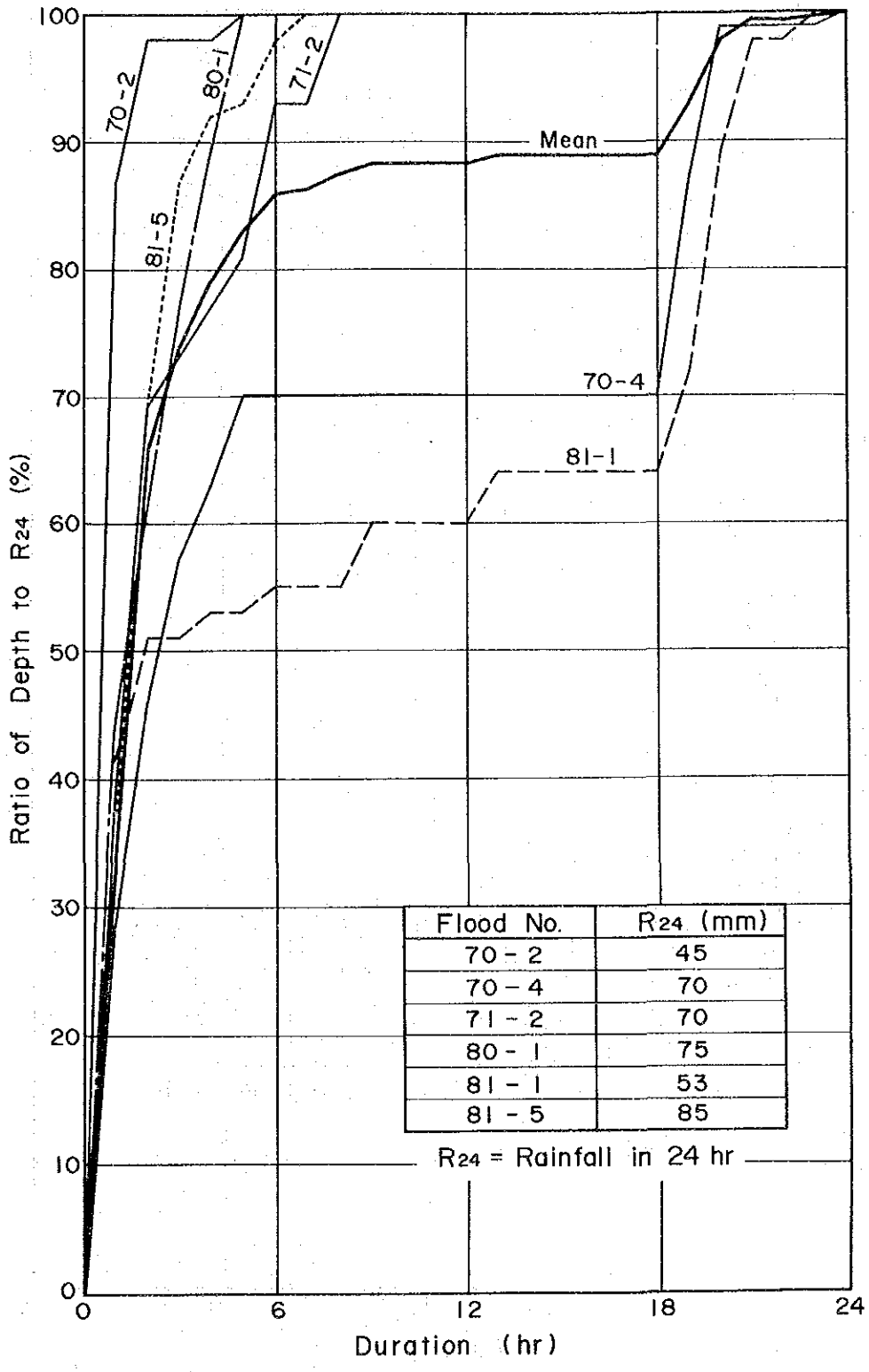
R24 = Rainfall in 24 hr

TENOM PANGI PHASE III

TYPICAL DEPTH-DURATION PATTERN FOR 24 HOURS AT KG. SOOK (5163002)

SEB / JICA

FIGURE NO. : A17



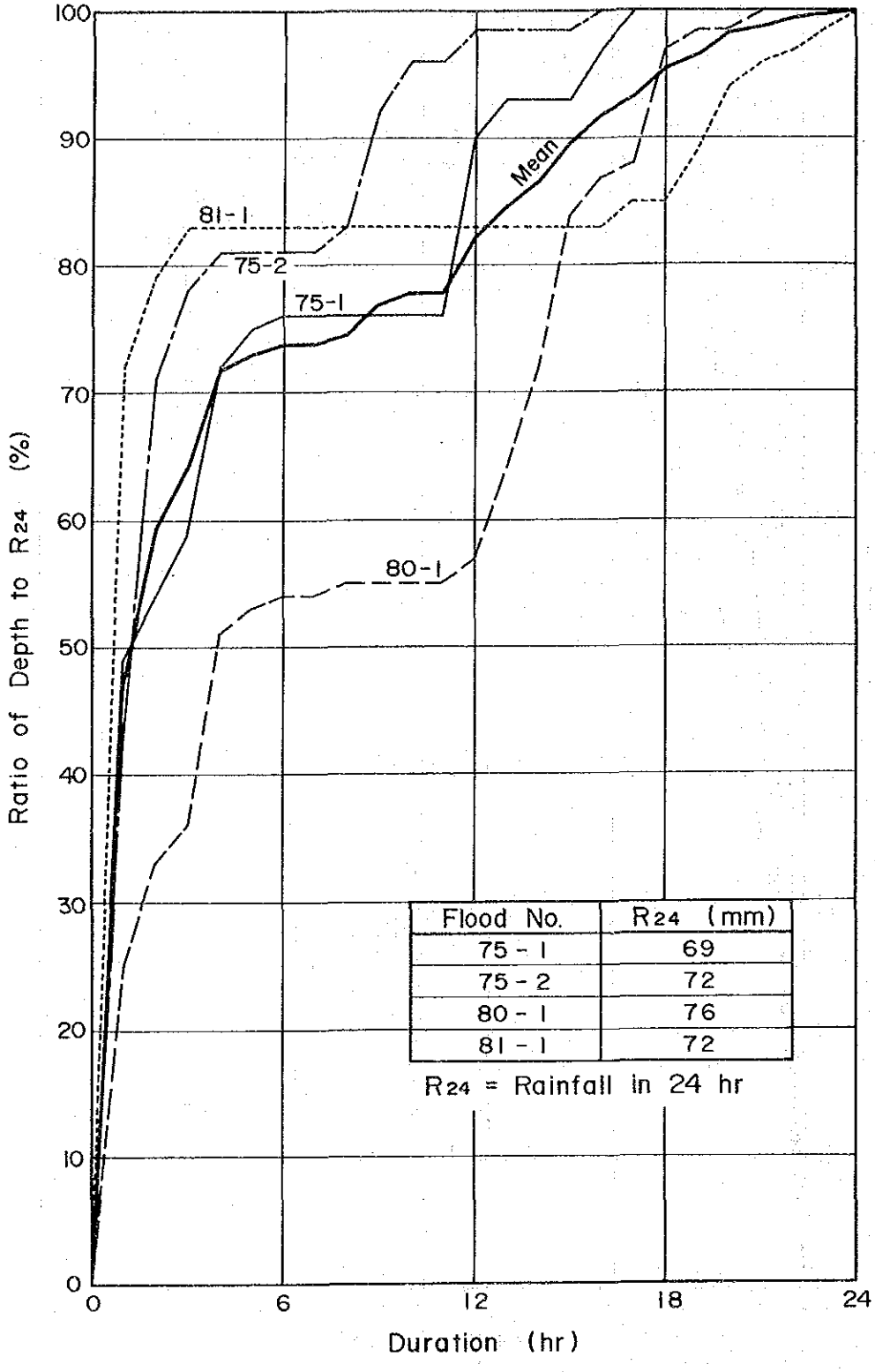
Flood No.	R24 (mm)
70 - 2	45
70 - 4	70
71 - 2	70
80 - 1	75
81 - 1	53
81 - 5	85

TENOM PANGI PHASE III

TYPICAL DEPTH-DURATION PATTERN FOR 24 HOURS AT KENINGAU M.S. (5361002)

SEB / JICA

FIGURE NO. :A18



Flood No.	R24 (mm)
75 - 1	69
75 - 2	72
80 - 1	76
81 - 1	72

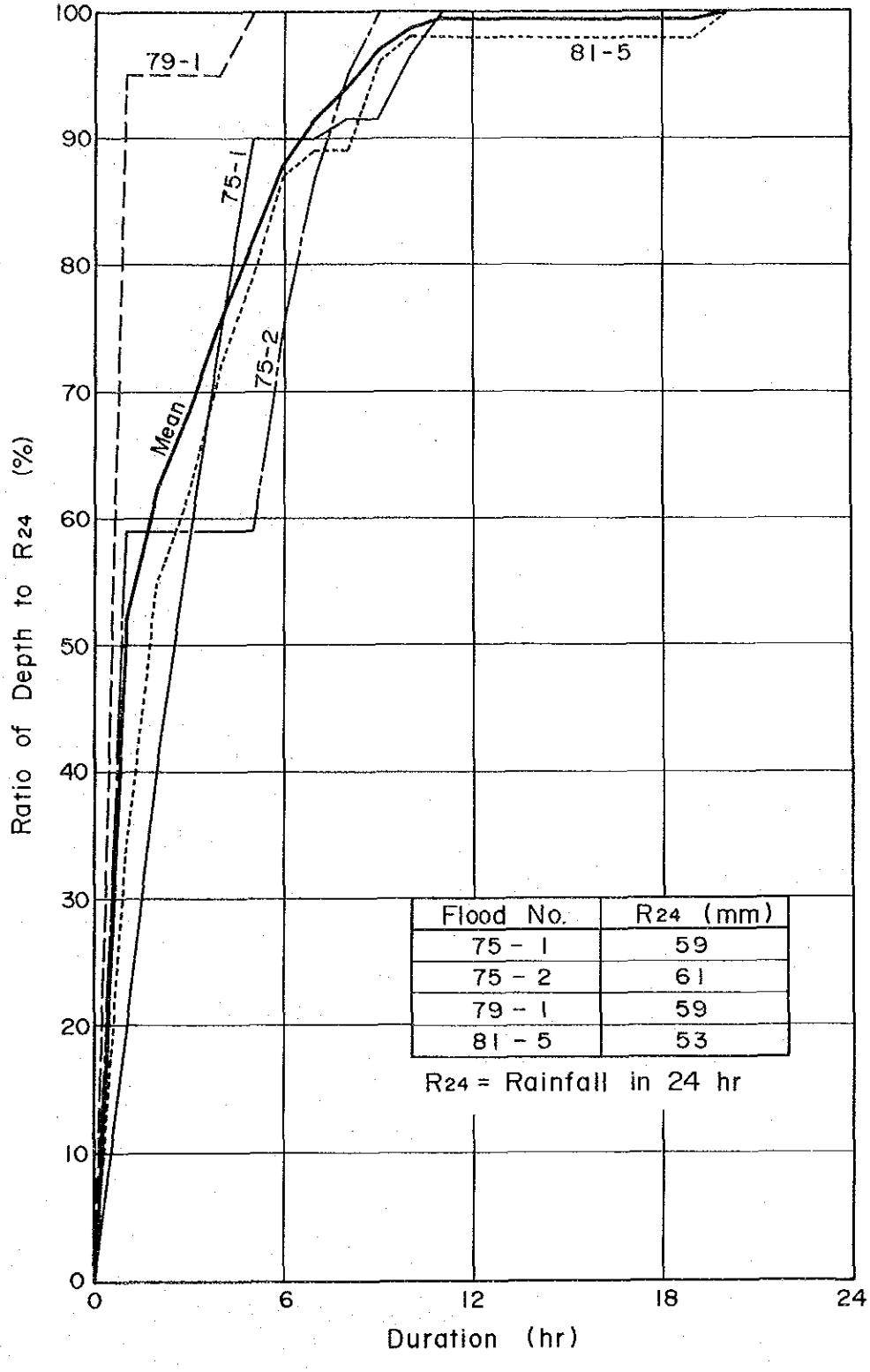
R24 = Rainfall in 24 hr

TENOM PANGI PHASE III

TYPICAL DEPTH-DURATION PATTERN FOR 24 HOURS AT APIN APIN (5462001)

SEB / JICA

FIGURE NO. : A19



Flood No.	R24 (mm)
75 - 1	59
75 - 2	61
79 - 1	59
81 - 5	53

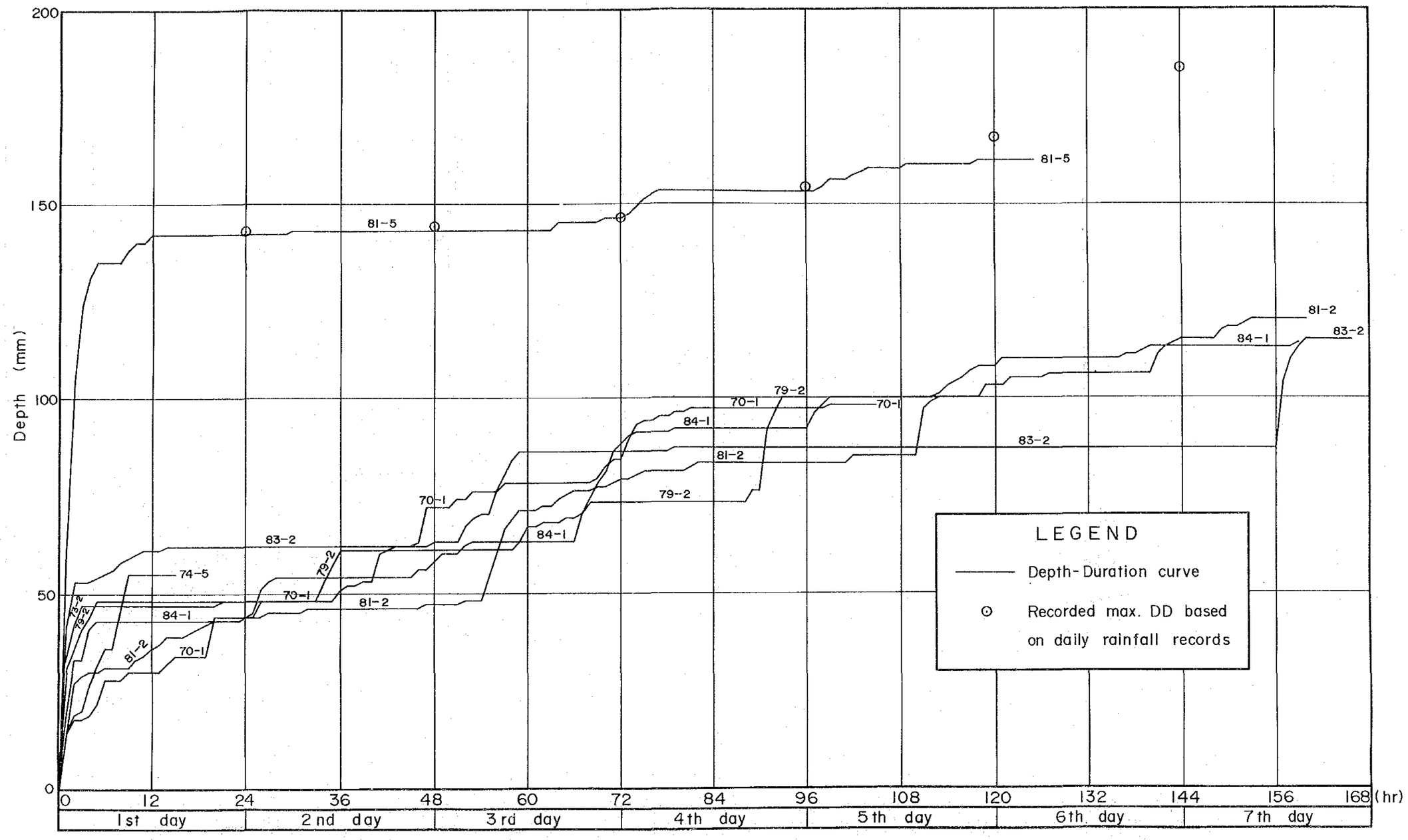
R24 = Rainfall in 24 hr

TENOM PANGI PHASE III

TYPICAL DEPTH-DURATION PATTERN FOR 24 HOURS AT TAMBUNAN A.S. (5663001)

SEB / JICA

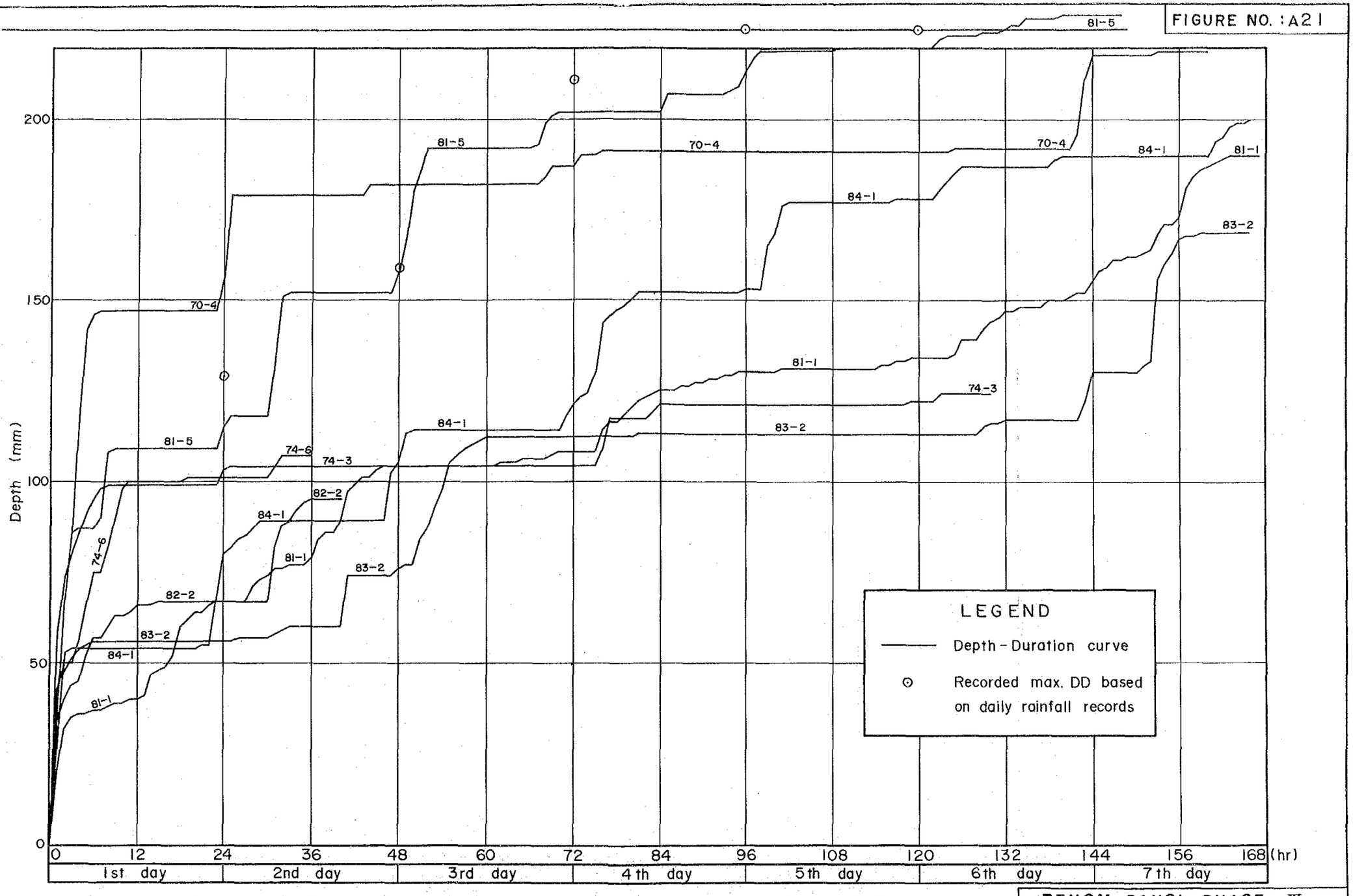
FIGURE NO. : A20



Note : Numbers attached to each curve show respective flood No.

TENOM PANGI PHASE III
DEPTH - DURATION RECORDS FOR 7 DAYS AT KEMABONG (4959001)
SEB / JICA

FIGURE NO. : A 2 1



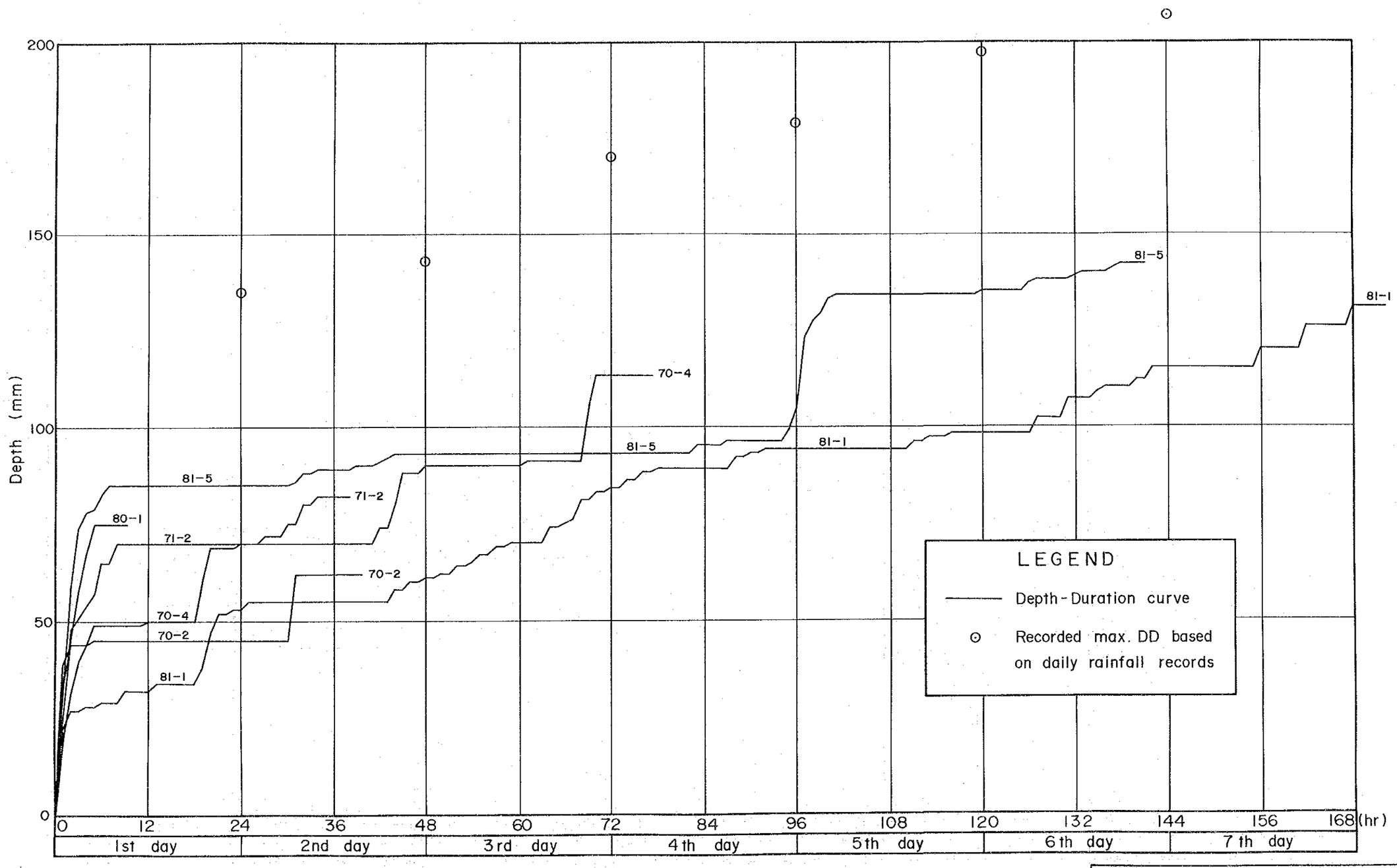
Note : Numbers attached to each curve show flood No.

TENOM PANGI PHASE III

DEPTH - DURATION RECORDS FOR 7 DAYS AT KG. SOOK (5163002)

SEB / JICA

FIGURE NO. :A22



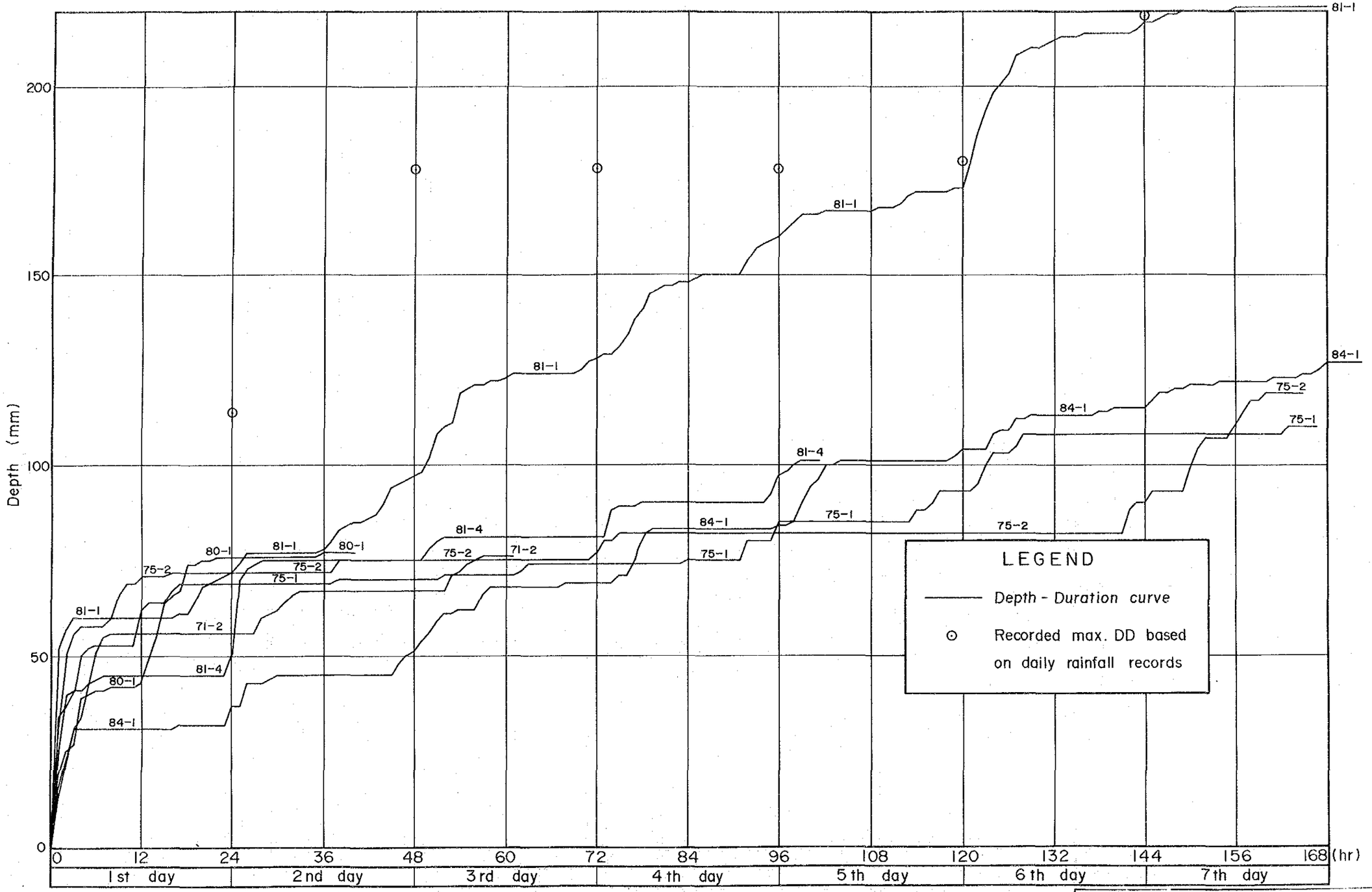
Note : Numbers attached to each curve show respective flood No.

TENOM PANGI PHASE III

DEPTH - DURATION RECORDS FOR 7 DAYS AT KENINGAU MET. ST.

SEB / JICA

FIGURE NO. :A23



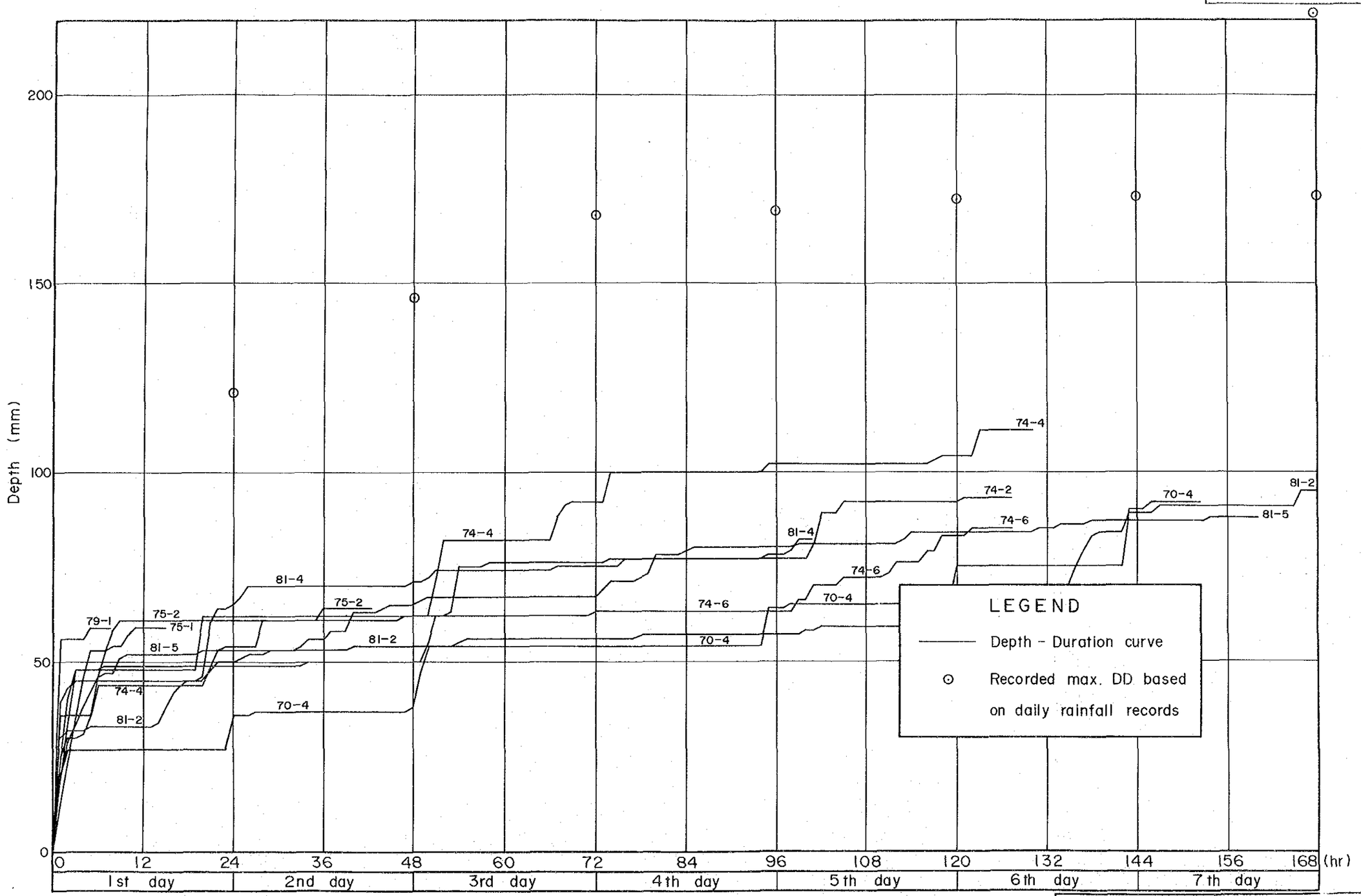
Note : Numbers attached to each curve show respective flood No.

TENOM PANGI PHASE III

DEPTH - DURATION RECORDS FOR 7 DAYS AT APIN APIN (5462001)

SEB / JICA

FIGURE NO. : A24



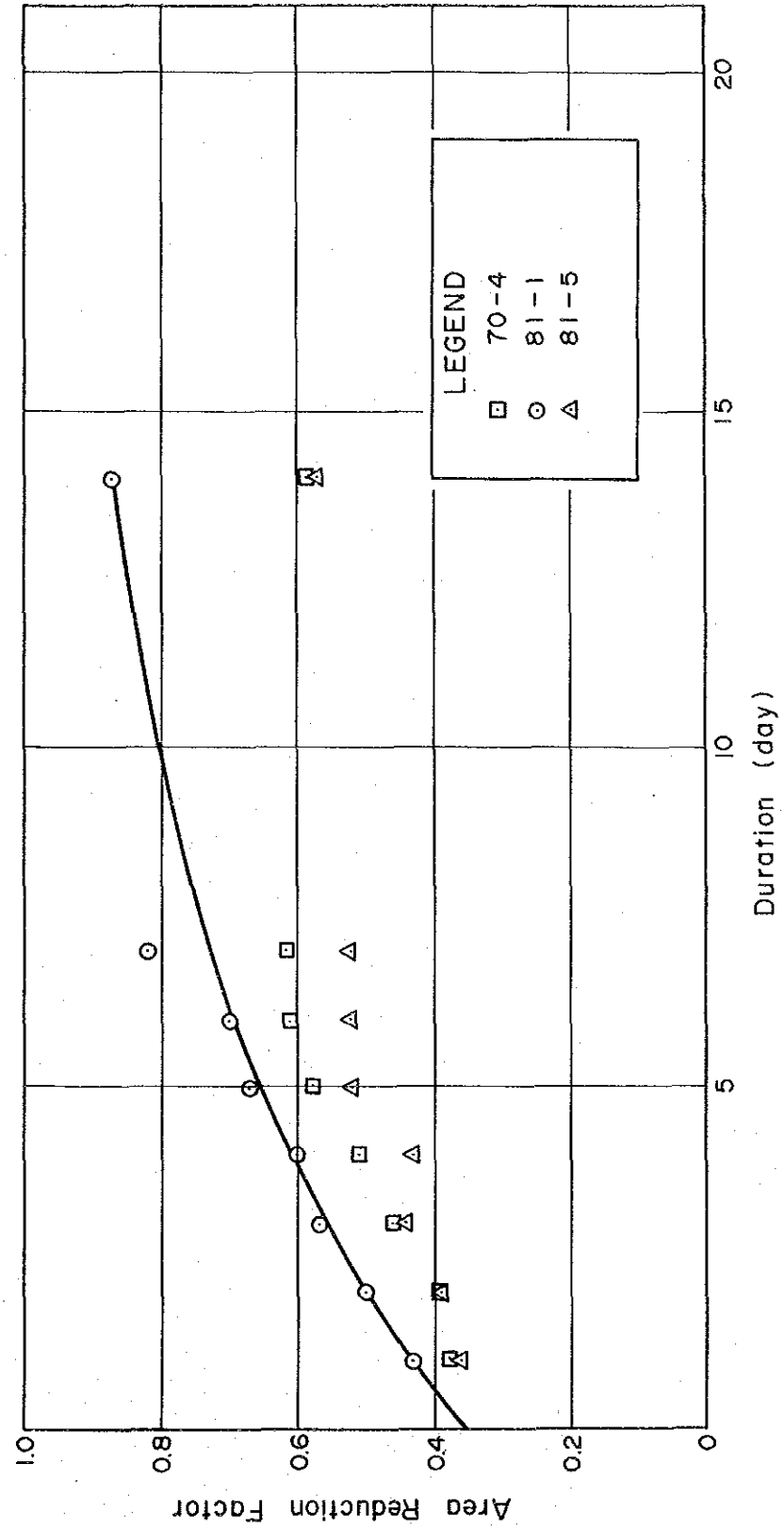
Note : Numbers attached to each curve show respective flood No.

TENOM PANGI PHASE III

DEPTH - DURATION RECORDS FOR 7 DAYS AT TAMBUNAN AGR. ST. (5663001)

SEB / JICA

FIGURE NO. : A25

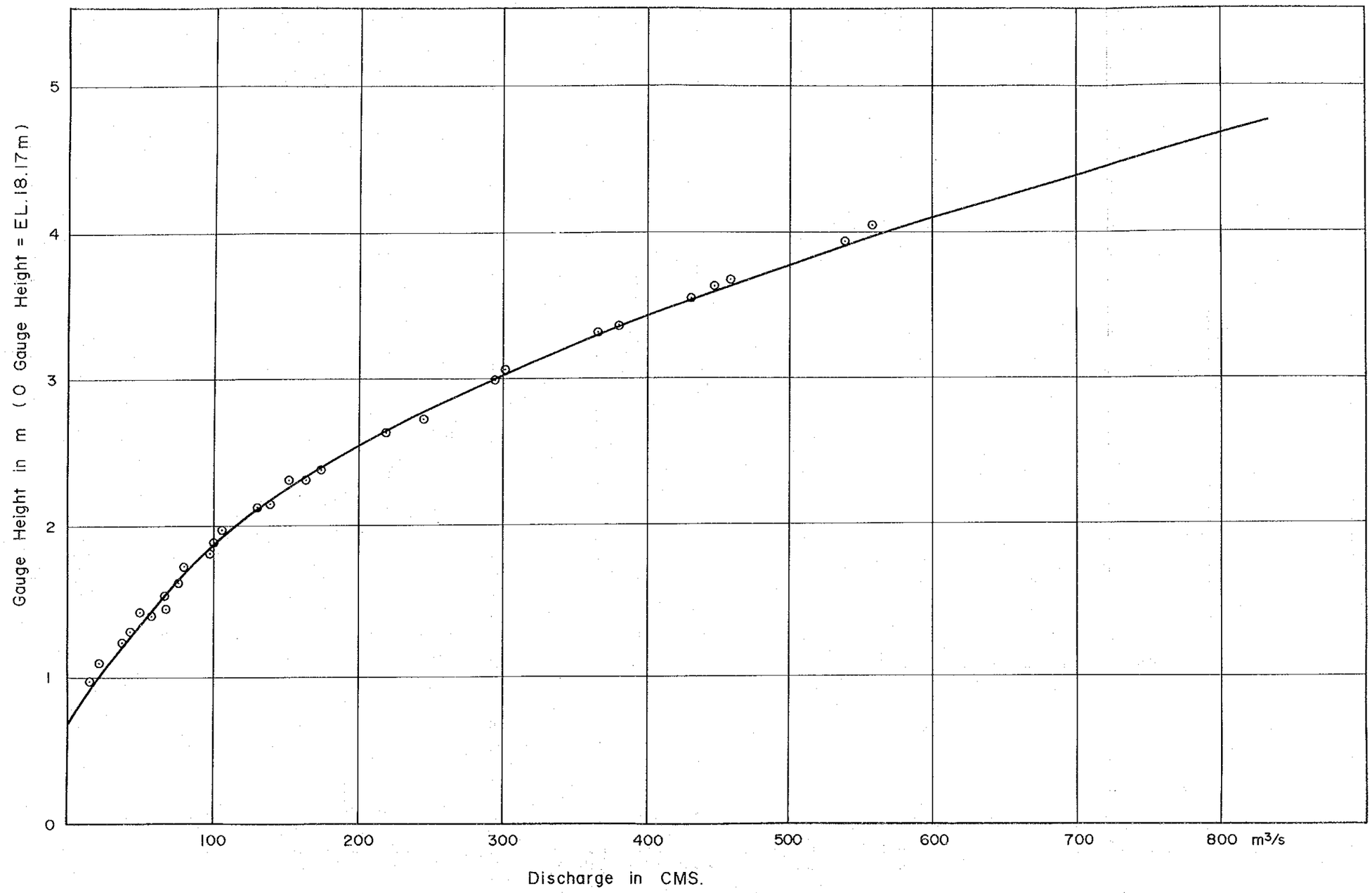


TENOM PANGI PHASE III

AREA REDUCTION FACTOR FOR RAINFALL OVER SOOK BASIN

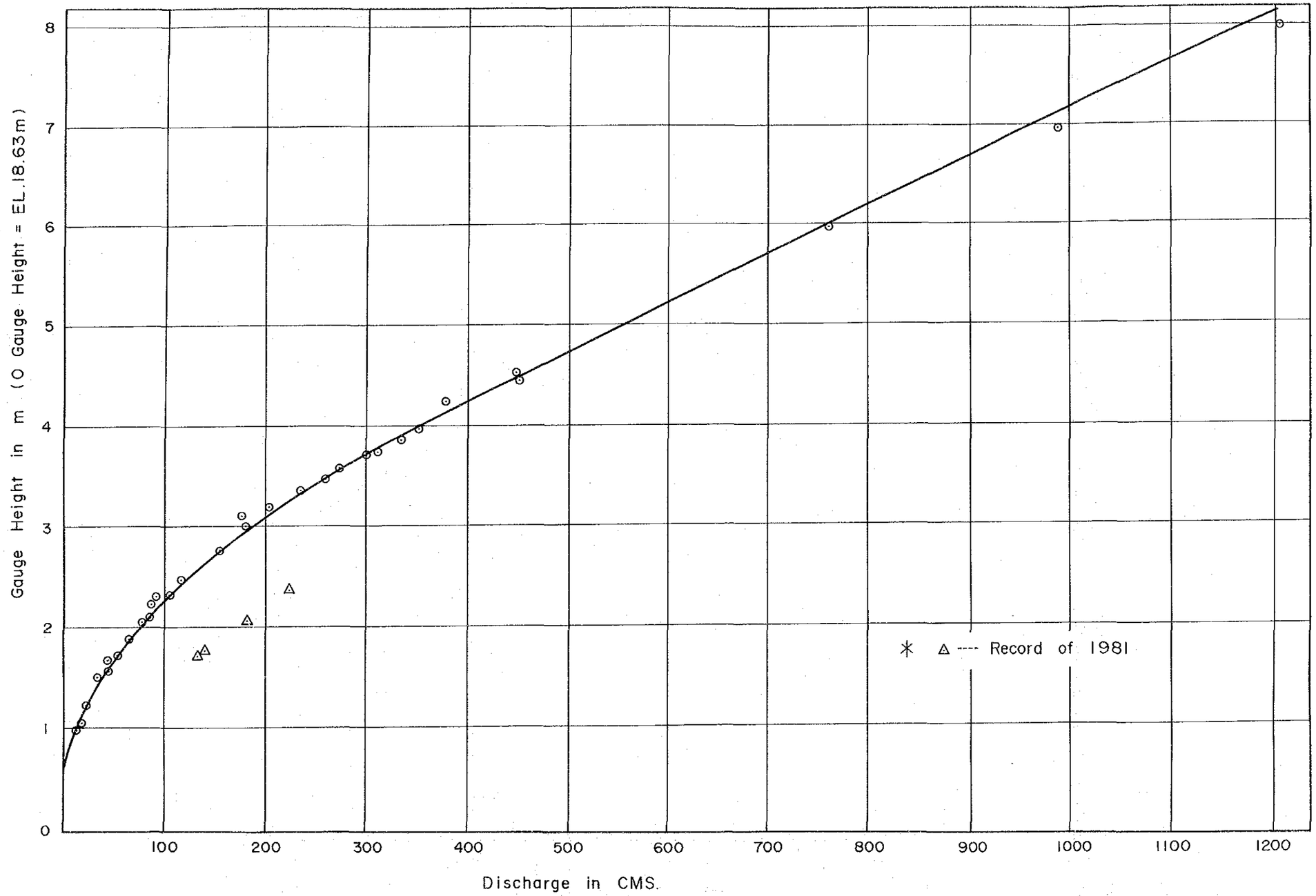
SEB / JICA

FIGURE NO. : A26



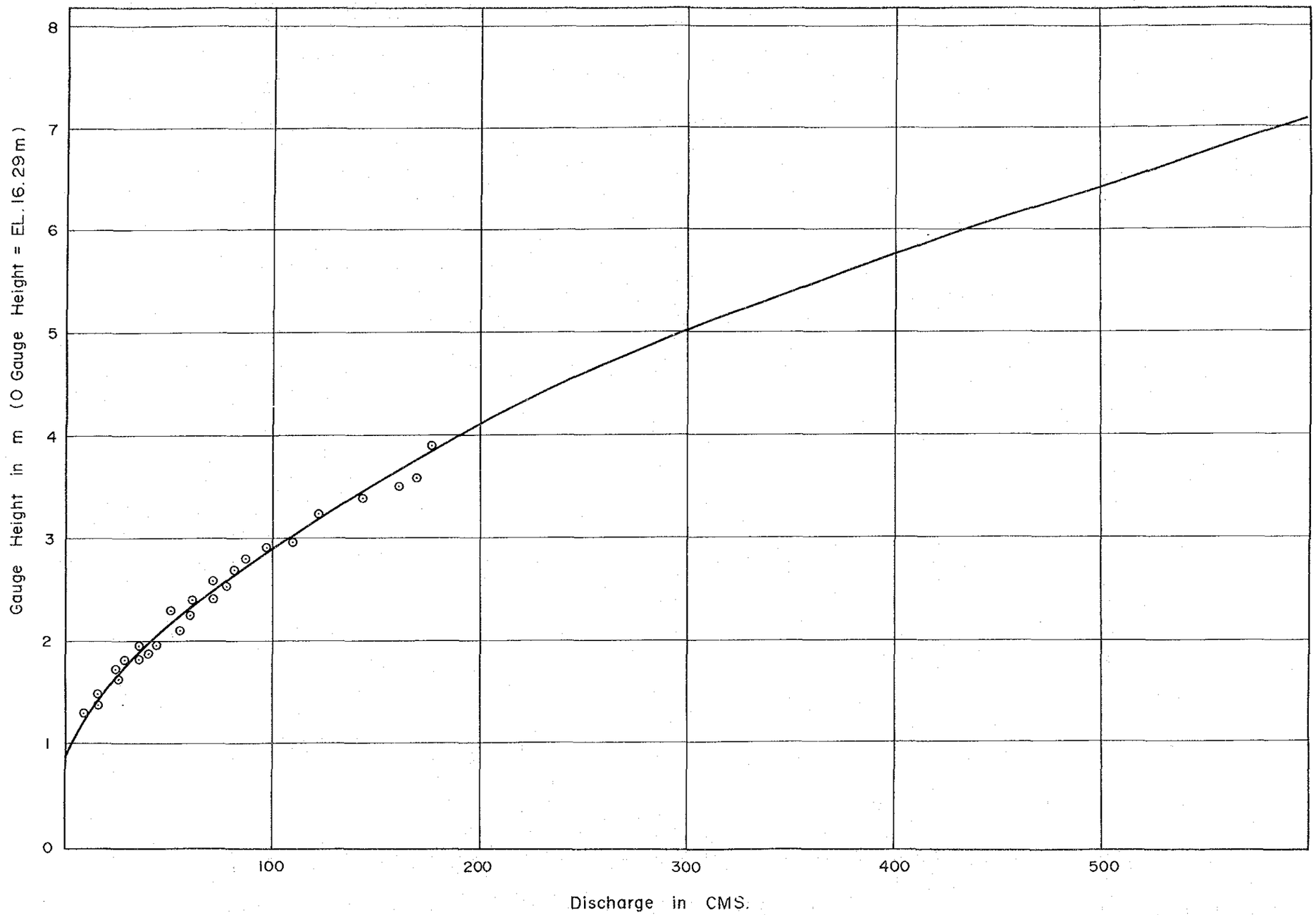
TENOM PANGI PHASE III
FLOW RATING CURVE OF PADAS RIVER AT KEMABONG (4959401)
SEB / JICA

FIGURE NO. :A27



TENOM PANGI PHASE III
FLOW RATING CURVE OF PADAS RIVER AT TENOM LAMA (5159401)
SEB / JICA

FIGURE NO. :A28



TENOM PANGI PHASE III
FLOW RATING CURVE OF PEGALAN AT ANSIP (5261401)
SEB / JICA