APPENDIX 8 COUNTRY DATA

I. MAIN INDICATOR

1 Country Name: Republic of Zambia
Capital City: Lusaka, Population of 870,000 (1988)
Independent Day: October 24, 1964

2 Land Area: 752,614 km^2 (Twice of Japan)

3 Population:

6,945,000	7,200,000	7,800,000
(1986)	(1987)	(1989)

4 Head of the Nation: President Dr. kenneth David Kaunda

5 Tribes: 73 Tribes, Bemba, Nyenga, Tonga, Lozi and others

6 Language: English, Nyanga, Bemba, Tonga, Lozi and others

7 Education:

Primary school	(100 %),	1985
Secondary school	(19 %),	1985
High school	(2 %),	1985

* As percentage of attendance

8 Currency Kwacha (ZK), Avelage exchange rate December, 1990
1US$=40ZK

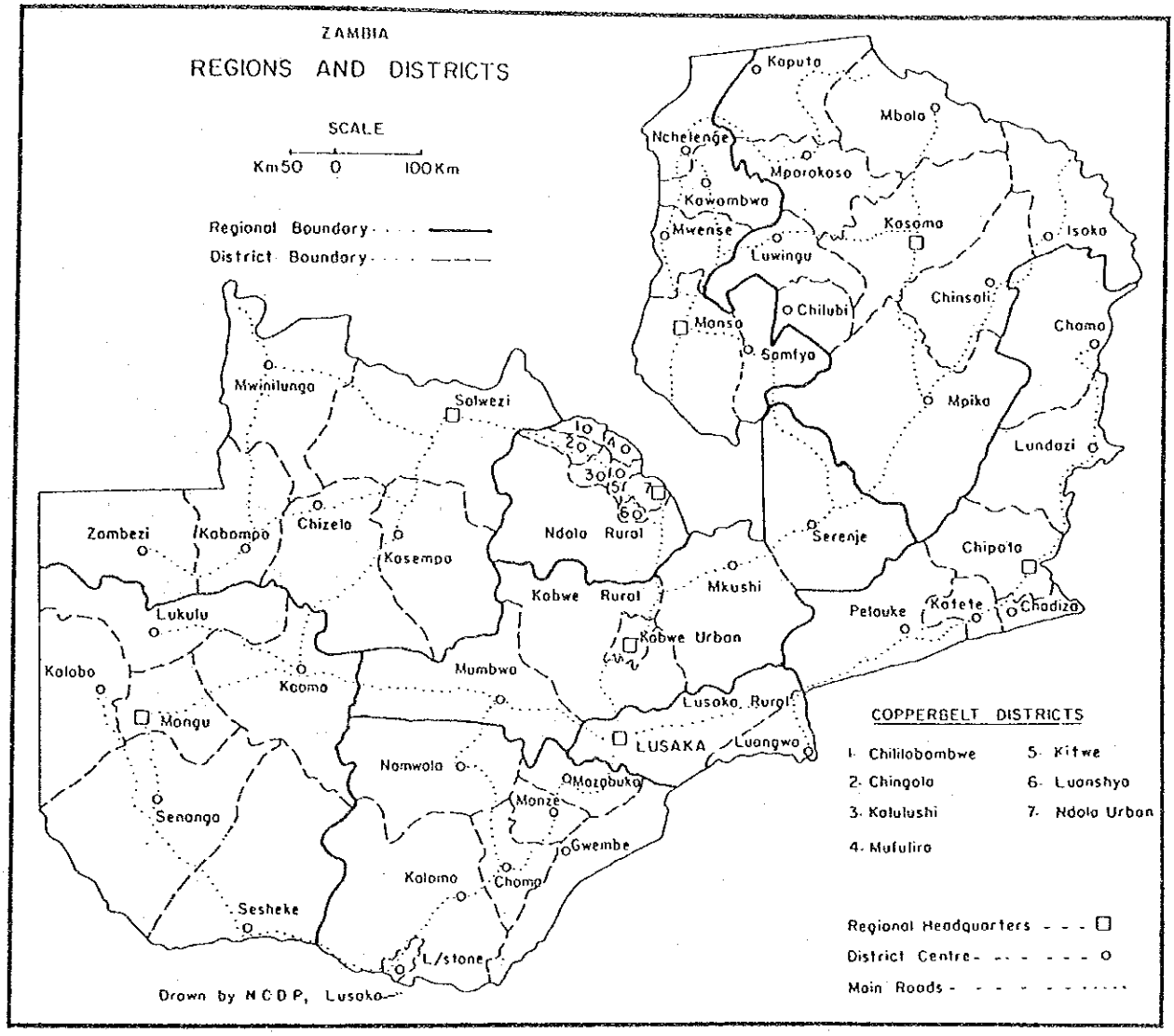
9 Balance of Payment (ZK' Million)

	1987	1988	1989
Exports(FOB)	8,032	9,786.2	11,914.8
Imports(CIF)	7,953	5,675.2	9,642.5

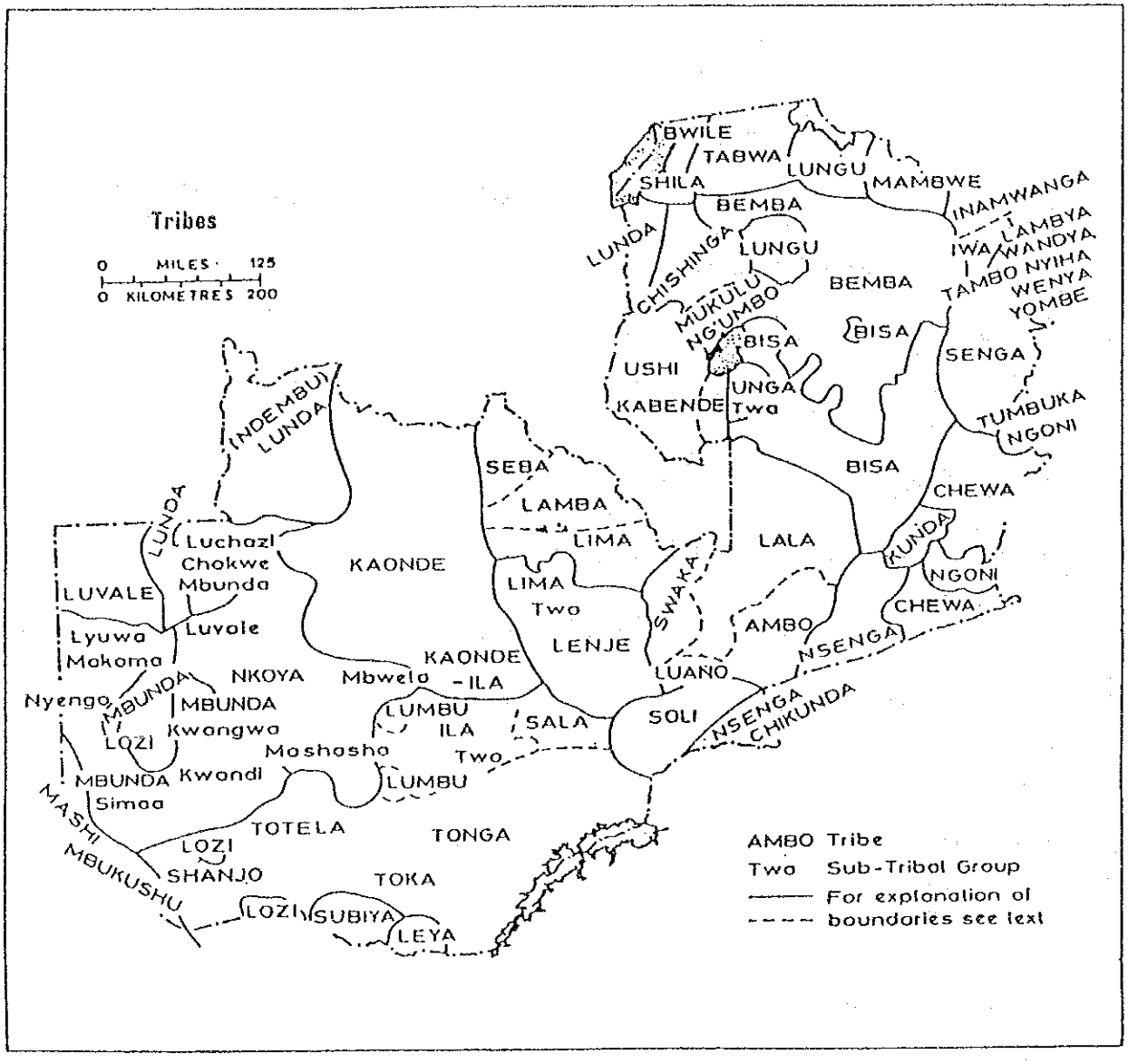
10 GNP

1985	1989
$ 2,130 Million US	$ 3,060 Million US
$ 300 US/capit.	$ 390 US/Capit.

10 ADMINISTRATIVE DISTRICT



11 TRIBES OF ZAMBIA



II. Socie-Economic Indicators

1 Population Census

	1980 CENSUS	RATIO (%)
Total Zambia	5,661,801	100.0
Province:		
1. Central	511,905	9.0
2. Copperbelt	1,251,178	22.1
3. Eastern	650,902	11.5
4. Luapla	420,966	7.4
5. Lusaka	691,054	12.2
6. Northern	674,750	11.9
7. North - Western	302,668	5.3
8. Southern	671,923	11.9
9. Western	486,439	8.6
Large Urban Areas:		
1. Cililabombwe	61,928	
2. Chingola	145,869	
3. Kabwe	143,635	
4. Kalulushi	59,213	
5. kitwe	314,794	33.6
6. Livingstone	71,987	
7. Luanshya	132,164	
8. Lusaka	538,469	(1,900,276)
9. Mufullra	149,778	
10. Ndola	282,439	
Total Urban (including small Urban Areas)	2,258,519	(39.9%)
Total Rural	3,403,282	(60.1%)

	Year	1980	1985	1989
1.	Total Population	5,661.8 (100.0%)	6,725.3 (100.0%)	7,803.8 (100.0%)
2.	Urban Population	2,258.5 (39.9%)	2,998.2 (44.6%)	3,917.5 (50.2%)
3.	Rural Population	3,403.2 (60.1%)	3,727.1 (55.4%)	3,886.3 (49.8%)
4.	Density	8 Psn./km2	9 Psn./km2	11 Psn./km2

2 Economic Indicator

		1985	1986	1987	1988	1989
1.	Population *(Million)*	6.7	12,963	7.3	7.6	7.8
2.	GDP *(Million Kwacha)*	7,071	12,963	19,778	30,020	61,817
3.	GNP *(Million Kwacha)*	6,362	10,622	17,520	26,096	42,283
	(million US $)	1,116	836	2,190	2,610	*3,060
	Person/Kwacha	949	1,517	2,400	3,434	5,421
	Person/US $	166	119	300	343	*390
	GDP Growth (%)					
4.	*1 us$/kwacha*	1.6	0.7	2.2	2.7	-
5.	*Copper Prodctn.*	5.7	12.7	8.0	10.0	13.9
6.		479	459	483	422	450

CSO, 1990 * UN: Stastics

3 Kind of Economic Activity

YEAR	1985	1986	1987	1988	1989
GDP					
(Million Kwacha)	7,071	12,963	19,778	30,020	61,817
(Million us$)	1,241	1,021	2,472	3,002	4,447
Copmonent (%)					
1. Agriculture	16.8	18.2	17.3	19.4	18.0
2. Mine	9.1	8.6	8.7	7.1	7.8
3. Manufacture	20.6	20.7	21.9	24.3	24.6
4. Electricity	3.6	3.5	2.9	2.7	2.3
5. Construction	3.8	3.9	3.9	3.1	2.8
6. Comercial	11.0	10.8	10.8	10.4	10.8
7. Transpotation /Communication	5.3	5.3	5.4	5.0	4.9
8. Service	29.8	29.0	29.3	28.0	28.8

4 Exchange Rate

	Kwacha (US$1.00)	Kwacha (/¥)
1983	1.51	
1984	2.20	
1985	5.70	
1986	12.71	
1987	8	
1988	10	
1989 Jan.	10.15	0.0810
1989 June	10.96	0.0768
1989 Dec.	20.73	0.1442
1990 Jan.	40.60	0.2804
1990 June	40.60	0.2630
1990 Dec.	47.45	0.3562

III. DEVELOPMENT INDICATOR

1 Fourth National Development Plan (1989-1993)

Fourth National Development Plan (1989 - 1993)

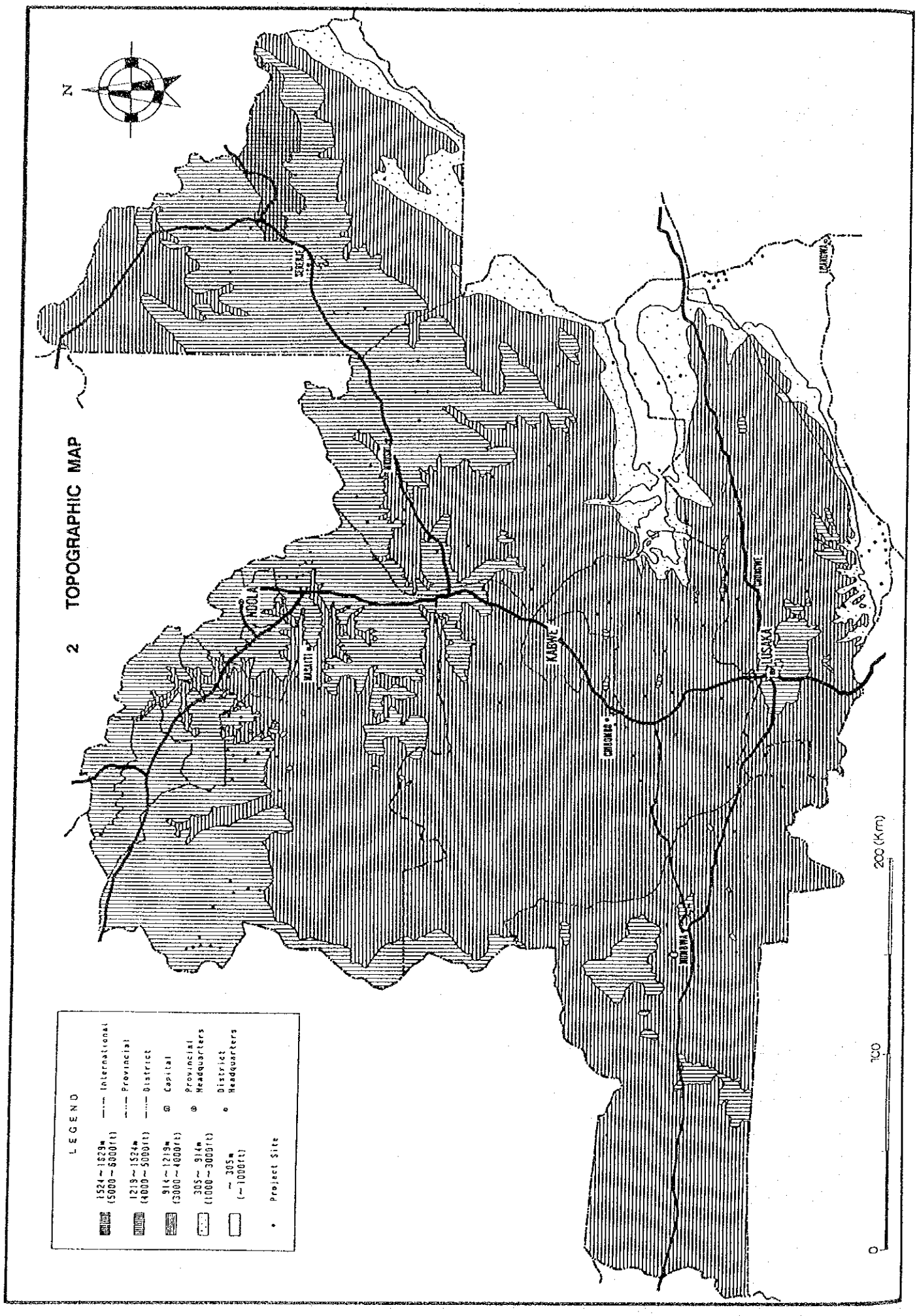
(1) to attain the objectives of self- reliance in the economy and reactivate the economy on the basis of maximizing the use of own resources;
(2) to accelerate the rate of Zambianization in the economy to achieve greater self-reliance in meeting the growing demand for middle level technicians and highly skilled manpower;
(3) to alleviate poverty among the ecomically disadvantaged and vulnerable groups and to reduce the existing socio-economic and regional disparities;
(4) to reduce the current high rate of growth of the Nation's population and to increase the role an precipitation of woman in overall national Socio-economic development;

(5) Macro-economic and financial targets
1) to achive a 3.2 percent per annum real GDP growth rate;
2) to reduce inflation to below 20 percent by the end of the Plan period;
3) to reduce the overall Government budget deficit to below 2 percent of the GDP by the end of the Plan period;
4) to increase formal sector employment to 400,000 by the end of Plan period;
5) to increase the contribution of the private sector to economic growth to 45 percent of the GDP.

unit: kwacha (ZK)

	1989	1993	'89/'95 Avarage growth rate (%)
Real GDP Growth (Mn ZK)	18,920	21,427	3.2
Overall Investment	3,877	5,377	8.5
Government Outlay	3,974	4,500	3.2
Private Sector Outlay	9,577	9,902	0.8
Export Earnings	8,121	9,401	3.7
Imports	6,629	7,753	4.0
Per Capita GDP Grouwth(ZK)	2,511	3,539	9.0
Inflation Rate (%)	45	20	-
Formal Sector Employment (Thousand Persons)	357	400	2.9
Population Growth (Thousand persons)	7,804	9,085	3.9
Government Deficit (as % of GDP)	14	2	-
Contribution of private Sectors to GDP (%)	40	45	-

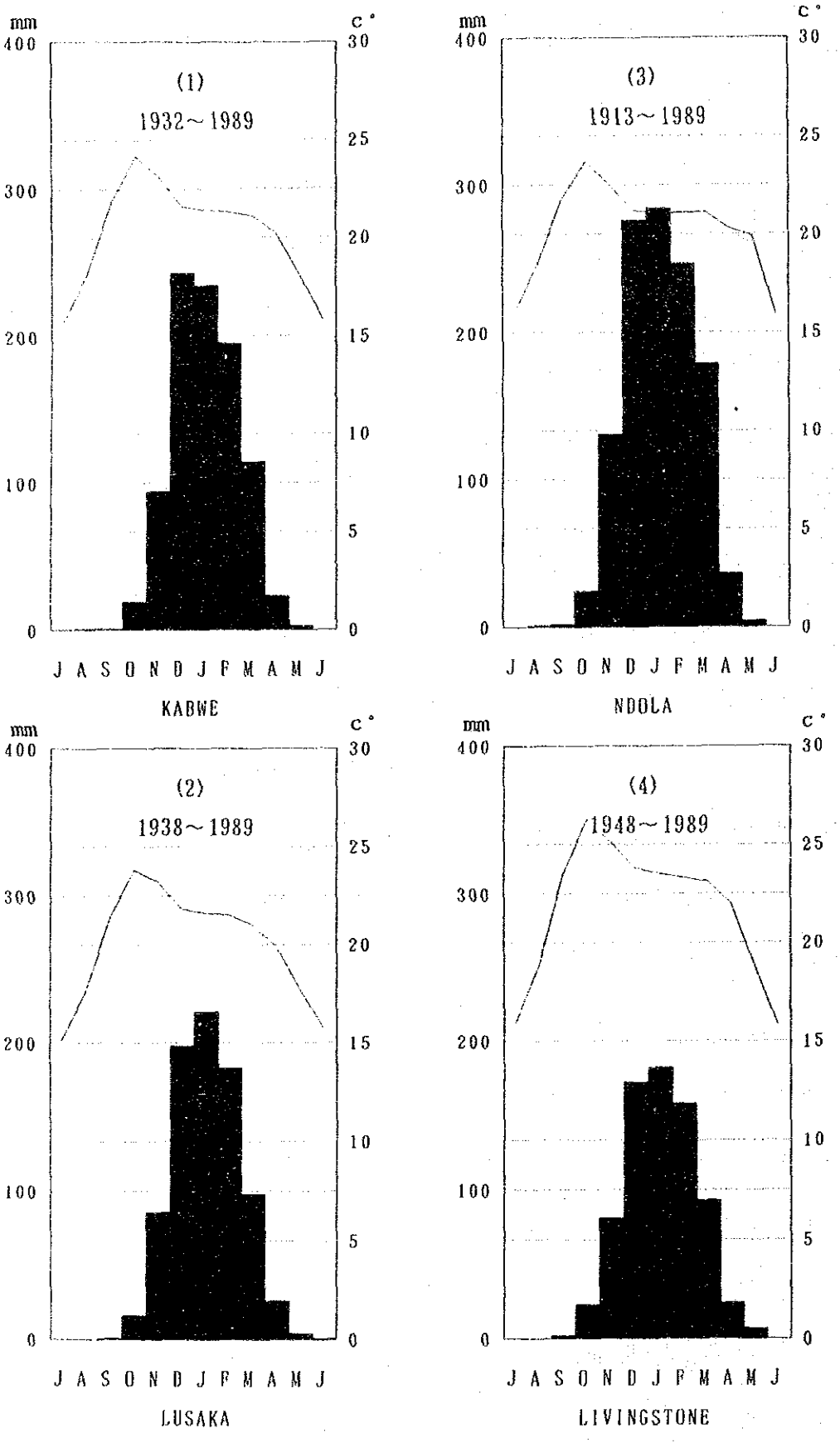
1 DRAINAGE SYSTEM IN PROJECT AREA


2 TOPOGRAPHIC MAP
N
LEGEND
1524 ~ 1829m (5000 ~ 6000ft)
1219 ~ 1524m (4000 ~ 5000ft)
914 ~ 1219m (3000 ~ 4000ft)
305 ~ 914m (1000 ~ 3000ft)
~ 305m (~ 1000ft)
International
Provincial
District
Capital
Provincial Headquarters
District Headquarters
Project Site
KABWE
LUSAKA
CHIRUNDU
MONGU
SESHEKE
MANKOYA
MUMBWA
CHAVUMA
0
100
200 (Km)

3 ANNUAL AVERAGE CLIMATOLOGIC DATA

STATION	ITEMS	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	TOTAL
(1)KABWE	1) PRECIPITATION (mm)	0	1	1	19	94	243	234	195	114	23	3	0	928
(1932-1989)	2) TEMPERATURE (C')	15.7	18.2	21.9	24.2	23.1	21.6	21.4	21.3	21.1	20.2	18.1	15.8	20.2
	3) RAINY DAYS (days/mon.)	0	0	0	3	11	19	19	17	11	3	1	0	84
	4) HUMIDITY (%)	51	47	41	42	61	75	81	77	77	71	65	55	62
	5) EVAPORATION (mm)	165	215	268	295	173	142	137	115	146	153	157	137	2103
	6) SUNSHINE DURATION (hr/day)	9.5	10.1	9.9	9.5	6.9	5.5	5.7	5.7	7.1	8.5	9.6	9.2	8.1
	7) WIND VELOCITY (knot)	6.3	6.9	7.0	6.2	4.7	3.1	3.7	3.5	4.4	5.1	5.2	5.6	5.2
(2)LUSAKA	1) PRECIPITATION (mm)	0	0	1	16	86	198	221	183	98	26	4	1	833
(1938-89)	2) TEMPERATURE (C')	15.1	17.6	21.4	23.8	23.2	21.8	21.6	21.5	21.0	19.9	17.7	15.7	20.0
	3) RAINY DAYS (days/mon.)	0	0	0	3	11	18	20	14	12	4	2	0	84
	4) HUMIDITY (%)	53	47	39	41	58	76	77	72	68	68	61	57	60
	5) EVAPORATION (mm)	158	204	230	267	241	138	171	135	152	171	183	165	2215
	6) SUNSINE DURATION (hr/day)	9.4	9.9	9.9	9.3	7.4	5.5	5.8	6.0	6.6	7.8	8.9	8.8	7.9
	7) WIND VELOCITY (knot)	7.1	7.8	8.3	8.3	6.2	4.8	3.9	4.3	5.1	5.9	5.7	6.4	6.2
(3)NDOLA	1) PRECIPITATION (mm)	0	1	2	24	131	276	284	247	179	36	4	0	1183
(1903-1989)	2) TEMPERATURE (C')	16.0	18.5	21.8	23.7	22.5	21.2	21.0	21.1	21.1	20.3	19.9	15.9	20.3
	3) RAINY DAYS (days/mon.)	0	1	1	3	12	20	20	19	15	5	1	0	97
	4) HUMIDITY (%)	52	45	41	43	65	79	82	82	77	71	61	58	63
	5) EVAPORATION (mm)	161	210	245	259	184	139	124	115	146	157	159	147	2046
	6) SUNSHINE DURATION (hr/day)	9.4	9.6	9.4	8.8	6.7	4.8	4.6	4.6	6.1	8.0	9.0	9.0	7.5
	7) WIND VELOCITY (knot)	5.1	5.8	6.5	6.0	4.8	3.9	3.7	3.2	3.5	4.1	4.0	4.6	4.6
(4)LIVINGSTONE	1) PRECIPITATION (mm)	0	0	2	23	81	172	182	158	93	24	7	0	742
(1948-1989)	2) TEMPERATURE (C')	15.9	18.9	23.5	26.3	25.1	23.8	23.5	23.3	23.1	22.0	18.9	15.8	21.7
	3) RAINY DAYS (days/mon.)	0	0	1	3	11	16	17	15	9	4	1	0	77
	4) HUMIDITY (%)	46	38	32	35	56	70	74	76	67	59	51	50	55
	5) EVAPORATION (mm)	150	196	251	281	217	162	164	136	164	159	158	132	2170
	6) SUNSHINE DURATION (hr/day)	9.8	10.1	9.8	8.9	7.2	5.9	6.4	6.5	7.9	9.0	9.7	9.5	8.4
	7) WIND VELOCITY (knot)	4.6	5.1	5.9	5.7	5.0	3.9	4.3	4.2	4.5	4.3	3.9	4.3	4.6

4 MEAN ANNUAL TEMPERATURE AND RAINFALL



5 MONTHLY RAINFALLLS AT KABWE STATION (1970 - 1990)

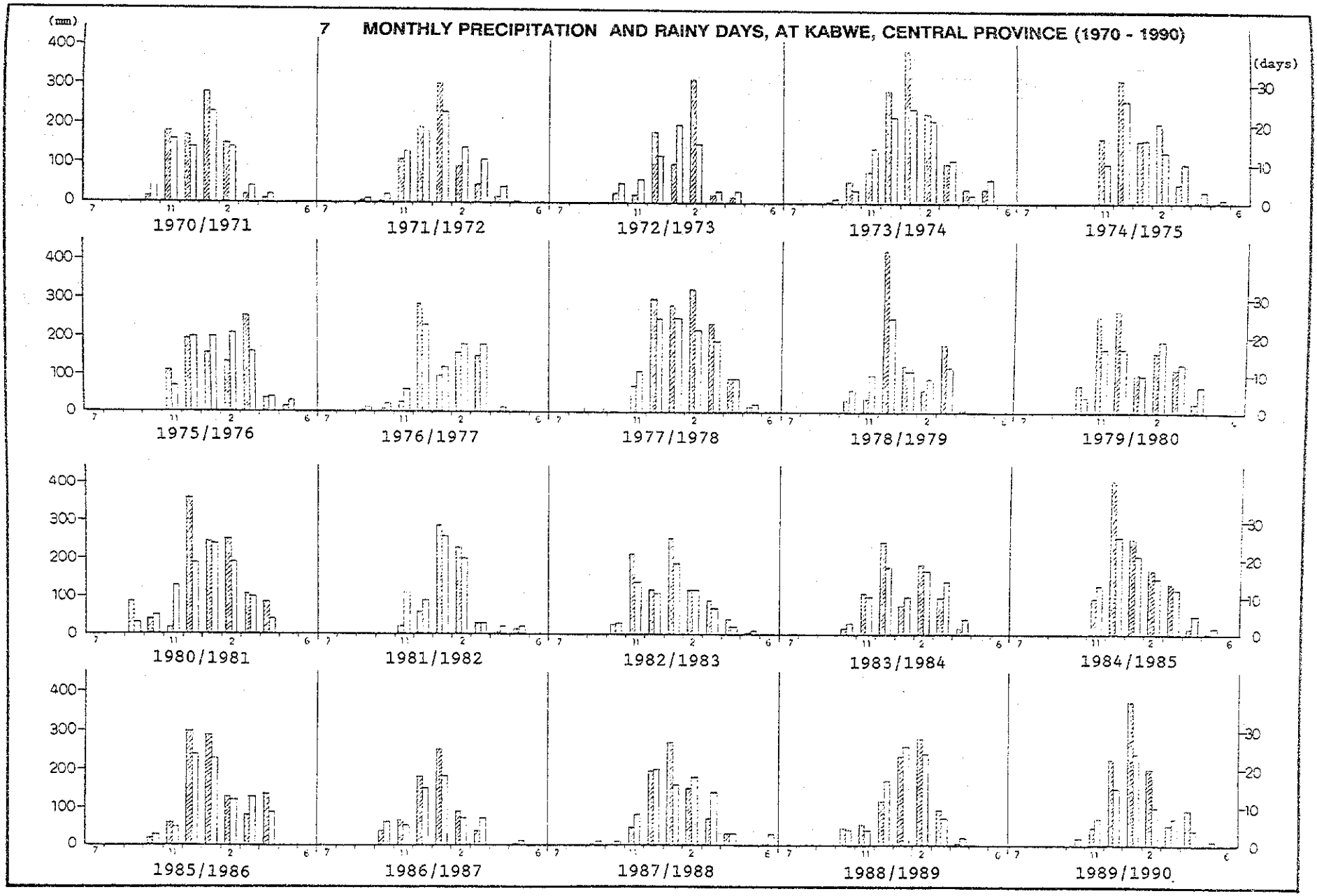
(Unit:mm)

Year	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Annual
1970/71	0.0	0.0	0.0	14.5	180.6	170.2	281.4	152.7	24.1	10.7	TR	0.0	834.2
1971/72	0.0	0.0	2.5	4.6	111.0	191.3	302.5	94.2	45.0	14.2	TR	0.0	765.3
1972/73	0.0	0.0	0.0	26.4	22.6	181.6	106.1	315.4	19.0	16.1	0.0	0.0	687.2
1973/74	0.0	0.0	0.7	54.0	82.0	286.2	386.0	227.2	99.4	36.8	36.6	0.0	1208.9
1974/75	0.0	0.0	0.0	0.0	165.1	265.4	161.0	207.7	49.0	6.3	2.5	0.0	857.0
1975/76	0.0	0.0	0.0	0.0	110.6	194.3	154.7	133.0	258.9	35.2	14.6	0.0	901.3
1976/77	0.0	0.0	0.8	37.4	27.3	285.1	98.1	157.8	149.5	0.2	0.0	0.0	756.2
1977/78	0.0	2.4	0.1	TR	67.7	298.8	284.4	327.7	238.9	89.6	11.9	0.0	1321.5
1978/79	0.0	0.0	0.0	31.6	34.2	426.9	122.4	61.6	80.2	6.5	0.0	0.0	763.4
1979/80	0.0	0.0	0.0	7.4	256.1	269.3	105.5	186.4	115.9	28.6	0.0	0.0	969.2
1980/81	0.0	0.0	8.8	40.0	160.8	360.0	248.7	254.3	111.3	86.0	0.0	0.0	1269.9
1981/82	0.0	0.0	0.0	0.0	20.3	59.4	287.5	229.5	31.7	9.5	12.7	0.0	650.6
1982/83	0.0	0.0	0.0	27.8	212.5	119.7	256.6	121.5	91.1	39.9	2.6	0.0	871.7
1983/84	0.0	0.0	0.0	18.9	111.8	246.0	76.8	181.8	99.7	13.0	0.0	0.0	748.0
1984/85	0.0	0.0	0.0	0.0	97.0	405.6	254.9	173.6	138.2	14.7	10.4	0.0	1094.4
1985/86	0.0	0.0	0.0	20.2	62.2	300.9	289.1	129.5	83.2	137.7	0.0	0.0	1022.8
1986/87	0.0	0.0	0.0	37.9	67.2	180.7	251.0	88.7	38.3	0.0	0.9	0.0	664.7
1987/88	0.0	0.0	1.5	2.5	47.0	197.2	169.3	148.3	69.3	2.9	0.0	2.8	640.8
1988/89	0.0	0.0	0.0	43.3	55.0	114.7	233.8	279.0	92.0	5.0	0.0	0.0	822.8
1989/90	0.0	0.0	0.0	1.7	46.5	179.6	376.6	200.0	53.4	96.4	1.7	0.0	955.9
Average	0.0	0.1	0.7	18.4	96.9	236.6	222.3	183.5	99.4	32.5	4.7	0.1	890.2
Rainy days	0.0	0.1	0.4	2.7	10.0	18.8	19.5	16.0	10.5	3.5	1.0	0.2	82.7

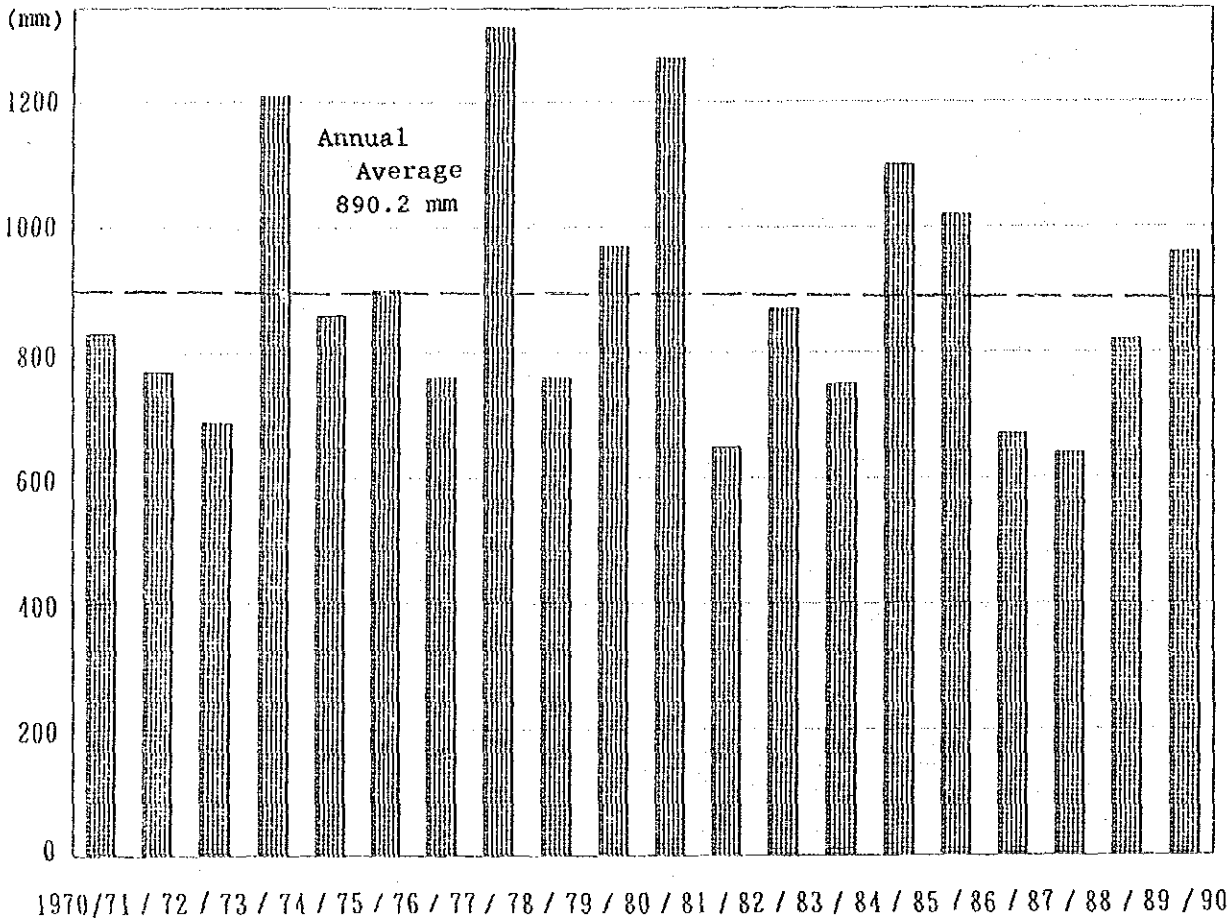
6 MONTHLY RAINY DAYS AT KABWE STATION (1970 - 1990)

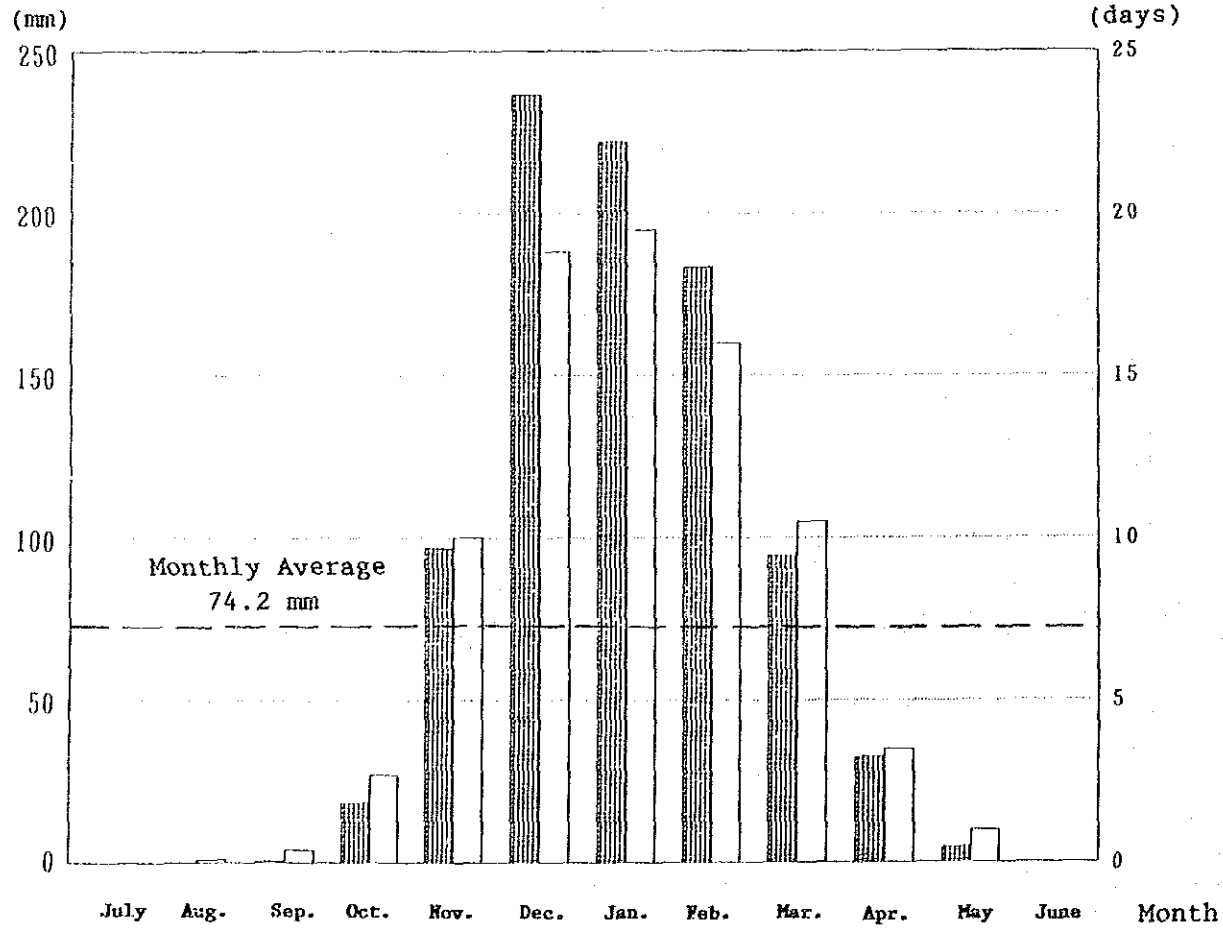
(Unit:days)

	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Annual
1970／71	0	0	0	4	16	14	23	14	4	2	0	0	77
1971／72	0	0	1	2	13	18	23	14	11	4	0	0	86
1972／73	0	0	0	5	6	12	20	15	3	3	0	0	64
1973／74	0	0	1	3	14	22	24	21	11	2	6	0	104
1974／75	0	0	0	0	10	26	16	13	10	3	1	0	79
1975／76	0	0	0	0	7	20	20	21	16	4	3	0	91
1976／77	0	0	1	2	6	23	12	18	18	1	0	0	81
1977／78	0	1	1	0	11	25	25	22	19	9	2	0	115
1978／79	0	0	0	6	10	25	11	9	12	1	0	0	74
1979／80	0	0	0	4	17	17	10	19	13	7	0	0	87
1980／81	0	0	3	5	13	19	24	19	10	4	0	0	97
1981／82	0	0	0	0	11	9	26	20	3	2	2	0	73
1982／83	0	0	0	3	14	11	19	12	7	2	1	0	69
1983／84	0	0	0	3	10	18	10	17	14	4	0	0	76
1984／85	0	0	0	0	13	26	21	15	12	5	2	0	94
1985／86	0	0	0	3	5	24	23	12	13	9	0	0	89
1986／87	0	0	0	6	5	15	18	7	7	0	1	0	59
1987／88	0	0	1	1	8	20	16	18	14	3	0	3	84
1988／89	0	0	0	4	4	17	26	24	7	2	0	0	84
1989／90	0	0	0	2	7	15	24	10	7	4	1	0	70
Average	0	0.1	0.4	2.7	10.0	18.8	19.5	16.0	10.5	3.5	1.0	0.2	82.7

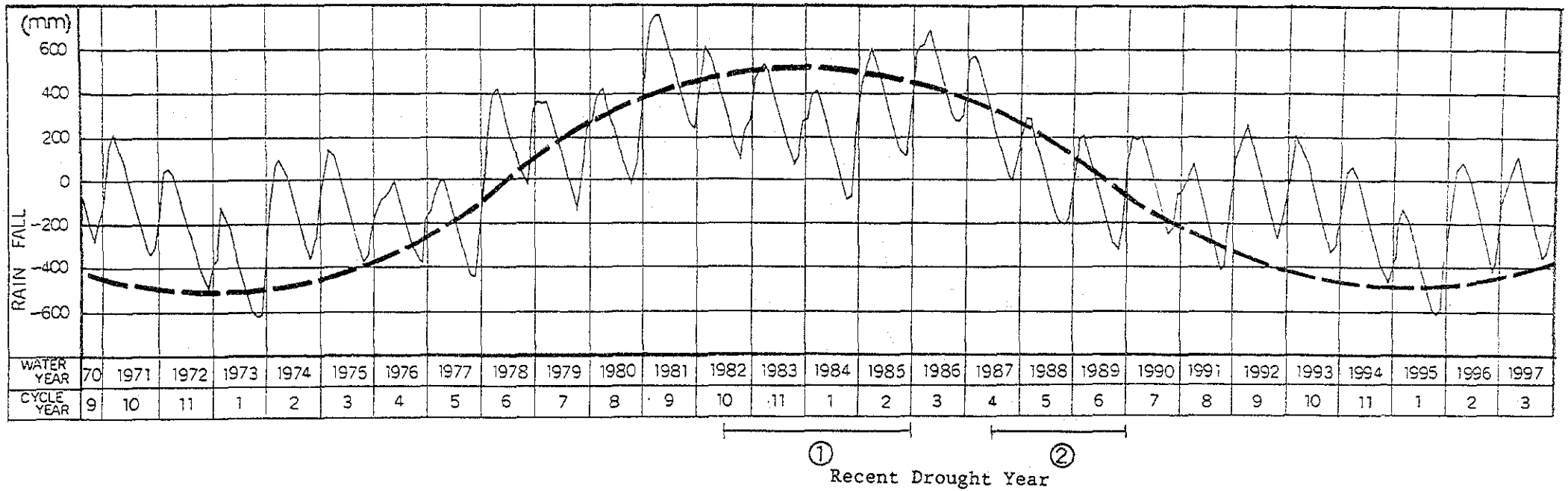

7 MONTHLY PRECIPITATION AND RAINY DAYS, AT KABWE, CENTRAL PROVINCE (1970 - 1990)
(mm)
(days)
1970/1971
1971/1972
1972/1973
1973/1974
1974/1975
1975/1976
1976/1977
1977/1978
1978/1979
1979/1980
1980/1981
1981/1982
1982/1983
1983/1984
1984/1985
1985/1986
1986/1987
1987/1988
1988/1989
1989/1990

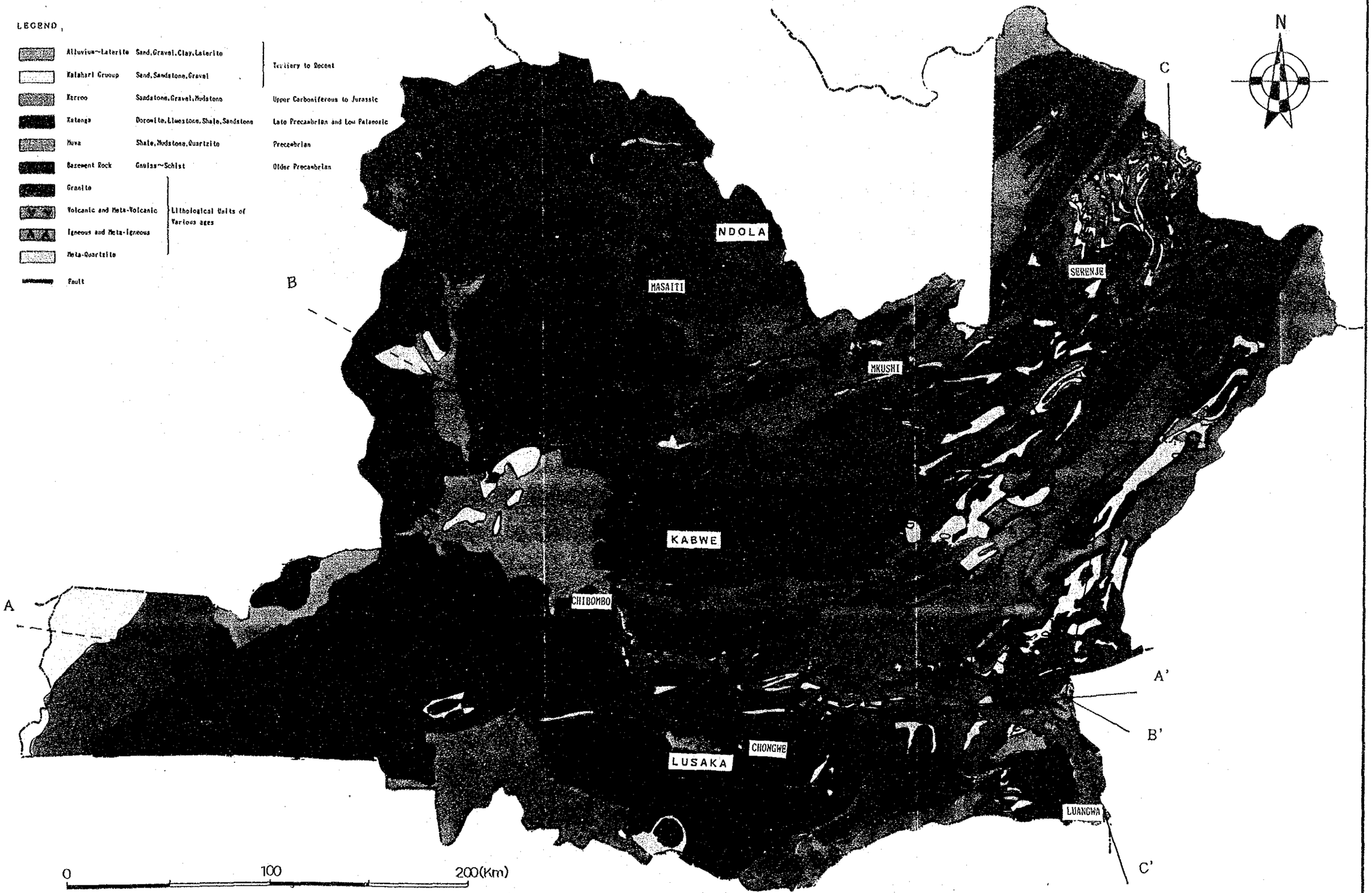
8 ANNUAL PRECIPITATION AT KABWE, CENTRAL PROVINCE (1970 - 1990)
AND MONTHLY PRECIPITATION & RAINY DAYS (1970 - 1990)



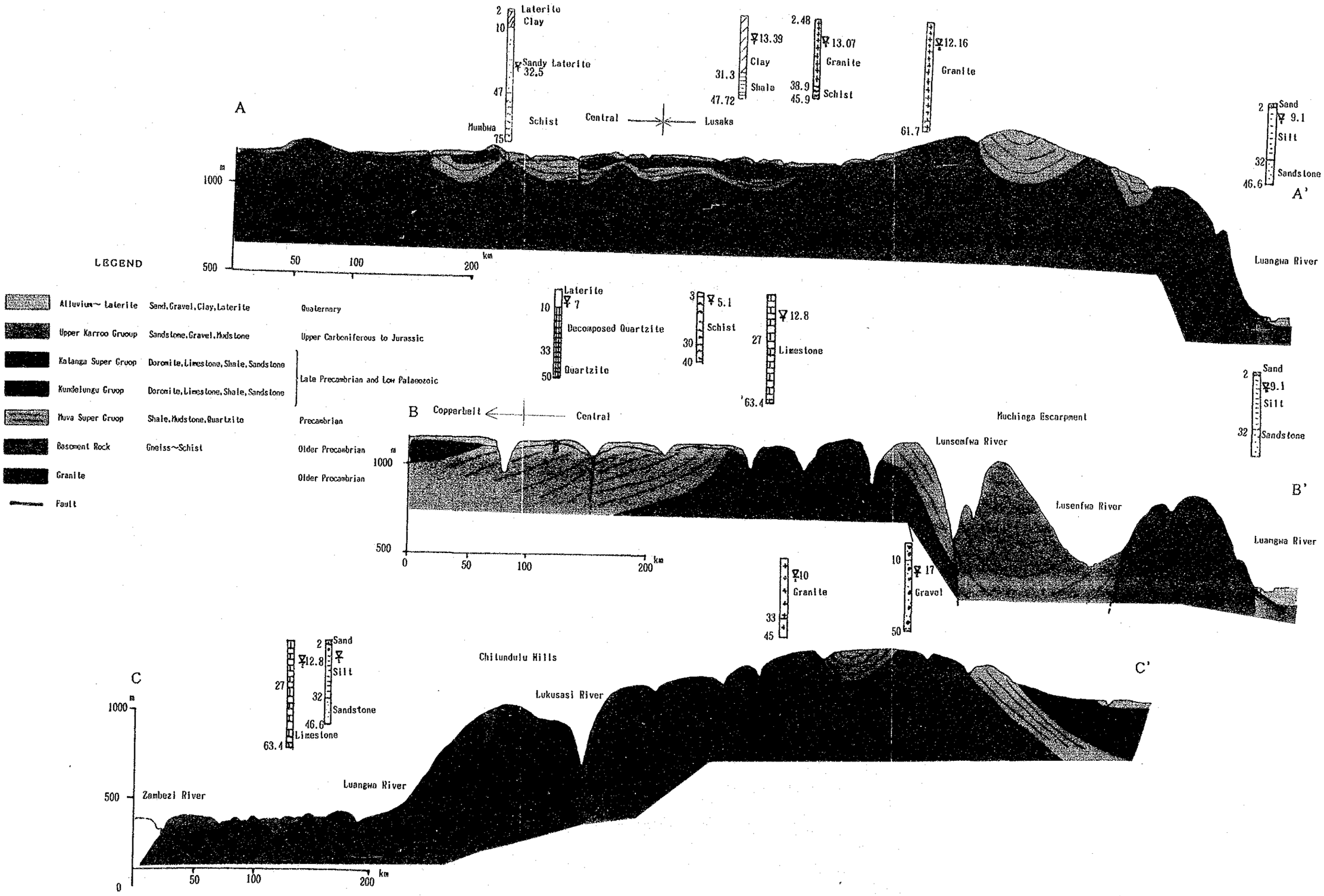


9 A LONG RANGE PRECIPITATION CYCLE AT KABWE, CENTRAL PROVINCE (1971-1997)

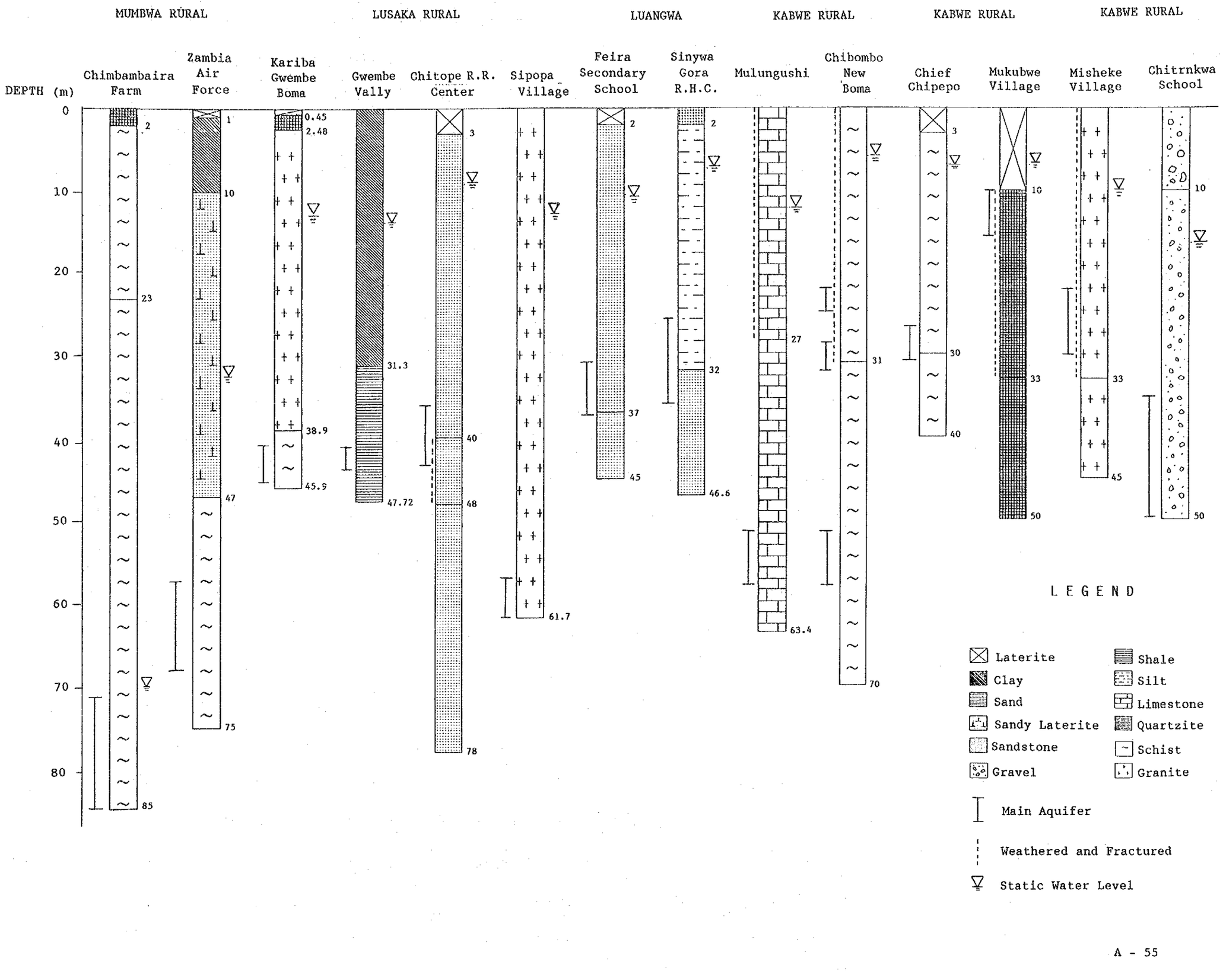


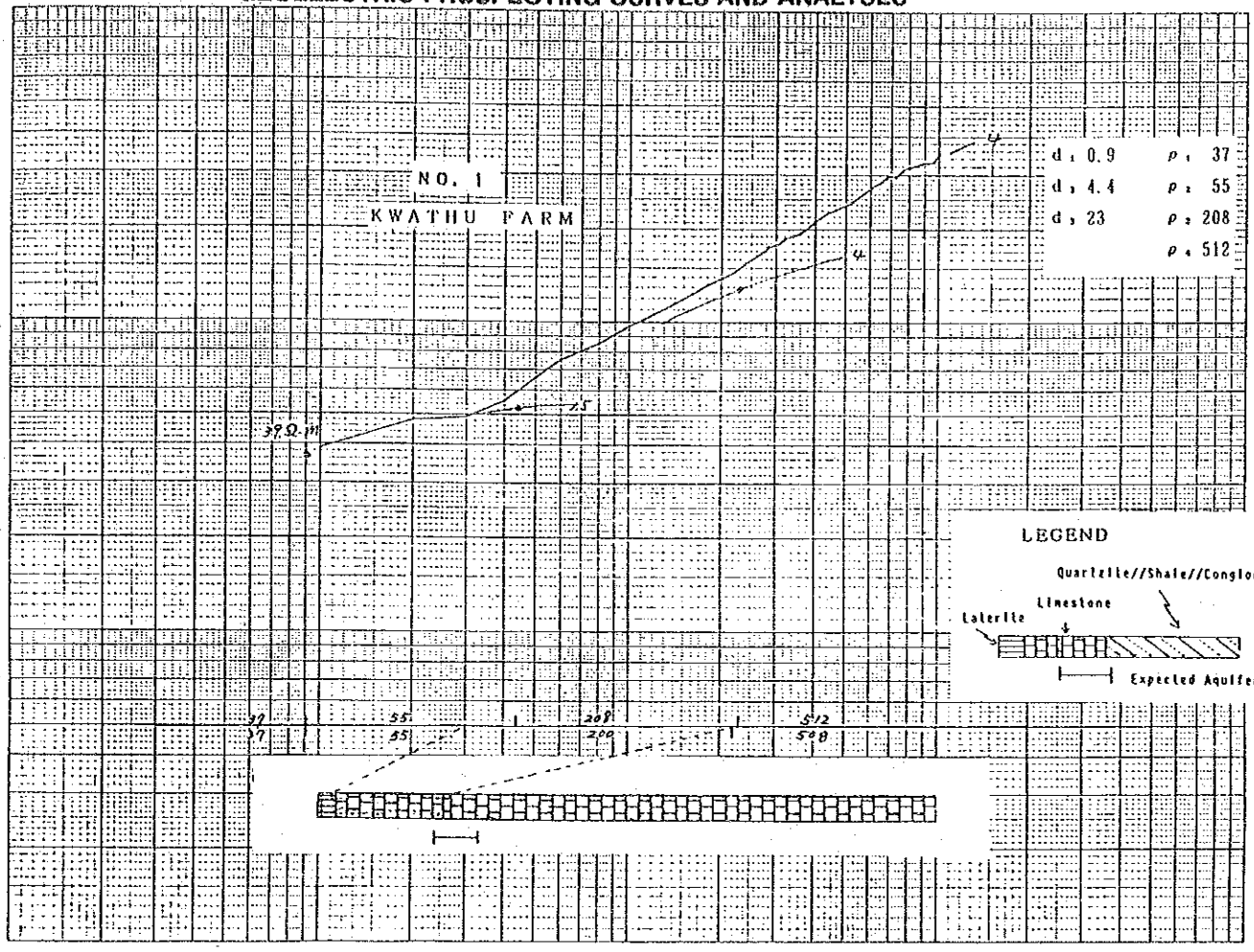

LEGEND
Alluvium~Laterite
Sand, Gravel, Clay, Laterite
Kalahari Group
Sand, Sandstone, Gravel
Karroo
Sandstone, Gravel, Mudstone
Katanga
Dolomite, Limestone, Shale, Sandstone
Muva
Shale, Mudstone, Quartzite
Basement Rock
Gneiss~Schist
Granite
Volcanic and Meta-Volcanic
Igneous and Meta-Igneous
Meta-Quartzite
Fault
Tertiary to Recent
Upper Carboniferous to Jurassic
Late Precambrian and Low Palaeozoic
Precambrian
Older Precambrian
Lithological Units of Various ages
N
A
B
C
A'
B'
C'
NDOLA
MASAITI
MKUSHI
SERENJE
KABWE
CHIBOMBO
LUSAKA
CHONGWE
LUANGWA
0
100
200(Km)

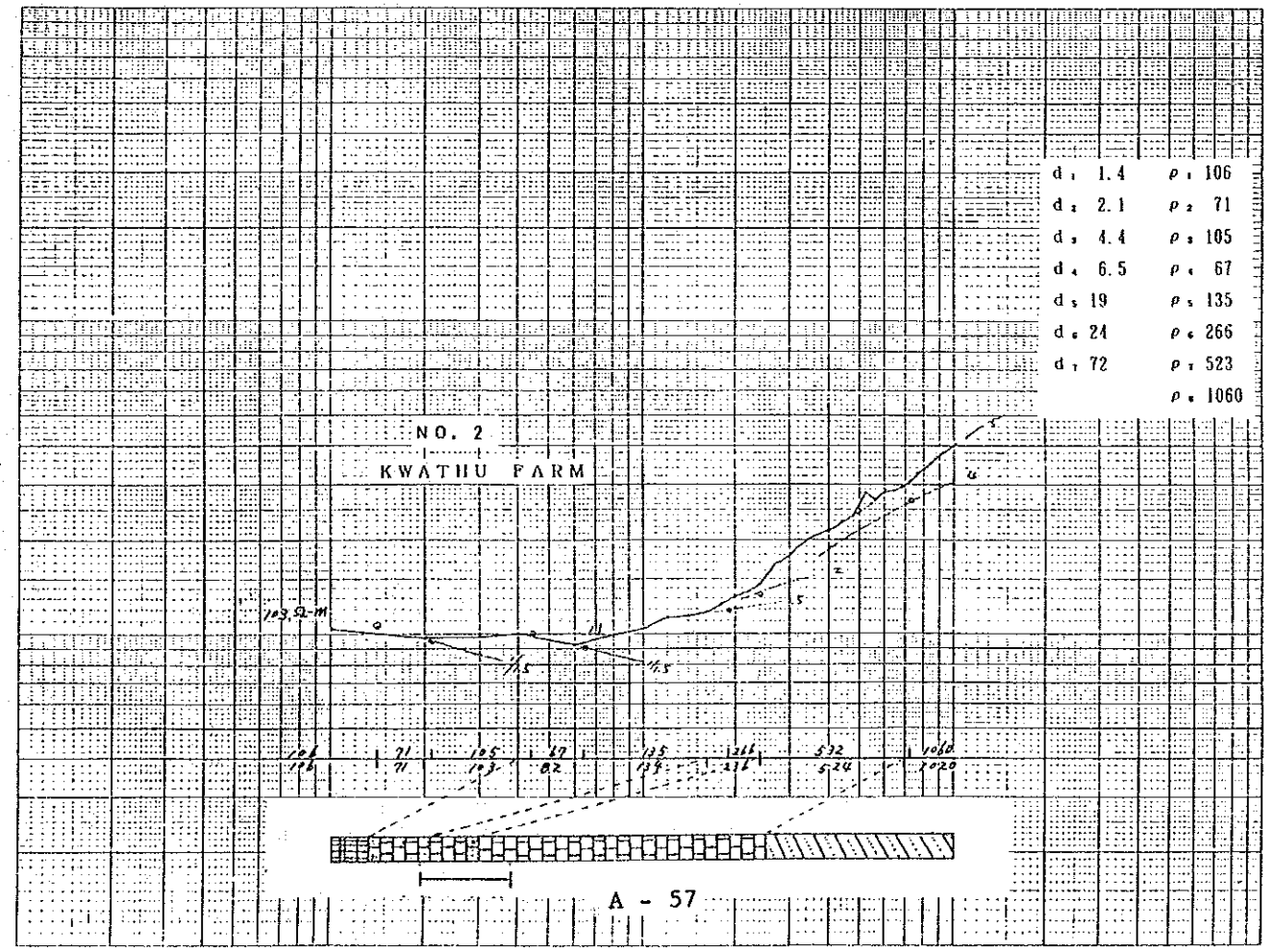
11 HYDROGEOLOGICAL FEATURES IN PROJECT AREA :SECTIONAL VIEW

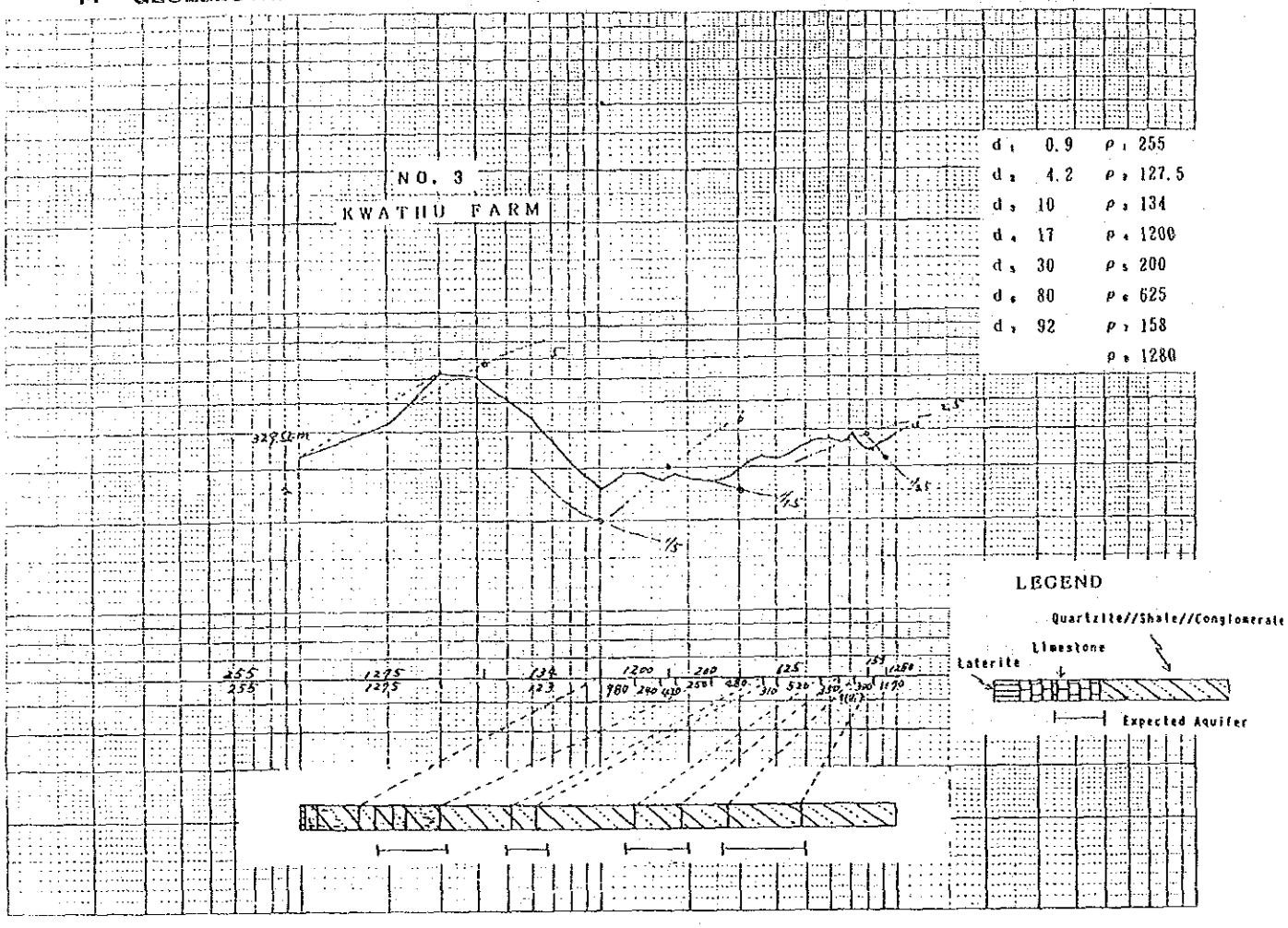


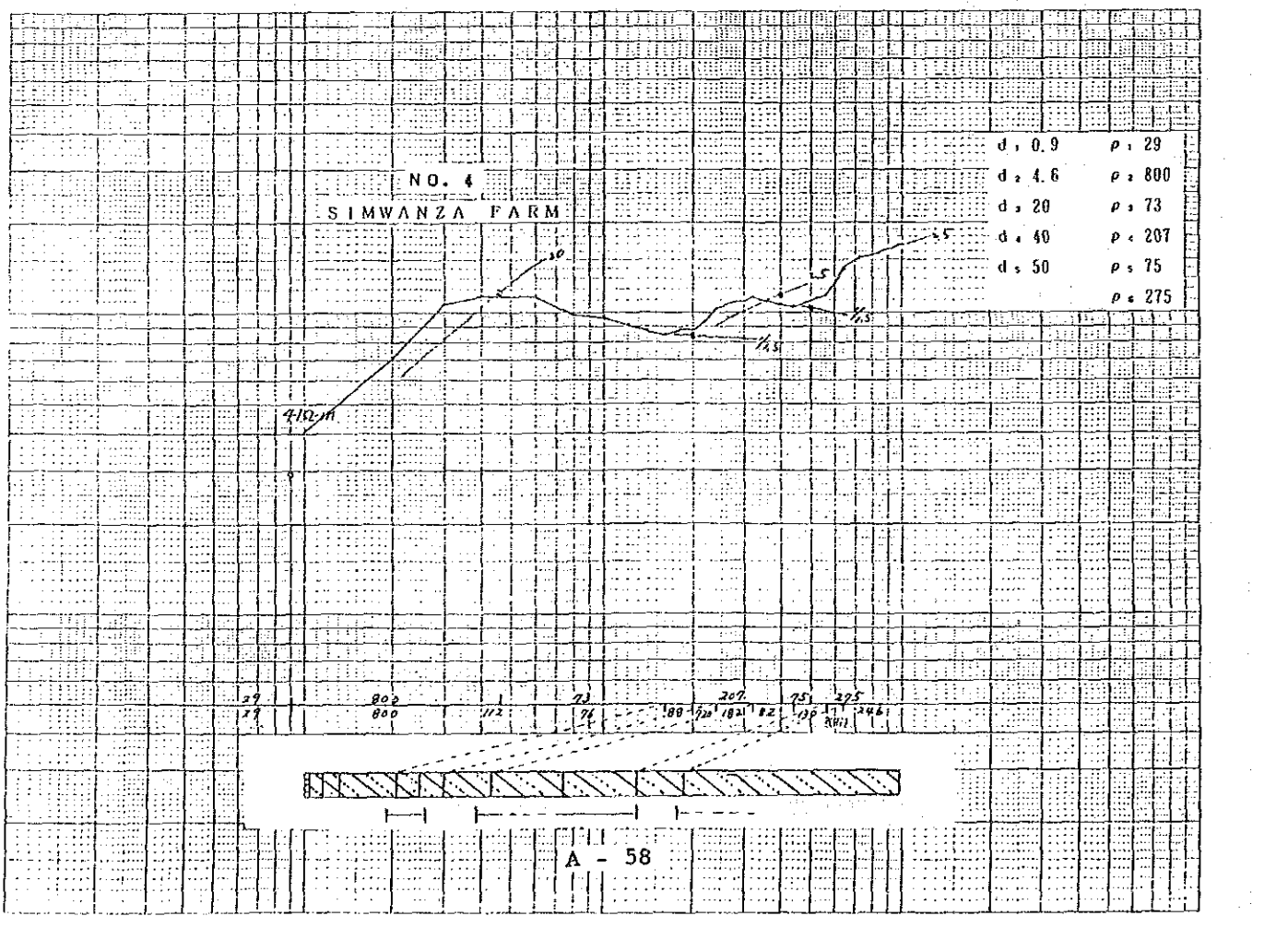
LITHOLOGY OF BOREHOLES IN THE PROJECT AREA



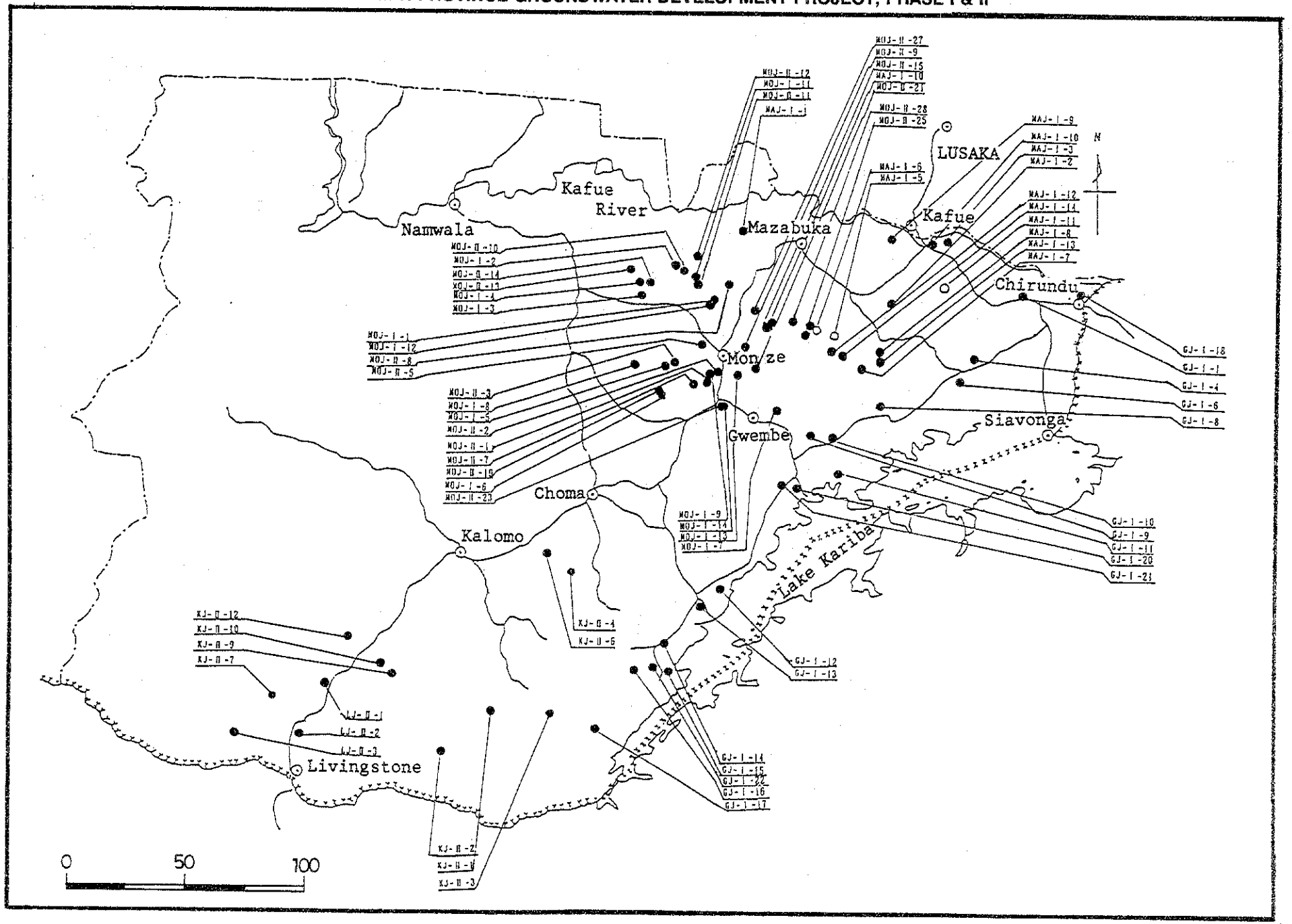

NO. 1
KWATHU FARM
d₁ 0.9 ρ₁ 37
d₂ 4.4 ρ₂ 55
d₃ 23 ρ₃ 208
ρ₄ 512
37 Ω-m
LEGEND
Quartzite//Shale//Conglomerate
Limestone
Laterite
Expected Aquifer

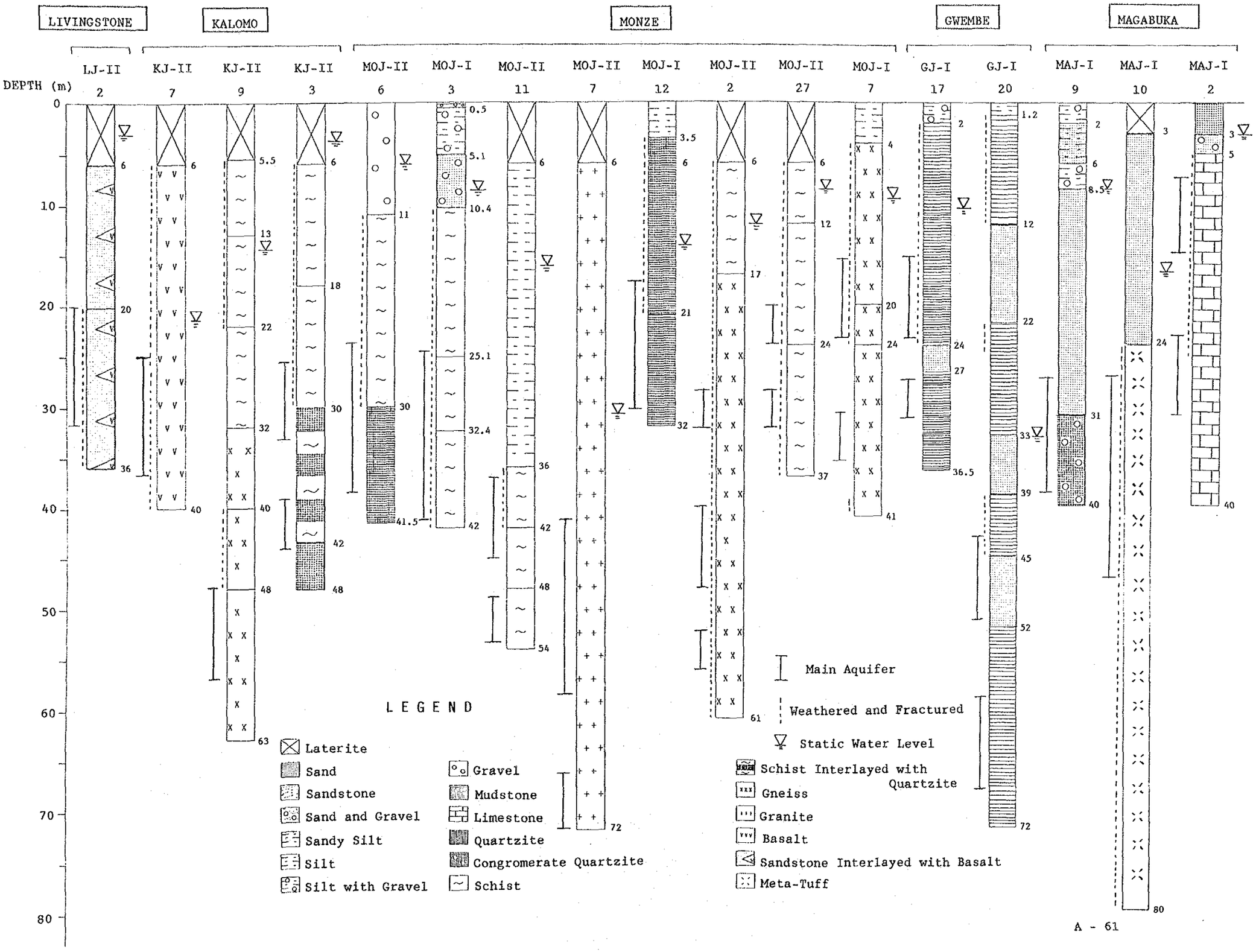

NO. 2
KWATHU FARM
d₁ 1.4 ρ₁ 106
d₂ 2.1 ρ₂ 71
d₃ 4.4 ρ₃ 105
d₄ 6.5 ρ₄ 67
d₅ 19 ρ₅ 135
d₆ 24 ρ₆ 266
d₇ 72 ρ₇ 523
ρ₈ 1060
103 Ω-m


NO. 3
KWATHU FARM
d₁ 0.9 ρ₁ 255
d₂ 4.2 ρ₂ 127.5
d₃ 10 ρ₃ 134
d₄ 17 ρ₄ 1200
d₅ 30 ρ₅ 200
d₆ 80 ρ₆ 625
d₇ 92 ρ₇ 158
ρ₈ 1280
LEGEND
Quartzite//Shale//Conglomerate
Limestone
Laterite
Expected Aquifer


NO. 4
SIMWANZA FARM
d₁ 0.9 ρ₁ 29
d₂ 4.6 ρ₂ 800
d₃ 20 ρ₃ 73
d₄ 40 ρ₄ 207
d₅ 50 ρ₅ 75
ρ₆ 275

15 LOCATION MAP OF BOREHOLES SOUTHERN PROVINCE GROUNDWATER DEVELOPMENT PROJECT, PHASE I & II




LIVINGSTONE
KALOMO
MONZE
GWEMBE
MAGABUKA
LJ-II
KJ-II
KJ-II
KJ-II
MOJ-II
MOJ-I
MOJ-II
MOJ-II
MOJ-I
MOJ-II
MOJ-II
MOJ-I
GJ-I
GJ-I
MAJ-I
MAJ-I
MAJ-I
DEPTH (m)
2
7
9
3
6
3
11
7
12
2
27
7
17
20
9
10
2
0
10
20
30
40
50
60
70
80
6
20
36
40
6
13
22
32
40
48
63
5.5
6
18
30
42
48
11
30
41.5
0.5
5.1
10.4
25.1
32.4
42
6
36
42
48
54
6
17
3.5
6
21
32
6
12
24
37
41
6
17
20
24
61
4
2
6
24
27
36.5
1.2
12
22
33
39
45
52
72
2
6
8.5
31
40
3
24
3
5
40
80
LEGEND
Laterite
Sand
Sandstone
Sand and Gravel
Sandy Silt
Silt
Silt with Gravel
Gravel
Mudstone
Limestone
Quartzite
Congromerate Quartzite
Schist
Main Aquifer
Weathered and Fractured
Static Water Level
Schist Interlayed with Quartzite
Gneiss
Granite
Basalt
Sandstone Interlayed with Basalt
Meta-Tuff

17 HYDROGEOLOGICAL EVALUATION OF JAPANESE PROJECT IN SOUTHERN PROVINCE (1)

Division	Borehole No.	Drilling Year	Well Dia. (mm)	Total Depth (m)	Pumping Rate l/min	S.W.L. (m)	P.W.L. (m)	Drow Down (m)	Spcific Capcity m³/d/m	Screen Depth (m)	Aquifer	Laterite (m)
MONZE	MOJ-I-1	1987	100	70.0	DRY						Mudstone	3.5
	MOJ-I-2	1987	150	78.5	6.3	5.0	36.3	31.3	0.29	13～16 25～28 34～37 40～43 49～58	Schist	0.3
	MOJ-I-3	1987	100	42.0	25	8.0	23.1	15.1	1.66	25～41	Schist	10
	MOJ-I-4	1987	100	40.0	43	10.0	21.8	11.8	5.24	23～29	Schist	1
	MOJ-I-5	1987	100	36.0	33	9.4	21.6	12.2	3.89	23～35	Schist	3
	MOJ-I-6	1985	100	40.0	43	3.6	22.1	17.5	3.36	15～19 23～35	Gneiss	3
	MOJ-I-7	1986	100	40.5	36	9.4	23.3	13.9	3.74	16～24 32～36	Gneiss	4
	MOJ-I-8	1986	100	32.0	11	3.1	20.9	17.8	0.89	7～19	Sand, Schist	9
	MOJ-I-9	1986	100	52.5	50	4.3	31.1	26.8	2.7	8～12 32～44	Schist	3
	MOJ-I-10	1987	150	42.0	47	6.5	22.3	15.8	4.29	15～21 27～36	Schist	0
	MOJ-I-11	1987	100	60.5	20	12.1	20.8	8.7	3.31	40～60	Schist	4
	MOJ-I-12	1987	100	31.0	150	14.1	21.6	7.5	28.8	18～30	Schist	4
	MOJ-I-13	1987	100	40.5	25	12.8	20.5	7.7	4.81	24～40	Gneiss	3
	MOJ-I-14	1987	100	40.5	200	1.2	12.1	10.9	26.41	32～40	Schist～Gneiss	3

17 HYDROGEOLOGICAL EVALUATION OF JAPANESE PROJECT IN SOUTHERN PROVINCE (2)

Division	Borehole No.	Drilling Year	Well Dia. (mm)	Total Depth (m)	Pumping Rate l/min	S.W.L. (m)	P.W.L. (m)	Drow Down (m)	Spcific Capcity m³/d/m	Screen Depth (m)	Aquifer	Laterite (m)
MONZE	MOJ-II-1	1989	100	49.0	18	6.2	31.6	25.4	1.02	16～25 36～44	Schist	2
	MOJ-II-2	1989	100	61.0	33	11.3	32.5	21.2	2.24	28～32 40～48 52～56	Schist	5
	MOJ-II-3	1989	150	43.0	72	10.1	11.4	1.3	79.75	14～18 30～43	Quartzite	3
	MOJ-II-4	1990	100	32.5	12	3.0	26.8	23.8	0.72	15～26 31～36	Schist	5
	MOJ-II-5	1990	100	40.0	35	5.7	20.1	14.4	3.5	29～41	Schist	6
	MOJ-II-7	1990	100	72.0	6.7	30.5	40.3	9.8	0.98	42～58 66～72	Granite	6
	MOJ-II-8	1990	100	57.5	15	18.4	31.2	12.8	1.69	24～28 32～36 40～48	Schist	12
	MOJ-II-9	1989	100	78.0	DRY						Granite	3
	MOJ-II-10	1990	100	37.0	54	6.6	14.8	8.2	10.8	20～32	Schist	5
	MOJ-II-11	1989	100	54.0	20	15.3	37.0	21.7	1.33	37～45 49～53	Schist	6
	MOJ-II-12	1989	100	43.0	38	12.7	26.5	13.8	3.97	32～44	Silt	6
	MOJ-II-13	1990	100	60.0	17	13.4	36.9	23.5	1.04	35～54	Quartzite	6
	MOJ-II-14	1990	100	48.0	32	21.8	24.2	2.6	17.7	26～31 35～44	Schist	6
	MOJ-II-15	1990	100	60.0	DRY						Schist	10

17 HYDROGEOLOGICAL EVALUATION OF JAPANESE PROJECT IN SOUTHERN PROVINCE (3)

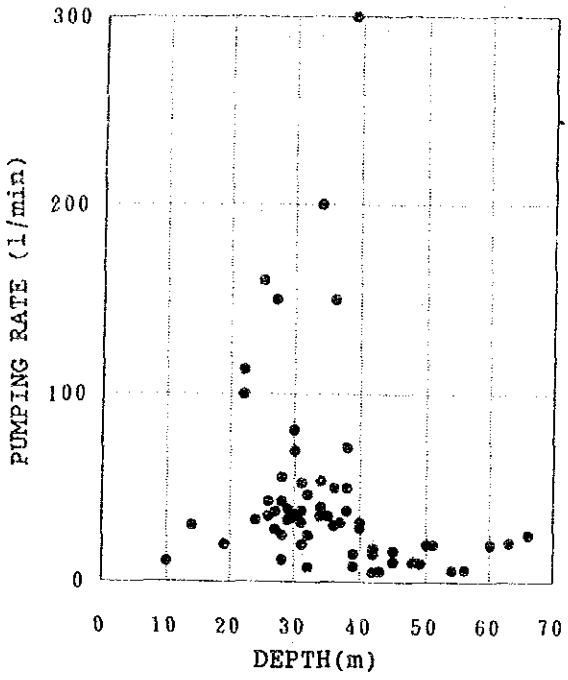
Division	Borehole No.	Drilling Year	Well Dia. (mm)	Total Depth (m)	Pumping Rate l/min	S.W.L. (m)	P.W.L. (m)	Drow Down (m)	Spcific Capcity m³/d/m	Screen Depth (m)	Aquifer	Laterite (m)
MONZE	MOJ-H-19	1990	100	50.0	11	7.9	19.1	9.2	1.72	26~34 38~46	Schist	10
	MOJ-H-21	1990	100	39.5	38	12.7	26.5	13.8	3.96	15~23 26~35	Schist	15
	MOJ-H-23	1989	100	37.0	35	5.6	12.8	7.2	7.00	20~32	Schist	7
	MOJ-H-25	1989	100	57.0	30	21.4	30.7	9.3	4.65	24~40	Schist	10
	MOJ-H-27	1989	100	37.5	100	8.7	8.8	0.1	1440	20~24 28~32	Schist Quartzite	6
	MOJ-H-28	1989	100	40.0	30	2.4	28.8	26.4	1.64	8~20	Schist	4
GWEMBE	GJ-I-1	1987	100	78.0	DRY						Shale	6
	GJ-I-4	1987	100	79.0	DRY						Shale	3
	GJ-I-6	1987	100	70.0	21	7.0	28.6	21.6	1.40	18~25 57~69	Shale	3 9
	GJ-I-8	1986	100	60.0	6	8.5	45.3	37.2	0.23	35~31	Mudstone	0.9
	GJ-I-9	1986	100	60.0	10	13.9	20.9	7.0	2.1	23~31 43~55	Mudstone	2
	GJ-I-10	1986	100	56.0	8	3.5	43.7	40.2	0.29	27~43	Mudstone	0.5
	GJ-I-11	1986	100	72.5	25	40.06	40.13	0.07	514	60~72	Mudstone	2
	GJ-I-12	1986	100	45.0	40	10.1	13.4	3.3	17.4	20~24 28~40	Sandstone Mudstone	2
	GJ-I-13	1986	100	40.5	50	9.2	12.9	3.7	19.4	32~44	Mudstone	6

17 HYDROGEOLOGICAL EVALUATION OF JAPANESE PROJECT IN SOUTHERN PROVINCE (4)

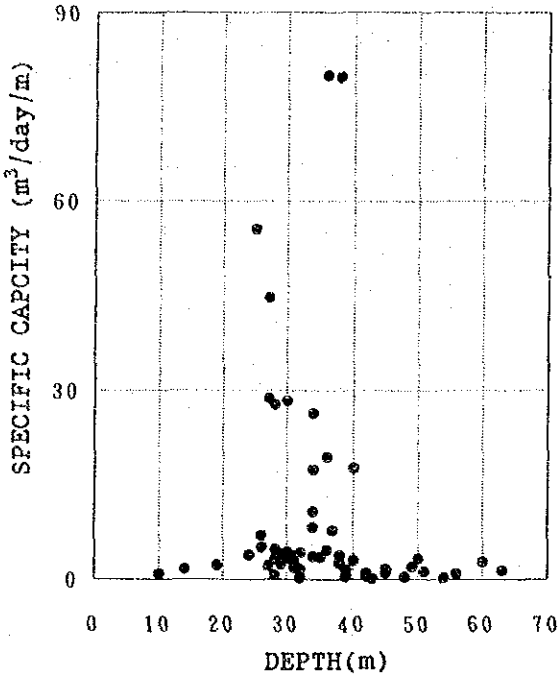
Division	Borehole No.	Drilling Year	Well Dia. (mm)	Total Depth (m)	Pumping Rate l/min	S.W.L. (m)	P.W.L. (m)	Drow Down (m)	Spcific Capcity m³/d/m	Screen Depth (m)	Aquifer	Laterite (m)
GWEMBE	GJ-I-14	1986	100	36.5	70	9.2	12.7	3.6	28.4	16~20 29~32	Shale	0
	GJ-I-15	1986	100	82.0	15	8.3	28.5	20.2	1.1	34~60	Sandstone Shale Mudstone	6
	GJ-I-16	1986	100	40.5	35	8.8	21.2	12.4	3.7	12~16 28~36	Sand, Gravel Sandstone	12
	GJ-I-17	1986	100	36.5	160	11.3	15.4	4.1	55.7	16~29 28~32	Mudstone	2
	GJ-I-18	1986	100	79.0	DRY						Mudstone	0.5
	GJ-I-20	1986	100	72.0	20	32.9	43.2	10.3	2.8	43~51 59~67	Mudstone Sandstone	1.2
	GJ-I-21	1987	100	48.0	150	29.3	32.0	2.7	80.1	31~43 32~36	Sandstone	0.5
	GJ-I-22	1986	150	48.0	300	4.9	6.7	1.8	235	36~45	Sandstone	0.3
MAZABUKA	MAJ-I-2	1987	100	40.0	37.5	2.9	27.9	25.0	2.16	7~16 23~31	Limestone	5
	MAJ-I-3	1987	100	73.0	DRY						Gneiss	0
	MAJ-I-5	1987	100	36.0	39	6.6	20.6	14.0	4.02	23~35	Quartzite	3
	MAJ-I-6	1987	100	36.0	20	5.3	16.9	10.6	2.48	23~35	Schist	3
	MAJ-I-7	1987	100	37.0	113	20.3	21.4	1.0	160	20~32	Gneiss	3
	MAJ-I-8	1987	100	73.0	DRY						Gneiss	3
	MAJ-I-9	1987	100	40.0	53	8.4	35.3	26.9	2.84	27~39	Quartzite	8.5

17 HYDROGEOLOGICAL EVALUATION OF JAPANESE PROJECT IN SOUTHERN PROVINCE (5)

Division	Borehole No.	Drill-ing Year	Well Dia. (mm)	Total Depth (m)	Pumping Rate l/min	S.W.L. (m)	P.W.L. (m)	Drow Down (m)	Spcific Capcity m³/d/m	Screen Depth (m)	Aquifer	Laterite (m)
MAZABUKA	MAJ-I-10	1987	100	79.5	5.6	16.9	31.1	14.2	0.56	27~47	Meta-Basalt	3
	MAJ-I-11	1987	100	40.0	32	9.2	33.0	23.8	1.93	23~39	Graniticgneiss	0
	MAJ-I-12	1987	100	68.5	—	1.5	—	—	—	15~35	Schist	2
	MAJ-I-13	1987	100	33.5	20	4.3	17.1	12.7	2.26	9~21	Gneiss	3
	MAJ-I-14	1987	100	70.0	DRY						Gneiss	0.5
KALOMO	KJ-II-1	1990	100	61.5	DRY						Granite	6
	KJ-II-2	1990	100	60.0	8.7	23.2	45.4	22.2	0.564	29~48	Quartzite	6
	KJ-II-3	1990	100	48.0	29	4.0	17.7	13.7	3.05	26~34 37~43	Schist Quartzite	7
	KJ-II-4	1990	100	42.0	35	4.0	10.2	6.2	8.13	26~38	Schist	6
	KJ-II-6	1990	100	41.5	81	6.0	32.2	26.2	4.45	24~38	Schist Quartzite	12
	KJ-II-7	1990	100	30.0	56	3.4	6.3	2.9	27.8	24~32	Basalt	6
	KJ-II-9	1990	100	63.0	11	13.6	51.9	38.3	0.414	48~57	Schist~Gneiss	6
	KJ-II-10	1990	100	61.5	DRY						Graniticgneiss	6
	KJ-II-12	1990	100	42.0	32	10.9	16.8	5.9	7.81	26~57	Schist~Gneiss	6
LIVING-STONE	LJ-II-1	1990	100	60.0	DRY						Silt	6
	LJ-II-2	1999	100	36.0	28	21.3	22.2	0.9	44.8	21~32	Sandstone Basa	6
	LJ-II-3	1990	100	60.0	DRY						Silt	8

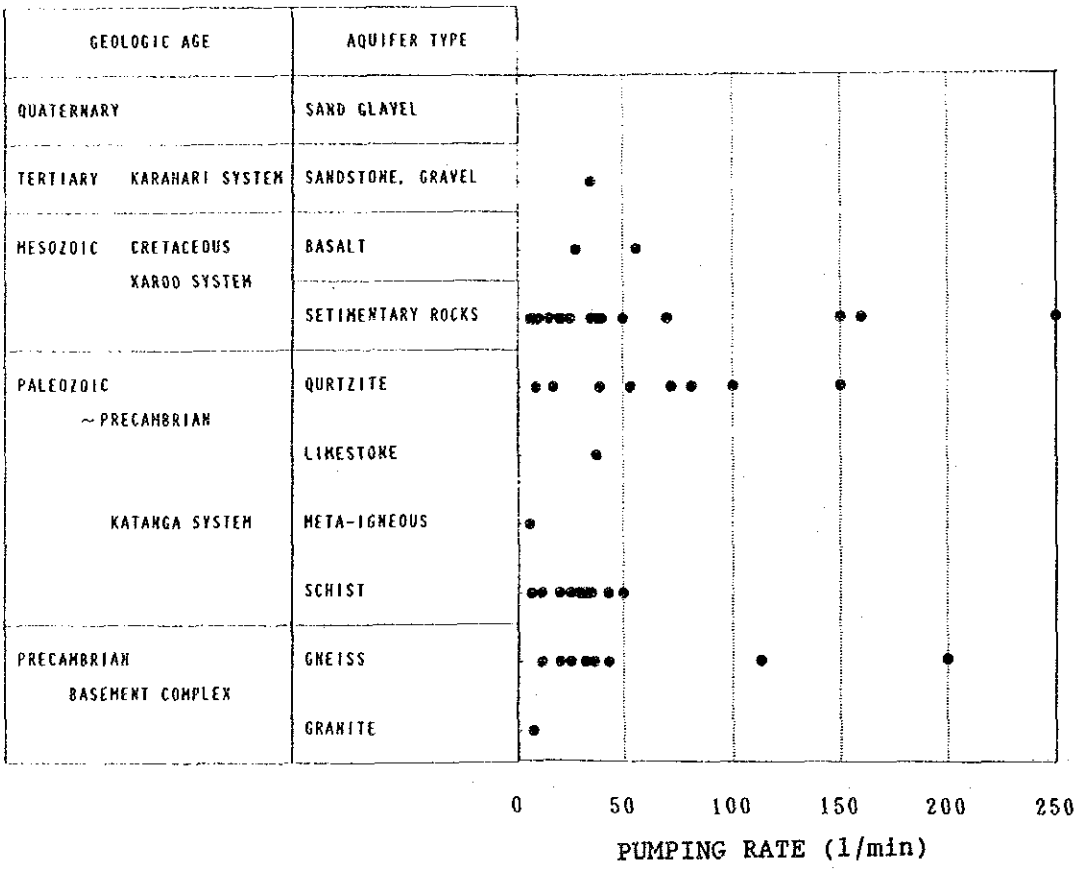


18 GRAPHSHOWING RELATIONS BETWEEN PUMPING RATE AND AQUIFER DEPTHS



19 GRAPH SHOWING RELATIONS BETWEEN SPECIFIC CAPACITY AND AQUIFER DEPTHS

(SOURCE: SOUTHERN PROVINCE GROUNDWATER DEVELOPMENT PROJECT, PHASES I & II)



20 GRAPH SHOWING RELATIONS BETWEEN AQUIFER AND PUMPING RATE
(SOURCE: SOUTHERN PROVINCE GROUNDWATER DEVELOPMENT PROJECT, PHASES I & II)