Table 23 MONTHLY MEAN RUNOFF RECORD (1/2)

Station : Jam. Johor Tenggara
River : Sayong
Catchment Area : 624 km^2

Unit: 10^6 m^3

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1977	N.R.	(25.2)	(8.6)	8.3	19.6	24.4	21.7	38.8	39.4	94.3	74.6	35.1	-
1978	92.7	17.9	32.7	44.1	60.5	21.3	32.7	21.2	22.8	26.2	55.5	111.2	538.8
1979	56.2	20.1	(60.3)	89.2	25.2	33.2	28.9	25.7	39.1	33.5	(94.3)	(26.8)	-
1980	40.7	20.3	22.5	46.1	43.1	39.4	25.4	81.4	72.8	67.5	81.4	94.8	635.4
1981	30.3	8.7	10.7	53.1	85.2	26.4	23.8	15.3	25.7	30.3	44.3	43.7	397.5
1982	33.9	22.8	36.1	87.6	62.2	61.3	25.2	39.3	24.8	28.9	83.8	(31.6)	-
1983	(34.8)	17.9	11.2	9.8	18.2	20.5	27.6	50.9	68.9	37.2	61.9	114.6	-
1984	99.1	137.6	99.6	55.7	73.4	59.4	65.6	38.0	21.0	34.0	(51.6)	N.R.	-
Average	58.8	35.0	35.5	49.2	48.4	35.7	31.4	38.8	39.3	44.0	66.9	80.0	523.9

Station : Ran, Tanah Jengeli
River : Linggiu
Catchment Area : 209 km^2

Unit: 10^6 m^3

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1978	24.4	13.8	15.5	13.5	20.6	11.4	16.1	8.0	6.5	13.1	25.7	25.7	194.3
1979	20.9	13.5	12.3	23.8	12.1	9.3	8.6	8.8	16.1	16.6	45.6	30.3	217.9
1980	22.2	9.3	10.7	16.6	20.1	11.4	12.3	N.R.	(50.3)	47.9	28.3	25.7	-
1981	12.6	4.6	25.7	39.1	22.8	9.8	7.5	5.9	7.8	11.2	13.5	20.4	180.9
1982	14.7	4.8	10.7	17.1	(19.4)	11.1	7.5	7.5	6.7	7.2	7.0	(20.1)	-
1983	(31.6)	(9.0)	4.8	4.1	14.2	6.5	8.3	8.6	16.8	19.0	26.2	(37.2)	-
1984	(41.5)	66.9	34.3	22.0	28.9	17.1	16.3	(12.1)	N.R.	(60.3)	42.2	(38.6)	-
Average	19.0	18.8	16.3	19.5	19.8	10.9	10.9	7.8	10.8	19.2	26.9	25.5	197.7

Remarks: ( ): Parenthesized figure shows incomplete data interporated.

Table 24 MONTHLY MEAN RUNOFF RECORD (2/2)

Station : Saleng
River : Skudai
Catchment Area : 91 km^2

Unit: 10^6 m^3

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1971	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	(3.9)	(4.8)
1972	(1.9)	2.8	3.2	(4.9)	5.9	2.6	0.8	1.3	3.1	N.R.	N.R.	9.1
1973	(9.9)	(5.1)	(7.8)	(11.4)	(7.8)	3.9	(2.1)	(5.6)	(2.9)	5.4	7.5	(7.5)
1974	2.4	(2.4)	(2.7)	(3.1)	11.0	6.7	(4.0)	3.7	7.8	(3.2)	2.9	(1.9)
1975	3.7	(2.9)	(11.0)	(17.1)	(19.6)	(13.2)	(13.1)	7.8	7.5	8.6	(18.1)	12.3
1976	2.7	1.8	(2.4)	(7.0)	4.0	(3.4)	(3.6)	3.5	3.1	(8.6)	7.8	9.6
1977	(5.6)	3.9	2.9	1.8	2.4	2.1	2.1	8.8	4.4	(8.0)	6.7	5.6
1978	19.8	7.7	13.9	12.4	12.6	7.8	12.1	7.0	(7.0)	(13.7)	(13.5)	(12.9)
1979	5.9	1.9	4.6	11.4	2.4	(2.6)	(3.1)	(1.9)	3.9	(6.2)	(12.4)	(4.6)
1980	(5.1)	(5.6)	(2.4)	(7.3)	(4.8)	6.2	3.7	7.5	7.0	11.0	7.0	11.5
1981	(2.7)	1.9	1.9	6.7	8.0	2.6	(3.2)	(1.1)	N.R.	4.6	2.3	7.2
1982	(3.2)	(3.4)	(0.8)	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.
Average	6.9	3.3	5.3	8.1	6.6	4.6	4.7	5.7	5.3	7.4	5.7	9.2

Remarks: ( ) : Parenthesized figure shows incomplete data interporated.

Table 25 MEAN ANNUAL INFLOW DISCHARGE AT PROPOSED DAMSITES

Proposed dam	Catchment area (km2)	Mean annual inflow discharge (1963-1984) (106 m3/y)
Benut	37	33
Pontian Besar	40	41
Upper Pengli	127	126
Sayong	662	655
Linggiu	206	216
Telor	38	37
Layau Kiri	31	38
Sedili	224	290

Table 26 POTENTIAL BASIN EVAPOTRANSPIRATION

Unit: mm

BASIN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Benut-Pontian	121	120	137	126	125	118	125	119	122	130	120	116	1,479
Skudai-Tebrau	126	120	134	121	121	112	118	120	121	126	117	114	1,450
Johor	123	119	137	125	124	116	123	125	124	131	120	113	1,480
Sedili	123	119	137	125	124	116	123	125	124	131	120	113	1,480

Table 27 RAINFALL RECORDS APLLIED FOR TANK MODEL (1/2)

RIVER SYSTEM : RIVER SKUDAI

CATCHMENT AREA: 90.5 km^2

HYDROLOGICAL STATION NAME: Saleng (1971 - 1982)

RAINFALL DATA

Station No.	YEAR																					
	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1. 1535106	———															———						
2. 1536110	———																					
3. 1636109	———																					
4. 1735125	———																					
Nos. of Station	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	3	3

RIVER SYSTEM : RIVER LINGGIU

CATCHMENT AREA: 209.0 km^2

HYDROLOGICAL STATION NAME: Ran. Tanah Jengeli (1836401)
(1978 - 1984)

RAINFALL DATA

Station No.	YEAR																					
	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1. 1737128										———												
2. 1836001														———								
3. 1838148										———												
Nos. of Station										2	2	2	2	2	2	2	1	1	1	1	1	1

Table 28 RAINFALL RECORDS APLLIED FOR TANK MODEL (2/2)

RIVER SYSTEM : RIVER SAYONG

CATCHMENT AREA: 624.0 km^2

HYDROLOGICAL STATION NAME: Jam. Johor Tenggara (1836402)
(1977 - 1984)

RAINFALL DATA

Station No.	YEAR																				
	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1. 1833123	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. 1834122	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
3. 1834124	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4. 1836001														—	—	—	—	—	—	—	—	—
Nos. of Station	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	4	4

RIVER SYSTEM : RIVER JOHOR

CATCHMENT AREA: 1,130.0 km^2

HYDROLOGICAL STATION NAME: Kg. Pantau Panjang (1737451)
(1963 - 1984)

RAINFALL DATA

Station No.	YEAR																				
	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1. 1636109	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. 1735125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
3. 1833092	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4. 1833123	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. 1834122	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
6. 1834124	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7. 1836001														—	—	—	—	—	—	—	—	—
Nos. of Station	6	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	6	6	6	6

Table 29 ANNUAL WATER BALANCE BETWEEN RUNOFF AND LOSS AT KEY STATION (1/2)

Basin: Johor
Station: Rantau Panjang

Unit: mm

Year	Basin Rainfall	Observed		Simulated	
		Runoff	Loss	Runoff	Loss
1963	2182	778	1404	892	1290
1964	2802	1066	1736	1384	1418
1965	2060	872	1187	837	1222
1966	2376	982	1394	1014	1362
1967	2896	1596	1300	1371	1525
1968	2457	1126	1331	1365	1092
1969	2821	1184	1636	1479	1342
1970	2568	968	1599	1197	1371
1971	1780	721	1059	628	1152
1972	2268	647	1620	943	1325
1973	2273	958	1315	988	1285
1974	1910	567	1343	694	1216
1975	2203	845	1358	840	1363
1976	2096	598	1498	703	1393
1977	2015	811	1204	831	1184
1978	2259	928	1332	935	1324
1979	2261	1055	1207	1042	1219
1980	2417	1128	1290	974	1443
1981	2053	790	1263	826	1227
1982	2247	1127	1120	886	1360
1983	2040	1143	897	796	1244
1984	2604	1702	902	1321	1283
Mean	2299	981	1318	997	1302

Basin: Linggiu
Station: Ran, Tanah Jengeli

Unit: mm

Year	Basin Rainfall	Observed		Simulated	
		Runoff	Loss	Runoff	Loss
1963	-	-	-	-	-
1964	-	-	-	-	-
1965	-	-	-	-	-
1966	-	-	-	-	-
1967	-	-	-	-	-
1968	-	-	-	-	-
1969	-	-	-	-	-
1970	-	-	-	-	-
1971	-	-	-	-	-
1972	2351	-	-	978	1372
1973	2123	-	-	703	1340
1974	2977	-	-	1416	1561
1975	2649	-	-	1134	1514
1976	2099	-	-	710	1389
1977	2173	-	-	972	1201
1978	2505	928	1576	1073	1431
1979	2474	1042	1432	1179	1295
1980	2263	1199	1065	778	1485
1981	2210	864	1346	935	1275
1982	2452	658	1795	958	1494
1983	2243	954	1288	858	1384
1984	2725	1806	918	1358	1366
Mean	2403	1034	1369	1010	1393

Table 30 ANNUAL WATER BALANCE BETWEEN RUNOFF AND LOSS AT KEY STATION (2/2)

Basin: Sayong
Station: Jam. Johor Tenggara

Unit: mm

Year	Basin Rainfall	Observed Runoff	Observed Loss	Simulated Runoff	Simulated Loss
1963	2077	-	-	719	1359
1964	2732	-	-	1237	1495
1965	2093	-	-	764	1329
1966	2198	-	-	824	1373
1967	2651	-	-	1054	1597
1968	2451	-	-	1259	1193
1969	2701	-	-	1273	1429
1970	2317	-	-	921	1396
1971	1680	-	-	557	1123
1972	2286	-	-	844	1442
1973	2241	-	-	893	1348
1974	1923	-	-	669	1254
1975	2093	-	-	700	1392
1976	2040	-	-	551	1488
1977	2112	755	1357	853	1259
1978	2162	863	1299	751	1411
1979	2233	963	1270	944	1289
1980	2378	1019	1359	840	1538
1981	2026	710	1317	771	1255
1982	2295	1028	1267	841	1454
1983	2073	794	1279	772	1301
1984	2645	1207	1438	1378	1267
Mean	2246	891	1323	883	1363

Basin: Skudai
Station: Saleng

Unit: mm

Year	Basin Rainfall	Observed Runoff	Observed Loss	Simulated Runoff	Simulated Loss
1963	2297	-	-	1032	1265
1964	2714	-	-	1329	1385
1965	2312	-	-	1083	1230
1966	2311	-	-	989	1322
1967	2707	-	-	1280	1426
1968	2151	-	-	1100	1051
1969	2671	-	-	1334	1337
1970	2768	-	-	1447	1321
1971	1982	754	1228	790	1192
1972	2106	548	1559	845	1261
1973	2611	906	1705	1335	1277
1974	1869	584	1285	710	1159
1975	2314	1446	868	948	1367
1976	1930	622	1316	647	1291
1977	1950	609	1342	764	1186
1978	2413	1572	840	1124	1288
1979	2443	787	1656	1211	1232
1980	2633	930	1703	1226	1407
1981	2510	642	1508	932	1218
1982	2445	1075	1370	1106	1339
1983	2216	-	-	967	1248
1984	2786	-	-	1447	1338
Mean	2354	1022	1332	1075	1279

Table 31 DIFFERENCE IN ANNUAL LOSS AT KEY STATION (1/2)

Basin: Johor
Station: Rantau Panjang

Year	Annual Loss (mm) Observed	Simulated	Difference (%)
1963	1404	1290	- 8
1964	1736	1418	-18
1965	1187	1222	3
1966	1394	1362	- 2
1967	1300	1525	17
1968	1331	1092	-18
1969	1636	1342	-18
1970	1599	1371	-14
1971	1059	1152	9
1972	1620	1325	-18
1973	1315	1285	- 2
1974	1343	1216	- 9
1975	1358	1363	0
1976	1498	1393	- 7
1977	1204	1184	- 2
1978	1332	1324	- 1
1979	1207	1219	1
1980	1290	1443	12
1981	1263	1227	- 3
1982	1120	1360	21
1983	897	1244	39
1984	902	1283	42
Mean	1318	1302	- 1

Basin: Linggiu
Station: Ran. Tanah Jengeli

Year	Annual Loss (mm) Observed	Simulated	Difference (%)
1978	1576	1431	- 9
1979	1432	1295	-10
1980	1065	1485	39
1981	1346	1275	- 5
1982	1795	1494	-17
1983	1288	1384	7
1984	918	1366	49
Mean	1369	1393	2

Table 32 DIFFERENCE IN ANNUAL LOSS AT KEY STATION (2/2)

Basin: Sayong
Station: Jam. Johor Tenggara

Year	Annual Loss (mm) Observed	Simulated	Difference (%)
1977	1357	1259	- 7
1978	1299	1411	9
1979	1270	1289	1
1980	1359	1538	13
1981	1317	1255	- 5
1982	1267	1454	15
1983	1279	1301	2
1984	1438	1267	-12
Mean	1323	1363	3

Basin: Skudai
Station: Saleng

Year	Annual Loss (mm) Observed	Simulated	Difference (%)
1971	1228	1192	- 3
1972	1559	1261	-19
1973	1705	1277	-25
1974	1285	1159	-10
1975	868	1367	57
1976	1316	1291	- 2
1977	1342	1186	-12
1978	840	1288	53
1979	1656	1232	-26
1980	1703	1407	-17
1981	1508	1218	-19
1982	1370	1339	- 2
Mean	1365	1268	- 7

Table 33 TANK PARAMETERS

		Model I	Model II	Model III	Model IV
Applied Gaging Station		Kg. Rantau Panjang	Jam. Johor Tenggara	Ran. Tanah Jengeli	Saleng
Top Tank	H1	5 mm	5 mm	5 mm	5 mm
	H2	35 mm	35 mm	35 mm	35 mm
	H3	40 mm	40 mm	40 mm	40 mm
	AO	0.15	0.15	0.15	0.15
	A1	0.20	0.10	0.10	0.15
	A2	0.40	0.20	0.15	0.35
	A3	0.0	0.0	0.0	0.0
	PS	80 mm	80 mm	80 mm	80 mm
	SS	350 mm	350 mm	350 mm	350 mm
Second Tank	BO	0.03	0.03	0.03	0.02
	B1	0.15	0.10	0.10	0.15
Third Tank	CO	0.006	0.006	0.006	0.006
	C1	0.025	0.02	0.02	0.025
Fourth Tank	DO	0.002	0.002	0.002	0.002
	D1	0.002	0.002	0.002	0.002
River Channel	HR	2 mm	2 mm	2 mm	2 mm
	R1	0.10	0.10	0.05	0.10
	R2	0.10	0.10	0.10	0.10
Area Ratio	a	3	3	3	3
Constant	TB	3	3	3	3
	TC	4	4	4	4

Table 34 INITIAL VALUES

	TOP TANK		SECOND TANK	THIRD TANK	FOURTH TANK
ZONE	XS	XP	XB	XC	XD
1	50.0	30.0	30.0	100.0	200.0
2	50.0	30.0	40.0	200.0	500.0
3	100.0	40.0	50.0	300.0	700.0
4	200.0	40.0	60.0	400.0	1,500.0

Table 35 5-DAY NATURAL RUNOFF AT RANTAU PANJANG (1737451) (1/3)

YEAR : 1963 ANNUAL MEAN : 27.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	41.6*	24.2*	50.5*	32.6*	16.4*	31.3*	10.2*	23.6*	10.2	30.3	42.5	57.2
6-10	33.4*	18.1*	28.3*	22.7*	13.1*	24.2*	9.2*	19.7*	11.5	24.3	58.1	44.7
11-15	26.7*	15.3*	20.0*	23.3*	13.1*	20.5*	8.2*	16.8*	14.9	18.9	34.2	53.1
16-20	20.7*	12.7*	14.9*	39.1*	18.9*	17.6*	7.5*	13.8*	10.1	32.3	52.9	23.6
21-25	15.9*	17.5*	19.7*	26.7*	48.0*	14.4*	8.4*	12.6*	49.7	25.9	36.6	59.1
26-END	18.5*	86.3*	60.7*	20.5*	47.6*	12.3*	22.5*	21.1*	35.2	47.8	46.2	55.2
MEAN	25.9	24.9	33.2	27.5	26.9	20.0	11.4	18.0	22.0	30.5	45.1	49.0

YEAR : 1964 ANNUAL MEAN : 37.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	35.1	18.6	239.7	24.6	88.6	15.4	14.2	27.9	23.0	7.3	14.0	7.6
6-10	19.4	26.4	65.1	24.6	93.1	13.9	22.3	12.8	47.4	17.5	15.6	2.9
11-15	11.5	21.4	152.9	64.1	83.7	14.1	20.2	9.3	32.9	7.6	8.1	6.0
16-20	39.9	13.9	110.0	59.9	63.3	9.4	35.9	9.7	28.9	44.0	6.9	10.8
21-25	56.7	16.6	49.9	57.6	22.2	12.9	56.0	8.6	20.5	30.9	3.9	140.0
26-END	33.6	123.6	32.8	66.9	12.8	8.4	50.6	5.9	11.8	19.1	7.4	177.0
MEAN	32.8	33.8	106.0	49.8	55.8	12.4	33.8	12.2	27.4	21.0	9.3	61.2

YEAR : 1965 ANNUAL MEAN : 31.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	171.7	10.7	8.4	13.2	33.7	22.3	12.0	20.3	12.0	26.6	88.8	73.3
6-10	59.2	11.0	7.2	19.8	36.8	15.9	7.8	22.5	14.8	21.6	61.4	52.3
11-15	33.5	23.1	6.5	24.4	50.5	11.4	19.1	24.5	8.9	39.6	47.5	56.8
16-20	21.2	18.3	5.4	26.7	50.7	16.8	9.1	24.2	15.5	37.8	66.0	74.9
21-25	14.5	13.8	9.3	34.9	49.8	12.3	8.6	24.9	17.9	44.2	55.2	52.2
26-END	11.2	14.2	8.0	25.8	33.7	11.8	9.4	18.0	18.2	81.1	80.4	60.5
MEAN	50.6	15.1	7.5	24.2	42.2	15.1	10.9	22.3	14.2	43.1	66.5	61.6

YEAR : 1966 ANNUAL MEAN : 35.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	50.5	24.8	13.5	11.9	50.1	28.0	13.9	27.7	42.2	22.3	25.0	45.5
6-10	32.9	19.3	32.8	18.5	24.8	34.8	26.3	43.4	25.2	28.0	36.9	51.4
11-15	45.8	15.5	17.7	46.8	18.3	30.0	40.4	35.2	34.0	69.4	75.0	62.5
16-20	30.5	17.9	15.8	33.2	16.7	24.1	48.3	48.6	19.0	47.6	72.5	53.2
21-25	50.3	19.1	24.1	38.6	16.9	18.8	44.7	46.1	27.0	42.3	80.9	57.1
26-END	48.1	13.0	15.0	44.5	16.1	14.8	32.7	42.2	19.2	32.1	68.0	64.6
MEAN	43.2	18.6	19.7	32.2	23.6	25.1	34.3	40.6	27.8	40.0	59.7	56.0

YEAR : 1967 ANNUAL MEAN : 57.5

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	56.9	40.0	127.2	24.7	81.2	25.8	16.3	9.6	18.4	22.6	52.5*	70.8*
6-10	52.7	21.5	60.6	33.3	53.0	19.0	17.9	8.5	26.4	20.6	51.2*	56.1*
11-15	196.7	50.2	53.5	24.4	89.2	18.6	24.8	12.4	23.1	19.4	58.2*	117.3*
16-20	143.7	284.5	33.1	25.8	82.6	42.8	26.3	15.3	15.4	13.6	78.0*	308.8*
21-25	51.0	182.5	30.5	40.1	64.5	31.5	19.8	11.2	26.2	35.2	92.4*	141.0*
26-END	35.5	74.6	20.6	135.4	40.3	23.0	11.7	12.5	36.3	32.3	97.9*	174.7*
MEAN	87.7	111.3	53.2	47.3	67.6	26.8	19.2	11.6	23.3	24.2	71.7	145.7

YEAR : 1968 ANNUAL MEAN : 40.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	391.6*	24.0*	9.4*	76.5*	39.8	24.8	23.2*	12.7*	9.0*	25.8*	56.8	30.6
6-10	173.5*	19.9*	8.6*	39.8	37.2	26.7	18.5*	11.4*	7.3*	28.8	54.9	29.6
11-15	90.0*	16.8*	27.6*	34.1	31.8	30.7	15.0*	13.3*	11.5*	56.1	37.5	42.9
16-20	56.2*	14.3*	58.2*	23.4	57.3	32.2	14.3*	14.1*	62.0*	28.7	74.2	64.4
21-25	39.8*	12.0*	74.6*	26.0	38.9	19.8	15.4*	12.8*	54.7*	21.4	49.0	32.8
26-END	26.2*	10.5*	116.7*	27.6	25.9	17.8	14.3*	11.1*	38.8*	42.3	44.7	30.9
MEAN	126.6	16.5	51.4	37.9	38.1	25.3	16.7	12.5	30.5	34.1	52.9	38.3

YEAR : 1969 ANNUAL MEAN : 42.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	43.1	13.6	7.0	41.7*	40.8*	49.7	27.7	12.4	69.1	19.7	36.2	45.3
6-10	66.2	12.7	5.3	44.1*	48.0	64.7	48.6	13.1	42.4	26.1	27.7	73.5
11-15	26.6	11.2	5.5	35.5*	31.6	41.3	41.1	18.6	23.5	42.5	21.9	464.6
16-20	25.7	10.1	5.4	40.3*	24.8	42.8	27.8	44.2	17.4	64.9	39.2	143.8
21-25	18.0	8.6	5.1	63.5*	48.6	41.9	30.6	75.7	28.0	86.1	36.4	87.3
26-END	22.8	8.6	15.2	44.3*	29.7	25.0	15.4	86.6	23.9	61.0	28.6	46.5
MEAN	30.2	10.9	7.5	44.9	37.0	44.2	31.3	43.2	34.0	50.4	31.7	140.4

YEAR : 1970 ANNUAL MEAN : 34.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	34.5	15.4	7.6	36.1	56.6	41.4	32.6	35.6*	13.1	48.2	27.4	67.1
6-10	44.4	45.1	6.5	43.6	63.9	25.7	35.6	29.8	14.1	45.6	42.7	58.3
11-15	36.3	25.2	8.1	46.4	48.9	29.9	24.0*	37.4	17.1	37.7	27.2	49.5
16-20	32.7	12.6	23.6	57.4	50.8	20.3	41.6*	20.9	28.0	19.7	39.7	40.8
21-25	19.4	9.8	15.3	68.3	55.1	20.5	54.5*	16.9	19.4	25.7	69.4	33.4
26-END	17.8	8.4	24.3	70.6	53.5	20.5	56.2*	17.8	20.7	25.5	75.8	43.2
MEAN	30.4	20.2	14.6	53.7	54.7	26.4	41.3	26.1	18.7	33.5	47.1	48.5

Table 36 5-DAY NATURAL RUNOFF AT RANTAU PANJANG (1737451) (2/3)

YEAR : 1971 ANNUAL MEAN : 25.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	195.1	16.2	30.4*	19.2*	6.1*	6.9	17.7	12.1	18.8	10.4	11.8*	12.4*
6-10	233.9	12.6	21.1*	19.5*	4.6	6.5	8.2	13.1	36.9	7.6	11.5*	13.0*
11-15	86.5	10.4	17.1*	17.9*	4.9	5.4	5.9	17.5	29.2	8.9	12.5*	58.9*
16-20	42.4	9.1	13.7*	15.4*	5.8	5.6	10.1	47.0	22.0	10.0	11.3*	146.6
21-25	29.7	9.5*	19.4*	12.2*	4.4	13.6	5.8	28.3	13.5	31.5*	10.0*	92.0
26-END	22.5	29.5*	18.1*	9.3*	6.8	16.6	8.7	16.5	16.3	13.9*	10.7*	67.3
MEAN	99.1	13.5	19.9	15.6	5.5	9.1	9.4	22.2	22.8	13.7	11.3	65.1

YEAR : 1972 ANNUAL MEAN : 23.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	32.1	10.3	6.9	16.7	41.5	26.4	11.2	7.2	13.3	26.0	14.9	50.6
6-10	18.0	11.6	5.1	23.5	29.0	16.0	8.5	6.3	14.0	13.3	28.0	42.3
11-15	13.0	15.3	6.6	30.5	22.9	19.6	6.7	6.7	18.3	13.0	42.3	34.0
16-20	15.2	7.9	5.4	35.2	18.8	30.6	5.8	12.1	25.6	11.1	65.2	44.8
21-25	14.6	12.4	6.4	40.9	48.5	30.1	6.2	10.5	41.7	16.3	58.8	48.2
26-END	10.2	14.0	5.4	47.5	50.0	20.0	6.1	19.7	42.9	21.6	72.4	41.2
MEAN	17.0	11.8	6.0	32.4	35.6	23.8	7.4	10.7	26.0	17.1	46.9	43.5

YEAR : 1973 ANNUAL MEAN : 34.4

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	32.5	16.0	30.0	26.8	44.4	60.2	51.1	43.4	25.1	21.7	39.3	21.7
6-10	53.3	11.6	15.1	30.9	51.3	53.2	28.5	39.0	31.6	13.8	62.3	30.0
11-15	70.5	12.5	19.8	35.0	60.6	31.1	22.6	35.1*	18.2	15.9	34.4	22.2
16-20	48.9	75.2	20.0	46.7	38.3	19.7	16.7	19.5	19.9	36.2	36.7	50.6
21-25	37.7	53.1	24.7	71.5	35.7	16.6	14.7	14.5	51.2	58.9	35.8	27.9
26-END	19.4	42.2	22.4	73.7	49.0	33.8	27.8	12.4	21.5	52.3	30.4	15.8
MEAN	42.9	34.6	22.0	47.6	46.6	35.8	26.9	26.8	27.9	33.8	39.8	27.6

YEAR : 1974 ANNUAL MEAN : 20.4

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	12.5	20.3	16.2	10.1	16.1	23.9	23.6	20.6	17.1	58.6	11.0	22.7
6-10	9.6	21.2	27.6	25.7	22.9	16.5	13.8	14.0	16.5	33.4	7.8	13.7
11-15	7.7	10.1	19.8	20.5	29.3	14.1	12.6	11.5	36.9	17.5	10.5	17.9
16-20	6.4	9.4	10.0	25.5	20.1	20.0	23.1	9.0	56.8	12.7	21.5	14.8
21-25	5.6	32.3	7.5	18.4	24.2	30.4	39.3	9.2	47.3	11.1	33.3	21.6
26-END	8.0	33.7	7.2	23.3	30.4	29.0	33.1	10.0	49.1	13.1	15.2	23.9
MEAN	8.3	20.3	14.5	20.6	24.0	22.3	24.5	12.3	37.6	24.0	16.6	19.2

YEAR : 1975 ANNUAL MEAN : 30.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	10.9	6.3	16.3	42.9	35.7	34.1	29.5	12.4	37.8	13.9	58.3	33.3
6-10	12.9	7.3	32.6	58.6	58.6	25.6	34.3	17.6*	24.8	21.4*	39.7	32.4
11-15	16.8	14.9	31.0	28.6	61.3	28.7	24.9	20.5*	26.2	14.5*	24.6	59.2
16-20	16.5	12.1	34.8	66.7	37.8	51.5	25.7	24.0	21.7	15.0	34.6	27.1
21-25	11.5	7.5	42.6	87.8	42.3	35.2	40.9	28.0	14.8	12.6	27.4	17.8
26-END	8.1	7.8	43.6	44.8	61.1	52.6	21.6	28.6	23.1	17.4	54.7	22.6
MEAN	12.6	9.5	33.8	54.9	49.9	37.9	29.2	22.0	25.0	15.8	39.9	31.8

YEAR : 1976 ANNUAL MEAN : 21.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	14.8	4.6	4.7*	14.2*	37.6*	14.1	11.5	12.3	12.3	12.9	29.3	39.6
6-10	11.5	4.0	7.1*	15.9*	27.4*	13.0	11.5	10.2	11.8	27.6	29.6	24.3
11-15	8.4	3.6	18.1*	16.4*	16.4	11.0	14.6	10.1	10.2	55.7	33.5	28.9
16-20	6.8	3.3	26.4*	14.9*	18.6	10.8	17.5	11.0	11.1	50.2	8.5	63.1
21-25	5.6	3.0	20.3*	45.4*	16.2	10.7	16.8	11.7	10.3	48.4	22.3	73.2
26-END	5.2	5.5	17.3*	57.2*	13.3	13.6	15.7	17.1	11.4	40.4	44.6	123.5
MEAN	8.6	4.0	15.7	27.3	21.3	12.2	14.6	12.2	11.2	39.2	28.0	60.8

YEAR : 1977 ANNUAL MEAN : 29.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	178.6	12.5	31.4	7.0	6.4	17.2	11.6	12.1	22.1	80.7	35.2	39.4
6-10	95.5	22.0	14.1	7.5	12.2	31.4	16.2	16.0	25.3	73.4	33.7	36.3*
11-15	44.3	36.1	9.7	6.7	29.2	21.8	13.6	16.7	18.9	56.3	72.0	24.1*
16-20	27.6	15.6	8.0	9.5	23.5	30.8	12.4	17.3	12.5	46.7	61.1	21.8*
21-25	19.2	20.2	7.6	5.6	14.5	14.6	12.3	26.9	15.2	41.2	75.4	31.1
26-END	14.0	101.5	8.0	5.3	19.3	11.6	14.8	33.4	48.9	43.8	47.4	25.2
MEAN	61.6	29.9	13.0	6.9	17.5	21.2	13.5	20.8	23.8	56.6	54.2	29.5

YEAR : 1978 ANNUAL MEAN : 33.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	29.5	17.0	26.5	24.2	33.1	23.0	35.2	15.1	19.2	11.7	35.6	141.2*
6-10	64.4	13.6	17.2	25.7	63.3	17.4	34.6	14.0	15.5	14.9*	51.4	116.4*
11-15	129.7	11.0	18.5	21.9	81.5	16.7	48.1	12.5	15.0	16.0*	87.2	56.3
16-20	78.7	23.5	16.1	37.7	48.1	11.3	35.0	18.4	10.4	11.6	39.2	36.1
21-25	43.0	18.9	35.3	39.5	29.8	16.1	25.0	13.9	15.6	19.4*	27.3	51.5
26-END	24.7	15.9	28.5	40.9	23.5	15.2	18.1	12.1	15.2	35.8	41.7	47.6
MEAN	60.5	16.7	23.9	31.7	45.8	16.6	32.2	14.2	15.1	18.8	47.1	74.0

Table 37 5-DAY NATURAL RUNOFF AT RANTAU PANJANG (1737451) (3/3)

YEAR : 1979 ANNUAL MEAN : 37.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	43.6	11.9	28.1	62.2	41.4	12.6	12.6	27.8	34.5	17.0	41.5	110.7
6-10	127.0	37.9*	36.1	78.1	25.2	17.7	10.3	16.7	34.4	12.8	55.2	62.8
11-15	42.3	12.9*	21.4	67.8	22.6	30.9	13.9	11.9	31.9	15.7	83.9*	37.6
16-20	24.4	13.2	18.8	47.9	13.0	28.9	17.8	11.7	36.3	15.6	65.9*	35.5
21-25	21.0	17.3	35.3	29.6	10.6	27.5	27.4	17.6	35.7	37.7*	142.9*	24.4
26-END	17.6	16.1	27.9	40.3	11.5	15.4	40.5	22.0	24.5	31.0	360.6	17.6
MEAN	45.0	18.4	27.9	54.3	20.4	22.2	21.1	18.1	32.9	21.9	125.0	47.1

YEAR : 1980 ANNUAL MEAN : 40.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	17.4	18.6	23.7	18.1	49.3	39.0	26.1	42.3	43.5	66.2	55.5	96.8
6-10	42.4	27.8	22.3	15.6	42.5	32.9	16.7	27.7	51.6*	57.1	56.3	100.4
11-15	22.9	15.5	17.7	31.9	32.8	28.6	17.3	65.7	35.9	31.6	48.5	97.3
16-20	18.5	12.3	15.8	45.5	25.5	41.3	24.9	54.6	47.1	35.1	38.7	43.1
21-25	89.5	13.6	22.7	46.9	17.9	28.2	30.3	58.9	81.7	57.5	72.9	25.1
26-END	30.2	24.3	13.3	43.6	35.7	22.2	22.9	39.3	92.2	54.8*	103.8	41.9
MEAN	36.6	18.5	19.0	33.6	34.0	32.0	23.0	47.8	58.7	50.5	62.6	66.6

YEAR : 1981 ANNUAL MEAN : 28.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	20.7	9.3	12.5	18.7	29.8	33.5	11.1	16.4	14.6	13.8	37.8	24.5
6-10	32.8*	7.6	12.2*	62.0	54.7	24.5	15.0	8.9	15.4	22.0	46.5	27.3
11-15	22.4*	6.3	10.6*	59.3	61.8	16.2	14.2	7.4	25.7	30.0	20.7	46.5
16-20	14.3	6.6	7.2*	40.8	85.8	17.5	10.6	6.8	20.3	30.1	27.1	228.8
21-25	11.4	5.3	6.7	44.6	55.8	11.9	17.9	9.3	16.0	38.9	30.5	123.4
26-END	9.1	8.0	8.2	40.6	37.0	16.5	20.8	14.2	17.7	32.1	55.4	37.4
MEAN	18.2	7.1	9.8	44.3	55.6	20.0	15.1	10.6	18.3	26.0	33.0	79.9

YEAR : 1982 ANNUAL MEAN : 40.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	52.8	12.4	11.6	31.4	64.2	60.6	21.3	12.9	42.7	30.2	56.9	61.9
6-10	85.0	20.7	12.0	75.1	39.9	55.9	19.2	13.5	19.3	19.9	44.6	33.8
11-15	41.0	20.4	27.3	38.4	36.7	43.0	24.0	49.5	14.0	17.1	55.9	34.4
16-20	22.0	10.3	30.8	41.0	87.7	65.0	24.2	46.5	15.9	21.7	48.0	54.9
21-25	15.5	11.9	46.6	76.3	52.2	30.2	34.3	32.1	23.7	17.2	66.8	202.8*
26-END	13.0	17.2	29.9	109.9	54.3	19.9	16.7	24.6	16.9	24.1	70.9	139.3*
MEAN	37.4	15.3	26.5	62.0	55.8	45.8	23.1	29.7	22.1	21.8	53.9	89.5

YEAR : 1983 ANNUAL MEAN : 40.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	81.0	25.9	31.3	9.7	16.3	15.1	13.1	42.3	37.5	26.2	57.2	25.8
6-10	50.7	20.0	20.4	10.8	36.2	13.6	16.8	32.3	74.3	28.8	76.7	32.6
11-15	37.8	16.7	11.9	10.9	52.1	22.4	23.2	24.9	86.6	23.6	69.3	217.6
16-20	93.6	17.2	9.1	7.8	32.7	22.9	21.8	38.7	49.2	24.0	52.9	113.2
21-25	53.5	14.7	9.6	8.8	23.6	21.8	26.2	54.0	49.5	31.5	39.6	66.6
26-END	36.0	12.4	10.1	11.3	19.2	15.8	22.0	42.2	32.1	35.5	30.1	333.0
MEAN	61.4	18.2	15.2	9.9	29.7	18.6	20.6	39.1	54.9	28.5	54.3	138.0

YEAR : 1984 ANNUAL MEAN : 61.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	136.3	256.6	81.9	41.5	57.1	58.9	26.5	45.3	15.6	62.7	31.2	50.0
6-10	77.1	258.8	113.3	58.4	64.1	46.5	43.3	39.6	22.1	59.8	40.9	53.8
11-15	85.6	278.5	64.1	47.0	58.1	37.1	43.3	30.7	18.7	20.9	47.7	46.1
16-20	42.2	121.6	49.4	37.0	63.4	40.2	52.2	21.8	15.3	17.2	53.6	39.5
21-25	49.6	83.7	68.3	36.4	79.9	39.1	60.5	18.7	18.1	13.4	38.2	77.7
26-END	143.8	59.3	64.3	37.2	45.9	33.3	31.6	16.8	26.7	15.4	49.9	199.6
MEAN	90.9	180.4	70.0	42.9	60.9	42.5	42.5	28.4	19.4	31.1	43.6	81.7

Table 38 5-DAY NATURAL RUNOFF AT RAN. TANAH JENGELI (1836401) (1/3)

YEAR : 1963 ANNUAL MEAN : 6.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	8.8*	5.7*	14.3*	6.8*	3.2*	8.6*	1.9*	5.8*	1.3*	5.5*	9.1*	12.2*
6-10	6.7*	3.9*	7.1*	4.6*	2.4*	6.3*	1.7*	4.6*	1.7*	4.0*	11.4*	8.8*
11-15	5.6*	3.7*	4.6*	4.9*	2.6*	4.9*	1.5*	3.7*	2.8*	2.6*	4.9*	12.1*
16-20	3.5*	2.4*	2.9*	9.4*	4.7*	4.0*	1.4*	2.8*	1.4*	6.3*	10.4*	3.6*
21-25	2.5*	4.1*	4.3*	6.0*	15.3*	3.0*	1.8*	2.3*	15.6*	4.4*	6.5*	14.2*
26-END	3.5*	27.2*	13.6*	4.3*	14.4*	2.4*	5.8*	3.9*	6.6*	11.2*	9.4*	12.1*
MEAN	5.0	6.3	8.9	6.9	7.4	4.9	2.4	3.9	4.9	5.8	8.6	10.5

YEAR : 1964 ANNUAL MEAN : 7.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.6*	2.4*	54.3*	3.7*	23.6*	1.9*	2.4*	6.1*	4.0*	0.5*	1.8*	0.7*
6-10	2.7*	4.5*	9.6*	3.7*	22.2*	1.7*	4.9*	1.7*	6.8*	2.7*	2.2*	0.1*
11-15	1.1*	3.5*	32.2*	10.5*	23.1*	2.0*	4.2*	1.1*	4.8*	0.7*	0.7*	0.5*
16-20	6.7*	1.8*	23.6*	9.2*	8.0*	1.8*	9.6*	1.2*	4.0*	11.2*	0.5*	1.3*
21-25	11.5*	2.3*	8.6*	11.0*	2.8*	2.0*	17.5*	1.0*	2.7*	6.2*	0.2*	34.5*
26-END	5.5*	24.0*	5.3*	14.3*	1.2*	0.9*	14.9*	0.6*	1.2*	2.9*	0.7*	46.3*
MEAN	6.0	5.9	21.7	8.8	12.1	1.6	9.1	1.9	3.9	4.0	1.0	15.0

YEAR : 1965 ANNUAL MEAN : 7.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	49.4*	1.4*	1.3*	3.2*	10.4*	4.2*	2.6*	6.8*	2.5*	6.7*	20.4*	16.6*
6-10	12.9*	1.7*	1.0*	5.6*	11.9*	2.6*	1.4*	7.8*	3.1*	5.1*	12.8*	10.3*
11-15	6.1*	6.2*	0.9*	7.3*	17.3*	1.6*	5.6*	8.5*	1.3*	6.8*	9.6*	10.5*
16-20	3.1*	4.3*	0.6*	7.9*	8.9*	3.4*	2.0*	8.1*	3.3*	7.1*	15.0*	17.5*
21-25	1.8*	2.7*	1.9*	11.2*	9.8*	2.2*	1.8*	6.1*	4.2*	9.2*	8.7*	10.5*
26-END	1.3*	3.1*	1.6*	7.2*	7.1*	2.3*	2.2*	4.9*	3.5*	16.2*	17.3*	13.1*
MEAN	12.1	3.6	1.5	7.1	10.6	2.7	2.6	7.3	3.0	8.8	14.0	13.1

YEAR : 1966 ANNUAL MEAN : 8.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	10.8*	5.0*	2.4*	1.6*	12.3*	3.9*	2.3*	6.0*	10.9*	5.6*	4.5*	10.2*
6-10	5.2*	3.5*	7.4*	2.9*	4.4*	7.2*	5.9*	11.8*	5.2*	8.1*	7.3*	12.0*
11-15	10.4*	2.6*	3.1*	11.3*	2.8*	6.8*	11.0*	8.8*	8.4*	26.0*	17.8*	11.7*
16-20	5.9*	3.5*	2.7*	7.4*	2.6*	5.1*	13.2*	14.1*	3.5*	9.8*	19.6*	11.2*
21-25	13.3*	4.0*	5.2*	9.1*	2.9*	3.5*	11.7*	12.9*	6.5*	7.2*	21.7*	13.5*
26-END	13.0*	2.2*	2.4*	10.8*	3.0*	2.5*	7.5*	10.7*	4.1*	6.0*	17.2*	16.0*
MEAN	10.0	3.6	3.5	7.2	4.6	4.8	8.6	10.7	6.4	10.3	14.7	12.6

YEAR : 1967 ANNUAL MEAN : 15.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	11.4*	5.3*	35.8*	4.5*	26.2*	4.8*	2.6*	1.7*	5.6*	7.7*	16.4*	19.5*
6-10	10.0*	3.3*	14.6*	7.5*	14.2*	3.1*	3.2*	1.5*	9.2*	6.7*	15.4*	14.5*
11-15	54.2*	9.9*	12.4*	4.7*	26.1*	3.2*	5.7*	2.8*	7.9*	6.0*	16.1*	31.5*
16-20	38.5*	81.0*	6.2*	4.2*	24.1*	9.7*	6.5*	4.0*	4.7*	3.5*	23.4*	75.8*
21-25	9.8*	47.9*	5.6*	9.7*	17.7*	8.6*	4.5*	2.6*	6.8*	12.6*	27.2*	30.5*
26-END	6.2*	15.4*	3.1*	50.6*	9.1*	4.6*	2.1*	3.2*	14.2*	10.8*	28.6*	43.9*
MEAN	21.2	28.5	12.5	13.6	19.2	5.3	4.0	2.6	8.1	8.0	21.2	36.2

YEAR : 1968 ANNUAL MEAN : 7.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	91.4*	3.7*	1.4*	17.3*	7.3*	4.1*	4.1*	2.2*	1.5*	4.4*	13.6*	4.5*
6-10	33.2*	3.3*	1.4*	7.2*	7.8*	3.9*	3.0*	1.9*	1.1*	4.3*	9.4*	4.4*
11-15	17.1*	2.6*	5.4*	6.2*	4.7*	5.2*	2.3*	2.5*	2.1*	11.3*	5.2*	8.1*
16-20	13.7*	2.2*	11.6*	3.6*	12.9*	5.8*	2.3*	2.7*	15.1*	4.4*	13.1*	13.2*
21-25	7.2*	1.8*	17.3*	4.6*	7.7*	2.9*	2.8*	2.4*	12.3*	2.9*	8.4*	5.3*
26-END	4.7*	1.5*	26.1*	5.1*	4.1*	2.5*	2.6*	2.0*	8.7*	8.8*	7.6*	5.3*
MEAN	26.7	2.5	11.0	7.3	7.5	4.1	2.8	2.3	6.8	6.1	9.6	6.8

YEAR : 1969 ANNUAL MEAN : 8.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	9.0*	1.4*	0.8*	11.3*	8.0*	11.6*	5.0*	1.7*	15.9*	3.7*	5.8*	8.5*
6-10	10.6*	1.4*	0.5*	11.2*	9.7*	17.7*	11.1*	2.1*	8.5*	5.7*	4.2*	11.6*
11-15	4.6*	1.2*	0.5*	6.5*	5.7*	7.7*	8.7*	3.5*	3.4*	7.6*	3.0*	121.1*
16-20	4.5*	1.1*	0.5*	9.7*	4.1*	8.3*	5.1*	7.5*	2.2*	12.9*	6.6*	22.2*
21-25	2.4*	0.9*	0.6*	15.7*	11.2*	8.9*	6.4*	14.2*	5.6*	19.9*	6.6*	13.6*
26-END	3.0*	1.0*	2.6*	10.4*	5.5*	4.1*	2.2*	19.4*	4.5*	12.8*	5.0*	7.0*
MEAN	5.6	1.2	1.0	11.1	7.3	9.7	6.3	8.4	6.7	10.5	5.2	29.9

YEAR : 1970 ANNUAL MEAN : 7.5

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.4*	2.6*	1.0*	2.0*	14.6*	8.0*	7.3*	7.1*	1.8*	12.3*	5.6*	15.8*
6-10	9.1*	12.0*	2.8*	11.9*	18.2*	4.0*	3.2*	5.3*	2.2*	11.2*	11.3*	13.8*
11-15	7.2*	5.4*	1.2*	11.9*	12.8*	5.4*	4.6*	7.0*	3.4*	8.6*	5.9*	10.2*
16-20	6.6*	1.3*	6.7*	16.0*	9.3*	3.0*	10.3*	2.9*	7.5*	3.2*	7.7*	7.6*
21-25	3.1*	1.3*	3.6*	17.6*	9.3*	3.2*	13.4*	2.2*	4.2*	5.0*	12.6*	5.9*
26-END	3.0*	1.0*	4.8*	12.4*	10.6*	3.5*	13.3*	2.7*	4.2*	5.0*	17.3*	9.2*
MEAN	5.6	4.2	3.1	14..	12.4	4.5	9.6	4.5	3.9	7.5	10.1	10.4

Table 39 5-DAY NATURAL RUNOFF AT RAN. TANAH JENGELI (1836401) (2/3)

YEAR : 1971 ANNUAL MEAN : 6.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	54.0*	2.3*	6.7*	3.2*	9.7*	1.4*	5.5*	4.0*	4.2*	2.0*	3.3*	3.8*
6-10	65.3*	1.7*	4.5*	3.9*	9.5*	1.3*	1.9*	3.1*	10.3*	1.3*	3.2*	3.9*
11-15	19.6*	1.3*	3.6*	3.3*	8.6*	1.1*	1.2*	4.1*	7.5*	1.9*	3.8*	16.6*
16-20	7.8*	1.2*	2.5*	4.6*	9.9*	1.1*	2.8*	15.5*	5.2*	2.5*	3.4*	38.8*
21-25	4.9*	1.4*	3.7*	1.9*	9.6*	4.1*	1.3*	7.8*	2.5*	11.8*	3.0*	22.4*
26-END	3.5*	6.9*	3.5*	1.3*	1.3*	5.2*	2.5*	3.4*	3.7*	4.1*	3.3*	16.3*
MEAN	25.1	2.1	4.1	2.6	6.2	2.3	2.5	6.2	5.6	3.9	3.3	16.6

YEAR : 1972 ANNUAL MEAN : 4.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.1*	2.3*	0.7*	5.3*	10.0*	6.4*	2.3*	1.6*	3.3*	2.5*	2.2*	6.6*
6-10	3.5*	1.4*	9.6*	2.3*	7.2*	3.9*	1.7*	1.5*	3.5*	1.4*	5.0*	6.1*
11-15	2.6*	1.5*	0.8*	9.2*	5.5*	4.5*	1.3*	1.6*	2.6*	1.4*	6.1*	5.5*
16-20	3.0*	1.0*	0.7*	12.5*	4.4*	6.4*	1.2*	3.3*	3.0*	1.2*	7.1*	9.4*
21-25	3.0*	0.9*	0.9*	11.1*	11.5*	5.6*	1.2*	3.2*	4.1*	1.8*	7.6*	9.0*
26-END	2.6*	1.0*	0.6*	10.6*	11.6*	3.9*	1.3*	5.2*	3.6*	2.6*	9.6*	7.6*
MEAN	3.6	1.4	0.3	7.2	8.5	5.1	1.5	2.8	3.3	1.8	6.3	7.4

YEAR : 1973 ANNUAL MEAN : 5.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.2*	3.6*	4.6*	4.2*	5.3*	7.4*	3.3*	6.3*	5.3*	5.9*	5.9*	3.7*
6-10	10.6*	2.5*	2.5*	5.4*	3.1*	6.9*	2.6*	5.8*	9.6*	3.7*	6.9*	4.7*
11-15	20.9*	3.7*	3.2*	4.1*	12.3*	4.1*	2.3*	5.7*	5.5*	3.6*	4.6*	3.3*
16-20	13.5*	9.9*	3.2*	6.1*	7.3*	2.7*	1.8*	3.3*	5.8*	4.2*	5.4*	5.1*
21-25	9.5*	7.6*	3.3*	3.2*	4.5*	2.3*	1.6*	2.6*	14.1*	9.6*	5.6*	3.7*
26-END	4.5*	5.9*	3.2*	0.6*	4.5*	3.6*	2.3*	2.4*	6.0*	9.3*	5.1*	2.5*
MEAN	10.3	5.3	3.5	3.7	7.7	4.5	2.3	4.3	7.7	6.1	5.6	3.8

YEAR : 1974 ANNUAL MEAN : 5.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.1*	1.9*	3.6*	2.8*	4.2*	7.5*	10.6*	6.5*	6.0*	12.7*	3.2*	5.8*
6-10	1.7*	1.9*	6.6*	3.3*	5.7*	5.1*	5.8*	4.5*	5.9*	8.2*	2.3*	3.4*
11-15	1.5*	1.1*	5.5*	4.5*	5.1*	4.2*	5.1*	3.5*	9.7*	4.3*	3.1*	4.6*
16-20	1.2*	1.1*	2.7*	3.2*	5.8*	6.4*	9.2*	2.8*	10.6*	3.3*	5.7*	4.6*
21-25	1.1*	6.0*	2.6*	3.7*	3.7*	10.9*	13.6*	2.9*	10.2*	2.9*	8.2*	7.2*
26-END	1.2*	7.3*	2.4*	6.1*	10.3*	11.1*	9.7*	3.5*	9.9*	3.6*	4.0*	7.7*
MEAN	1.5	2.7	3.7	3.7	7.4	7.6	8.8	3.9	8.7	5.8	4.4	5.6

YEAR : 1975 ANNUAL MEAN : 5.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.6*	1.7*	3.2*	7.6*	6.6*	5.7*	5.8*	2.8*	8.6*	3.5*	17.9*	11.6*
6-10	4.1*	1.9*	7.5*	9.5*	11.1*	4.9*	2.0*	4.2*	5.8*	6.5*	12.3*	12.5*
11-15	4.6*	2.9*	6.7*	5.5*	12.0*	5.8*	5.4*	5.5*	6.2*	4.8*	6.3*	23.9*
16-20	4.6*	2.6*	7.6*	9.6*	7.8*	6.4*	5.1*	6.7*	4.8*	4.7*	6.7*	11.1*
21-25	3.2*	1.5*	9.8*	12.1*	7.6*	5.7*	7.4*	8.0*	3.4*	3.9*	6.5*	7.1*
26-END	2.2*	1.5*	13.7*	7.5*	7.8*	9.5*	4.7*	8.1*	5.5*	5.9*	14.4*	8.8*
MEAN	3.7	2.0	7.7	8.5	9.7	6.7	5.9	5.9	5.7	4.9	10.7	12.3

YEAR : 1976 ANNUAL MEAN : 4.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.6*	1.5*	1.3*	2.5*	5.9*	3.5*	3.1*	2.0*	2.1*	2.3*	5.1*	8.7*
6-10	4.3*	1.4*	1.7*	2.6*	3.2*	3.2*	3.0*	1.7*	2.1*	4.8*	4.8*	5.2*
11-15	3.1*	1.2*	3.7*	2.6*	2.0*	2.7*	3.5*	1.7*	1.8*	9.1*	5.7*	6.1*
16-20	2.4*	1.1*	3.9*	2.5*	2.8*	2.7*	3.4*	1.8*	2.0*	8.7*	2.1*	16.0*
21-25	2.0*	1.0*	3.4*	5.1*	3.7*	2.8*	2.7*	1.9*	2.0*	8.5*	3.7*	18.5*
26-END	1.6*	1.7*	3.2*	4.7*	2.6*	3.8*	2.4*	2.8*	2.1*	7.1*	10.5*	27.1*
MEAN	3.1	1.5	2.7	3.3	3.3	3.1	3.0	2.0	2.0	6.8	5.6	14.1

YEAR : 1977 ANNUAL MEAN : 6.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	40.4*	2.9*	7.2*	2.1*	1.5*	4.3*	3.1*	2.5*	4.4*	10.0*	8.4*	9.8*
6-10	24.6*	6.2*	3.2*	2.2*	2.1*	5.4*	4.2*	2.6*	4.6*	10.6*	8.5*	9.8*
11-15	11.3*	8.2*	2.2*	1.8*	5.2*	4.2*	3.4*	2.4*	4.0*	9.9*	15.5*	7.3*
16-20	6.6*	4.5*	2.7*	2.1*	6.0*	5.2*	3.1*	2.4*	3.2*	9.4*	13.2*	5.9*
21-25	4.5*	5.2*	2.5*	1.5*	4.0*	3.4*	3.0*	3.5*	3.7*	10.1*	13.8*	7.1*
26-END	5.2*	12.3*	2.7*	1.5*	5.0*	3.2*	2.9*	5.1*	6.9*	8.5*	10.2*	5.5*
MEAN	14.7	6.2	3.7	1.9	4.0	4.3	3.3	3.1	4.5	9.7	11.6	7.5

YEAR : 1978 ANNUAL MEAN : 6.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.8	4.1	7.2	3.9	6.8	4.8	7.7	2.9	3.1	1.8	8.8	14.9
6-10	12.8	3.5	4.5	5.3	13.5	3.7	7.1	2.7	2.7	3.2	15.1	11.2
11-15	17.0	3.3	5.7	4.1	13.1	4.6	13.5	2.8	2.5	3.4	18.6	10.8
16-20	9.8	7.2	4.3	6.5	7.6	3.1	7.7	4.0	2.1	3.1	9.1	7.9
21-25	6.9	5.6	5.0	5.5	6.7	4.2	5.4	2.5	2.5	6.3	5.9	10.2
26-END	5.2	5.4	4.9	7.3	6.0	3.7	3.7	2.4	2.3	7.6	6.0	8.2
MEAN	9.4	4.8	5.2	5.5	8.4	4.0	7.4	2.9	2.5	4.3	10.6	10.5

Table 40 5-DAY NATURAL RUNOFF AT RAN. TANAH JENGELI (1836401) (3/3)

YEAR : 1979 ANNUAL MEAN : 7.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	9.7	3.5	5.9	6.6	9.3	3.0	2.4	3.7	7.7	2.8	10.6	14.8
6-10	18.6	10.0	10.3	9.4	6.1	2.5	2.3	2.8	7.5	2.1	13.7	11.4
11-15	8.1	3.8	3.1	11.9	4.5	4.0	2.7	2.4	7.3	2.7	14.9	7.7
16-20	5.8	3.6	2.8	8.2	2.9	5.2	3.3	2.3	8.5	3.4	13.5	9.1
21-25	5.5	4.3	4.4	6.8	2.4	4.3	4.6	3.1	5.8	9.7	26.4	7.7
26-END	4.7	4.3	4.8	9.3	2.6	2.9	5.2	5.0	4.1	8.7	45.9	6.0
MEAN	8.6	5.0	5.2	8.8	4.6	3.7	3.5	3.3	6.8	5.0	20.8	9.3

YEAR : 1980 ANNUAL MEAN : 8.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.4	4.3	4.6	4.3	12.6	6.2	5.5	8.3*	5.9*	19.9	12.2	13.1
6-10	13.8	5.3	5.9	3.6	9.3	5.0	3.9	6.5*	4.8*	19.2	11.8	16.6
11-15	7.6	5.6	4.4	6.3	7.0	5.6	4.2	5.2*	6.8*	9.7	11.2	16.2
16-20	5.4	3.2	3.9	7.3	5.2	6.1	5.5	6.3*	15.3*	8.6	8.5	6.6
21-25	12.2	5.8	5.2	8.6	4.6	4.8	6.1	6.3*	18.1	12.6	13.0	2.7
26-END	6.2	4.1	3.5	9.3	6.3	4.3	6.0	6.2*	20.9	14.9	13.5	9.5
MEAN	8.5	4.1	4.3	6.5	7.6	5.3	5.2	6.5	12.0	14.2	11.7	10.7

YEAR : 1981 ANNUAL MEAN : 5.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.9	2.1	3.6	7.9	7.1	2.4	2.3	2.5	2.3	2.8	7.5	3.6
6-10	6.7	1.8	4.1	13.7	6.9	4.2	3.0	1.8	2.9	4.1	8.7	4.8
11-15	4.8	1.5	4.5	15.7	8.9	3.1	2.5	1.6	3.9	6.8	4.5	9.3
16-20	3.5	1.5	3.2	12.5	14.3	3.3	1.8	1.6	3.0	4.8	5.8	34.1
21-25	2.9	1.3	3.9	10.1	8.3	2.6	2.7	2.1	3.0	8.6	3.6	10.5
26-END	2.1	2.2	3.6	7.7	5.9	3.0	3.6	3.1	3.9	5.6	4.3	4.5
MEAN	3.9	1.7	3.8	12.1	5.4	3.9	2.7	2.1	3.2	5.4	5.8	10.9

YEAR : 1982 ANNUAL MEAN : 9.4

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	11.1	2.8	2.2	7.7	7.2	9.4	4.7	2.4	6.6	4.1	3.7	3.9
6-10	17.8	2.1	2.9	6.4	8.6	6.8	3.8	2.5	3.3	3.4	3.2	2.8
11-15	8.2	1.9	4.4	5.3	7.9	5.1	3.8	4.5	2.5	2.6	3.4	2.5
16-20	4.9	1.8	5.8	7.6	17.9*	5.0	4.1	4.3	2.8	3.9	3.6	8.3
21-25	3.5	1.8	6.3	5.6	11.9*	3.7	4.1	3.6	3.0	2.6	3.1	26.9
26-END	3.6	1.7	5.8	12.0	10.4	2.7	3.0	4.1	2.9	2.6	3.6	11.6*
MEAN	7.9	2.1	4.4	7.5	10.6	5.4	3.9	3.6	3.5	3.2	3.4	9.4

YEAR : 1983 ANNUAL MEAN : 9.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	17.9*	6.2*	7.0	1.7	4.9	3.2	2.1	7.8	5.9	5.8	10.2	6.8
6-10	11.4*	4.9	4.5	1.9	11.3	3.7	3.0	5.6	10.4	7.3	17.6	8.4
11-15	12.7*	4.0	2.6	2.5	13.2	4.5	2.9	3.9	9.7	6.1	13.6	15.8
16-20	21.7*	3.9	2.0	1.9	9.3	2.9	3.9	6.4	7.4	6.4	11.2	34.3
21-25	12.5*	3.3	2.1	1.9	4.9	2.6	3.4	9.3	8.2	7.3	8.3	21.0*
26-END	9.1*	2.2	1.7	2.7	4.2	2.5	5.5	5.9	6.1	7.6	7.4	59.8*
MEAN	14.0	4.3	3.3	2.1	9.5	3.2	3.5	6.5	8.0	6.8	11.4	25.5

YEAR : 1984 ANNUAL MEAN : 13.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	39.1*	58.1	13.2	7.9	10.1	8.3	5.8	7.7	3.0*	5.3*	10.8	17.2
6-10	18.7*	47.0	16.4	10.7	14.3	7.3	6.4	6.7	4.0*	15.6*	10.4	17.3*
11-15	22.0	81.5	6.2	9.0	11.8	7.5	6.6	5.1	3.3*	8.6	15.7	12.0*
16-20	11.4	29.5	11.0	8.5	15.7	6.3	6.4	3.7	2.7*	7.4	18.2	10.4*
21-25	9.1	18.2	13.0	7.4	13.0	6.3	7.4	3.4	3.6*	6.0	15.1	23.0*
26-END	28.1	13.0	14.1	8.7	9.6	6.5	5.9	3.3*	4.8*	6.7	18.1	62.0*
MEAN	20.2	41.1	12.7	8.7	12.1	7.0	6.4	4.9	3.6	8.2	14.7	24.9

Table 41 5-DAY NATURAL RUNOFF AT JAM. JOHOR TENGGARA (1836402) (1/3)

YEAR : 1963 ANNUAL MEAN : 13.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	21.3*	11.1*	18.7*	16.7*	8.7*	12.1*	5.6*	10.5*	6.7*	16.9*	21.3*	28.8*
6-10	17.6*	9.2*	12.3*	11.9*	7.2*	10.3*	5.4*	9.0*	7.0*	14.3*	31.0*	23.7*
11-15	14.7*	8.1*	9.7*	12.0*	6.9*	9.3*	4.5*	8.2*	8.2*	12.0*	21.3*	25.4*
16-20	11.9*	7.0*	7.9*	17.7*	5.1*	8.4*	4.1*	7.2*	6.4*	17.3*	28.1*	14.6*
21-25	9.5*	9.2*	9.7*	12.9*	14.9*	7.3*	4.4*	6.9*	15.6*	14.9*	20.7*	26.6*
26-END	9.9*	26.9*	29.3*	10.5*	15.9*	6.5*	9.6*	11.6*	19.3*	22.1*	24.1*	27.1*
MEAN	14.2	10.6	15.1	13.6	10.5	9.0	5.7	9.0	10.5	16.4	24.4	24.5

YEAR : 1964 ANNUAL MEAN : 17.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	19.2*	12.2*	114.6*	15.1*	61.0*	10.2*	8.3*	13.7*	13.1*	5.5*	9.1*	5.3*
6-10	12.3*	14.8*	40.1*	15.3*	43.4*	9.1*	11.0*	8.1*	29.6*	10.5*	9.8*	2.3*
11-15	8.0*	12.5*	77.8*	37.7*	37.9*	7.8*	10.4*	6.3*	20.4*	5.6*	5.8*	4.3*
16-20	19.7*	9.0*	55.2*	35.2*	24.3*	6.4*	14.4*	6.4*	18.2*	18.7*	5.0*	7.1*
21-25	29.6*	10.4*	28.3*	31.2*	14.5*	7.8*	17.6*	5.7*	13.1*	16.3*	3.1*	61.5*
26-END	19.9*	66.4*	19.5*	33.3*	9.1*	5.7*	17.8*	4.2*	8.3*	11.6*	5.2*	72.7*
MEAN	13.2	19.3	54.7	28.0	27.5	8.0	13.4	7.3	17.1	11.4	6.4	27.1

YEAR : 1965 ANNUAL MEAN : 14.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	62.2*	6.9*	5.0*	5.9*	10.9*	12.2*	6.0*	5.6*	6.3*	11.3*	42.0*	35.1*
6-10	29.2*	6.6*	4.4*	7.4*	11.1*	9.4*	4.4*	5.7*	7.5*	10.0*	31.5*	27.8*
11-15	16.8*	9.6*	4.0*	8.5*	13.2*	7.1*	6.7*	6.2*	5.5*	22.8*	24.9*	31.4*
16-20	13.1*	8.2*	3.6*	9.2*	23.6*	8.9*	4.5*	6.7*	7.7*	20.7*	31.5*	34.7*
21-25	9.5*	6.8*	4.5*	10.6*	26.5*	6.9*	4.2*	7.3*	8.2*	22.7*	33.0*	27.4*
26-END	7.5*	7.1*	4.3*	9.7*	17.2*	6.3*	4.3*	7.1*	8.2*	42.7*	40.2*	30.1*
MEAN	24.9	7.6	4.3	8.6	17.9	8.5	5.0	6.5	7.2	22.6	33.8	31.0

YEAR : 1966 ANNUAL MEAN : 16.4

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	25.5*	12.9*	7.6*	7.5*	22.2*	17.5*	8.2*	13.9*	17.6*	9.7*	14.0*	21.9*
6-10	16.7*	10.7*	15.6*	11.1*	14.0*	17.8*	12.6*	17.1*	13.1*	10.1*	19.5*	23.8*
11-15	21.6*	9.0*	10.0*	21.1*	11.0*	14.4*	15.9*	15.2*	14.9*	14.3*	34.3*	34.4*
16-20	16.5*	9.6*	7.1*	16.2*	10.0*	12.2*	18.9*	17.4*	10.4*	24.6*	28.5*	27.0*
21-25	23.3*	9.6*	12.0*	17.7*	9.7*	10.2*	18.5*	17.3*	12.2*	24.4*	32.3*	26.1*
26-END	19.0*	7.5*	8.9*	19.8*	8.9*	8.6*	15.4*	18.0*	9.6*	17.6*	29.1*	28.2*
MEAN	20.3	10.1	10.5	15.6	12.5	13.5	14.9	16.5	13.0	16.8	26.3	26.9

YEAR : 1967 ANNUAL MEAN : 23.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	30.0*	28.4*	47.6*	13.7*	24.2*	14.3*	9.7*	5.5*	6.1*	6.0*	16.7*	27.3*
6-10	28.7*	13.0*	26.5*	16.0*	21.2*	11.2*	10.1*	4.9*	6.6*	6.1*	17.3*	23.5*
11-15	74.5*	26.7*	24.6*	13.2*	31.6*	10.7*	11.8*	6.0*	6.1*	8.3*	22.4*	47.0*
16-20	57.4*	104.6*	18.1*	14.2*	29.2*	26.5*	11.5*	6.3*	5.1*	5.8*	26.6*	136.4*
21-25	27.5*	74.6*	16.6*	18.0*	24.9*	16.1*	9.4*	5.3*	5.5*	8.4*	32.4*	70.3*
26-END	20.1*	32.5*	12.6*	27.9*	19.2*	12.5*	6.5*	5.4*	6.4*	9.0*	34.8*	75.3*
MEAN	39.1	44.9	24.3	17.2	24.9	14.2	9.7	5.5	6.0	7.0	25.0	63.7

YEAR : 1968 ANNUAL MEAN : 21.4

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	182.0*	14.5*	5.2*	26.7*	22.0*	14.6*	13.2*	7.2*	5.3*	15.0*	25.7*	18.9*
6-10	92.9*	12.0*	5.3*	22.2*	19.0*	16.4*	10.9*	6.5*	4.4*	17.7*	31.6*	18.2*
11-15	63.6*	10.2*	14.7*	16.9*	19.6*	17.8*	9.1*	7.3*	6.3*	29.4*	23.6*	23.3*
16-20	30.5*	8.7*	30.6*	14.2*	27.7*	18.0*	8.4*	7.5*	27.7*	17.4*	41.9*	33.4*
21-25	22.2*	7.4*	15.0*	14.3*	23.6*	12.4*	8.6*	7.0*	26.4*	13.6*	28.1*	19.5*
26-END	16.5*	6.5*	54.5*	15.3*	15.5*	11.3*	8.0*	6.2*	18.7*	21.7*	25.8*	17.7*
MEAN	63.9	10.0	25.7	20.3	20.6	15.1	9.6	6.9	14.8	19.2	29.5	21.7

YEAR : 1969 ANNUAL MEAN : 21.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	22.1*	9.3*	4.6*	16.4*	21.7*	23.0*	15.5*	7.9*	32.6*	10.8*	21.4*	24.8*
6-10	21.9*	8.6*	3.7*	16.7*	25.0*	25.2*	23.1*	7.8*	22.3*	13.0*	16.8*	44.0*
11-15	15.3*	7.6*	3.6*	16.0*	17.7*	22.7*	20.9*	10.1*	14.5*	23.9*	13.8*	191.9*
16-20	14.7*	6.9*	3.6*	18.1*	14.5*	23.9*	15.6*	25.5*	11.3*	34.3*	23.0*	86.7*
21-25	11.4*	5.9*	3.4*	27.9*	22.9*	21.1*	15.6*	41.6*	15.1*	40.4*	20.3*	52.5*
26-END	14.6*	9.7*	9.3*	20.5*	16.3*	14.7*	9.6*	41.8*	13.0*	31.2*	16.3*	28.3*
MEAN	16.6	7.5	4.9	19.6	19.6	21.6	16.4	23.1	18.1	25.8	18.6	70.0

YEAR : 1970 ANNUAL MEAN : 17.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	28.2*	9.0*	5.6*	17.5*	23.6*	22.3*	15.9*	18.9*	8.4*	20.6*	14.4*	30.6*
6-10	23.0*	18.2*	4.3*	17.1*	23.6*	15.5*	16.6*	16.7*	8.4*	20.2*	17.5*	26.7*
11-15	19.2*	12.7*	5.0*	19.4*	20.0*	16.7*	12.9*	20.6*	9.1*	17.9*	13.5*	25.5*
16-20	17.6*	7.2*	8.7*	21.7*	28.2*	12.6*	18.4*	13.1*	11.2*	11.7*	21.3*	22.4*
21-25	11.5*	6.3*	7.0*	26.3*	31.9*	12.3*	24.0*	10.8*	9.6*	13.8*	38.8*	18.9*
26-END	10.4*	5.5*	12.9*	29.1*	28.4*	11.9*	25.8*	10.9*	10.8*	13.6*	36.0*	21.7*
MEAN	16.8	10.2	7.3	12.2	26.0	15.2	19.2	15.0	9.6	16.2	23.6	24.3

Table 42 5-DAY NATURAL RUNOFF AT JAM. JOHOR TENGGARA (1836402) (2/3)

YEAR : 1971 ANNUAL MEAN : 11.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	74.6*	10.2*	14.5*	11.3*	4.1*	3.6*	5.6*	3.5*	9.1*	5.7*	4.5*	4.1*
6-10	85.4*	8.1*	10.6*	11.0*	3.1*	3.3*	4.0*	6.0*	14.0*	4.3*	4.3*	4.5*
11-15	41.5*	6.7*	9.0*	10.0*	3.2*	2.9*	3.2*	8.1*	12.2*	4.4*	4.3*	25.6*
16-20	23.5*	5.3*	7.7*	8.8*	3.5*	2.9*	4.0*	13.6*	10.2*	4.3*	3.8*	59.5*
21-25	17.3*	5.8*	10.5*	7.4*	2.6*	4.6*	2.9*	11.0*	7.4*	6.5*	3.4*	41.1*
26-END	13.5*	13.7*	9.9*	5.3*	3.7*	5.3*	3.2*	8.6*	7.9*	4.9*	3.5*	30.2*
MEAN	42.2	8.0	10.3	9.0	3.4	3.8	3.8	8.5	10.1	5.0	4.0	27.6

YEAR : 1972 ANNUAL MEAN : 12.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	17.6*	5.0*	4.8*	5.5*	19.1*	12.1*	5.9*	3.4*	5.9*	18.4*	9.1*	32.0*
6-10	9.6*	7.6*	3.4*	6.0*	12.9*	7.3*	4.5*	2.9*	6.4*	9.2*	15.4*	25.9*
11-15	6.9*	10.6*	4.3*	10.3*	19.5*	9.2*	3.6*	3.0*	11.4*	8.9*	25.7*	20.1*
16-20	8.0*	5.0*	3.5*	12.7*	9.9*	15.5*	3.1*	4.9*	17.1*	7.6*	43.1*	22.3*
21-25	7.6*	9.1*	4.0*	16.7*	22.1*	16.6*	3.3*	3.6*	28.5*	11.1*	36.7*	26.3*
26-END	5.1*	10.5*	3.3*	22.7*	22.5*	10.7*	3.0*	8.0*	30.4*	14.2*	44.8*	23.1*
MEAN	9.0	7.9	3.9	12.4	16.2	11.9	3.9	4.4	16.6	11.6	29.1	24.9

YEAR : 1973 ANNUAL MEAN : 19.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	17.7*	7.8*	18.2*	17.1*	27.8*	37.8*	37.6*	26.9*	12.8*	8.6*	23.9*	12.5*
6-10	27.6*	5.7*	8.9*	22.3*	29.4*	32.8*	20.1*	23.9*	11.1*	5.7*	41.7*	17.9*
11-15	24.6*	6.2*	11.7*	22.7*	30.4*	19.4*	15.6*	20.7*	6.4*	7.7*	22.0*	13.7*
16-20	18.8*	46.7*	11.9*	25.0*	20.1*	12.5*	11.4*	11.2*	7.3*	23.8*	22.7*	34.6*
21-25	16.6*	32.4*	14.4*	46.2*	19.3*	10.5*	10.0*	8.1*	18.7*	34.5*	21.3*	17.9*
26-END	9.2*	26.1*	13.1*	46.9*	30.1*	22.4*	20.1*	6.7*	8.3*	29.0*	17.7*	9.4*
MEAN	16.7	20.4	13.6	30.4	26.3	22.6	19.2	15.9	10.8	18.6	24.9	17.4

YEAR : 1974 ANNUAL MEAN : 8.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	7.2*	14.3*	7.9*	4.1*	6.5*	8.0*	3.6*	6.9*	4.5*	28.5*	4.2*	9.9*
6-10	5.4*	15.1*	12.4*	15.3*	9.9*	5.6*	2.1*	4.5*	4.3*	15.1*	2.8*	6.1*
11-15	4.3*	6.8*	7.6*	13.4*	11.7*	4.9*	2.2*	3.9*	15.5*	7.7*	3.7*	7.6*
16-20	3.4*	6.1*	4.1*	16.6*	5.6*	6.5*	4.3*	3.1*	33.0*	5.5*	8.7*	5.1*
21-25	3.0*	17.2*	3.1*	9.7*	6.2*	7.9*	11.6*	3.1*	23.6*	4.7*	14.6*	6.6*
26-END	5.0*	16.8*	2.6*	9.8*	8.8*	6.2*	12.2*	2.9*	25.6*	5.3*	6.4*	7.5*
MEAN	4.7	12.5	6.2	11.6	7.2	6.5	6.2	4.0	17.7	10.9	6.7	7.1

YEAR : 1975 ANNUAL MEAN : 14.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.4*	2.6*	3.6*	24.2*	19.9*	19.9*	15.5*	6.1*	17.4*	6.1*	19.4*	9.5*
6-10	4.2*	3.1*	16.0*	33.9*	33.4*	13.9*	17.3*	8.0*	11.6*	7.5*	13.4*	6.9*
11-15	6.8*	8.0*	15.2*	15.6*	23.6*	15.9*	12.3*	8.4*	13.6*	4.5*	10.6*	10.8*
16-20	6.4*	6.4*	16.5*	40.7*	19.0*	33.2*	13.5*	9.5*	10.6*	5.0*	18.5*	4.8*
21-25	4.6*	3.9*	19.6*	53.5*	23.6*	20.9*	22.3*	10.4*	7.1*	4.4*	12.9*	3.4*
26-END	3.3*	4.2*	19.1*	25.9*	33.7*	25.1*	10.7*	10.6*	10.7*	5.0*	21.8*	4.9*
MEAN	4.7	4.7	16.0	32.3	27.4	21.8	15.1	8.9	11.8	5.4	16.1	6.6

YEAR : 1976 ANNUAL MEAN : 11.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.4*	1.3*	1.9*	8.1*	24.9*	6.3*	4.6*	7.2*	7.1*	7.2*	16.7*	19.2*
6-10	2.7*	1.2*	3.2*	9.4*	17.3*	5.8*	4.8*	5.9*	6.7*	15.2*	17.4*	12.2*
11-15	2.1*	1.1*	10.5*	9.8*	13.6*	4.8*	6.7*	5.9*	5.7*	31.6*	19.4*	14.5*
16-20	1.7*	1.0*	15.8*	6.8*	11.4*	4.7*	9.3*	6.4*	6.1*	27.7*	3.8*	26.1*
21-25	1.5*	0.9*	11.6*	29.0*	9.5*	4.5*	10.0*	6.8*	5.5*	26.8*	9.7*	30.4*
26-END	1.4*	1.8*	9.8*	19.5*	7.2*	5.4*	9.4*	10.1*	6.3*	22.5*	20.6*	58.0*
MEAN	2.1	1.2	8.2	17.4	13.4	5.2	7.5	7.2	6.2	21.9	14.6	27.7

YEAR : 1977 ANNUAL MEAN : 14.5

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	81.5*	5.9*	14.4*	2.4	2.9	7.5	4.8	6.2	11.7	53.0	16.2	17.5
6-10	39.9*	3.2	6.6*	2.8	6.9	17.4	6.9	9.5	14.1	45.5	14.6	14.7
11-15	19.2*	16.6	4.7*	2.9	16.0	11.5	5.9	10.4	9.7	32.0	36.0	8.5
16-20	12.6*	5.9	2.4	4.5	12.0	17.3	5.5	11.0	5.4	24.2	30.5	9.0
21-25	9.0*	7.3	2.4	2.3	5.7	6.8	5.5	17.4	7.0	18.6	41.9	14.6
26-END	6.7*	63.8	3.1*	2.3	7.9	4.5	7.9	20.2	30.5	23.5	23.8	12.5
MEAN	27.5	14.7	5.5	2.8	7.6	10.8	6.1	12.7	13.1	32.5	27.2	12.8

YEAR : 1978 ANNUAL MEAN : 17.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	15.7	7.8	10.6	14.2	17.1	11.9	17.2	8.2	11.3	7.0	15.9	96.8
6-10	34.1	5.3	7.2	13.7	36.7	6.7	17.4	7.6	8.8	7.2	18.7	79.8
11-15	82.8	4.0	6.4	12.0	47.7	6.6	18.1	6.1	8.7	8.1	42.6	29.9
16-20	51.1	8.5	4.6	21.6	27.9	4.5	16.7	9.0	5.4	4.8	18.0	17.7
21-25	25.4	6.9	21.9	24.6	14.2	6.9	12.2	7.8	9.3	6.2	13.6	27.2
26-END	12.5	4.6	16.4	21.9	10.1	6.9	9.3	6.3	9.3	18.2	25.9	26.9
MEAN	36.6	6.3	11.7	18.3	25.1	7.6	15.0	7.5	8.8	8.9	22.5	45.8

Table 43 5-DAY NATURAL RUNOFF AT JAM. JOHOR TENGGARA (1836402) (3/3)

YEAR : 1979 ANNUAL MEAN : 20.5

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	21.3	4.5	14.3	42.7	19.4	5.9	6.8	17.4	16.7	9.9	18.0	70.3*
6-10	77.0	15.7	12.9*	51.6	11.4	11.0	5.0	9.6	16.9	7.4	24.5	35.1*
11-15	22.4	4.9	13.3	32.5	11.8	19.8	7.5	6.2	14.9	9.0	47.3	19.5*
16-20	11.1	5.3	11.5	28.5	6.4	16.1	9.8	6.2	16.8	7.7	34.2	15.3*
21-25	8.8	7.6	22.9	14.0	5.1	16.4	15.8	10.0	20.7	16.2	77.3*	8.1
26-END	7.2	6.6	16.0	18.6	5.3	8.5	25.6	10.7	14.2	12.2	223.4*	5.0
MEAN	24.1	7.5	15.2	32.3	9.8	13.0	12.2	10.0	16.7	10.5	70.8	24.9

YEAR : 1980 ANNUAL MEAN : 20.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	4.4	8.7	12.5	8.9	21.1	22.8	13.0	22.5	27.4	23.6	27.1	60.0
6-10	13.6	14.3	12.6	7.5	21.0	19.7	7.7	12.9	36.5	16.3	28.0	56.5
11-15	7.1	7.1	7.6	16.7	16.5	14.9	7.8	48.1	18.7	10.9	23.0	53.9
16-20	6.9	5.2	7.1	27.2	11.6	25.0	12.0	36.2	14.2	15.7	19.0	26.1
21-25	55.9	5.4	9.5	25.9	7.8	15.9	15.6	40.2	40.1	28.4	41.0	17.2
26-END	15.1	14.0	5.5	22.0	19.9	11.7	9.6	23.2	44.2	21.7	66.0	20.1
MEAN	17.1	9.1	9.1	18.0	16.4	15.3	10.9	30.3	30.2	19.5	34.0	38.4

YEAR : 1981 ANNUAL MEAN : 15.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	11.3	4.4	5.6	2.9	13.6	16.3	5.7	9.8	8.7	7.2	19.8	14.9
6-10	16.9	3.5	3.6	21.9	35.6	14.1	7.8	4.7	8.3	11.9	24.8	15.3
11-15	11.2	2.9	1.7	24.6	39.4	8.7	8.1	3.8	15.5	14.0	10.1	24.2
16-20	6.4	3.2	9.6	14.1	49.5	9.6	6.1	3.3	12.5	17.3	13.6	134.0*
21-25	5.0	2.4	9.8	21.5	34.2	6.0	10.9	4.5	6.8	18.5	20.2	86.0*
26-END	4.3	3.2	1.3	22.2	21.9	9.1	11.8	6.9	8.6	17.9	23.3	24.8*
MEAN	9.0	3.3	2.2	17.7	31.9	10.6	8.5	5.6	10.4	14.6	18.6	49.1

YEAR : 1982 ANNUAL MEAN : 25.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	26.0	5.9	6.3	33.9	42.8	35.7	10.2	6.8	24.9	18.8	24.9	46.0
6-10	41.6	14.5	5.4	50.1	19.6	36.1	9.8	7.2	10.9	11.1	33.1	24.2
11-15	20.7	14.3	16.6	53.9	17.9	28.3	13.8	34.7	7.7	10.2	61.9	25.2
16-20	10.4	5.2	16.9	22.2	63.6	46.8	13.7	32.2	8.7	12.0	34.9	32.6
21-25	7.2	7.2	29.1	56.5	24.2	19.6	22.1	21.1	15.1	10.5	51.3	127.1*
26-END	6.1	11.5	17.3	22.8	29.0	12.4	9.1	14.1	9.5	16.3	54.7	100.2*
MEAN	18.5	9.7	15.2	39.9	29.5	29.8	13.0	19.2	12.8	13.2	40.1	60.5

YEAR : 1983 ANNUAL MEAN : 22.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	39.2*	11.2	14.0	5.5	5.5	7.4	7.5	22.8	22.2	13.0	31.7	10.8
6-10	24.5*	9.8	3.4	6.0	12.0	5.3	9.5	18.0	45.7	12.5	35.6	13.6
11-15	27.6*	7.5	5.6	5.0	12.9	11.4	14.9	14.9	57.0	10.1	35.9	154.1
16-20	41.2*	8.0	4.5	3.5	12.5	14.5	12.1	22.4	29.6	9.9	26.5	38.7
21-25	24.1*	7.1	4.6	4.4	11.7	14.3	16.7	30.3	28.0	15.0	20.0	21.9
26-END	15.8	6.0	5.7	5.1	9.1	9.2	9.8	26.0	17.5	17.9	13.5	177.8
MEAN	28.3	8.2	7.2	4.9	11.6	10.4	11.7	22.5	33.3	13.2	27.2	73.0

YEAR : 1984 ANNUAL MEAN : 28.9

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	65.5	131.5	47.9	22.4	32.2	36.2	13.0	25.7	8.3	43.6	8.7	13.6*
6-10	35.1	134.0	67.9	31.7	30.7	27.5	26.4	22.7	11.8	24.5	17.7	16.3*
11-15	35.4	94.5	24.3	24.9	29.9	19.4	26.1	17.7	10.3	3.6	14.3*	18.4*
16-20	17.1	53.6	24.1	17.5	23.2	24.1	34.4	12.5	8.5	2.4	14.6*	15.6*
21-25	27.6	29.9	36.3	18.8	45.3	23.0	39.3	10.3	9.3	1.4	7.5*	26.1*
26-END	74.3	29.4	31.6	17.5	24.8	17.8	17.2	9.0	14.7	2.0	12.4*	59.3*
MEAN	43.5	82.4	38.5	22.1	31.6	24.7	25.8	16.1	10.5	12.6	12.5	26.0

Table 44 5-DAY NATURAL RUNOFF AT SALENG (1/3)

YEAR : 1963 ANNUAL MEAN : 3.0

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.2*	1.9*	7.6*	2.2*	1.8*	4.5*	2.2*	1.6*	2.0*	2.3*	4.5*	5.2*
6-10	2.7*	1.4*	3.6*	1.7*	1.5*	4.1*	1.8*	1.5*	1.7*	2.6*	4.5*	5.0*
11-15	2.1*	1.3*	2.5*	1.6*	1.5*	3.9*	1.5*	1.4*	1.7*	2.7*	6.4*	5.9*
16-20	1.6*	1.1*	1.8*	2.2*	2.7*	3.5*	1.2*	1.2*	1.8*	3.2*	7.5*	4.6*
21-25	1.2*	2.6*	1.8*	2.3*	5.5*	3.0*	1.0*	0.9*	2.5*	3.2*	5.8*	4.4*
26-END	1.4*	12.6*	3.6*	2.0*	4.8*	2.6*	1.4*	1.8*	2.4*	5.2*	5.2*	3.9*
MEAN	2.0	2.7	3.5	2.0	3.0	3.6	1.5	1.4	2.0	3.3	5.7	4.8

YEAR : 1964 ANNUAL MEAN : 3.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.2*	2.4*	17.1*	3.0*	6.6*	2.1*	1.4*	3.2*	3.5*	2.5*	3.0*	1.8*
6-10	3.0*	2.2*	8.1*	3.8*	5.1*	1.6*	1.2*	2.9*	4.1*	2.0*	2.8*	1.6*
11-15	2.5*	2.3*	10.9*	7.5*	4.7*	2.5*	1.1*	2.6*	3.6*	1.6*	2.6*	1.6*
16-20	2.8*	2.3*	7.0*	7.2*	4.0*	2.0*	1.3*	2.2*	4.8*	1.5*	2.2*	4.6*
21-25	3.3*	2.8*	4.8*	5.4*	3.4*	1.8*	2.9*	1.9*	3.9*	3.1*	1.9*	9.5*
26-END	2.8*	17.1*	3.6*	9.1*	2.7*	1.7*	3.1*	2.1*	3.2*	3.2*	1.7*	8.4*
MEAN	2.9	4.4	8.4	6.0	4.4	1.9	1.9	2.5	3.9	2.3	2.4	4.7

YEAR : 1965 ANNUAL MEAN : 3.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.5*	1.0*	1.1*	0.8*	2.7*	3.0*	2.5*	2.4*	3.9*	2.9*	6.0*	5.2*
6-10	4.8*	0.8*	1.1*	1.5*	4.7*	2.3*	2.3*	3.1*	3.9*	2.7*	4.5*	4.1*
11-15	3.9*	0.6*	1.0*	2.6*	5.3*	1.8*	2.0*	4.0*	3.4*	2.9*	4.1*	3.9*
16-20	3.1*	0.5*	0.8*	2.5*	6.1*	1.7*	1.7*	3.9*	4.1*	3.0*	4.0*	3.9*
21-25	2.2*	0.9*	0.6*	2.7*	4.9*	3.0*	1.3*	5.1*	4.3*	4.6*	4.1*	3.6*
26-END	1.5*	1.1*	0.6*	2.7*	3.8*	2.7*	1.0*	5.0*	3.3*	8.5*	5.5*	3.9*
MEAN	3.6	0.9	0.9	2.1	4.6	2.4	1.8	4.0	3.8	4.3	4.7	4.1

YEAR : 1966 ANNUAL MEAN : 2.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	3.6*	3.3*	1.5*	1.9*	3.6*	2.5*	1.7*	2.4*	2.0*	1.0*	2.2*	3.7*
6-10	3.6*	2.8*	1.8*	2.2*	3.1*	2.5*	2.6*	2.5*	1.8*	1.1*	2.8*	4.3*
11-15	5.4*	2.3*	1.8*	4.8*	2.5*	2.3*	3.3*	2.3*	1.7*	1.2*	4.1*	6.4*
16-20	4.1*	1.9*	1.8*	4.1*	2.0*	2.1*	3.9*	2.0*	1.5*	2.9*	5.5*	5.0*
21-25	4.1*	1.8*	2.1*	5.9*	1.7*	1.8*	3.5*	2.0*	1.3*	2.6*	6.1*	4.4*
26-END	3.9*	1.6*	2.1*	4.2*	1.8*	1.7*	2.9*	2.1*	1.1*	2.3*	4.4*	4.4*
MEAN	4.1	2.3	1.9	3.7	2.4	2.2	3.0	2.2	1.6	1.9	4.2	4.7

YEAR : 1967 ANNUAL MEAN : 3.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	6.0*	2.8*	5.3*	1.5*	3.8*	3.1*	1.1*	0.9*	0.5*	1.6*	4.8*	7.2*
6-10	5.2*	2.1*	4.0*	1.1*	4.8*	2.4*	1.1*	0.8*	0.9*	1.8*	4.3*	5.3*
11-15	10.5*	3.2*	3.4*	0.9*	7.0*	1.7*	1.1*	0.6*	1.0*	1.7*	4.6*	7.9*
16-20	7.6*	11.2*	2.9*	0.8*	6.2*	1.3*	1.1*	0.5*	1.0*	1.6*	6.5*	20.4*
21-25	5.0*	7.4*	2.4*	1.8*	4.7*	1.1*	1.1*	0.4*	1.0*	1.7*	5.8*	10.5*
26-END	3.7*	5.3*	1.9*	4.6*	3.8*	1.1*	1.0*	0.3*	1.4*	2.3*	8.7*	11.4*
MEAN	6.3	5.4	3.3	1.8	5.0	1.8	1.1	0.6	1.0	1.8	5.8	10.5

YEAR : 1968 ANNUAL MEAN : 3.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	25.7*	1.7*	0.6*	3.9*	1.9*	3.2*	1.9*	1.3*	0.8*	2.6*	3.1*	3.4*
6-10	12.5*	1.3*	0.5*	3.4*	2.4*	5.9*	1.4*	1.1*	0.7*	3.3*	4.1*	3.1*
11-15	6.9*	1.1*	0.5*	2.9*	6.2*	4.4*	1.1*	1.1*	1.0*	3.9*	3.6*	3.1*
16-20	4.7*	0.9*	2.3*	2.3*	6.7*	3.4*	1.3*	1.1*	3.8*	3.1*	4.7*	4.5*
21-25	3.4*	0.7*	3.6*	1.9*	4.4*	2.9*	1.4*	1.1*	2.6*	2.7*	3.9*	3.1*
26-END	2.5*	0.6*	5.6*	2.0*	3.6*	2.4*	1.4*	1.0*	2.1*	2.6*	4.2*	2.7*
MEAN	9.1	1.1	2.3	2.7	4.2	3.7	1.4	1.1	1.8	3.0	3.9	3.3

YEAR : 1969 ANNUAL MEAN : 3.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.8*	1.7*	0.6*	3.2*	5.4*	3.8*	2.1*	1.5*	7.1*	2.2*	2.2*	3.4*
6-10	2.6*	1.4*	0.6*	2.6*	4.9*	3.4*	2.9*	1.1*	5.0*	2.1*	1.8*	14.6*
11-15	2.4*	1.1*	0.6*	2.4*	4.3*	3.0*	3.8*	1.0*	4.0*	2.2*	1.5*	32.2*
16-20	3.0*	0.8*	0.6*	2.6*	4.8*	2.9*	2.8*	1.4*	3.3*	2.6*	1.6*	21.5*
21-25	2.5*	0.7*	0.5*	4.9*	5.7*	2.6*	2.3*	5.0*	2.6*	2.7*	2.1*	12.2*
26-END	2.1*	0.6*	3.4*	4.7*	4.0*	2.4*	1.9*	10.5*	2.6*	2.5*	2.4*	7.0*
MEAN	2.6	1.1	1.1	3.4	4.8	3.0	2.6	3.7	4.1	2.4	1.9	14.9

YEAR : 1970 ANNUAL MEAN : 4.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	4.9*	1.5*	1.2*	3.9*	9.3*	4.2*	9.1*	3.7*	1.8*	4.6*	4.0*	5.1*
6-10	3.8*	3.8*	0.9*	4.7*	9.7*	4.2*	7.6*	3.2*	1.4*	4.9*	4.4*	4.1*
11-15	3.3*	3.0*	1.6*	4.2*	7.1*	4.4*	4.9*	3.4*	1.8*	8.2*	4.0*	3.4*
16-20	2.9*	2.1*	2.3*	4.7*	5.3*	3.8*	3.9*	3.0*	3.9*	5.6*	4.9*	3.1*
21-25	2.4*	1.7*	2.0*	7.2*	4.3*	3.8*	4.0*	2.6*	5.6*	4.4*	9.3*	3.3*
26-END	1.9*	1.4*	3.1*	11.7*	3.8*	3.9*	3.8*	2.2*	4.1*	4.3*	6.3*	3.6*
MEAN	3.2	2.3	1.9	6.1	6.5	4.0	5.5	3.0	2.8	5.3	5.5	3.8

Table 45 5-DAY NATURAL RUNOFF AT SALENG (2/3)

YEAR : 1971 ANNUAL MEAN : 2.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.4*	1.6*	1.3*	1.2*	0.5*	1.0*	3.5*	0.7*	3.8*	1.3*	2.1*	1.4
6-10	2.6*	1.2*	1.3*	1.2*	0.4*	1.1*	2.7*	0.9*	3.6*	1.0*	4.2*	1.7
11-15	5.0*	0.9*	1.2*	1.1*	0.5*	1.1*	2.2*	1.7*	3.3*	0.9*	5.5*	2.2
16-20	3.6*	0.7*	1.0*	1.0*	0.7*	1.1*	1.8*	3.4*	2.8*	2.2*	2.1*	4.1*
21-25	5.1*	0.9*	1.5*	0.8*	0.8*	1.5*	1.4*	5.2*	2.2*	4.3*	1.4	5.0*
26-END	2.3*	1.3*	1.4*	0.6*	0.8*	1.9*	1.0*	3.9*	1.7*	2.7*	1.5	4.0*
MEAN	5.0	1.1	1.3	1.0	0.6	1.3	2.1	2.7	2.9	2.1	2.8	3.1

YEAR : 1972 ANNUAL MEAN : 1.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.0*	0.9	1.9	1.7*	2.1	1.3	0.4	0.5	0.3	3.2*	1.6*	2.8
6-10	0.8	1.7	0.6	2.7*	1.7	0.9	0.2	0.4	1.4	2.7*	2.2*	2.9
11-15	0.6	1.2	1.0	1.8	1.1	1.0	0.3	0.5	1.5	2.1*	3.4*	2.2
16-20	1.0	0.6	1.3	1.3	1.8	0.8	0.3	0.6	1.3	1.6*	3.6*	4.2
21-25	0.6	0.9	1.7	1.6	4.0	1.5	0.4	0.5	1.8	1.3*	3.7*	5.5
26-END	0.4	1.1	0.7	3.0	2.4	0.7	0.3	0.4	1.0	1.3*	3.7*	2.9
MEAN	0.9	1.1	1.2	2.0	2.2	1.0	0.3	0.5	1.2	2.0	3.0	3.4

YEAR : 1973 ANNUAL MEAN : 2.6

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.7	1.2	2.1	4.7*	2.8	2.7	1.7*	2.3	1.6*	1.8	4.3	3.3
6-10	4.5	0.9	1.3	4.9*	3.5	2.2	1.9*	3.4	1.2	0.8	5.2	3.0
11-15	5.1	0.9	4.3	4.9*	3.0*	1.2	0.9	2.7	1.5	1.6	2.2	3.2
16-20	4.2	5.0	4.6	3.7*	3.7*	1.0	0.7	1.3	1.0	1.3	1.8	4.2*
21-25	2.6	6.1*	2.5	5.1	2.0	0.9	0.6	1.1	1.0	2.0	2.3	3.0*
26-END	2.7*	6.0*	3.4*	3.8	3.1	1.2	0.9	2.0*	1.0	4.0	1.6	1.4
MEAN	3.6	3.2	3.1	4.5	3.0	1.5	1.1	2.1	1.2	2.0	2.9	3.0

YEAR : 1974 ANNUAL MEAN : 1.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	1.3	1.4	1.0	0.6*	1.3	5.4	1.3	2.2	4.4	2.0*	0.8	1.0*
6-10	1.6	0.9	1.8	1.8	2.4	2.5	1.2	1.3	3.7	2.7*	0.8	0.7
11-15	0.8	0.6	1.3	1.4	4.1	1.6	1.4	1.3	2.4	1.0	1.5	0.7
16-20	0.7	1.5*	0.7	1.2	6.2	1.7	1.4	0.8	2.6	0.9	1.8	0.7
21-25	0.6	1.7*	0.5	1.3	5.7	2.6	1.8*	1.0	1.6	1.3	1.5	0.8
26-END	0.8	1.4	0.4*	1.0	4.8	2.0	1.8*	1.5	3.2	1.2	1.0	0.6
MEAN	0.9	1.1	0.9	1.2	4.1	2.6	1.5	1.4	3.0	1.5	1.2	0.8

YEAR : 1975 ANNUAL MEAN : 4.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	0.6	1.1*	1.9	7.6	3.7	4.4*	2.8*	2.8	4.0	2.5	6.8	4.5
6-10	1.7	0.8	6.6	7.9*	9.2	4.9	4.2*	3.9	2.8	2.5	5.7	5.3
11-15	2.4	1.4	5.2*	5.4*	5.5	4.4	5.3	2.9	3.2	4.8	5.5	5.7
16-20	2.1	1.7	3.7*	7.7	5.6	7.5	6.6	2.9	2.2	3.7	10.2	3.3
21-25	1.0	0.9	4.6*	7.1	8.7	4.8	5.0	2.6	2.5	3.2	5.8*	3.4
26-END	0.6	1.4	4.5	4.5	9.8*	3.1*	3.6	2.6	2.9	2.7	4.2*	5.0
MEAN	1.4	1.2	4.0	6.7	7.2	4.9	4.4	2.9	2.9	3.2	6.4	4.6

YEAR : 1976 ANNUAL MEAN : 1.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	1.4	0.6	0.7	0.7*	2.7	1.9	0.9*	1.5	1.1	2.0*	2.0	2.8
6-10	1.1	0.6	0.6	1.3	2.2	1.5	0.9*	1.2	0.9	4.0	2.6	3.7
11-15	0.9	0.5	1.2	1.2	1.5	0.9	1.2	1.2	0.9	4.9	2.1	2.3
16-20	1.1	0.6	1.2	1.1	1.1	0.8	1.3	1.1	1.4	3.7	3.0	5.5
21-25	0.7	0.7	0.7	5.3	1.0	1.3	1.5	1.1	1.2	2.2	4.3	3.0
26-END	0.6	0.5	0.7*	5.2	0.8	1.1*	1.9	1.8	1.9	2.2	3.9	4.1
MEAN	1.0	0.6	0.8	2.5	1.5	1.3	1.3	1.3	1.3	3.1	3.0	3.6

YEAR : 1977 ANNUAL MEAN : 1.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.3	0.9	2.2	0.7	0.6	1.3	0.6	3.4	1.5	4.3	2.6	2.5
6-10	2.4	1.1	1.3	0.8	1.2	1.0	0.6	2.4	1.1	4.3*	2.5	2.0
11-15	1.7	2.0	0.9	0.9	1.2	0.6	0.9	2.1	1.4	3.8	1.9	1.5
16-20	1.2	1.1	0.7	0.7	0.7	0.6	0.6	4.8	0.9	2.6	3.0	1.3
21-25	1.0	1.4	0.7	0.5	0.5	0.7	0.5	4.2	1.5	2.2	2.9	2.4
26-END	0.9*	4.1	0.6	0.6	1.3	0.7	1.4	3.8	3.8	1.8	2.9	2.8
MEAN	2.1	1.6	1.1	0.7	0.9	0.8	0.8	3.4	1.7	3.1	2.6	2.1

YEAR : 1978 ANNUAL MEAN : 4.5

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	4.6	3.3	3.4	5.0	6.6	3.4	4.6	2.4	3.0	1.7*	5.7	14.6*
6-10	8.1	2.8	3.7	3.8	7.9	3.5	4.8	2.1	2.2*	1.5*	5.2	12.8*
11-15	11.0	3.1	4.1	3.9	5.0	2.6	6.6	3.3	2.2*	1.9*	6.1	7.5*
16-20	11.6	4.2	6.4	6.6	3.7	2.4	4.5	2.6	2.5	2.0*	5.9	4.0
21-25	5.6	2.7	7.3	4.9	2.8	2.8	3.7	2.7	2.8	2.7*	4.0	7.8
26-END	4.2	3.6	6.0	4.6	2.7	3.1	3.0	2.5	2.5	5.3*	5.1*	3.0
MEAN	7.4	3.2	5.2	4.8	4.7	3.0	4.5	2.6	2.5	2.6	5.3	8.1

Table 46 5-DAY NATURAL RUNOFF AT SALENG (3/3)

YEAR : 1979 ANNUAL MEAN : 2.3

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.9	0.4	1.6	4.2	1.8	0.3	0.4*	0.8	0.9	0.4	2.4	10.4*
6-10	4.8	1.0	2.4	4.4	1.2	1.1	0.3	0.4	1.6*	0.4	6.0	6.4*
11-15	3.5	0.4	1.0	6.6	9.9	0.7	0.6	0.2	0.8	1.5	5.3	1.8
16-20	1.1	0.8	0.6	2.5	0.5	2.4	0.3	1.0	1.9	1.5*	4.9	2.1
21-25	0.8	1.6	2.5	4.4	0.4	1.0	0.8	1.0	3.1	6.3*	5.4	1.6
26-END	0.6	0.8	2.1	4.5	0.5	0.4*	4.1*	0.6*	1.0	3.7	15.0*	1.2
MEAN	2.2	0.8	1.7	4.4	0.9	1.0	1.2	0.7	1.5	2.4	6.5	3.8

YEAR : 1980 ANNUAL MEAN : 2.7

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	1.0	2.6*	0.9*	1.1	5.1*	4.0	0.8	1.2	3.4	2.9	3.9	3.8
6-10	3.2	1.9	1.4*	1.0	5.7*	4.2	0.6	1.2	1.8	3.6	3.0	7.6
11-15	1.0	1.2	1.6	3.9	3.8*	1.9	1.4	5.2	1.6	5.5	2.0	3.4
16-20	1.3	0.9	0.8	6.1*	2.0	1.4	2.6	3.0	1.1	4.6	1.4	3.9
21-25	7.0*	1.3*	0.6	3.0	1.4	1.3	2.4	3.5	3.7	4.5	2.4	4.9
26-END	3.5*	1.0*	1.1*	2.9	1.6	1.4	1.0	3.0	4.4	3.4	3.5	2.5
MEAN	2.9	1.5	1.0	3.0	3.2	2.4	1.4	2.8	2.7	4.1	2.7	4.3

YEAR : 1981 ANNUAL MEAN : 1.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	1.6	1.5	0.9	1.0	1.8	1.4	0.6	0.8	3.3*	2.7*	2.6*	0.5
6-10	1.0	0.7	1.3	1.2	3.9	1.4	0.7	0.3	4.2*	2.2*	2.6*	1.2
11-15	0.9*	0.6	0.5	2.8	3.5	1.0	1.5*	0.2	4.4*	1.8*	2.5*	1.6
16-20	1.0	0.6	0.5	3.6	3.1	0.8	3.5*	1.6*	3.8*	1.5	2.3*	8.6
21-25	0.8	0.5	0.5	3.5	3.8	0.6	1.3	1.0*	3.5*	2.7*	1.6*	3.3
26-END	0.6	1.2	0.8	3.7	2.1	1.0	0.9	0.4	3.2*	2.3*	0.8	1.5
MEAN	1.0	0.8	0.7	2.6	3.0	1.0	1.4	0.7	3.7	2.2	2.1	2.7

YEAR : 1982 ANNUAL MEAN : 3.1

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	2.4	0.4	0.4	3.3*	4.6*	5.0*	1.7*	0.8*	2.6*	1.0*	3.4*	8.3*
6-10	2.3	3.0	0.8*	5.7*	3.8*	4.4*	1.3*	0.9*	2.3*	0.8*	2.9*	6.0*
11-15	1.6	1.4	2.3*	4.0*	3.5*	3.7*	1.0*	2.3*	2.0*	0.7*	4.3*	5.7*
16-20	0.3*	0.7*	2.9*	4.5*	5.0*	3.3*	0.6*	3.2*	1.7*	0.6*	5.3*	4.9*
21-25	0.5	0.9*	4.2*	5.3*	4.7*	2.7*	0.8*	2.6*	1.4*	0.8*	6.4*	12.5*
26-END	0.5	0.8*	3.2*	5.6*	5.3*	2.2*	0.8*	2.6*	1.1*	3.4*	8.6*	10.0*
MEAN	1.1	1.2	2.3	4.8	4.5	3.5	1.1	2.1	1.9	1.3	5.2	7.9

YEAR : 1983 ANNUAL MEAN : 2.8

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	5.8*	3.1*	0.8*	0.5*	0.3*	2.4*	2.8*	5.3*	3.6*	2.4*	2.4*	3.1*
6-10	4.3*	2.6*	0.7*	0.4*	0.7*	2.6*	2.6*	4.3*	4.7*	1.9*	2.6*	3.4*
11-15	3.8*	2.1*	0.6*	0.4*	2.5*	2.5*	2.6*	3.4*	5.0*	1.4*	3.7*	5.5*
16-20	6.7*	1.6*	0.5*	0.4*	2.4*	2.7*	2.9*	3.2*	3.9*	1.2*	4.2*	4.7*
21-25	4.8*	1.2*	0.5*	0.3*	2.5*	3.2*	3.0*	5.0*	3.4*	1.6*	4.0*	3.9*
26-END	3.6*	1.0*	0.5*	0.3*	2.5*	3.3*	3.4*	4.5*	2.9*	2.0*	3.5*	6.5*
MEAN	4.8	2.0	0.6	0.4	1.8	2.8	2.9	4.3	3.9	1.7	3.4	4.6

YEAR : 1984 ANNUAL MEAN : 4.2

PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1- 5	4.6*	10.9*	5.6*	3.6*	5.2*	6.4*	2.6*	2.4*	1.2*	2.1*	3.7*	3.6*
6-10	3.6*	9.8*	5.0*	4.1*	9.2*	5.2*	2.0*	2.3*	1.0*	2.3*	4.7*	4.1*
11-15	3.0*	9.0*	3.9*	4.5*	8.1*	4.6*	1.8*	2.2*	0.8*	2.4*	6.0*	3.7*
16-20	2.4*	6.8*	3.3*	5.2*	6.0*	4.0*	4.6*	2.0*	0.7*	2.3*	4.5*	3.3*
21-25	7.7*	5.5*	2.9*	5.6*	4.9*	3.5*	4.1*	1.8*	0.7*	2.1*	3.8*	6.5*
26-END	10.6*	4.6*	3.4*	4.8*	4.7*	2.9*	2.9*	1.6*	1.1*	2.1*	3.5*	6.7*
MEAN	5.5	7.9	4.0	4.6	6.3	4.4	2.9	2.0	0.9	2.2	4.4	4.7

Table 47 ANNUAL LOSS OF NATURAL FLOW

Station: Kg. Rantau Panjang

Year	Basin Rainfall	Runoff	Loss
1963	2182	778	1404
1964	2802	1066	1736
1965	2060	872	1187
1966	2376	982	1394
1967	2896	1596	1300
1968	2457	1126	1331
1969	2821	1184	1636
1970	2568	968	1599
1971	1780	721	1059
1972	2268	647	1620
1973	2273	958	1315
1974	1910	567	1343
1975	2203	845	1358
1976	2096	598	1498
1977	2015	811	1204
1978	2259	928	1332
1979	2261	1055	1207
1980	2417	1128	1290
1981	2053	790	1263
1982	2247	1127	1120
1983	2040	1143	897
1984	2604	1702	902
Mean	2299	981	1318

Station: Ran. Tanah Jengeli

Year	Basin Rainfall	Runoff	Loss
1963	2182	778	1404
1964	2802	1066	1736
1965	2060	872	1187
1966	2376	982	1394
1967	2896	1596	1300
1968	2457	1126	1331
1969	2821	1184	1636
1970	2568	968	1599
1971	1780	721	1059
1972	2351	979	1372
1973	2123	783	1340
1974	2977	1417	1560
1975	2649	1134	1514
1976	2099	710	1389
1977	2173	972	1202
1978	2505	928	1576
1979	2474	1042	1432
1980	2263	1199	1065
1981	2210	864	1346
1982	2452	658	1795
1983	2243	954	1288
1984	2725	1806	918
Mean	2418	1033	1385

Station: Jam.Johor Tenggara

Year	Basin Rainfall	Runoff	Loss
1963	2077	719	1359
1964	2732	1237	1495
1965	2093	764	1329
1966	2198	825	1373
1967	2651	1054	1597
1968	2451	1258	1193
1969	2701	1273	1429
1970	2317	921	1396
1971	1680	557	1123
1972	2286	844	1442
1973	2241	893	1348
1974	1923	669	1253
1975	2093	700	1392
1976	2040	551	1488
1977	2112	755	1357
1978	2162	863	1299
1979	2233	963	1270
1980	2378	1019	1359
1981	2026	710	1317
1982	2295	1028	1267
1983	2073	794	1279
1984	2645	1207	1438
Mean	2246	891	1323

Station: Saleng

Year	Basin Rainfall	Runoff	Loss
1963	2297	1033	1264
1964	2714	1330	1385
1965	2312	1083	1229
1966	2311	990	1321
1967	2707	1281	1425
1968	2151	1100	1051
1969	2671	1335	1336
1970	2768	1448	1320
1971	1982	754	1228
1972	2106	548	1559
1973	2611	906	1705
1974	1869	584	1285
1975	2314	1446	868
1976	1938	622	1316
1977	1950	609	1342
1978	2413	1572	840
1979	2443	787	1656
1980	2633	930	1703
1981	2150	642	1508
1982	2445	1075	1370
1983	2216	967	1248
1984	2786	1447	1338
Mean	2354	1022	1332

Table 48 CONVERSION RATIO FROM KEY STATION TO SUB-BASIN

Sub-Basin Code	Key Station: Station Name	Key Station: Ao Catchment (km2)	Key Station: Ro Rainfall (mm)	Key Station: Lo Loss (mm)	Applied Basin: A Catchment (km2)	Applied Basin: R Rainfall (mm)	Applied Basin: Conversion Ratio /1
BP 1	Kg. Rantau Panjang	568	2193	1300	568	2193	1.0000
BP 2	Kg. Rantau Panjang	573	2350	1333	573	2350	1.0000
BP 3	Kg. Rantau Panjang	289	2350	1333	289	2490	0.9530
JO 1	Jam. Johor Tenggara	624	2246	1323	662	2312	1.1377
JO 2	Ran. Tanah Jengeli	209	2418	1385	391	2435	1.9016
JO 3	Kg. Rantau Panjang	1130	2299	1318	77	2297	0.0680
JO 4	Kg. Rantau Panjang	1130	2299	1318	317	2294	0.2792
JO 5	Kg. Rantau Panjang	1130	2299	1318	408	2496	0.4336
JO 6	Kg. Rantau Panjang	1130	2299	1318	541	2321	0.4871
JO 7	Kg. Rantau Panjang	1130	2299	1318	714	2546	0.7910
ST 1	Saleng	91	2354	1332	292	2506	3.6860
ST 2	Saleng	91	2354	1332	422	2379	4.7508
ST 3	Saleng	91	2354	1332	296	2383	3.3450
SD 1	Kg. Rantau Panjang	1130	2299	1318	248	2613	0.2897
SD 2	Kg. Rantau Panjang	1130	2299	1318	312	2805	0.4186
SD 3	Kg. Rantau Panjang	1130	2299	1318	347	2509	0.3728
SD 4	Kg. Rantau Panjang	1130	2299	1318	519	2721	0.6569
SD 5	Kg. Rantau Panjang	1130	2299	1318	375	2695	0.4658

Remarks: Conversion ratio = $A(R-Lo)/Ao(Ro-Lo)$

Table 49 PROBABLE BASIN RAINFALL OF PROPOSED DAM

Return Period	Proposed Dam							
	Benut	Pontian	U. Pengli	Sayong	Linggiu	Telor	Layau Kiri	Sedili
2	95	95	84	69	82	97	105	106
5	121	121	112	93	108	129	140	143
10	155	155	132	111	128	152	163	169
20	176	176	152	129	148	175	185	193
30	189	189	165	141	160	188	198	208
40	197	197	174	149	169	198	207	218
50	205	205	182	156	176	206	214	226
100	226	226	205	177	199	230	235	251
200	249	249	231	201	224	255	257	276
500	281	281	267	235	259	290	287	311
1,000	306	306	298	263	288	318	310	338
10,000	399	399	416	374	403	422	389	435
PMP	430	430	422	391	429	430	458	451

Note: Peason Type III is applied for statistic distribution.

Table 50 PARAMETERS OF STORAGE FUNCTION

Dam Site	Basin		Channel		Mean Slope
	k-value	p-value	k-value	p-value	I
Benut	32.3	0.486	-	-	0.0130
Pontian Besar	26.2	0.572	-	-	0.0065
Upper Pengli	28.3	0.539	-	-	0.0083
Sayoug	17.0	0.802	89.8 102.0	0.623 0.871	0.0015
Linggiu	30.5	0.508	9.4 15.0	1.143 0.909	0.0108
Telor	21.4	0.671	-	-	0.0033
Layau Kiri	27.0	0.559	-	-	0.0071
Sedili	25.5	0.583	11.6 9.4	0.649 0.885	0.0060

Note: (1) Parameters of basin are estimated by the equation of Tone River as below.

$$k = 118.84\ I^{0.3}$$
$$p = 0.175\ I^{-0.235}$$

(2) Parameters of channel are estimated based on the map of 1:10,000 scale for three proposed dams. Upper and lower figures are separately applied for low flow and high flow.

Table 51 PROBABLE FLOOD PEAK DISCHARGE OF PROPOSED DAM

Unit: m^3/sec

Return Period	Dam Site							
	Benut	Pontian Besar	Upper Pengli	Sayong	Linggiu	Telor	Layau Kiri	Sedili
2	21	27	67	380	98	29	24	180
5	38	45	109	530	150	49	48	360
10	72	80	159	640	240	67	66	510
20	89	96	221	860	340	88	90	680
50	130	130	360	1,260	500	120	110	930
100	150	150	430	1,450	680	140	130	1,080
200	190	190	510	1,840	810	170	160	1,220
500	220	230	690	2,210	1,100	200	180	1,440
1,000	250	250	800	2,720	1,270	230	200	1,600
10,000	380	380	1,320	4,400	2,110	350	290	2,360
PMF	420	420	1,340	4,630	2,280	350	360	2,470

FIGURES

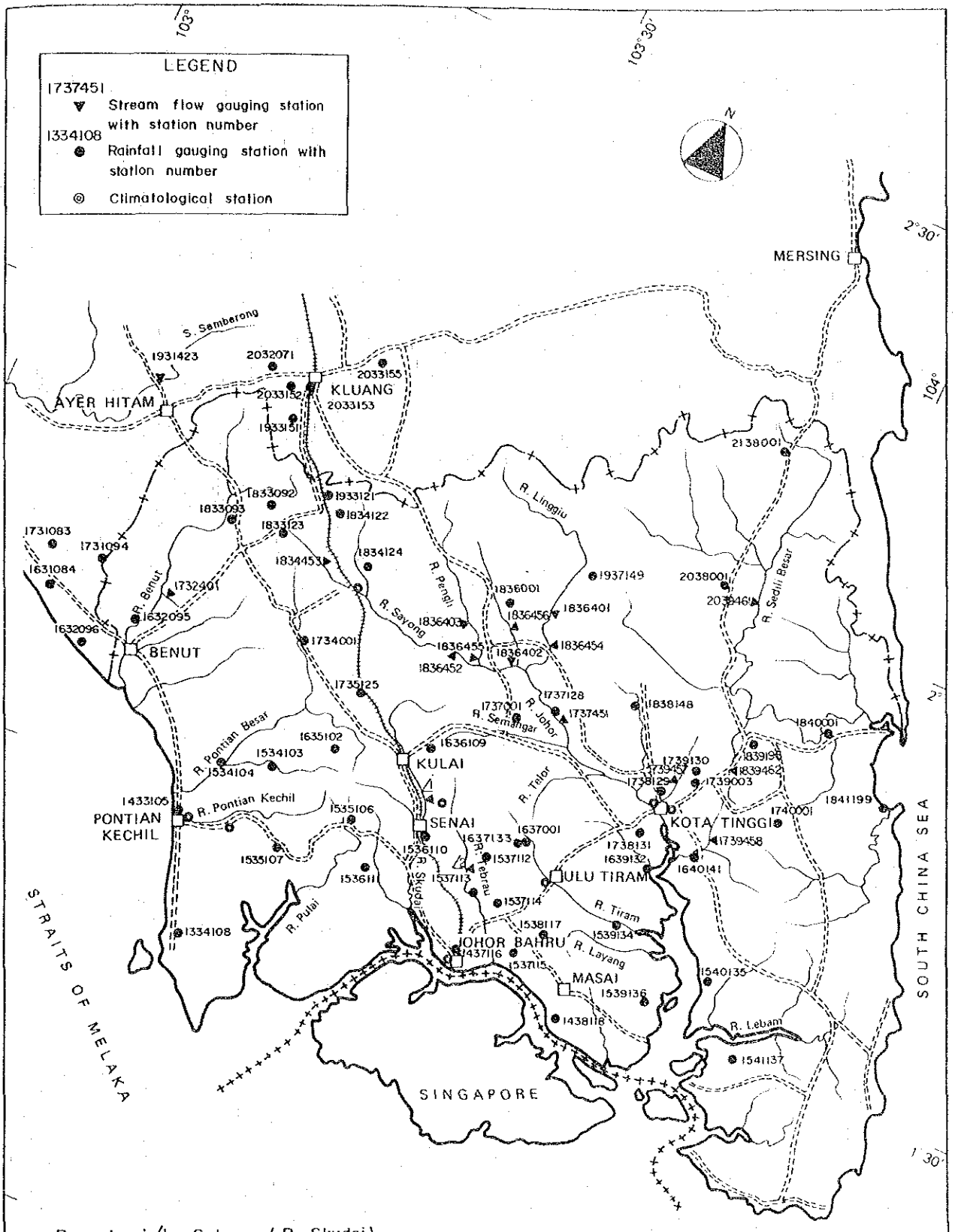

Fig. 1 Location Map of Stream Flow and Rainfall Gauging Stations

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Fig. 2 Duration of Record at Selected Rainfall Gauging Station (1 / 3)

No.	Station Number	Station Name	Latitude (D.M.S)	Longitude (D.M.S)	Nos of Years
1	1334108	Ldg. Getah Kukup	01 20 55	103 27 30	21
2	1433105	Rumah Sakit Umun	01 29 55	103 23 20	13
3	1437116	Stor JPT Johor Bahru	01 28 15	103 45 10	19
4	1438118	Ldg. Sg. Buloh	01 27 30	103 53 35	7
5	1534103	Stn. Penyelidekan Nenas	01 35 25	103 27 55	14
6	1534104	Ibu Bekalan JKR	01 33 50	103 24 55	21
7	1535106	Ldg. Gunong Pulai	01 33 50	103 34 45	21
8	1535107	Balai Bomba, Pekan Nanas	01 30 25	103 31 00	13
9	1536110	Ldg. Senai	01 35 05	103 39 15	22
10	1536111	Ldg. Buan Heng, Skudai	01 32 10	103 37 30	20
11	1537112	Ldg. Timur, Johor Bahru	01 35 30	103 44 35	20
12	1537113	Ldg. Tebrau	01 33 00	103 44 35	21
13	1537114	Ldg. Mount Austin	01 33 00	103 46 35	21
14	1537115	Kolam Air	01 30 05	103 43 55	14
15	1538117	Ldg. Sg. Pelentong	01 32 05	103 50 40	22
16	1539134	Ldg. Sg. Tiram	01 35 15	103 55 05	21
17	1539136	Ldg. Lim & Lim Bhd, Masai	01 31 15	103 59 30	22
18	1540135	Ldg. Telok Sengat	01 34 05	104 02 20	20
19	1541137	Ldg. Sg. Papan	01 30 00	104 06 20	14
20	1631084	Pintu Pasang Surut Rengit	01 40 50	103 08 55	19
21	1632095	Parit Batang Duku, Batu Pahat	01 40 20	103 15 00	19
22	1632096	Pintu Kawalan Tampok, B.Pahat	01 37 35	103 21 10	18
23	1635102	Ldg. Kulai Young, Kulai	01 37 44	103 31 55	20
24	1636109	Ldg. Kelan, Kulai	01 40 55	103 37 45	22
25	1637001	FELDA Ulu Tiram / Ulu Tebrau	01 37 45	103 46 45	12
26	1637133	Ldg. Ulu Tiram	01 37 45	103 46 45	7
27	1639132	Ldg. Nam Heng	01 39 15	103 55 35	21

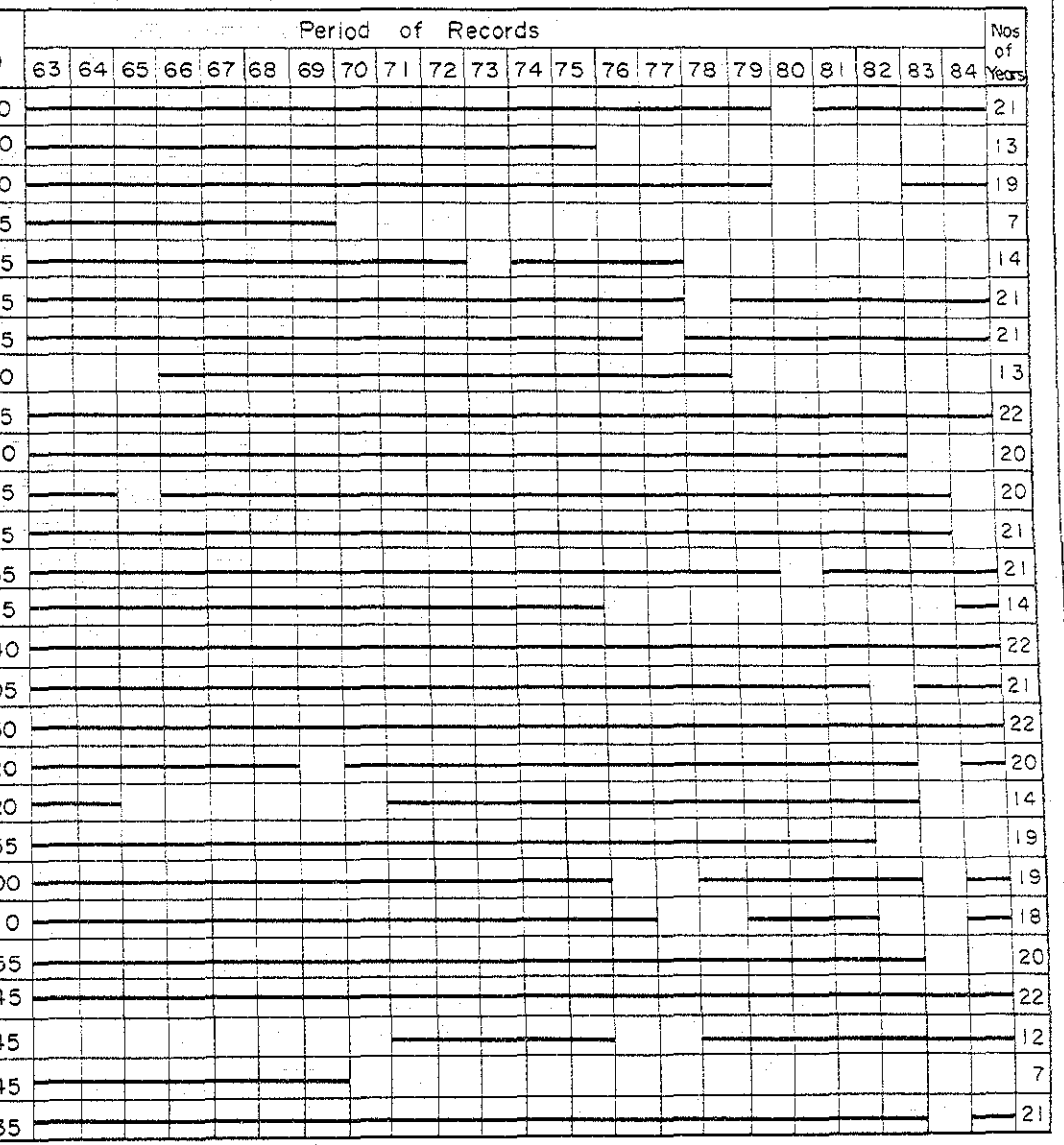

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Fig. 3 Duration of Record at Selected Rainfall Gauging Station (2/3)

No.	Station Number	Station Name	Latitude (D.M.S)	Longitude (D.M.S)	Period of Records 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84	Nos of Years
28	1640141	FELDA Air Tawar 1	01 37 15	103 02 40		7
29	1730081	Stn.Pam Koris, Batu Pahat	01 45 40	103 00 00		17
30	1730082	Pintu Pasang Srut Senggarang	01 44 46	103 03 25		20
31	1731094	Sek. Keb.Merlong Darat	01 43 55	103 11 15		22
32	1734001	Loji Pembersih Bt. Batu	01 43 40	103 26 35		13
33	1735125	Ldg. Sedenak, Sedenak	01 42 50	103 31 40		20
34	1737128	SRJK Kg. Rantau Panjang	01 46 55	103 44 40		8
35	1738129	Rumah Tapis Air	01 45 05	103 53 35		21
36	1738131	Ldg. Getah Malaya	01 42 10	103 53 10		20
37	1739003	Ldg. Permatang	01 46 35	103 55 35		8
38	1739130	Ldg. Permatang	01 46 45	103 55 25		13
39	1740001	FELDA Bkt. Wah Ha	01 46 10	104 01 50		5
40	1829077	Kulai JKR, Batu Pahat	01 51 20	102 58 30		9
41	1829078	Stor JPT Batu Pahat	01 51 10	102 55 35		12
42	1829079	Kolan Air BT	01 50 00	102 56 40		8
43	1833092	Ldg. Wessington, Renggam	01 51 25	103 20 10		22
44	1833093	P. Perbekalan Air, SPG. Renggam	01 49 33	103 18 00		9
45	1833123	Ldg. Benut, Renggam	01 50 20	103 21 40		22
46	1834122	Ldg. Renggam, Renggam	01 53 20	103 24 55		20
47	1834124	Penyelidekan Chemara, Layang Layang	01 50 55	103 28 05		19
48	1836001	Rancangan Ulu Sebol	01 52 30	103 38 17		9
49	1838148	Kerja Air, Kota Tinggi	01 49 55	103 50 00		4
50	1840001	Logi Pembersih Sg. Gembut	01 53 30	104 03 00		5
51	1841199	Pengkalan Kg. Sedili Kechil,	01 50 30	104 08 55		4
52	1926001	Pintu Kawalan Parit Jawa,	01 57 08	102 38 05		11
53	1926051	Ldg. Air Manis, Muar	02 00 00	102 41 30		20
54	1926052	Pintu Kawalan Parit Jamil,	01 56 35	102 38 45		10

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No.	Station Number	Station Name	Latitude (D.M.S)	Longitude (D.M.S)	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	Nos of Years
55	1927053	Ibu Bekalan SG. Sarang Buaya	01 57 13	102 46 25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—							16
56	1933121	Ldg. Gatah See Sun, SPG. Renggam	01 54 10	103 23 50	—	—	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		20
57	1933151	Ldg. Lambak, Kluang	01 58 05	103 19 35	—	—	—	—	—		—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	20
58	2032071	Ldg. Kian Hoe, Kluang	02 01 35	103 16 15	—	—	—		—	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	—	20
59	2033152	Ldg. Mengkibou, Kluang	02 00 25	103 18 00	—	—	—	—	—	—	—	—	—	—	—	—	—	—				—		—			16
60	2033153	Stor JPT Kluang	02 01 20	103 19 10	—	—	—	—	—	—	—	—	—	—	—	—											12
61	2033155	Ldg. Rengo Malay Kluang	02 04 35	103 23 00	—	—		—	—	—	—	—	—	—	—	—	—	—	—								14
62	2038001	Rancangan Belia Sg. Ara	02 00 15	103 52 20														—	—	—	—	—	—			—	7
63	2138001	Rancangan RISDA Sg. Ambat	02 10 50	103 52 05														—	—	—	—	—	—	—		—	8

Remarks : Description of district
JB , Johor Bahru
KT , Kota Tinggi
PO , Pontian
KG , Kluang
ME , Mersing
BP , Batu Pahat

Fig. 4 Duration of Record at Selected Rainfall Gauging Station (3 / 3)

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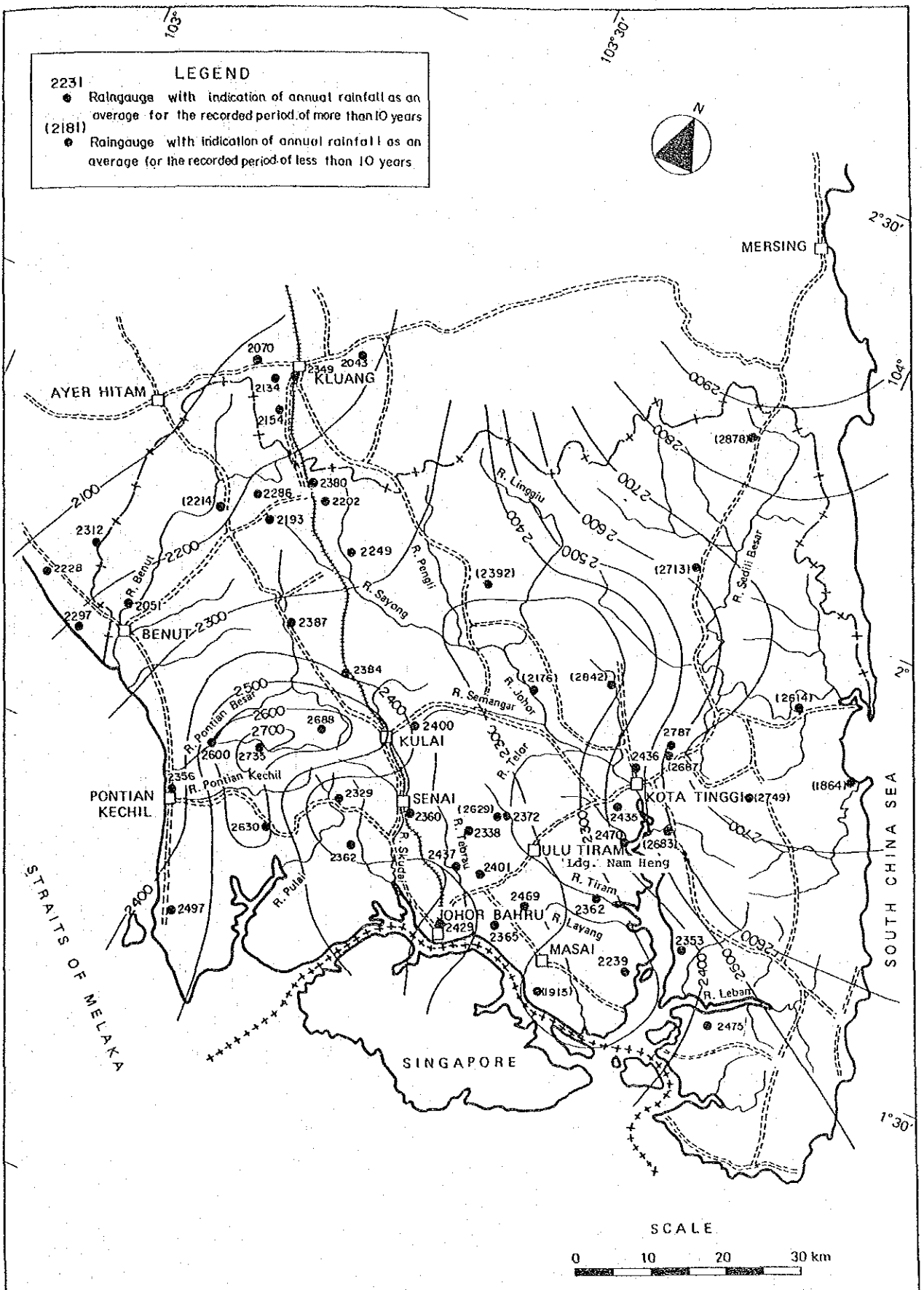

SCALE
0 10 20 30 km

Fig. 5 Isohyetal Map of Annual Rainfall

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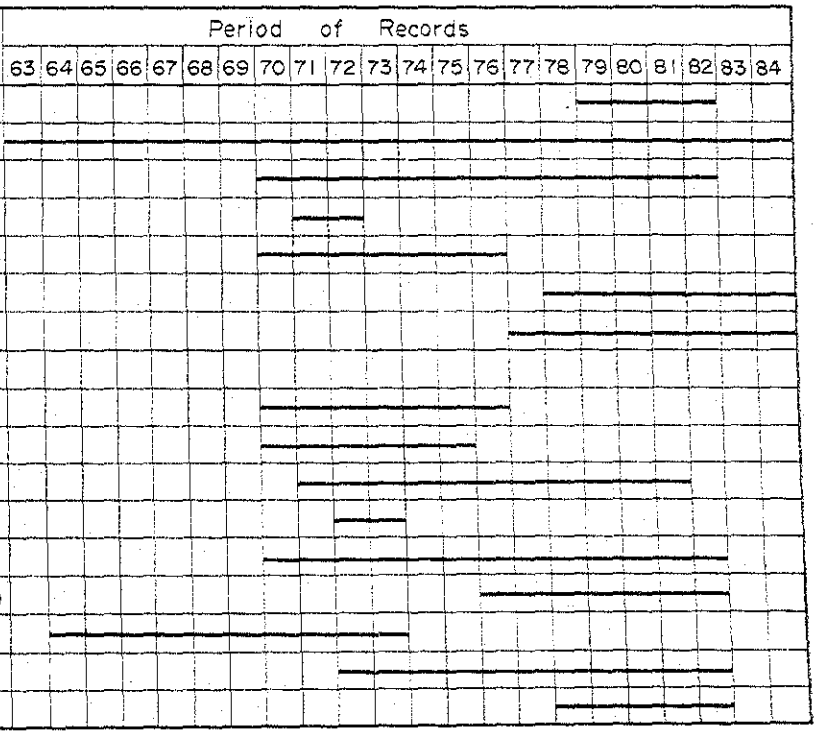
NO.	Station Number	Station Name	River Name	Catchment Area (Km^2)	Latitude (D.M.S)	Longitude (D.M.S)	Period of Records
1	1732401	PT. Madirono Weir	Madirono	1.8	01 42 35	103 16 15	
2	1737451	Kg. Rantau Panjang	Johor	1130	01 46 50	103 44 45	
3	1739457	Permandi	Permandi	23	01 44 30	103 55 05	
4	1739458	Jambatan	Seluyut	62	01 43 00	103 58 15	
5	1834453	Layang Layang	Sayong	98	01 49 20	103 28 20	
6	1836401	Ran. Tanah Jengeli	Linggiu	209	01 53 45	103 41 30	
7	1836402	Jam. Johor Tenggara	Sayong	624	01 48 15	103 40 10	
8	1836403	Felda Inas	Pengli	142	01 49 15	103 37 15	
9	1836452	Hilir Sayong	Sayong	430	01 48 00	103 36 50	
10	1836454	Linggiu	Linggiu	290	01 52 00	103 41 40	
11	1836455	Pengli "A"	Pengli	148	01 48 00	103 37 50	
12	1836456	Jambatan	Sebol	23	01 50 50	103 39 55	
13	1839462	BT32 JB / Mersing	Mupor	22	01 43 05	103 57 40	
14	1931423	BT2 Air Hitam / YP [2]	Semberong	186	01 56 20	109 09 40	
15	2039461	Ulu Sedili	Sedili Besar	585	02 00 45	103 54 25	
16	—	Saleng [3]	Skudai	91	—	—	
17	—	Maju Jaya [3]	Tebrau	72	—	—	



Remarks : [1], Installed January 1983

[2], Locating outside of the Region

[3], Not registered in DID hydrological data bank

Note : This inventory is cited from INVENTORY OF HYDROLOGICAL STATIONS IN MALAYSIA 14th Edition, Feb. 1984

Fig.6 Duration of Record at Hydrological Stations

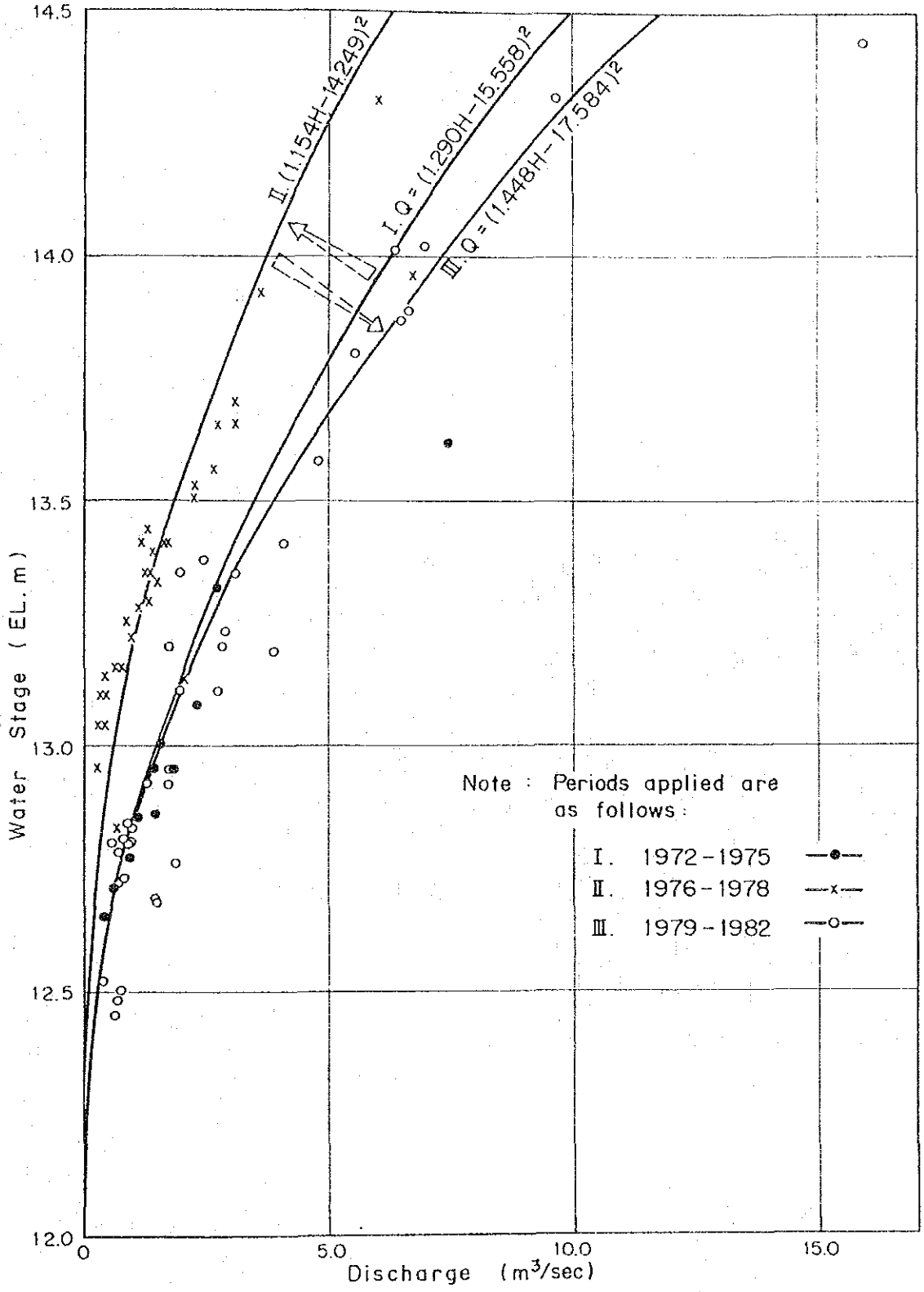


Fig. 7 Discharge Rating Curve at Saleng (Skudai River)

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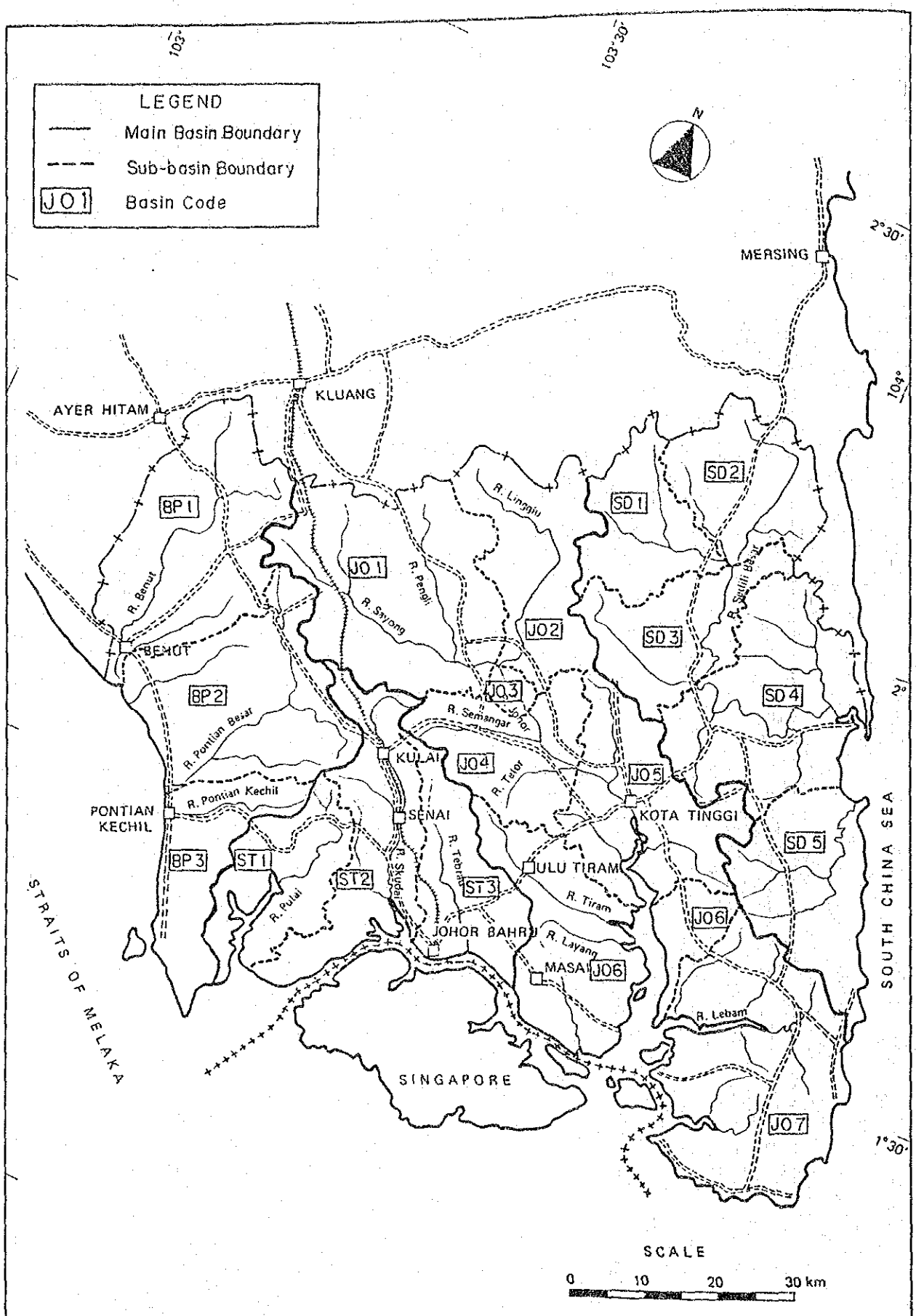

Fig. 8 Basin Division

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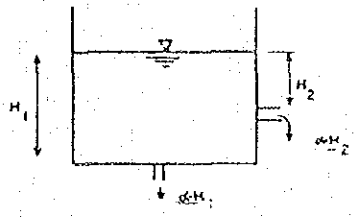
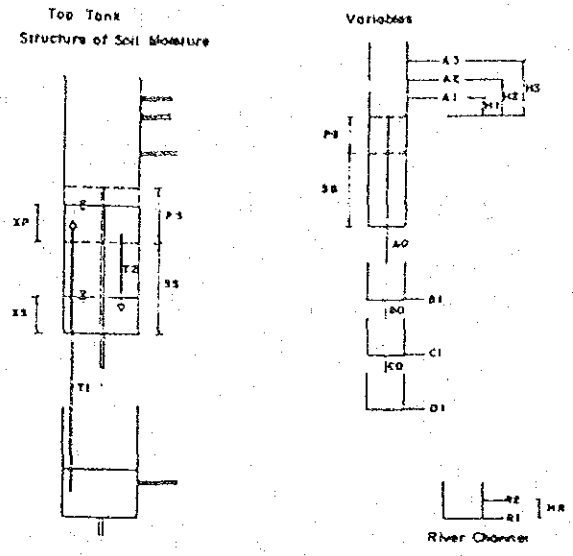


Fig. 9 Simplified Tank Model



PS Primary Soil moisture capacity
SS Secondary Soil moisture capacity

XP Primary Soil moisture depth
XS Secondary Soil moisture depth

T1 Transfer by capillary action from lower tanks.
$T1 = TS \times (1 - \frac{XP}{PS})$ TS: Constant

T2 Transfer of moisture between primary and secondary layers.
$T2 = TC \times (\frac{XP}{PS} - \frac{XS}{SS})$ TC: Constant

Fig. 11 Structure of Tank Model

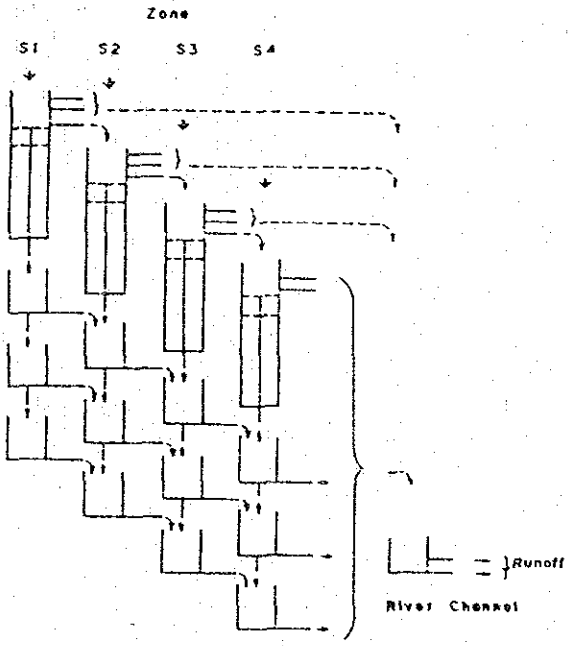
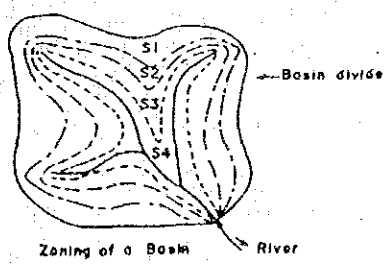


Fig. 10 Tank Arrangement for a Basin



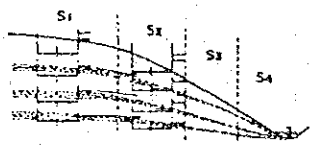


Fig. 12 Schematic Representation of Mechanism of Runoff in a Basin

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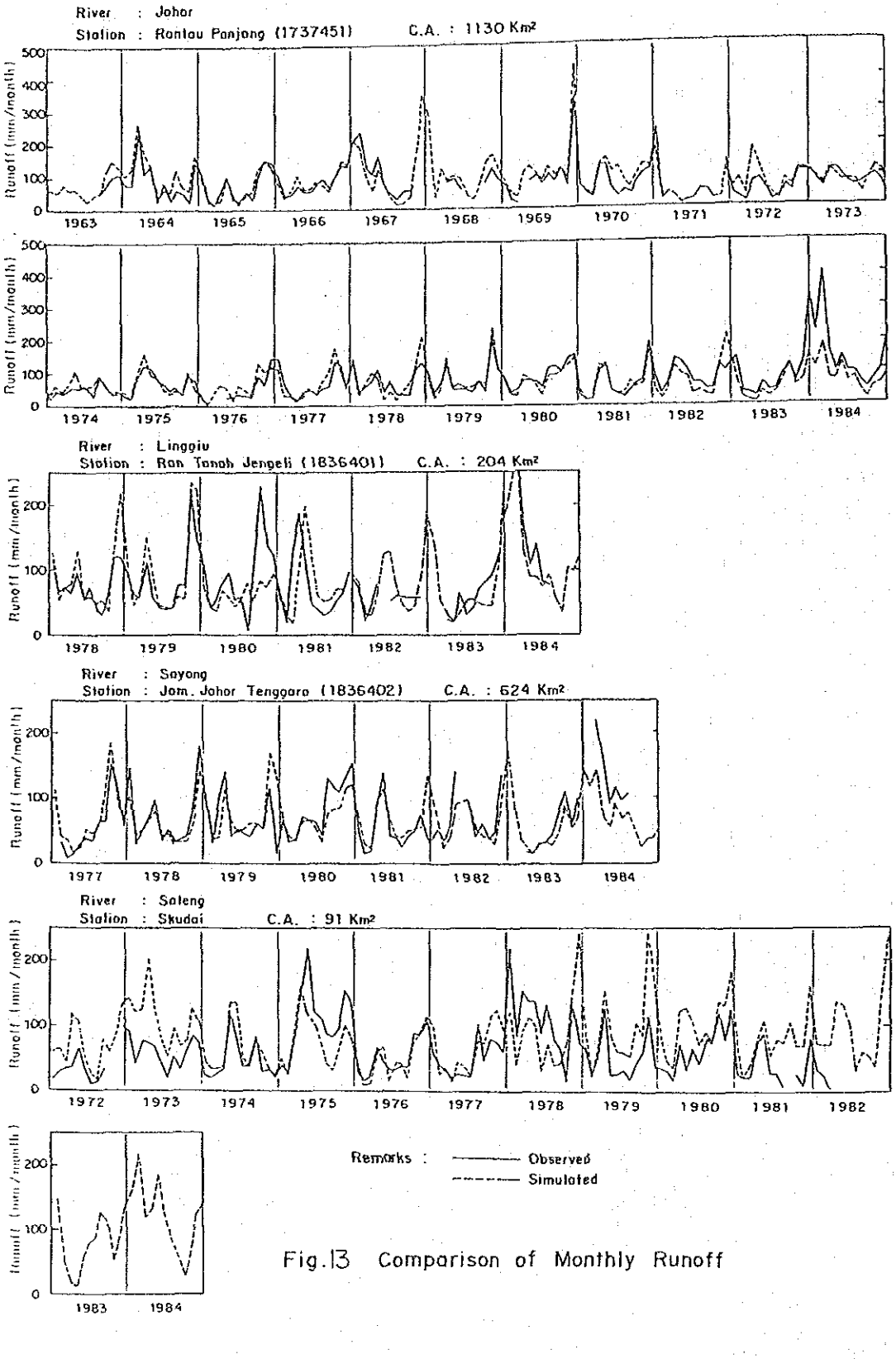

Fig.13 Comparison of Monthly Runoff

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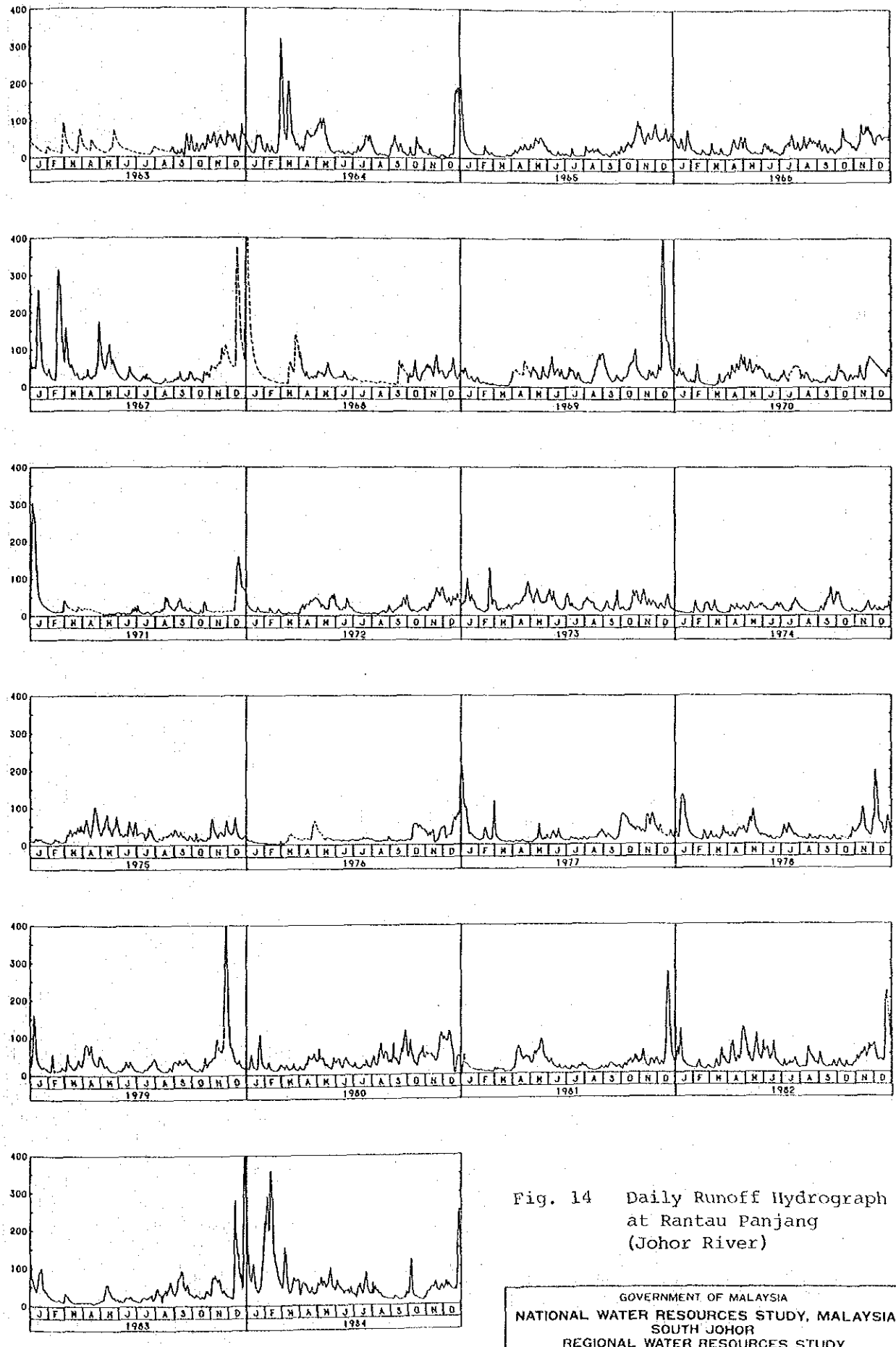

Fig. 14 Daily Runoff Hydrograph at Rantau Panjang (Johor River)

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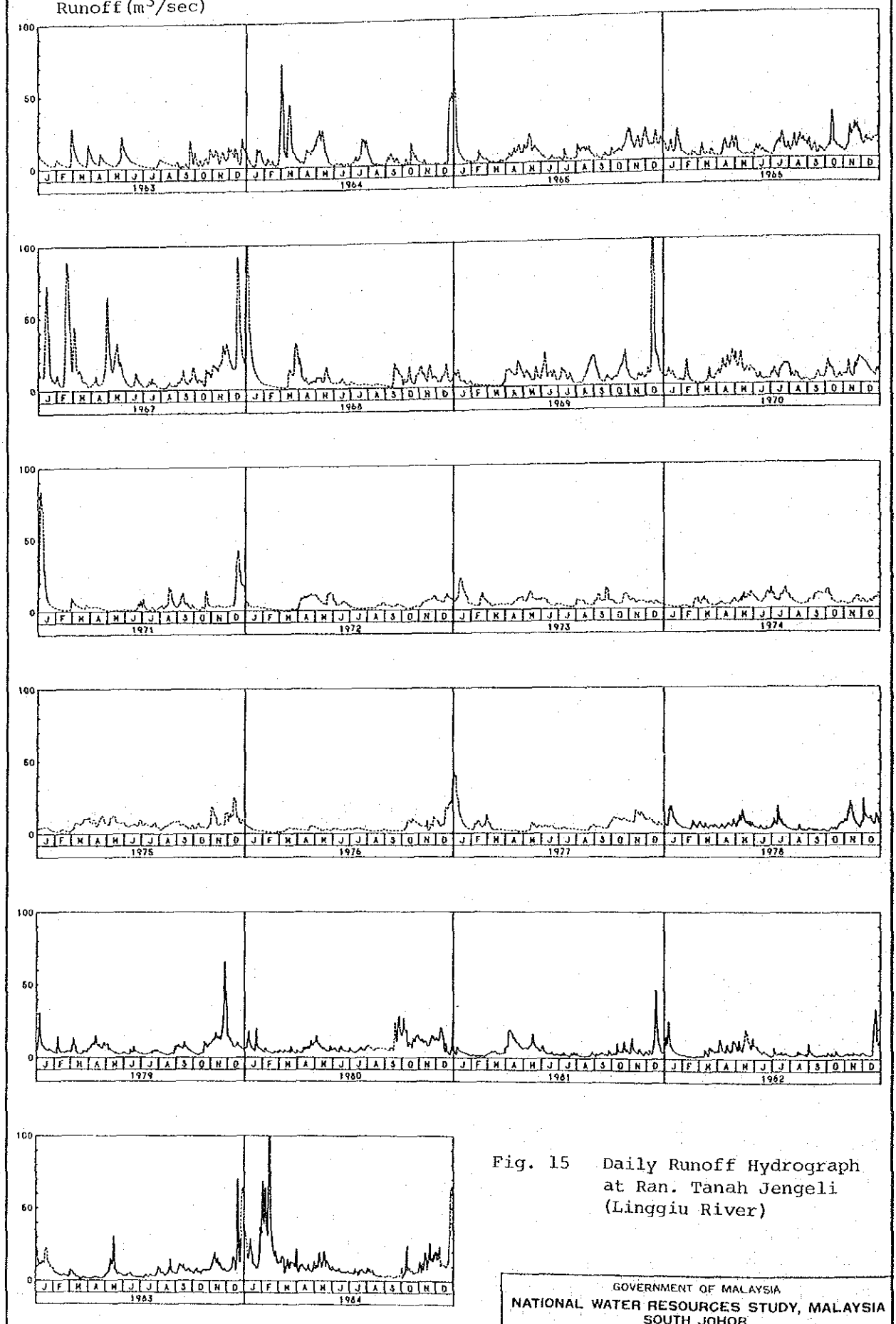

Fig. 15 Daily Runoff Hydrograph at Ran. Tanah Jengeli (Linggiu River)

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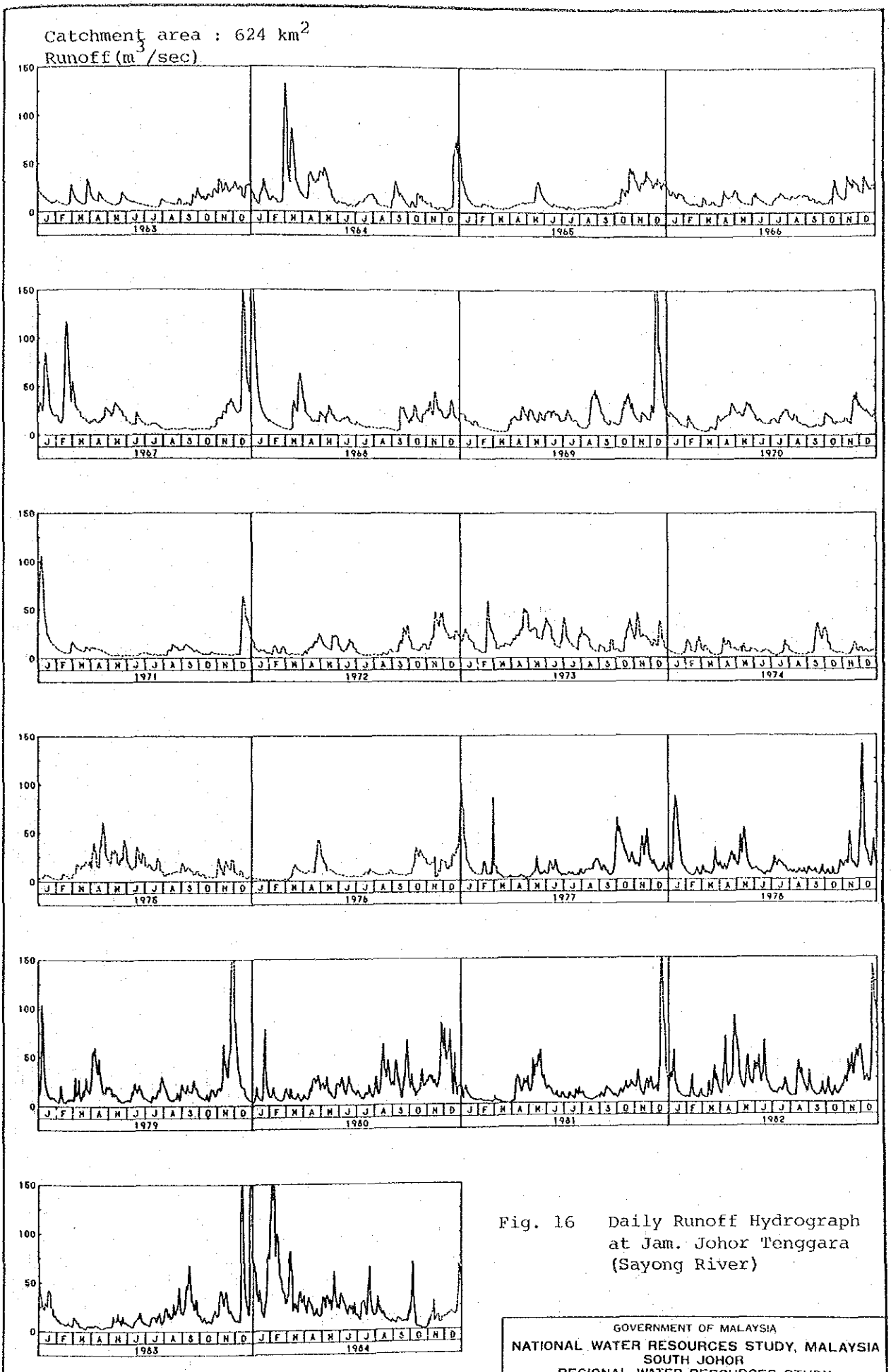

Fig. 16 Daily Runoff Hydrograph at Jam. Johor Tenggara (Sayong River)

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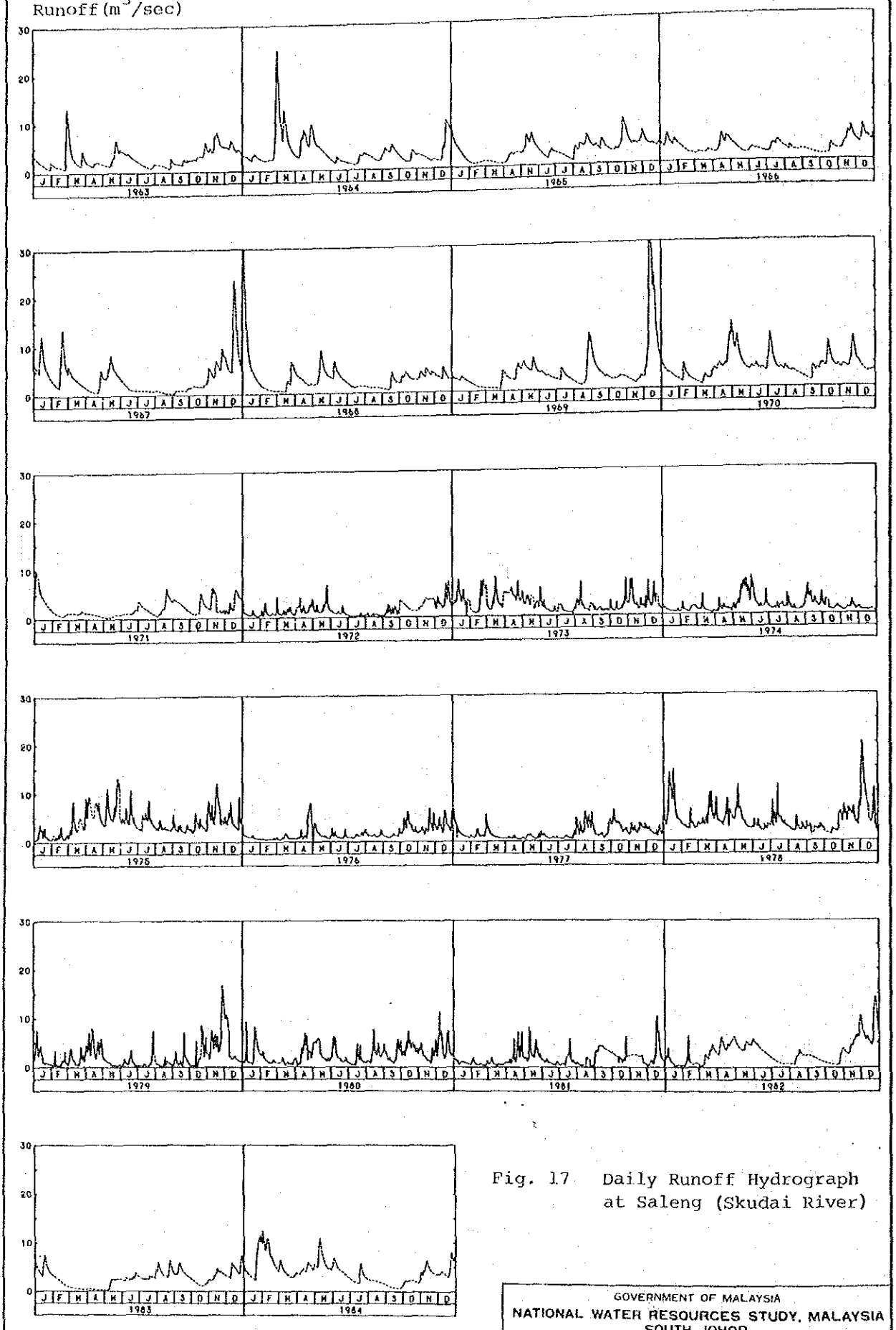

Fig. 17 Daily Runoff Hydrograph at Saleng (Skudai River)

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Catchment area : 148km^2

Runoff (m^3/scc)

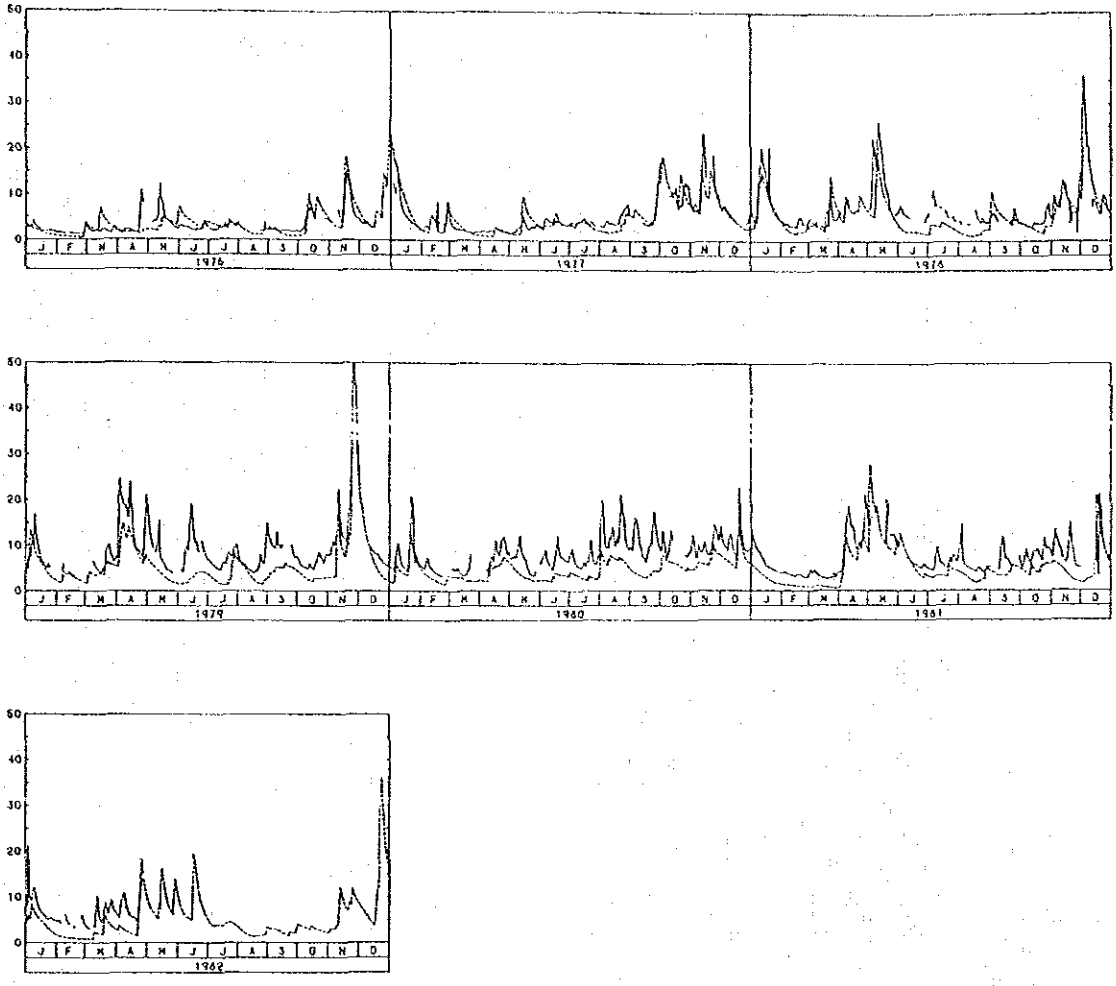

Fig.18 Daily Runoff Simulation
at pengli "A" (Pengli River)

Catchment area : 186 km^2

Runoff (m^3/sec)

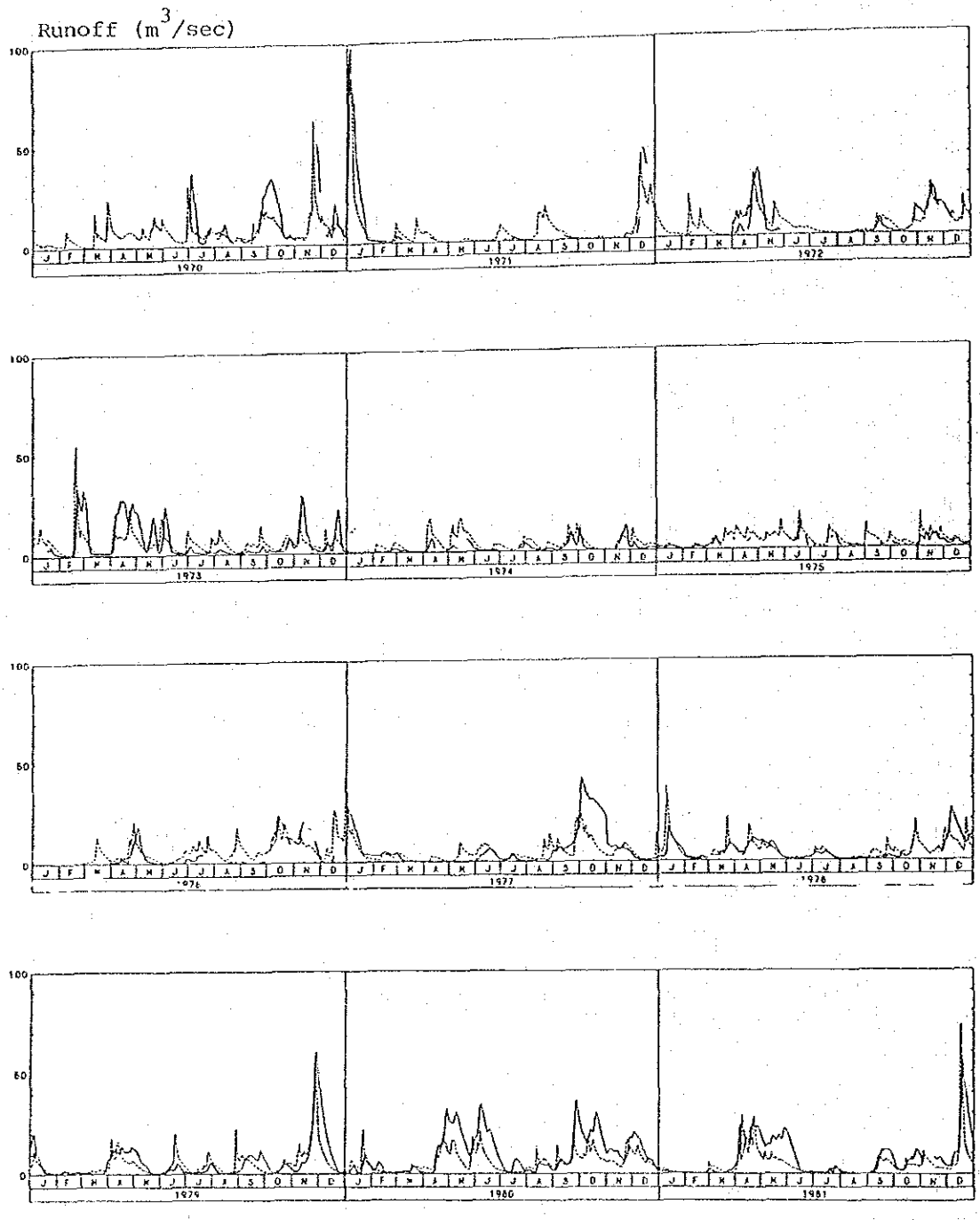

Fig. 19 Daily Runoff Simulation
at BT 2 JL Air Hitam/Yong Peng
(Semberong River)

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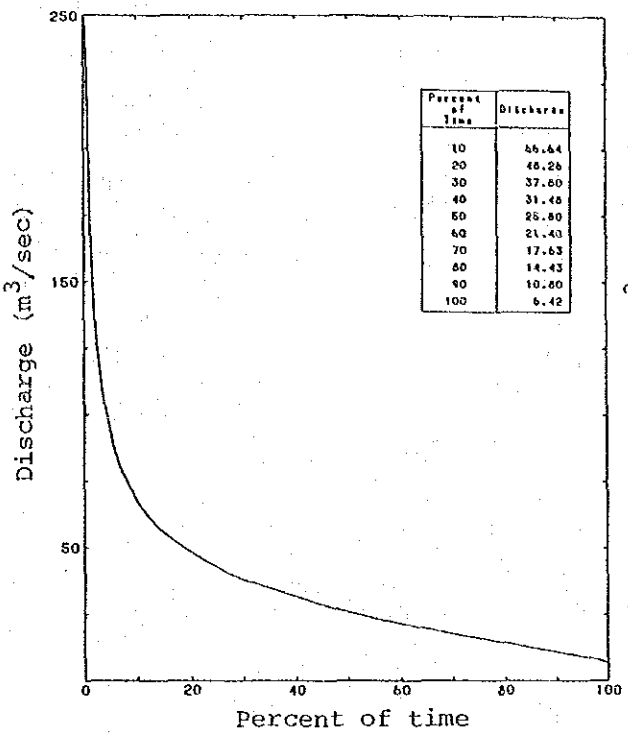
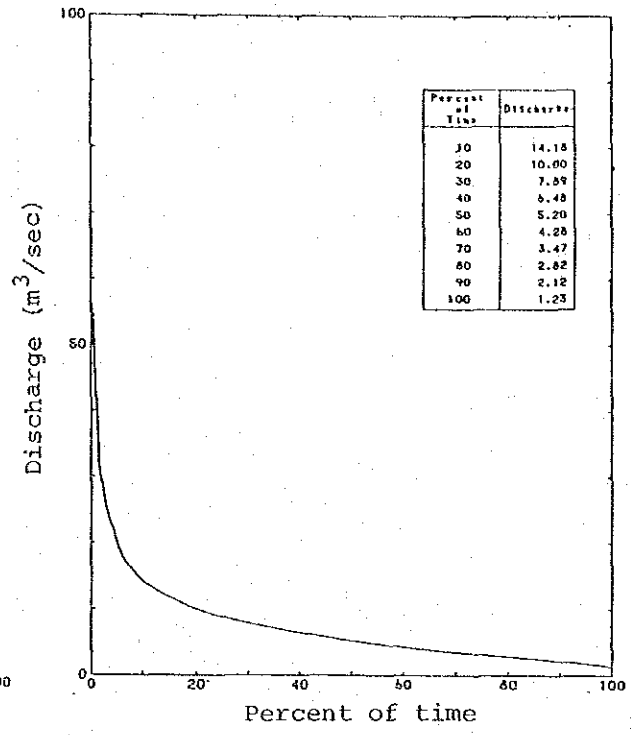
Station : Rantau Panjang



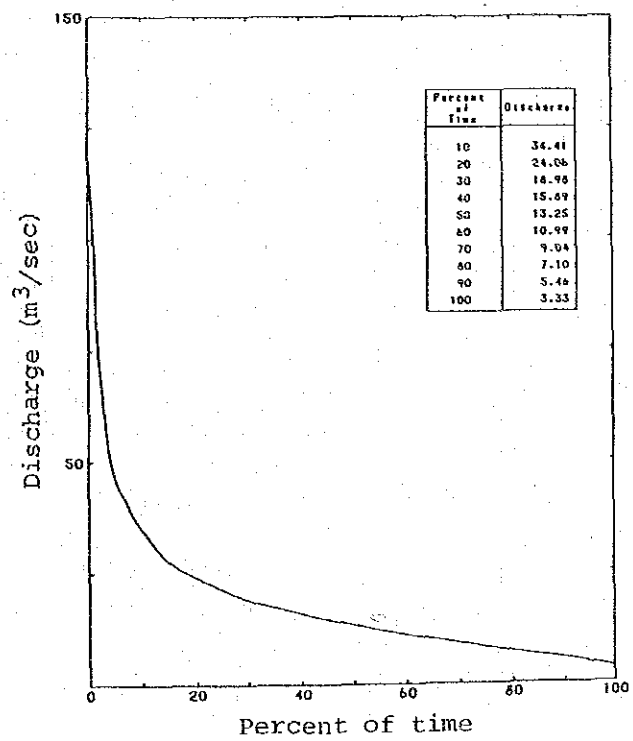
Percent of Time	Discharge
10	66.64
20	48.26
30	37.60
40	31.46
50	25.80
60	21.40
70	17.63
80	14.43
90	10.80
100	6.42

Station : Ran. Tanah Jengeli



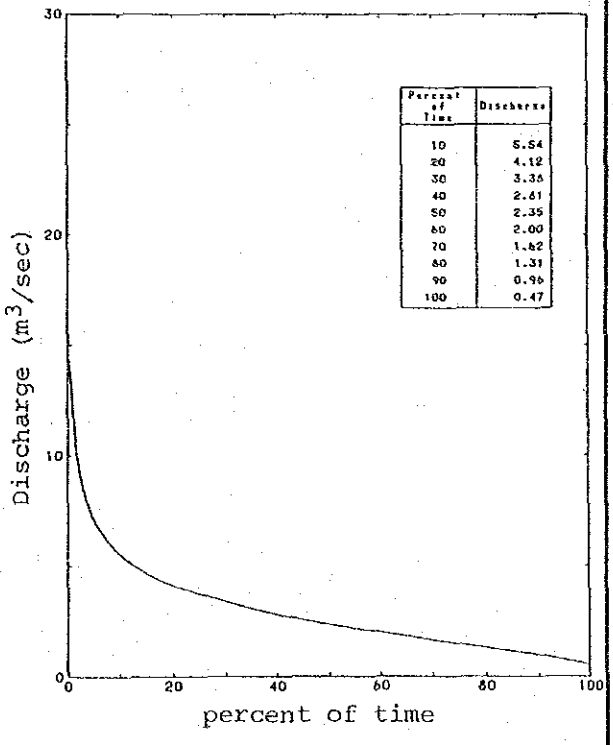
Percent of Time	Discharge
10	14.15
20	10.00
30	7.89
40	6.48
50	5.20
60	4.28
70	3.47
80	2.82
90	2.12
100	1.23

Station : Jam. Johor Tenggara



Percent of Time	Discharge
10	34.41
20	24.06
30	18.98
40	15.69
50	13.25
60	10.99
70	9.04
80	7.10
90	5.46
100	3.33

Station : Saleng



Percent of Time	Discharge
10	5.54
20	4.12
30	3.36
40	2.81
50	2.35
60	2.00
70	1.62
80	1.31
90	0.96
100	0.47

Fig. 20 Duration Curve at Key Station (Parallel method : 1963-1984)

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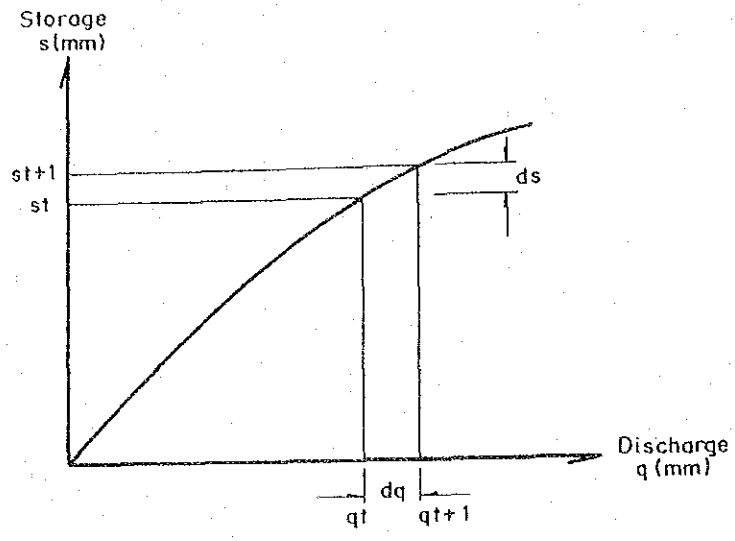
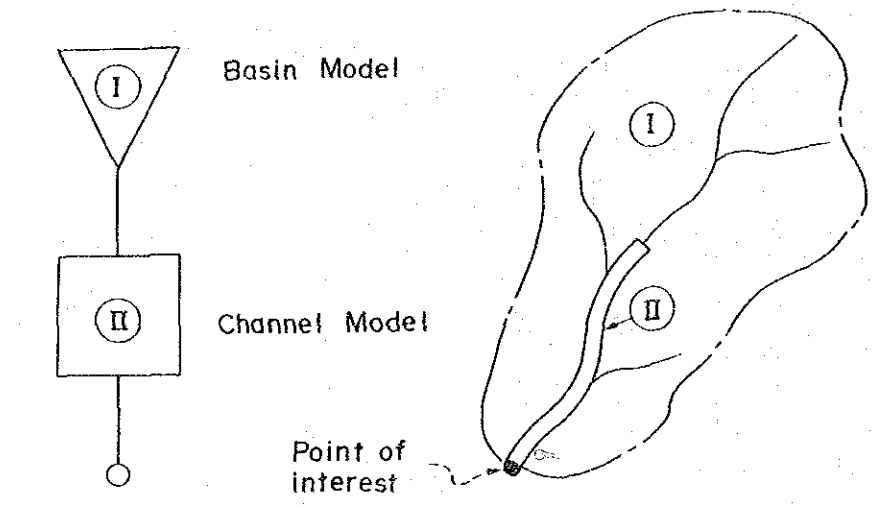


Fig. 21 Storage - Discharge Relationship of Storage Function



Schematic flow of flood routing

Basin division for model composition

Fig. 22 Model of River System in Proposed Dam Scheme for Flood Analysis

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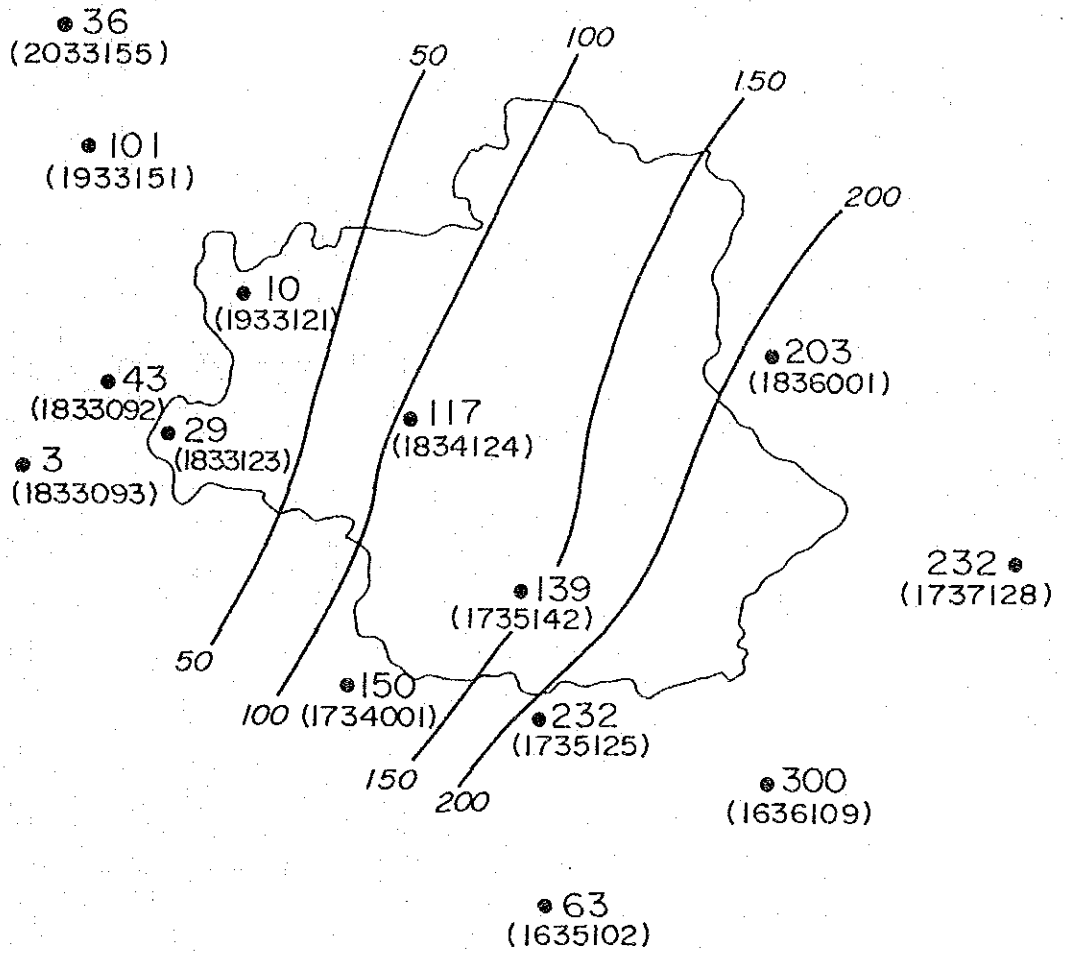

Fig. 23 Isohyetal Map of Storm Rainfall recorded from December 2nd to 4th in 1978

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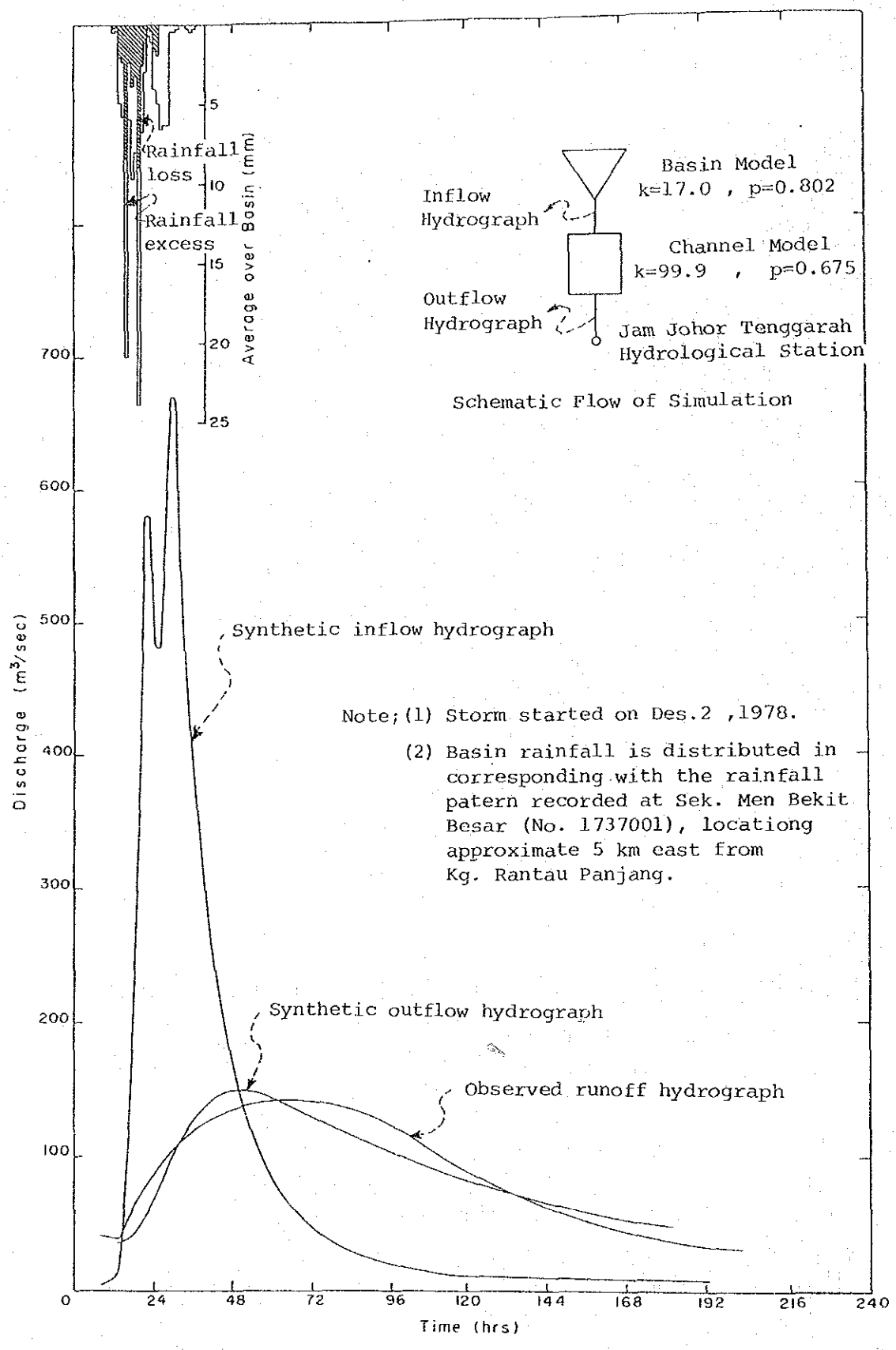

Fig. 24 Comparison of Observed and Synthetic Runoff Hydrographs at Jam. Johor Tenggara (Sayong River)

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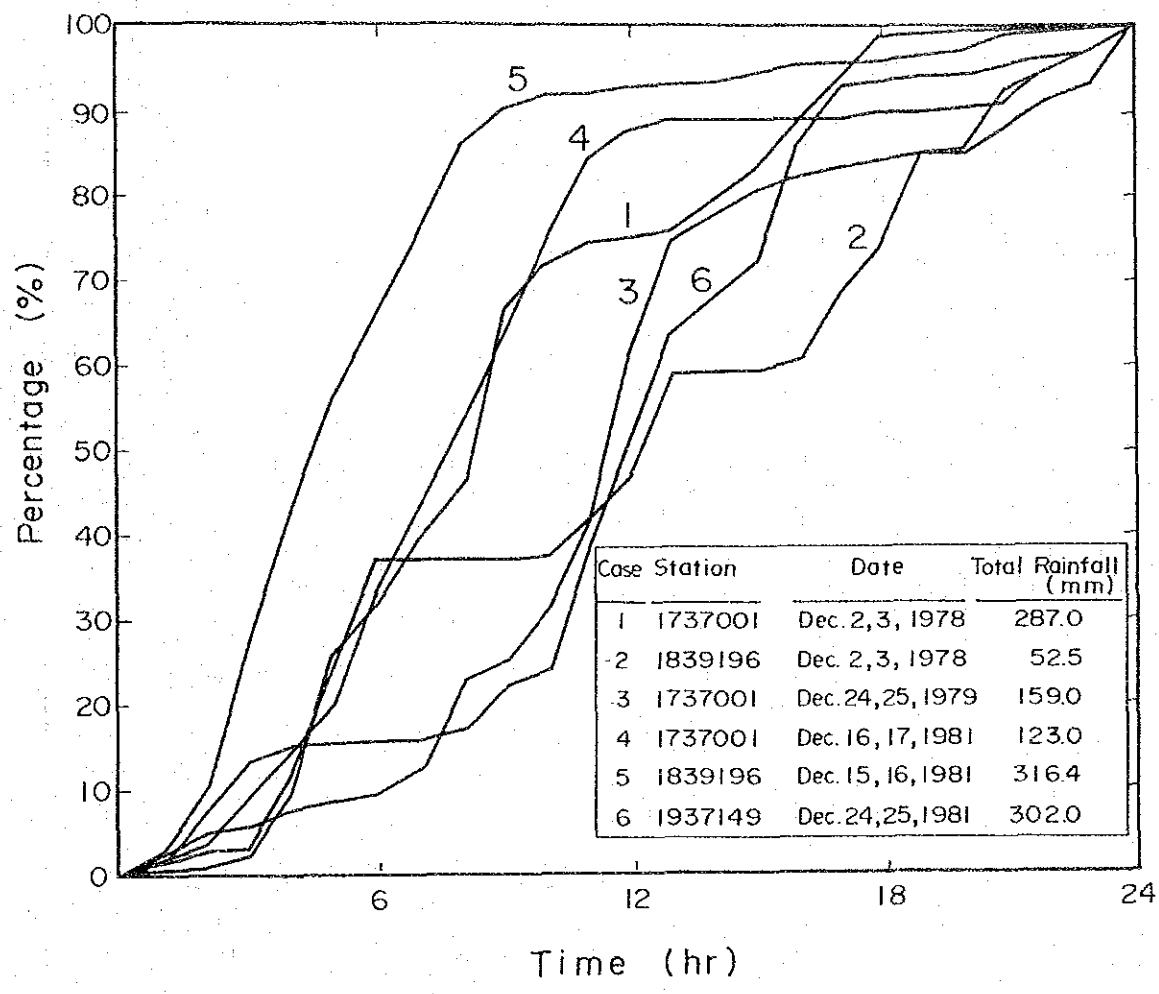

Case	Station	Date	Total Rainfall (mm)
1	1737001	Dec. 2,3, 1978	287.0
2	1839196	Dec. 2,3, 1978	52.5
3	1737001	Dec. 24,25, 1979	159.0
4	1737001	Dec. 16,17, 1981	123.0
5	1839196	Dec. 15,16, 1981	316.4
6	1937149	Dec. 24,25, 1981	302.0

Fig. 25 Accumulative Rainfall Curve of Past Storm Rainfall

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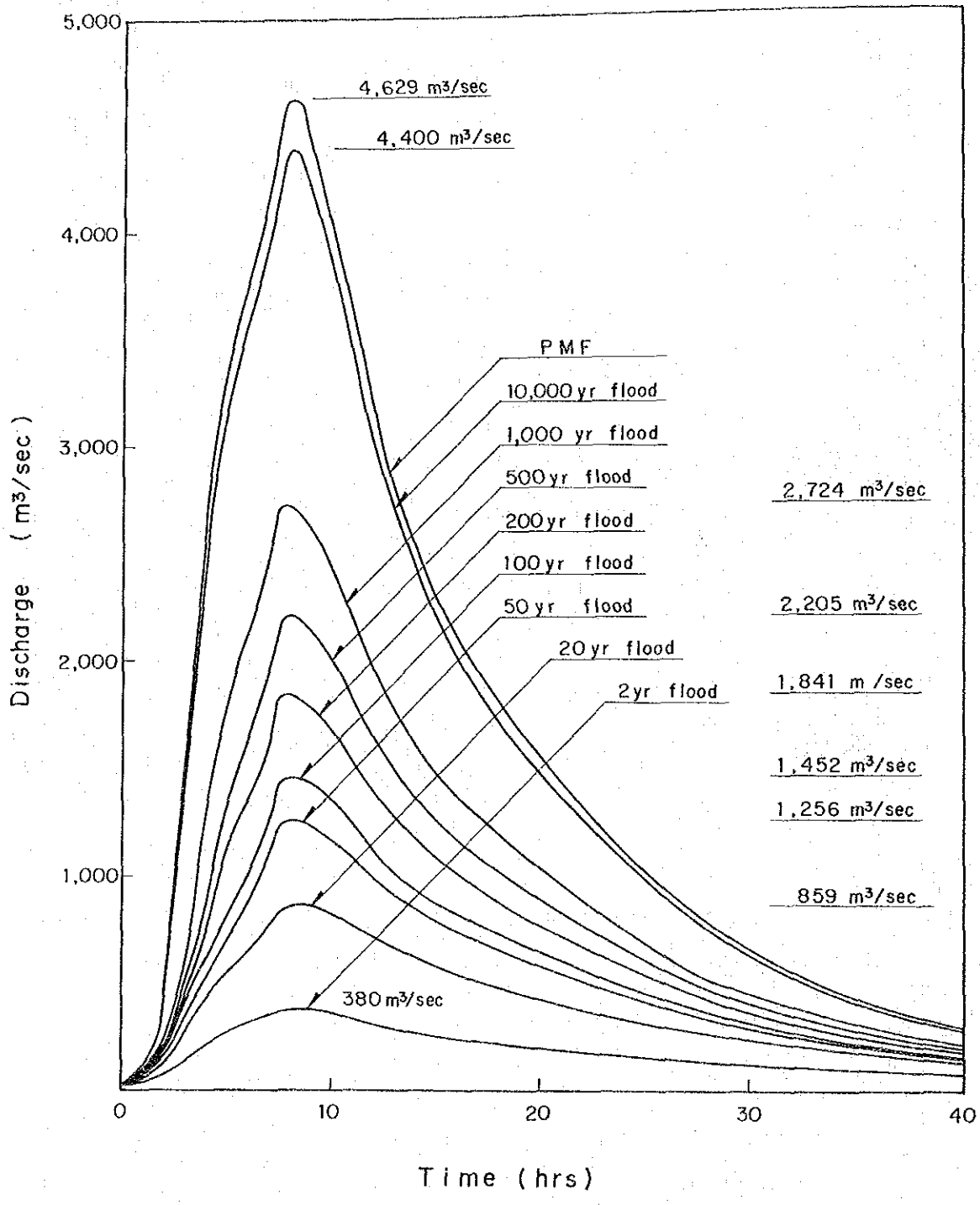

Fig.26 Inflow Hydrographs at Sayong Dam

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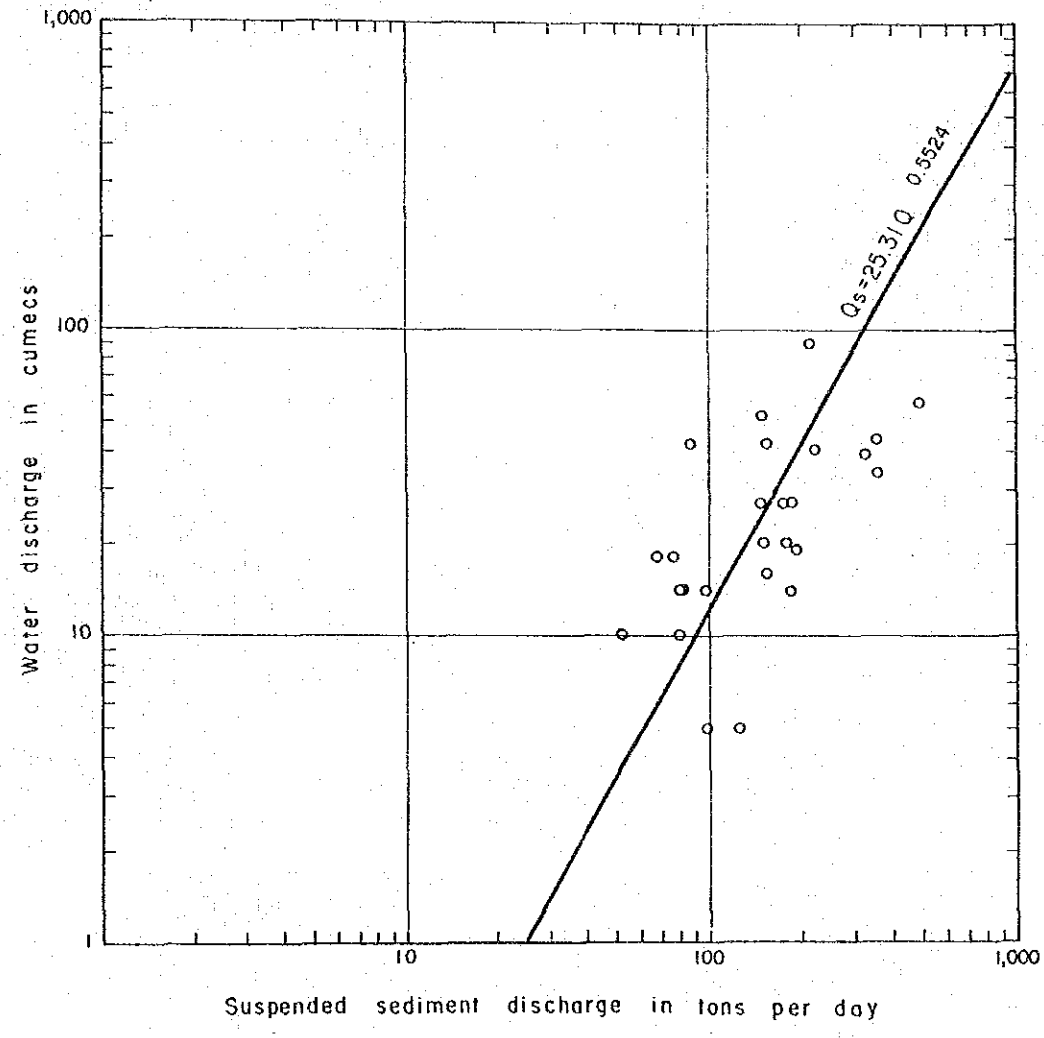

Fig. 27 Suspended Load Rating Curve
at Kg. Rantau Panjang Hydrological Station

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ANNEX E
GROUNDWATER RESOURCES

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1. INTRODUCTION

1.1 General

Groundwater study was carried out to provide the estimate of groundwater development potential in the Study Area. This report presents the results of groundwater resources study including the present condition of groundwater use, inventory of existing tube wells and bore holes, description of potential aquifers, and cost analysis of ground water.

Data collection was performed with the assistance of GSD, JKR, MOH and private drilling companies. General information on geology and hydrogeology in the Study Area were compiled based on GSD (Ipoh, Johor Bahru) and field visit. Well data, drilling log and water quality analysis of existing wells and bore holes are accumulated from GSD (Ipoh) RESP (Johor Bahru) and private drilling companies (Kuala Lumpur).

1.2 Previous Study

The comprehensive study on groundwater resources in the Johor State was initiated in 1971 as a part of the Johor Tengah and Tanjong Penggerang Project by the Binnie & Partness for the Government of Malaysia and the State of Johor (Ref. 1).

The main objective of the study in the Johor Tengah area was to confirm the potentiality of groundwater development for the rural water supplies. The study identified the potential aquifer area and made recommendation regarding rural water development. In 1980, the groundwater potential in the Seri Gading area (Batsu Pahat district) was investigated aiming at domestic use by the GSD for the EPU (Ref. 2). Investigation was conducted by means of 6 test wells and 35 exploration holes. In 1983, the groundwater resources development study in the West Johor region, was documented in the report titled as the Feasibility Study of Water Supply for West Johor Phase I & II, prepared by Ranhill Bersekutu for JKR (Ref. 3 & 4). In this report, Sri Banang and Kg.

Petani schemes were recommended to use groundwater in the west Johor region. The study was executed by means of 4 test wells and 6 points resistivity surveys.

Furthermore groundwater survey with the intention to utilize groundwater resources as a supplementary source for the Kluang water supply system was conducted in 1983 as a part of the feasibility study for the Bekalan Air Baru Kluang, Johor by Kejuruteraan maju sekitar for JKR (Ref. 5). In conformity with the data obtained at the 3 test wells, the Kluang water supply system was planned to abstract the groundwater through the Sungai Kahang Flood Plain Well Field.

2. PRESENT GROUNDWATER USE

2.1 Inventory of Tube Wells and Bore Holes

About 100 boreholes have drilled before 1984. The substantial proportion thereof are located in the Johor Bahru district. The inventory of tube wells and boreholes, drilled between 1956 and 1984, is shown in Table 1. The purpose of this inventory is to present the hydrogeological conditions describing location, depth, diameter, use, screen length, drawdown, pumping discharge rate and specific capacity. The summary of drilling and geologic logs of inventory is illustrated in the Fig. 1.

These wells and boreholes are categorized into 5 types, based upon the mode of use, as illustrated in Table 2. Fig. 2 shows the areal distribution of the main tube wells, boreholes, test wells and exploration holes. While the drilling point of RESP small scale tube wells are shown in Fig. 3.

2.2 Domestic Groundwater Use

In the Region, groundwater is not the substantial resources for the domestic water use in an urban area, but it plays an important role in the rural area. According to the PWD, the piped water supplied to the Region in 1982 amounted to 42.85 x 10^6 m^3. Around 86.6% is attributable to domestic use and the rest of 13.4% to manufacturing use (Ref. 9). The ratio of piped water supplied to urban area reached 91.6%, whereas 70.7% of the piped water use in rural area. All the resources of PWD piped water are surface water abstraction.

Wells for domestic water use are mostly hand dug wells. Water are withdrawn using ropes and buckets, but there are some which are equipped with hand pumps. Several tube wells were drilled in fractured openings in the consolidated rocks in the Kulai-Senai area. However, wells yield are small and most tube wells have no productivity (See Table 1). Small tubewells are provided as domestic water resources by RESP for small

village in rural area which is isolated from the PWD's water supply system.

According to the reports of MOH, who is financially assisting RESP, 246 small (shallow) tube wells were improved and sealed against saline water contamination (See Refs. 7 & 8, Fig. 3, Table 3) in the Region from 1976 to 1984. The MOH estimated the water supply population by RESP well in rural area at 5,000 people or 1.3% of the total population. Rural water supply tubewells established by RESP are operated and maintained by the beneficiaries and O & M cost is assumed negligible (Refs. 6 & 7).

2.3 Industrial Groundwater Use

According to PWD the piped manufacturing water amounts 5.7 x 10^6 m^3/y (15.6 Mld) (in 1982), whereas total manufacturing water demand is 20 x 10^6 m^3/y (54.8 Mld) in Study Area (Ref. 9). Therefore deficit is 14.3 x 10^6 m^3/y (39.2 Mld). These deficit is supplemented by direct pumping from rivers, ponds and tube wells. Groundwater shares only 0.22 x 10^6 m^3/y (0.60 Mld) against the total water supply of 20 x 10^6 m^3/y (54.8 Mld). Typical type of industrial water use well is a deep tube well drilled by truck mounted drilling rig. The discharge rate of these wells ranges from 100 m^3/d to 300 m^3/d, with a large drawdown (around 30 m). It is presumed that permeability of the aquifer is small. Many wells are located in the area along the River Kedai because many rubber factories and pineapple factories (Ref. 10) are established therein. Main usage of groundwater is washing, treatment and drinking water for workers. Pump and well capacity are medium scale.

2.4 Agricultural Groundwater Use

No irrigation system is utilizing groundwater in the Region (Ref. 10). A few dug wells exploit groundwater to supply for agriculture purposes, and also a tube well was drilled by private drilling company for orchard garden as shown in Table 1. In total, the groundwater supply for the agriculture use is about 5 x 10^4 m^3/y tube well.

3. DEVELOPMENT POSSIBILITIES

3.1 Geology

The Region is divided into several zones according to geologic and topographic characters (See Table 4 & Fig. 3, Refs. 11, 12, 13 and 14).

The area, which has an area of approximately 7,350 km2, consists of coastal plains and hills with some mountainous areas. The central part of the Region is underlain by intrusive granite masses, ranging from EL. 70 to EL. 100 meters. The hilly granite masses extends in the south-east direction, forming a watershed.

The east part of the Region is patched by granitic rocks among the area of Permian meta-sedimentary rocks which include wide-spread volcanic facies consisting of andesitic to rhyolitic lava flows, tuffs and conglomerates.

The western side of the central granite zone is bordered by Triassic meta-sedimentary rocks of marine origin, which are overlain by alluvial sediments developing with a wide strip of 10 to 20 km along the southwestern coast.

The southern part of the Region is characterized by Pleistocene sedimentary facies of terrestrial origin, which are underlain by granite formation (Refs. 13, 15 and 16).

Tertiary sedimentary facies of terrestrian deposits is located in small patches in the upper reaches of the Johor river. The eastside of Tertiary sediments is bounded by Mesozoic sedimentary rock which are mainly consist of sandstone.

3.2 Hydrogeology

Groundwater potential is dependent chiefly on local geologic conditions of water bearing formations which are encountered in fissures

or cracks in indurated sandstone and shale, weathered sandy formation of granite, and sand and gravel of unconsolidated layers. The ground water regions clarified by hydrogeologic condition are summarized as follows (Refer to Fig. 4).

(1) Western coastal region

The region lies along the Straits of Melaka and is bordered on the northeast by the lower hills formed of Mesozoic sediments (western lower hilly region). Topographically the region is included in the widespread recent alluvial plains.

The recent alluvial deposit is composed of clay, sandy clay, peaty layer and very thin sand. However, groundwater development is not promissive because overlying clay is dominated. Further, the sand interbedded with clay, mostly produces high saline or brackish groundwater.

According to the drilling investigations of GSD, the alluvium ranges in thickness from a few meters to 15 meters (Ref. 2 & 4). Mesozoic impervious sedimentary rock (the Gemas Formation) unconformably underlying the alluvial sediments, crops out along the Ayer Hitam-Kulai road and dips southwest below the alluvial plain. The peaty layers are distributed near hilly area, (Ref. 17 Quaternary map), the water have low range of PH value. This region is classified to class 5 of unconsolidated aquifer.

(2) Western lower hilly region

The region lies to southwest of western coastal plain and is bounded by the central mountain range to the northeast. It seems that geological unit in this region comprise argillaceous rocks belonging to the Gemas Formation.

Based on the results of the existing wells, it can be considered that an impermeable formation (mudstone) continues more than 100 meters in thickness, near Simpang Renggam. Otherwise drilling information at Tanjong Kupang, which bears small groundwater in the tuffaceous layer.

Generally the region consists of class 3 and class 4 of unconsolidated aquifer. In the northern part of the region, the water bearing formation appears to be scarce, but in the southern part it becomes more permeable and eventually it produces groundwater from the fractured tuff layer.

(3) Johor Bahru-Kota Tinggi coastal region

The region is located in the south of the Johor River where groundwater is contained in the aquifers of the Simpang Formation and the Gula Formation. In this area, about 40 tube wells have been drilled for groundwater, including 30 small scale tube wells of RESP Project (MOH).

The Simpang Formation, disconformably overlying the Gulet Granite, is exposed in the Johor Bahru area. The term of the Simpang Formation was introduced by Suntharalingam and Toeh (1977), (Ref. 16). This formation is equivalent to the old Alluvium of Burton (1964), (Ref. 15). The formation, which is composed of boulder, gravel, sand, silt and clay, is basically permeable layer of late Pliocene to Pleistocene age. The Gula Formation conformably overlying the Simpang Formation, contains a series of clay and subordinate sand. In general, this region consists of class 3 and 4 of unconsolidated aquifer.

(4) The Central Mountain range region

This region is distributed northeast part of the Region and forms a hilly watershed. The geology of this region consists of Mesozoic rocks and Paleozoic rocks. The Mesozoic rocks are divided into two formations which are the Blumet Granite Formation and the Gemas Formation. The Paleozoic rocks are divided into two formations and one group which are the Sedili Volcanic Formation, the Linggiu Sandstone Formation and the Mersing Group.

In general these rocks have poor aquifers, because these rocks are compact without cracks and fractures and also are overlain by thick impermeable residual soil. However, based on the existing wells in Kulai - Senai area, small potential groundwater is found in cracks and

fractures of granite formation. In general, the region consists of class 3 and class 4 of consolidated aquifer.

(5) Sandstone region

The sandstone region is scattered near the Linggiu river and the Pengeli river. The geology of this region consists of the Layang Formation and the Panti Sandstone Formation, which may have a moderate to fair permeability. There is no existing well in this region, however several tube wells were drilled in the sandstone layer at the east of Kluang town. These wells revealed moderate to fair permeabilities, therefore groundwater potential of sandstone region is expected to be class 2 of consolidated aquifer.

(6) Eastern coastal region

This region is distributed along the South China Sea, where groundwater is contained in the coastal sand dune, terrestrial clay and silt, and paludal deposits. The coastal sand dunes are considered to be the Gula Formation of Holocene. The sand dunes consist of well sorted sand with some clay. The thickness of the formation varies from 2 meters to 10 meters.

In general these sand dunes are aquifers of good quality water however quantity of groundwater is rather small, because of limited thickness. The terrestrial and paludal deposits are not expected groundwater in quality and quantity, because of dominant clay and saline water. The water bearing formations of this region consist of class 3, 4 and 5 of unconsolidated aquifer.

3.3 Water Quality

Data on groundwater quality are available from several sources (Refs. 2 - 5). MOH RESP project conducted water quality analysis for drinking purpose (Table 5). Chemical analysis of groundwater about 20 samples were carried out by the projects in and around the Region in 1983. Table 6 summarizes the data obtained. The existing borehole

records often contain a few chemical properties of water, although these are usually incomplete and often restricted to pH value and chloride ion.

The quality of groundwater is good to fair in the Region except for the coastal alluvial aquifers mainly along the west coast which are influenced by sea water intrusion. Quality criteria for drinking water depend on the influence of the water on the human bodies and health. For drinking water supplies the most authorized quality standard is those established by the World Health Organization (Table 7 and Ref. 18). The quality of groundwater in the coastal alluvial aquifers is noted with rather low pH and high chloride ion. The maximum value of chloride ion content at EX 25 in Suri Gadin Project is 8,640 ppm, which exceed the WHO Standard of 200 ppm. According to the results of classification analysis, most of test well water in alluvial aquifer are categorized into non-sodium bicarbonate type as high salinity and high sodium hazard water, and hence it can not be used for domestic use. Water quality of TW1 in fractured zone of Granite belongs to sodium bicarbonate type, which is generally within the allowable quality for water supply.

3.4 Classification of Groundwater Potential

The water bearing formations can be classified into the following aquifer types on the basis of its lithology and their individual hydrologic conditions (Fig. 6). The impermeable unconsolidated formations are considered as an aquiclude since there are layers of clay, peaty clay and silt which are mainly located in coastal plains along the west coast. And also saline groundwater is observed in purched aquifer penetrated by the exploratory holes with maximum chloride contents of 8,640 ppm by GSD Suri Gaden Project. (Ref. 2 and Table 6)

The alluvium of unconsolidated aquifer in the Region is considered to be moderate to poor aquifer due to probably low storativity and transmissivity. The Pleistocene deposits of unconsolidated aquifers contain sand, gravel, and boulders, however these deposits have rather lower deep percoration ratio than alluvial deposits, because of low permeable ground surface.

The fractured opening in consolidated sandstone in the upper reach of the Linggiu River and Sayong River are considered to be moderate to fair aquifers. There is no existing well in the sandstone, however tube wells were drilled in the same formation along the Keluang - Mersing road. These wells have a transmissibility of about 40 m^2/day. Fair to poor aquifers occur in fractured openings in granite or sandstone of Mesozoic age along the Skudai River, and also in shale and tuff of Mesozoic age in the Tanjung Kupang area. Existing wells of 27 to 91 m in depth produce a yield of 59 to 382 m^3/d, with an average of 200 m^3/d.

Paleozoic and Mesozoic sedimentary rocks, and granite rocks are composed mostly of impermeable consolidated aquifer. A few wells were drilled into these rocks resulting in a dry hole. Very poor potential aquifers in these rocks, are widely distributed in watershed hilly area.

Based on the aquifer parameters of thickness, specific yield, pumping discharge, transmissivity coefficient and drawdown in the previous study, potential areas are classified into two types and nine classes. The range of specific yield was assumed, though there is no data available.

Unconsolidated aquifers

(1) Class UC-1: Excellent

These are defined excellent aquifers of great thickness with very high permeability, located in the down stream area of large river basins. This type of aquifer is not found in the Region. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	10 - 40 m
Specific Yield (Effective Porosity)	:	15 - 25 %
Pumping Discharge Rate	:	1500 m^3/d
Transmissivity	:	100 - 1000 m^2/d
Drawdown	:	1 - 10 m
Probability of Occurrence of Aquifer	:	90 %

(2) Class UC-2: Excellent to Moderate

These are categorized in excellent to moderate aquifers of moderate thickness with rather high permeability, located in the coastal alluvial plains. This type of aquifer is not found in the Region. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	8 - 15 m
Specific Yield (Effective Porosity)	:	10 - 20 %
Pumping Discharge Rate	:	200 - 1500 m^3/d
Transmissivity	:	50 - 150 m^2/d
Drawdown	:	2 - 10 m
Probability of Occurrence of Aquifer	:	70 %

(3) Class UC-3: Moderate to Fair

These are moderate to fair aquifers of moderate thickness of less than Class UC-2 with moderate permeability, located in Pleistocene series of Johor Bahru district and in sand dune of east coast. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	2 - 10 m
Specific Yield (Effective Porosity)	:	10 - 15 %
Pumping Discharge Rate	:	20 - 200 m^3/d
Transmissivity	:	10 - 80 m^2/d
Drawdown	:	2 - 10 m
Probability of Occurrence of Aquifer	:	30 %

(4) Class UC-4: Fair to Poor

These are fair to poor aquifers of very thin thickness of less than 3 m with small permeability, located in the limited part of coastal plain. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	0 - 3 m
Specific Yield (Effective Porosity)	:	5 - 15 %
Pumping Discharge Rate	:	0 - 20 m^3/d
Transmissivity	:	0 - 10 m^2/d

Drawdown	:	4 - 10 m
Probability of Occurrence of Aquifer	:	20 %

(5) Class UC-5: Very Poor

These are very poor aquifers of sandy clay with saline water, mainly located in the western coastal plain, having a very low permeability or a probability of peaty clay aquiclude. This Class UC-5 is excluded from the potential analysis to estimate the safe yield.

Consolidated rock aquifers

(1) Class C-1: Excellent to Moderate

These are excellent to moderate aquifers of large to moderate thickness with high permeability, located in the crystalline limestone and Karst area. This type of aquifer is not found in the Region. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	10 - 25 m
Specific Yield (Effective Porosity)	:	5 - 10 %
Pumping Discharge Rate	:	300 - 1500 m^3/d
Transmissivity	:	50 - 500 m^2/d
Drawdown	:	1 - 10 m
Probability of Occurrence of Aquifer	:	50 %

(2) Class C-2: Moderate to Fair

These are moderate to fair aquifers of moderate thickness with high to medium permeability, scattered in the Linggiu river and the Pengeli river basin, consisting of the sandstone. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	5 - 20 m
Specific Yield (Effective Porosity)	:	2 - 8 %
Pumping Discharge	:	100 - 300 m^3/d
Transmissivity	:	10 - 50 m^2/d
Drawdown	:	10 - 20 m

Probability of Occurrence of Aquifer : 20 %

(3) Class C-3: Fair to Poor

These are fair to poor aquifers of fractured openings in granite of Mesozoic age, located along the Skudai River, and also in shale and tuff of Mesozoic age in the Tanjung Kupang area, having low permeability. Aquifer parameters are assumed as follows:

Thickness of Aquifer	:	0 - 15 m
Specific Yield (Effective Porosity)	:	2 - 5 %
Pumping Discharge Rate	:	0 - 200 m^3/d
Transmissivity	:	0 - 15 m^2/d
Drawdown	:	15 - 40 m
Probability of Occurrence of Aquifer	:	10 %

(4) Class C-4: Very Poor

These are very poor aquifers consisting of sedimentary rocks and granitic rocks of the late Paleozoic to Mesozoic age which widely cover the Region, having a very low permeability or no groundwater. This class C-4 is excluded from the potential analysis to estimate the safe yield.

In accordance with 4 river basins, which are used for water balance study on surface water resources, classification map of groundwater potential is prepared as shown in Fig. 5. Basin wide description is shown as following (See Table 8).

(a) Benut-Pontian Basin: This basin consists mainly of the western coastal plain, the argillaceous hilly region and the small granite rock region. Therefore this basin shows no potential of groundwater. Specially water quality is unsuitable for drinking use.

(b) Skudai-Tebrau Basin: This basin belongs to the Johor Bahru - Kota Tinggi coastal plain, granite region, the argillaceous hill and the southern part of west coastal region. This basin is most progressively developed in terms of groundwater use by deep tube well, however pumping

discharge rate is small and also percentage of a successful well is very low. Water quality of this area is generally suitable for any use.

(c) Johor Basin: This basin comprises the Johor Bahru - Kota Tinggi coastal plain, the granite rock and Paleozoic rock region, the sandstone region, and the southern coastal plain. The geology is dominated by granite rock and Paleozoic basement rock, but the potential of groundwater can not be expected. Sandstone formation is distributed in the limited area with rather high ground-water potential. The Johor bahru - Kota Tinggi coast is developed by small scale tube wells by RESP and some dug wells.

(d) Sedili Basin: This basin lies mainly in the granite and Paleozoic rock region, and with subordinate Quaternary Coastal plain with sand dune along the South China Sea. In general, groundwater potential is poor to very poor.

3.5 Storage Potential

Storage potential is the groundwater volume which is stored in the pores, cracks and fissures of the aquifer. It is estimated as follows:

$$SP = A \times B \times Sy$$

where, SP : Storage potential
A : Area
B : Thickness of aquifer
Sy : Specific yield (Effective porosity) of aquifer

Assuming the average thickness and average specific yield (See Ref. 19) by hydrogeological land class as shown in Table 9, the storage potential classified according to the basins is calculated as shown in Table 10.

3.6 Groundwater Recharge

It is recognized that very few studies on percolation rate to subsurface or groundwater recharge are conducted in hydrogeological study. According to a recent study on deep percolation in Japan, a

linear relation between deep percolation and precipitation was determined by a field investigation and water balance analysis. The deep percolation in alluvial plain and hilly land is estimated to be 15 to 25% of the annual precipitation (Refs. 20 & 21). The deep percolation in the mountain areas of granitic rock is preliminarily estimated to be 3% of the annual precipitation (Ref. 22). Some rates of deep percolation have been used in the previous studies to estimate the sustain yield of well fields (Ref. 23 to 25).

Based on the previous studies, annual deep percolation rates are assumed to be 22% of annual precipitation in the alluvial plain, 15% of annual precipitation in Pleistocene sediments, 10% of annual precipitation in the hilly to mountainous areas of sandstone formation and 3% of annual precipitation in the hilly to mountainous areas of the granite and other hand rocks. The deep percolation rates in the 4 basins are calculated based on the average basin rainfall which is shown in Table 11.

The average yearly groundwater recharge is calculated according to the ratios of hydrogeological land class in the basin to allotting the above percolation rates as shown in Table 12.

3.7 Preliminary Estimate of Safe Yield

In this study, the safe yield is defined to be an annual discharge rate by which water can be withdrawn from a groundwater basin within the limit of annual groundwater recharge and groundwater storage. Assuming the probability of occurrence of aquifer is applied, the safe yield is calculated according to the hydrogeological land class by basin as shown in Table 13.

3.8 Cost Analysis

The unit cost of the water sources is estimated in order to compare the cost between groundwater and surface water. Corresponding to hydrogeological land classification, 4 cases were assumed, itemizing

aquifer type, average well depth, average pumping discharge, average drawdown, well type and pumping capacity as shown in Table 14. To estimate the unit cost of water source, following 6 conditions were assumed:

1) Regarding the power source and electric supply from power system, a diesel engine power generator is proposed because it is considered that the groundwater development is conducted mostly in rural areas;

2) Economic depreciation spell of the facilities is assumed to be 25 years for a well which is cased by steel wire wounded continuous slotted type screen with diameter of 200 mm (Ref. 26), 8 years for pump and generator which include a standby unit and 50 years for other facilities;

3) All the costs are set at price level of 1984, including 5% of assumed annual escalation rates of both foreign and domestic portions from 1980 to 1984;

4) Physical contingency is assumed to be 10% of a total cost in item 1 to 7 of the investment cost;

5) Unit cost of the chlorination is assumed to be M$0.02/m3; and

6) The cost is capitalized at the beginning of construction.

The estimated cost stream for 50 years of use of the assumed ground-water source facilities is shown in Table 15. The unit cost of the water source is estimated assuming discount rates of 6 to 20% is applied as shown in Table 16.

REFERENCES

1. EPU/THE GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR, JOHOR TENGAH AND TANJONG RENGGERANG REGIONAL MASTER PLAN, SUPPORTING VOLS. 2 & 3, BINNIE & PARTNERS, 1971.

2. EPU/HYDROGEOLOGICAL INVESTIGATION IN SERI GADING AREA, BATSU PAHAT, JOHOR, GSD, ANG NUM KIAT & ZAIONOL ABIDIN SULAIMAN, 1982 (UNPUBLISHED)

3. JKR/FEASIBILITY STUDY OF WATER FOR WEST JOHOR PHASE I (MACAP) & PHASE II (SEMBRONG/BEKOK), INTERIM REPORT, RANHILL BERSEKUTU, 1982.

4. JKR/FEASIBILITY STUDY OF WATER FOR WEST JOHOR PHASE I (MACAP) & PHASE II (SEMBRONG/BEKOK), FINAL REPORT & APPENDIX G, RANHILL BERSEKUTU, 1983.

5. JKR/FEASIBILITY STUDY FOR THE BEKALAN AIR BARU KELUANG, JOHOR, VOL 1 MAIN REPORT 1983.

6. MOH/RURAL ENVIRONMENTAL SANITATION PROGRAMME, 1973 - 1980, DIVISION OF ENGINEERING SERVICES MOH, 1981.

7. MOH/RANCANGAN KEBERSIHAN ALAM SEKELILING DAM BEKALAN AIR MASYARAKAT LUAR BANDAR - NEGERI JOHOR, ANNUAL REPORT 1983.

8. MOH/RAN CANGAN KEBERSIHAN ALAM SEKELILING DAN BEKALAN AIR LUAR BANDAR CADANGAN - CADANGAN BAGI RANCANGAN MALAYSIA KE EMPAT (1981 - 1985) (MALAYA).

9. JKR/APPENDIX K2, JOHOR, 1982.

10. EPU/NATIONAL WATER RESOURCES STUDY, MALAYSIA, STATE REPORT VOL. 5 JOHOR, JICA, 1982.

11. GEOLOGICAL MAP OF THE REGION (SOUTH JOHOR), INFORMATION FROM GSD, 1985 (UNPUBLISHED)

12. HYDROGEOLOGICAL MAP OF PENINSULAR MALAYSIA, SCALE 1:500,000 GSD 1975.

13. GEOLOGY AND MINERAL RESOURCES JOHOR BAHRU - KULAI AREA SOUTH JOHOR, MAP BULLETIN 2, C.K. BURTON, GSD, 1973.

14. GEOLOGICAL MAP OF GUNONG BELUMUT, SHEET 125, SCALE 1: 63,360 GSD 1976.

15. THE OLDER ALLUVIUM OF JOHOR AND SINGAPORE, THE JOURNAL OF TROPICAL GEOGRAPHY VOL 18, PP 30 - 42, C.K. BURTON, 1964.

16. STUDIES ON THE QUATERNARY GEOLOGY OF PENINSULAR MALAYSIA, NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA, VOL. 10, NO. 3 PP 101 - 110, T. SUNTHARALINGAM, 1984.

17. RECONNAISSANCE MAP OF THE QUATERNARY OF PENINSULAR MALAYSIA, SCALE 1: 253,440, T. SUNTHARALINGAM, GSD (UNPUBLISHED)

18. INTERNATIONAL DRINKING WATER STANDARD, WHO, 1971.

19. HYDROGEOLOGY, JOHN WILEY & SONS, INC., 1966. P.P. 394 ETC.

20. HYDROGEOLOGICAL CYCLE OF HILLY LAND AND EFFECTS ON URBANIZATION ON IT, 1981 (JAPANESE).

21. GROUNDWATER RESOURCES STUDY, 1973 (JAPANESE).

22. SG. LUI REPRESENTATIVE BASIN REPORT, WATER RESOURCES PUBLICATION NO. 9, 1978, DID.

23. FINAL REPORT FEASIBILITY STUDY SANDAKAN WATER SUPPLY EXTENSION SCHEME VOL. 1 TO 4, 1980, PWD.

24. HYDROGEOLOGICAL REPORT BELAWAI/SARAWAK, 1978, GSD.

25. GROUNDWATER RESOURCE EVALUATION, 1970, MC GRAW HILL.

26. EPU/NATIONAL WATER RESOURCES STUDY, MALAYSIA, SECTIONAL REPORT VOL. 3, JICA, 1982.