

ANNEXURE E : CATCHMENT RAINFALL

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E.1.

AERIAL RAINFALL FOR HOLOLO/NGOAJANE CATCHMENT

AVERAGE RAINFALL ON HOLOLO/NGOAJANE CATCHMENT

DETAILS OF RAINFALL STATIONS USED

SECTION	POSITION	PERIOD OF RECORD
0298	194	1935 TO 1999
0297	825	1935 TO 1999
0297	612	1935 TO 1999
0298	244	1935 TO 1999
0297	436	1935 TO 1999

	GAUGES	RAINFALL INPUT AS PERCENT M.A.P.												YEAR
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
1935	5	6.53	8.69	12.74	10.79	12.73	13.46	2.52	9.93	0.00	0.00	0.00	0.13	77.53
1936	5	11.88	29.77	13.27	27.60	19.90	14.23	2.05	0.33	0.00	0.33	0.07	1.25	120.68
1937	5	10.32	5.32	9.89	20.03	21.80	1.51	10.83	3.17	11.33	0.99	11.52	4.60	111.31
1938	5	12.00	5.34	11.18	15.16	22.63	5.22	3.33	8.41	1.05	3.74	5.27	4.60	97.93
1939	5	14.27	22.11	9.55	13.60	11.39	13.70	13.45	10.22	0.79	0.00	0.00	8.04	117.11
1940	5	2.69	15.14	19.75	13.50	17.51	7.20	11.39	0.60	0.19	2.83	0.00	6.07	96.88
1941	5	14.37	0.66	6.80	23.70	13.35	18.51	9.50	4.08	1.04	0.00	6.93	3.72	102.65
1942	5	12.79	13.52	26.33	19.77	7.40	15.33	13.31	10.09	0.07	12.56	2.80	3.15	137.13
1943	5	21.28	22.10	23.07	20.16	18.77	9.85	0.27	3.75	8.81	0.00	0.00	12.37	140.42
1944	5	11.15	14.86	4.89	7.49	14.44	25.23	4.13	3.36	0.00	0.00	0.00	0.00	85.55
1945	5	3.61	5.00	10.42	15.12	12.82	9.94	5.52	8.11	0.00	0.46	0.00	1.18	72.19
1946	5	21.88	15.82	8.77	12.57	17.45	14.58	11.17	0.73	0.61	1.12	0.22	8.09	113.02
1947	5	13.51	16.97	17.98	13.44	8.58	27.16	11.88	4.12	0.00	0.00	0.39	1.51	115.55
1948	5	8.72	3.36	4.46	16.95	8.69	16.46	9.90	1.59	1.11	0.66	0.53	1.96	74.40
1949	5	7.56	9.29	12.42	13.77	14.55	17.63	13.41	10.43	0.53	2.27	7.63	2.07	111.56
1950	5	6.62	6.44	21.10	18.53	11.95	8.31	10.20	7.19	1.46	0.07	2.32	3.61	97.79
1951	5	24.36	3.31	10.88	12.84	21.21	8.69	5.46	1.66	1.16	5.90	1.94	3.67	101.07
1952	5	6.41	10.76	13.37	7.17	20.95	6.99	8.58	2.78	0.46	0.00	1.29	1.59	80.36
1953	5	11.67	9.55	17.30	18.46	10.27	11.82	3.12	4.22	1.31	0.18	0.00	3.46	91.36
1954	5	3.82	12.96	10.24	25.79	25.51	8.16	8.41	6.19	1.04	0.61	0.00	0.97	103.69
1955	5	10.65	21.76	17.07	4.31	17.98	9.26	6.42	8.32	0.00	0.56	0.00	2.94	99.28
1956	5	16.17	19.83	29.39	15.85	9.89	17.92	4.89	0.56	4.34	3.58	5.07	25.48	152.97
1957	5	25.28	13.67	11.47	21.24	4.72	7.76	10.57	5.21	0.85	0.00	0.00	7.95	108.72
1958	5	7.35	13.47	15.03	10.28	6.54	6.44	13.76	17.92	1.57	6.04	0.05	0.48	98.92
1959	5	15.88	12.69	22.23	12.52	15.50	18.29	9.78	3.34	0.56	2.21	5.85	5.47	124.34
1960	5	11.80	15.73	17.86	21.05	5.64	10.92	13.25	10.22	6.07	2.38	1.87	4.85	121.64
1961	5	1.35	22.34	10.85	10.62	19.65	11.85	9.51	1.07	0.00	0.00	1.61	2.30	91.15
1962	5	5.24	12.71	7.07	25.20	9.01	15.15	12.51	4.49	3.50	3.80	0.58	0.61	99.86
1963	5	8.28	15.00	12.57	16.20	10.35	19.87	5.25	1.49	5.39	0.03	4.02	3.01	101.48
1964	5	19.99	8.07	15.14	16.59	4.53	4.37	12.59	0.26	2.12	2.83	1.86	3.15	91.49
1965	5	5.43	14.30	6.32	26.94	9.62	3.30	2.84	1.89	0.95	0.00	1.14	0.60	73.35
1966	5	8.12	8.42	15.21	35.25	19.12	13.30	10.36	7.72	0.25	0.02	1.43	3.37	122.56
1967	5	8.44	13.97	12.26	5.81	7.33	16.10	8.27	9.89	0.42	1.35	2.36	1.30	87.51
1968	5	7.55	9.34	12.03	9.66	8.34	13.85	7.57	8.98	0.87	0.16	1.53	1.58	81.46
1969	5	14.94	8.42	19.00	13.94	8.53	5.49	3.54	1.58	3.18	4.03	3.26	7.11	93.02
1970	5	8.50	7.37	22.31	19.91	12.19	12.41	9.53	9.92	0.32	2.21	0.85	1.19	106.70
1971	5	6.80	10.62	10.84	18.58	17.16	15.90	3.90	5.02	1.17	0.20	1.50	1.39	93.08
1972	5	8.81	13.83	2.16	11.44	15.38	8.62	7.39	1.52	0.00	1.41	10.46	5.61	86.63
1973	5	4.49	12.93	15.66	22.39	11.08	13.54	4.74	2.30	2.82	0.02	1.98	1.84	93.80
1974	5	6.20	30.68	8.48	17.93	19.13	13.69	4.83	2.05	0.85	1.76	1.61	10.39	117.62
1975	5	8.48	24.14	15.59	17.08	16.81	29.81	8.97	3.92	2.49	0.00	1.06	7.60	135.96
1976	5	18.44	22.44	10.51	19.82	6.93	20.68	4.25	1.93	0.16	0.00	0.35	7.62	113.13
1977	5	16.09	4.61	13.25	23.75	8.79	18.10	9.92	0.80	0.96	0.56	3.31	8.60	108.74
1978	5	8.82	4.62	22.67	8.95	13.58	7.46	1.81	5.91	0.92	5.78	15.70	6.54	102.75
1979	5	15.16	16.84	15.00	10.91	16.03	7.53	2.53	1.56	0.47	0.00	0.65	12.04	98.72
1980	5	2.70	17.49	12.35	31.09	17.98	13.32	7.59	1.02	3.74	0.31	7.40	1.16	116.15
1981	5	3.42	13.15	15.52	13.03	4.16	7.54	16.82	1.47	1.45	2.76	0.00	4.11	83.44
1982	5	16.50	10.50	6.01	8.92	9.34	10.29	4.11	4.02	2.68	3.56	0.25	2.62	78.81
1983	5	11.20	19.26	15.80	14.96	6.04	14.26	2.01	3.78	0.40	0.74	5.64	1.55	95.66
1984	5	11.25	7.38	11.78	9.77	16.47	6.87	3.23	0.03	0.19	0.14	0.00	0.70	67.83
1985	5	14.33	15.04	27.71	8.40	10.50	6.93	11.66	0.00	4.47	0.03	6.09	2.18	107.34
1986	5	14.03	14.21	8.22	8.41	11.32	8.14	9.33	0.43	0.31	0.56	7.46	21.43	103.84
1987	5	4.55	13.40	14.93	17.37	17.13	22.80	6.29	3.90	1.69	2.27	0.76	5.32	110.41
1988	5	12.27	11.33	21.58	12.72	17.55	9.69	4.00	5.03	5.94	0.50	1.04	0.28	101.94
1989	5	6.27	17.47	5.90	6.08	15.43	14.30	16.08	0.96	1.29	2.24	2.64	0.16	88.82
1990	5	5.81	2.87	10.28	29.55	19.90	15.98	0.56	0.33	2.01	0.01	0.04	6.94	94.29
1991	5	18.04	5.45	10.63	6.72	7.45	9.76	2.17	0.05	0.01	0.14	9.80	0.28	70.50
1992	5	10.71	21.44	7.87	10.38	12.02	9.21	7.57	0.75	0.57	0.01	3.19	2.16	85.87
1993	5	19.41	11.03	16.89	19.18	13.64	14.95	11.76	0.22	0.03	0.75	1.29	1.28	110.43
1994	5	3.99	5.76	9.29	11.15	7.82	12.12	5.75	2.78	0.32	0.08	1.14	1.00	61.19
1995	5	13.16	17.50	15.46	17.14	18.93	9.80	3.84	5.37	0.00	3.62	3.81	3.54	112.16
1996	5	9.48	21.22	6.88	13.73	10.33	24.60	10.68	10.69	2.87	2.01	1.90	2.50	116.90
1997	5	7.36	11.73	3.91	24.58	17.90	12.30	2.72	1.30	0.00	1.57	0.11	3.82	87.30
1998	5	8.15	23.47	7.79	7.79	9.34	6.91	2.84	4.49	0.43	0.43	0.33	0.45	72.44
1999	5	10.96	5.80	24.05	20.19	19.56	18.79	4.08	4.15	0.81	0.30	0.00	5.24	113.93
AVERAGE		10.73	13.14	13.50	15.91	13.36	12.68	7.39	4.15	1.55	1.43	2.49	4.18	100.50
ADJUSTED		10.67	13.08	13.43	15.83	13.30	12.62	7.36	4.13	1.54	1.42	2.48	4.16	100.00

E.2.

AERIAL RAINFALL FOR HLOTSE CATCHMENT

AVERAGE RAINFALL ON HLOTSE CATCHMENT

DETAILS OF RAINFALL STATIONS USED
SECTION POSITION PERIOD OF RECORD

0297	388	1935 TO 1999
0297	082	1935 TO 1999
0266	001	1935 TO 1999
0265	875	1935 TO 1999

GAUGES	RAINFALL INPUT AS PERCENT M.A.P.												YEAR	
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1935	4	5.68	7.70	13.15	12.97	6.27	12.27	2.26	8.15	0.07	0.63	0.00	0.20	69.35
1936	4	13.43	31.28	14.87	23.94	22.36	12.12	2.17	0.89	0.00	0.90	0.07	2.80	124.81
1937	4	5.67	7.64	13.07	21.45	24.39	2.46	10.27	3.38	4.73	1.46	4.90	2.82	102.24
1938	4	10.39	5.21	17.54	27.82	21.79	5.73	3.04	5.98	0.51	3.59	4.65	3.13	109.38
1939	4	11.26	17.59	10.22	9.42	17.77	8.53	11.56	6.29	1.02	0.82	0.23	12.43	107.14
1940	4	3.00	12.58	17.45	18.26	18.99	5.02	8.94	0.00	0.13	1.63	0.23	8.20	94.42
1941	4	16.54	0.71	3.48	22.17	15.38	16.42	9.37	3.44	1.73	0.02	7.90	3.28	100.45
1942	4	12.59	18.57	20.13	20.50	7.35	13.27	11.97	11.18	1.21	9.89	9.64	0.84	137.14
1943	4	22.02	26.16	26.46	10.13	20.21	10.28	1.17	4.68	7.86	0.00	0.00	9.37	138.33
1944	4	11.51	14.86	2.45	9.29	19.88	18.40	6.32	3.64	0.00	0.10	0.00	0.45	86.89
1945	4	6.74	7.03	6.30	16.64	9.08	13.16	4.45	7.24	0.00	0.22	0.00	1.82	72.69
1946	4	15.12	11.45	9.59	10.18	10.11	8.82	12.71	1.02	2.06	1.14	0.28	7.16	89.63
1947	4	11.76	11.30	24.89	12.38	15.94	23.22	6.65	1.05	0.00	1.30	0.16	0.00	108.65
1948	4	8.56	7.14	3.90	21.92	10.79	12.04	4.52	3.64	0.64	0.40	0.10	4.67	78.32
1949	4	11.79	17.85	22.22	17.24	11.15	23.43	13.97	6.74	0.69	4.41	11.59	2.79	143.87
1950	4	6.74	8.11	20.39	13.42	16.08	12.44	6.04	3.54	1.23	0.21	3.88	2.36	94.43
1951	4	17.97	4.78	9.41	15.03	20.69	9.76	5.50	1.54	0.76	3.88	2.90	3.88	96.08
1952	4	4.52	13.46	14.54	6.75	20.81	7.66	4.90	2.42	0.38	0.00	1.86	1.83	79.13
1953	4	14.17	12.44	13.37	13.84	14.98	15.40	3.70	5.63	1.40	0.08	0.00	2.55	97.57
1954	4	4.34	10.16	10.26	26.90	25.95	7.68	9.88	5.53	1.90	0.39	0.00	0.69	103.69
1955	4	8.04	14.61	18.47	15.49	17.61	14.60	5.89	7.72	0.14	0.56	0.40	3.21	106.74
1956	4	11.90	20.69	35.63	22.00	15.36	14.00	9.20	1.58	3.30	3.37	5.31	20.11	162.45
1957	4	26.82	14.88	13.85	14.60	12.54	10.80	12.32	8.83	1.36	1.18	1.17	6.07	124.43
1958	4	8.14	12.19	16.45	12.64	7.87	6.62	11.86	16.86	1.43	5.97	0.45	1.12	101.60
1959	4	13.24	16.10	19.67	14.13	25.46	16.50	11.03	3.11	0.28	0.86	3.07	7.46	130.93
1960	4	10.28	19.51	20.12	18.69	11.99	15.91	13.89	7.18	4.58	1.60	1.96	4.65	130.35
1961	4	2.32	15.88	13.58	15.22	21.62	13.51	9.24	2.73	0.00	0.00	1.56	2.03	97.69
1962	4	6.79	13.71	8.48	24.33	14.69	14.20	12.60	3.67	1.93	2.81	0.51	1.60	105.33
1963	4	8.92	14.59	13.77	14.76	7.73	16.96	5.76	1.66	3.18	0.00	2.47	5.78	95.57
1964	4	17.93	6.14	13.30	16.90	6.26	2.44	10.32	0.00	3.02	2.67	2.32	2.00	83.30
1965	4	6.75	11.47	6.57	21.89	10.43	7.10	3.75	2.98	1.50	0.00	1.11	1.51	75.05
1966	4	5.11	9.50	11.28	33.18	20.64	12.16	10.96	5.19	1.69	0.92	1.10	1.92	113.65
1967	4	8.56	9.92	15.48	5.60	5.02	15.09	7.98	9.09	1.08	2.24	2.00	1.03	83.09
1968	4	7.38	5.36	11.93	6.56	9.85	14.51	7.60	11.15	0.92	1.33	0.86	1.34	78.80
1969	4	14.84	5.41	16.55	10.99	6.68	5.34	2.85	1.40	3.13	2.23	3.05	6.33	78.82
1970	4	6.89	7.76	16.53	18.15	12.21	12.16	8.62	6.76	0.33	1.33	0.24	1.08	92.07
1971	4	7.76	8.33	9.80	17.83	19.44	15.52	4.38	2.33	1.29	0.04	0.98	5.90	93.60
1972	4	8.42	17.11	4.77	9.60	21.09	8.39	6.89	1.02	0.19	1.44	7.16	3.83	89.92
1973	4	3.42	19.25	11.64	29.01	11.65	12.35	6.70	2.05	2.41	0.11	3.19	2.44	104.21
1974	4	7.28	27.52	13.12	18.18	16.24	15.01	5.38	1.90	0.67	2.88	1.59	16.54	126.31
1975	4	7.81	20.29	15.60	15.21	20.53	22.86	9.16	3.52	2.96	0.00	0.47	12.11	130.52
1976	4	17.04	15.81	6.12	22.49	11.82	23.69	1.40	1.72	0.46	0.00	0.25	9.49	110.30
1977	4	16.13	8.30	17.05	20.63	9.23	14.43	14.42	0.89	1.55	0.52	3.54	7.95	114.65
1978	4	8.87	8.61	25.59	9.74	8.39	6.43	2.86	4.02	0.97	9.21	9.24	5.60	99.52
1979	4	17.17	14.68	16.15	9.21	13.73	6.17	2.48	1.44	0.16	0.12	0.66	13.77	95.75
1980	4	3.44	19.40	9.04	32.79	9.57	13.82	7.32	2.44	4.63	0.00	6.19	1.75	110.38
1981	4	3.68	13.32	10.66	7.67	6.54	7.31	16.28	0.66	2.98	1.44	0.00	1.20	71.75
1982	4	15.37	9.55	8.24	3.59	9.61	8.13	4.47	1.01	0.22	1.64	0.00	1.37	63.20
1983	4	7.35	16.87	12.55	12.07	4.05	7.97	4.40	7.34	0.31	0.18	4.45	0.79	78.33
1984	4	7.72	11.32	7.37	5.50	11.13	4.84	1.69	0.00	0.04	0.00	0.00	0.04	49.66
1985	4	10.35	11.22	16.04	9.06	11.12	6.41	6.06	0.00	7.25	0.00	7.31	1.80	86.60
1986	4	18.98	11.06	7.23	7.62	9.63	14.38	12.10	0.00	0.00	1.22	5.75	25.08	113.06
1987	4	6.92	15.90	14.24	17.76	23.40	24.09	10.80	5.44	2.80	0.88	0.54	7.16	129.95
1988	4	8.29	12.41	14.66	13.81	21.80	9.88	4.92	7.37	5.29	0.25	0.63	0.17	99.48
1989	4	6.26	16.36	5.88	7.83	13.22	12.68	16.42	2.08	3.97	3.09	3.38	0.00	91.16
1990	4	4.60	3.93	11.19	22.58	13.15	13.66	0.20	0.00	1.84	0.00	0.00	7.01	78.17
1991	4	19.36	7.08	7.83	4.44	10.07	9.58	2.16	0.12	0.00	0.00	8.40	0.34	69.38
1992	4	9.84	17.65	6.70	9.67	16.24	7.84	10.28	1.54	1.66	0.11	2.17	2.07	85.77
1993	4	23.24	8.32	13.87	20.35	14.22	9.64	8.97	0.00	0.12	1.19	0.16	1.14	101.22
1994	4	3.77	8.91	8.82	10.94	9.11	9.92	4.14	5.90	0.12	0.01	0.87	1.55	64.04
1995	4	16.14	17.45	17.96	17.05	17.84	10.14	5.61	4.30	1.56	4.09	3.21	3.42	118.77
1996	4	11.96	15.98	22.00	18.02	11.70	17.13	9.35	9.86	1.42	2.30	0.00	1.07	120.79
1997	4	6.95	9.94	7.04	17.22	15.11	15.57	2.27	2.02	1.19	0.36	0.27	8.98	86.92
1998	4	8.42	25.55	8.07	10.75	13.09	10.03	3.68	4.34	0.17	1.04	4.62	3.19	92.95
1999	4	8.25	24.87	18.23	33.73	8.71	29.89	8.32	2.64	1.77	3.22	0.09	3.87	143.59
AVERAGE		10.35	13.24	13.43	15.84	14.11	12.27	7.33	3.87	1.57	1.44	2.32	4.43	100.22
ADJUSTED		10.32	13.21	13.40	15.81	14.08	12.25	7.31	3.87	1.57	1.43	2.32	4.42	100.00

E.3.

AERIAL RAINFALL FOR THE UPPER MAKHALENG CATCHMENT

AVERAGE RAINFALL ON UPPER MAKHALENG CATCHMENT

DETAILS OF RAINFALL STATIONS USED		
SECTION	POSITION	PERIOD OF RECORD
0264	417	1935 TO 1999
0264	715	1935 TO 1999
0264	836	1935 TO 1999

GAUGES	RAINFALL INPUT AS PERCENT M.A.P.												YEAR	
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1935	3	9.22	13.55	18.18	9.45	13.34	10.29	2.34	5.26	0.00	0.47	0.00	0.82	82.92
1936	3	12.74	29.46	13.33	29.58	21.05	14.85	3.39	2.57	0.58	2.10	0.23	2.69	132.59
1937	3	3.86	10.41	15.67	13.09	18.36	2.57	12.74	2.10	4.09	1.40	3.27	2.22	89.79
1938	3	13.80	8.18	13.91	18.36	17.77	5.38	1.29	5.38	0.23	3.04	7.25	5.61	100.20
1939	3	17.19	13.21	6.43	3.86	8.54	13.45	14.26	7.02	0.00	1.99	0.00	16.13	102.07
1940	3	2.57	12.16	18.59	10.64	22.68	7.13	13.21	1.17	0.00	2.34	0.00	3.39	93.89
1941	3	14.15	0.70	4.21	19.06	13.56	16.95	9.94	2.22	0.00	0.00	6.66	2.92	90.38
1942	3	16.72	15.55	16.95	12.39	4.68	9.00	18.82	11.34	0.00	6.31	8.18	0.58	120.54
1943	3	11.46	25.84	12.16	7.83	19.29	5.73	4.33	4.68	6.31	0.00	0.00	3.74	101.37
1944	3	5.50	8.54	4.68	10.05	6.66	18.12	1.87	7.25	0.00	0.00	0.00	0.00	62.67
1945	3	3.39	8.42	11.22	15.78	9.47	13.68	4.09	0.00	3.86	0.23	0.00	2.34	72.49
1946	3	9.00	4.56	13.91	5.73	12.28	3.16	1.64	3.04	1.05	0.82	0.00	7.95	63.14
1947	3	11.22	5.38	18.82	11.22	7.72	22.80	6.08	3.98	0.00	0.58	0.00	0.00	87.81
1948	3	3.16	6.08	4.09	16.95	13.09	11.93	2.81	4.21	1.40	1.40	0.00	2.81	67.93
1949	3	8.89	14.38	17.65	11.93	21.16	20.81	22.68	8.89	1.87	6.20	13.21	2.92	150.59
1950	3	3.27	8.77	18.94	24.67	12.98	12.63	8.07	2.22	2.57	0.58	1.52	2.10	98.33
1951	3	21.40	2.34	7.02	12.63	18.01	11.69	1.05	1.87	1.64	6.31	2.92	4.68	91.55
1952	3	4.09	14.73	9.47	9.24	20.46	14.73	11.69	3.27	1.17	0.00	2.46	1.17	92.48
1953	3	12.86	17.89	16.02	6.31	14.97	15.43	4.09	4.68	3.16	0.35	0.00	0.94	96.69
1954	3	2.10	8.42	9.47	32.50	21.98	8.54	8.30	2.92	0.00	1.75	0.12	0.82	96.93
1955	3	8.18	11.93	20.46	7.83	26.54	18.01	6.66	7.13	0.00	0.00	0.00	1.64	108.38
1956	3	12.98	6.43	28.41	12.28	8.07	9.82	8.30	0.82	3.04	2.22	5.73	1.79	99.88
1957	3	20.81	12.86	10.41	19.06	8.07	9.70	10.17	8.77	0.23	0.00	0.00	4.56	104.64
1958	3	6.08	14.61	15.20	10.41	13.91	11.81	16.25	6.90	0.00	7.13	0.00	0.00	102.30
1959	3	8.07	12.28	24.90	5.61	16.13	14.38	7.37	2.81	2.22	2.34	4.56	2.46	103.12
1960	3	11.22	12.74	9.24	15.78	4.56	19.17	4.44	4.91	9.24	2.22	2.69	0.47	96.69
1961	3	0.23	28.41	11.93	8.89	23.85	12.98	9.00	0.70	0.00	0.00	0.12	1.05	97.16
1962	3	4.91	20.36	7.41	20.79	10.97	18.19	15.09	3.99	2.15	4.77	1.87	0.69	111.19
1963	3	9.17	20.03	17.29	11.33	10.07	26.55	6.09	1.60	3.64	0.00	1.33	3.14	110.24
1964	3	22.52	7.29	15.88	13.47	4.58	5.14	16.41	0.11	4.19	2.44	4.22	1.94	98.18
1965	3	5.92	10.82	5.97	33.70	13.26	6.49	5.73	3.05	1.57	0.00	1.55	0.29	88.35
1966	3	6.16	11.69	12.51	35.98	10.74	12.44	17.58	7.29	2.65	0.99	3.36	1.06	122.46
1967	3	10.87	10.75	11.22	6.60	6.09	12.13	10.33	11.39	1.20	3.18	1.69	2.65	88.10
1968	3	8.88	8.22	16.26	6.95	13.23	26.77	11.86	7.84	1.18	0.55	3.84	1.39	106.97
1969	3	17.06	5.13	9.04	11.56	7.69	4.96	2.66	1.52	2.55	2.39	4.63	8.35	77.54
1970	3	8.55	7.71	20.53	18.02	13.56	10.87	9.84	4.59	0.25	3.13	0.81	0.84	98.69
1971	3	8.20	5.52	9.25	22.42	21.16	15.86	4.66	3.09	1.88	0.16	0.74	1.81	94.76
1972	3	8.86	7.86	12.35	9.17	18.86	11.42	6.57	0.93	0.32	1.37	7.83	2.68	88.23
1973	3	2.06	5.90	7.45	28.56	22.42	8.84	2.59	1.01	0.60	0.03	2.16	1.27	82.90
1974	3	3.53	19.65	12.20	12.59	16.93	18.14	5.50	1.57	2.23	3.88	0.70	8.67	105.58
1975	3	6.25	21.23	14.02	27.14	18.90	20.34	11.00	5.06	5.57	0.08	0.33	11.50	141.41
1976	3	21.51	5.57	7.79	19.47	18.55	19.13	4.86	2.46	0.64	0.00	0.23	12.36	112.57
1977	3	13.93	7.37	14.72	25.73	6.57	19.92	12.77	0.29	0.62	0.32	2.22	7.97	112.41
1978	3	4.40	8.17	19.45	7.54	18.48	3.85	5.11	7.33	1.65	6.55	6.31	1.50	90.33
1979	3	14.25	8.86	12.43	7.65	4.57	4.05	2.38	1.35	0.63	0.11	1.18	7.56	65.04
1980	3	0.56	11.59	5.61	33.17	15.91	13.89	5.25	3.84	3.11	0.18	6.49	0.59	100.18
1981	3	4.75	15.10	14.23	10.16	12.60	7.19	19.70	1.54	2.54	1.89	0.16	4.41	94.28
1982	3	19.67	11.80	3.76	9.90	5.95	8.91	5.32	5.18	3.35	6.33	0.23	2.71	83.13
1983	3	7.90	20.02	15.05	11.95	4.95	9.39	4.11	10.85	0.85	0.30	6.97	2.25	94.59
1984	3	10.18	8.75	9.98	12.48	14.13	8.57	6.15	0.39	2.29	0.42	0.00	0.92	74.26
1985	3	16.50	10.97	20.28	9.24	7.11	8.82	6.35	0.00	8.64	0.20	8.21	4.73	101.05
1986	3	20.65	23.11	5.08	3.74	16.55	8.67	10.82	0.19	0.62	2.10	6.85	19.08	117.46
1987	3	8.01	18.13	15.27	8.37	28.43	16.70	15.37	6.09	1.93	4.97	3.54	7.46	134.27
1988	3	18.52	10.44	17.62	14.89	28.95	13.19	9.00	8.88	2.67	1.67	2.38	0.95	129.15
1989	3	9.86	17.63	6.86	21.31	14.07	19.98	16.66	1.57	7.15	1.58	3.42	0.08	120.16
1990	3	1.77	3.25	9.68	32.86	22.38	22.55	1.16	0.07	2.42	0.46	0.00	7.80	104.40
1991	3	19.83	9.02	12.16	4.94	7.10	7.97	3.53	0.07	0.03	0.06	8.07	0.31	73.09
1992	3	9.72	15.43	6.67	10.85	17.26	11.35	11.30	2.03	0.59	0.00	3.24	0.32	88.76
1993	3	23.20	11.43	16.02	31.14	18.35	11.62	6.75	0.60	0.48	1.37	0.06	0.23	121.24
1994	3	1.85	4.72	8.04	14.62	5.13	12.27	3.24	3.99	0.37	0.34	0.60	2.51	57.68
1995	3	17.81	12.53	17.13	19.76	18.06	14.84	8.67	4.10	3.28	4.99	3.59	3.90	128.67
1996	3	15.34	9.19	12.89	14.21	8.66	17.31	8.68	4.57	1.87	2.63	3.21	1.78	100.33
1997	3	2.91	11.08	14.06	16.59	21.84	27.87	3.34	2.80	0.08	3.43	2.49	4.09	110.57
1998	3	11.25	12.21	15.08	16.48	12.05	10.45	2.84	3.98	1.64	0.52	0.93	0.85	88.27
1999	3	10.91	3.55	22.49	13.40	6.98	20.09	7.13	5.01	0.98	0.76	0.01	11.63	102.95
AVERAGE		10.19	11.69	13.00	15.23	14.19	13.10	8.02	3.79	1.86	1.75	2.53	3.51	98.86
ADJUSTED		10.31	11.83	13.15	15.40	14.35	13.25	8.11	3.83	1.88	1.77	2.56	3.55	100.00

E.4.

AERIAL RAINFALL FOR TOTAL MAKHALENG CATCHMENT

AVERAGE RAINFALL ON TOTAL MAKHALENG CATCHMENT

DETAILS OF RAINFALL STATIONS USED
SECTION POSITION PERIOD OF RECORD

0264	417	1935 TO 1999
0264	715	1935 TO 1999
0264	836	1935 TO 1999
0234	170	1935 TO 1999
0234	150	1935 TO 1999
0233	775	1935 TO 1999

GAUGES	RAINFALL INPUT AS PERCENT M.A.P.											YEAR		
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		SEP	
1935	6	7.02	13.28	15.56	11.14	14.31	10.80	2.21	6.18	0.57	1.12	0.00	1.23	83.42
1936	6	13.24	25.09	11.12	26.64	26.58	10.36	2.35	2.76	0.24	1.60	0.28	1.52	121.80
1937	6	3.49	5.32	13.57	14.41	23.79	3.57	18.29	1.78	4.36	1.09	3.68	1.76	95.10
1938	6	13.22	8.88	13.85	21.64	23.67	6.24	4.24	6.62	0.38	3.83	7.52	2.65	112.72
1939	6	16.65	14.22	7.56	6.22	11.09	15.01	11.64	8.32	0.05	0.71	0.61	13.94	106.02
1940	6	2.89	7.40	17.25	9.86	24.28	6.91	9.81	0.39	0.00	2.94	0.29	6.07	88.08
1941	6	10.97	2.08	2.84	13.82	15.12	15.24	8.20	0.88	0.87	0.00	5.32	4.52	79.85
1942	6	11.78	14.59	22.67	12.55	7.96	12.44	22.13	15.69	0.00	3.38	7.38	1.19	131.75
1943	6	11.18	21.25	18.24	8.75	17.65	9.79	2.75	5.87	5.38	0.00	0.00	6.68	107.53
1944	6	5.62	13.08	3.41	10.29	11.31	17.41	1.31	6.51	0.00	0.50	0.00	0.10	69.54
1945	6	2.89	7.91	10.04	18.95	8.24	15.73	10.86	6.72	1.38	0.08	0.00	2.38	85.18
1946	6	10.75	6.55	11.68	10.70	12.76	2.98	5.76	4.67	0.90	0.99	0.51	11.34	79.59
1947	6	11.11	7.15	19.81	11.15	9.32	25.48	6.40	3.50	0.05	0.36	0.55	0.00	94.88
1948	6	7.27	3.97	5.18	10.99	8.66	11.97	2.85	4.71	1.20	1.93	0.00	2.35	61.09
1949	6	6.83	14.00	13.25	11.74	14.37	27.74	22.64	8.38	1.24	6.04	11.78	2.91	140.92
1950	6	3.32	7.68	18.63	18.48	13.21	11.91	8.32	1.03	1.81	2.77	1.41	6.02	94.59
1951	6	17.93	2.65	4.11	12.65	15.57	8.05	5.98	1.44	2.96	9.13	3.67	7.59	91.71
1952	6	6.00	11.73	10.24	7.33	20.49	9.76	10.33	1.81	0.49	0.00	3.11	2.66	83.94
1953	6	12.65	11.25	16.01	8.65	15.15	27.20	3.72	5.89	2.20	2.03	0.05	1.33	106.14
1954	6	1.92	8.18	12.49	31.49	24.43	7.95	9.02	3.33	1.70	1.83	0.27	0.27	102.89
1955	6	7.63	15.27	17.81	8.43	29.86	19.07	8.55	5.17	0.45	0.70	0.00	2.39	115.34
1956	6	9.56	12.65	26.20	11.41	11.11	13.18	5.68	1.01	2.53	2.49	7.56	17.97	121.37
1957	6	19.76	12.16	9.65	26.84	8.93	9.29	10.28	10.78	0.25	0.05	0.00	2.78	110.79
1958	6	7.01	18.23	17.87	12.61	13.08	14.13	14.06	7.09	0.08	8.57	0.02	0.04	112.79
1959	6	6.88	10.60	26.59	10.94	14.87	18.53	9.68	3.51	2.50	2.22	6.93	3.86	117.11
1960	6	11.28	13.73	13.18	12.29	5.42	20.40	11.11	8.07	9.83	1.94	2.66	0.43	110.33
1961	6	0.20	25.08	13.00	9.39	27.39	13.34	9.04	1.18	0.00	0.00	0.28	0.74	99.64
1962	6	3.89	22.43	7.45	20.89	10.82	18.46	16.92	3.80	3.66	4.90	1.67	0.60	115.50
1963	6	9.47	22.02	14.30	8.15	10.21	25.43	6.14	2.07	4.29	0.00	1.14	2.66	105.89
1964	6	21.15	5.60	13.64	12.83	5.55	5.96	14.75	0.05	4.10	2.43	4.29	1.77	92.14
1965	6	4.56	9.80	5.76	35.32	16.15	5.94	5.40	2.30	2.07	0.00	1.01	0.14	88.46
1966	6	4.94	12.73	11.76	33.79	11.27	12.10	17.96	8.45	2.85	0.92	2.96	1.06	120.78
1967	6	10.51	11.70	8.00	5.04	3.82	13.04	11.22	10.91	1.48	3.24	1.20	2.95	83.13
1968	6	8.26	7.84	19.17	6.71	15.44	23.30	11.61	5.92	0.59	0.42	3.71	1.55	104.53
1969	6	17.20	3.93	8.38	10.15	5.89	3.42	2.23	1.99	2.32	1.74	4.28	8.37	69.90
1970	6	9.53	7.82	18.64	15.79	14.88	10.62	11.19	4.20	0.14	2.51	0.68	0.48	96.50
1971	6	6.89	5.60	10.98	21.90	23.66	18.06	5.12	3.37	2.82	0.10	0.63	1.22	100.34
1972	6	8.97	5.92	8.30	7.11	20.72	10.13	7.36	1.42	0.29	1.23	8.18	3.72	83.34
1973	6	2.64	7.97	9.13	29.03	25.90	10.02	2.87	1.76	0.71	0.02	4.47	0.76	95.28
1974	6	4.61	19.08	10.77	13.96	15.49	17.21	6.72	1.27	2.97	4.48	0.68	9.72	106.95
1975	6	4.79	19.84	16.33	29.98	18.24	20.28	10.84	4.66	4.69	0.20	0.24	12.18	142.27
1976	6	21.97	4.75	7.34	19.70	15.61	20.54	4.57	3.43	0.77	0.00	0.37	13.11	112.16
1977	6	14.77	7.42	12.87	19.75	7.36	20.66	12.01	0.29	0.94	0.45	2.70	7.51	106.74
1978	6	3.85	6.31	18.92	7.93	17.48	5.11	4.91	6.64	1.29	7.41	10.33	3.71	93.88
1979	6	14.63	11.62	11.99	7.84	9.55	4.75	2.66	1.37	0.74	0.18	1.62	7.40	74.36
1980	6	0.34	13.44	5.46	29.14	17.01	11.50	6.06	5.67	3.74	0.11	9.08	0.48	102.01
1981	6	4.64	14.57	13.92	9.70	10.69	8.71	21.62	0.97	3.81	3.47	0.42	3.57	96.11
1982	6	18.17	11.01	4.46	10.06	5.87	10.10	6.35	5.23	3.89	8.01	0.14	2.80	86.09
1983	6	8.19	19.59	15.12	12.49	4.46	10.36	4.11	8.99	1.24	0.24	7.72	1.51	94.03
1984	6	10.20	9.29	8.76	14.13	14.54	8.41	6.18	0.47	4.35	0.25	0.00	0.81	77.40
1985	6	17.69	11.68	19.41	14.54	9.58	11.17	5.45	0.00	7.88	0.18	7.87	5.23	110.69
1986	6	19.98	19.96	5.97	2.80	13.84	8.40	10.45	0.31	2.05	2.39	10.02	18.08	114.27
1987	6	7.83	17.79	11.86	7.83	30.74	19.00	15.38	4.88	2.25	3.68	2.73	10.83	134.79
1988	6	17.74	11.06	18.84	15.09	29.14	10.31	8.60	7.21	3.43	1.36	1.81	1.82	126.41
1989	6	9.00	20.99	7.43	20.88	12.57	20.69	16.28	1.64	6.42	1.67	3.43	0.73	121.72
1990	6	4.47	3.61	9.11	32.56	21.94	19.04	1.67	0.86	3.16	0.28	0.00	0.65	106.35
1991	6	25.41	9.62	14.05	5.64	8.65	8.28	3.66	0.04	0.02	0.04	6.00	0.64	82.05
1992	6	10.21	14.32	4.94	12.23	15.50	10.40	9.44	1.99	0.63	0.00	3.34	1.09	84.10
1993	6	20.93	13.76	17.06	27.07	16.86	11.17	6.00	0.52	0.51	1.75	0.29	0.96	116.87
1994	6	2.19	5.36	6.26	14.08	6.46	13.55	2.41	4.42	0.42	0.21	1.34	3.06	59.73
1995	6	14.40	11.15	16.99	17.10	16.21	13.13	7.92	3.79	3.14	4.53	3.46	3.86	115.70
1996	6	10.96	10.37	11.10	9.30	9.66	22.83	7.20	4.26	3.46	2.69	1.74	0.89	94.45
1997	6	4.21	11.97	12.02	16.37	16.72	15.76	3.03	3.08	0.05	2.60	1.24	2.34	89.40
1998	6	10.91	15.92	11.18	15.30	9.15	8.29	4.18	3.15	1.02	0.37	0.59	0.60	80.67
1999	6	6.99	3.98	24.51	11.24	9.64	18.49	5.79	4.65	1.39	0.71	0.09	8.01	95.48
AVERAGE		9.79	11.63	12.68	14.97	14.71	13.37	8.36	3.99	2.02	1.86	2.70	4.01	100.07
ADJUSTED		9.78	11.62	12.67	14.95	14.70	13.36	8.36	3.99	2.01	1.86	2.70	4.01	100.00