LAND RESOURCES OF BIHARAMULO DISTRICT, KAGERA REGION, TANZANIA

Volume 2, Appendices

A.P. Oosterom, J.A. Ngailo, R.O. Kileo, J.D.J. Mbogoni, A.S. Msangi, W. Andriesse and A.J. van Kekem

International Activities Report 75

DLO Winand Staring Centre, Wageningen (The Netherlands), 1999

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Land Resources of Biharamulo District, Kagera Region, Tanzania

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ABSTRACT

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A reconnaissance-level land resources inventory has been carried out between June and September 1996, of the Biharamulo District in the Kagera Region, Tanzania. The report contains information on the district land resources (rock types, landforms, climate and soils), the present land use (including settlement history, administrative divisions and agro-economic land-use zones and an agro-ecological framework) and an assessment of the district's land suitability for various crops, livestock rearing and wood production. Further, the report discusses the district's potential for agricultural expansion and land-use optimization. This volume contains detailed technical information including climatic data, soil profile descriptions and analytical data and a description of the fertility evaluation system applied in this study.

Key words: land resources inventory, land suitability, land use, soil data base, Kagera District, Tanzania.

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APPENDIX I CLIMATIC DATA

I.1 RAINFALL DATA

There are eight registered meteorological stations in Biharamulo district. Only one of them (Biharamulo meteorological station) has a reasonably long and continuous record of rainfall data. Rainfall data from three stations (Buzirayombo, Lusahunga and Nyakahura) could not be made available for this survey, while at the remaining four (Nyabugombo, Nyamirembe, Runazi and Bwanga) many records are incomplete. All rainfall data are expressed in mm.

BIHARAMULO METEOROLOGIC STATION

(92.31000; Lat. 2° 58'; Long. 31° 19'; Alt. 4850ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1921			34	38	0	0	19	64	123	28	93		
1922	72	75	149	194	55	0	0						
1923	0	170	156	220	170	0	0	0	27	35	28	155	1061
1924	181	100	88	278	34	1	16	12	49	61	72	0	892
1925	140	110	209	40	114	65	0	39	35	33	156	124	1064
1926	82	110	112	216	28	4	27	18	31	119	140	127	1014
1927	90	115	205	147	86	5	0	10	48	77	84	152	1018
1928	55	116	75	187	111	0	12	3	23	30	57	98	765
1929	115	43	132	199	83	0	50	12	47	134	88	125	1027
1930	92	110	215	336	60	26	1	25	32	55	113	105	1170
1931	67	77	217	202	62	4	1	8	14	54	91	180	976
1932	38	95	295	194	54	0	0	0	87	58	152	113	1086
1933	185	92	144	47	53	15	4	37	30	22	29	64	722
1934	78	50	154	176	40	1	1	50	25	166	157	148	1047
1935	47	121	92	133	63	57	0	66	21	70	151	105	927
1936	152	170	81	262	32	46	1	1	62	46	118	154	1126
1937	160	163	175	239	108	0	0	0	8	162	176	91	1281
1938	44	141	215	193	63	1	3	3	19	93	107	88	970
1939	129	94	238	337	29	0	0	10	47	13	89	68	1055
1940	124	186	96	204	197	2	0	0	24	71	143	66	1115
1941	105	266	130	99	74	2	0	13	13	67	130	80	979
1942	128	130	164	266	46	0	0	51	3	0	62	64	913
1943	48	86	131	123	40	1	0	21	44	42	110	69	714
1944	107	89	155	164	111	1	0	0	53	42	161	65	948
1945	58	68	77	137	162	27	2	44	19	36	101	56	787
1946	87	84	32	324	32	22	0	18	5	89	110	169	972
1947	124	113	126	171	70	15	4	0	21	63	43	100	851
1948	119	52	152	262	37	0	0	29	37	108	38	130	964
1949	88	60	27	136	31	0	24	18	28	37	90	123	663

BIHARAMULO METEOROLOGIC STATION (Cont'd)

1950	61	86	175	155	33	0	0	39	30	46	76	73	775
1951	104	196	261	321	46	30	0	15	33	92	220	281	1599
1952	33	110	149	118	158	0	0	14	24	94	67	41	809
1953	93	23	168	210	64	32	0	41	20	58	124	52	885
1954	96	89	98	252	154	3	0	4	13	50	53	149	960
1955	58	119	125	141	47	0	0	1	47	100	75	176	890
1956	72	58	146	218	113	0	0	25	56	62	154	104	1008
1957	127	156	175	316	114	11	0	17	5	72	104	108	1207
1958	25	52	208	189	49	1	0	36	64	59	109	79	871
1959	97	100	59	117	90	0	0	6	68	129	144	131	941
1960	132	96	191	96	9	8	0	20	23	38	119	34	766
1961	14	169	166	201	47	0	0	0	0	180	471	88	1335
1962	0	0	214	147	269	18	0	59	19	60	164	69	1019
1963	161	126	169	123	151	0	0	10	8	108	217	88	1161
1964	24	183	126	302	5	6	0	0	12	15	62	132	867
1965	23	85	227	122	48	0	0	5	38	23	160	73	805
1966	72	133	167	140	8	0	0	3	58	73	148	100	902
1967	44	86	95	127	202	11	0	1	36	55	168	60	884
1968	108	96	76	182	88	8	0	0	26	46	138	156	924
1969	177	188	154	45	98	6	0	0	45	90	107	151	1062
1970	176	0	152	266	57	2	14	8	55	0	106	106	943
1971	111	119	86	174	47	0	8	52	36	65	124	87	908
1972	139	124	130	158	116	43	0	18	128	86	122	167	1231
1973	112	117	86	0	0	0	0	41	81	73	122	93	724
1974	73	70	63	146	43	32	17	30	66	25	152	113	830
1975	68	173	165	150	64	6	2	35	137	107	74	112	1092
1976	39	102	74	96	37	12	3	13	15	33	96	102	624
1977	112	0	80	423	110	11	0	61	7	18	104	83	1008
1978	100	124	186	180	78	18	0	2	2	30	141	216	1076
1980	104	50	181	0	0	0	0	0	32	39	187	106	699
1981	83	72	223	172	155	0	0	11	24	96	69	67	970
1982	90	57	92	162	158	5	0	0	36	137	222	100	1058
1983	62	40	165	304	59	0	0	34	46	70	85	59	925
1984	102	64	40	163	20	0	9	46	25	44	196	122	832
1985	150	155	92	363	109	3	0	0	53	54	106	141	1226
1986	93	76	176	231	93	3	0	5	67	96	161	177	1176
1988	71	43	0	35									
1991	115	171	186	155	96	4	3	0	32	63	85	79	989
1992	38	97	52	207	140	2	0	0	34	85	84	125	864
1993	163	38	103	194	73	16	0	22	17	54	87	45	812
1994	78	35	106	168	71	14	20	15	20	59	148	116	848
Mean	92	101	140	182	78	9	3	18	36	67	122	107	950

BUZIRAYOMBO

(92.0009; Lat. 2° 45'; Long. 31° 50'; Alt. 3700ft)
No data available

LUSAHUNGA

(92.0008; Lat. 2° 54'; Long. 31° 17'; Alt. 4500ft)
No data available

NYABUGOMBO

(92.0005; Lat. 2° 36'; Long. 30° 58'; Alt. 4800ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean	69	92	118	177	81	5	1	11	29	50	102	90	825

(means over period 1951-1969)

NYAKAHURA

(92.0006; Lat. 2° 48'; Long. 31° 04'; Alt. 4700ft)
No data available

NYAMIREMBE

(92.0004; Lat. 2° 32'; Long. 31° 42'; Alt. 3750ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1952													790
1953													750
1954													650
1955													710
1956													800
1963													720
1964													850
1965													790
1966													850
1975													790
1976													700
1977													1070
1978													920
1980													830
Mean	55	90	100	170	75	1	1	10	40	70	110	80	802

RUNAZI

(92.0005/16; Lat. 2° 47'; Long. 31° 29'; Alt. 4600ft)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1967	41	50	66	216	101	8	3	25	40	73	225	161	1010
1970	141	71	170										
1971	94	165	49	230	59	7	27	17	49	68	47	149	960
1972	136	152	52	46	73	2	0	19	42	55	150	80	806
1973	117	97	50	71	99	0	0	0	102	71	87	103	795
1974	96	31	106	157	20	0	11	0	51				
1975	20	80	206	197	48	0	0	14	76	81	48	113	883
1976	34	136	50	99	107	0	11	25	5	40	173	105	785
1977	96	77	122	244	172	0	0	5	14	6	74	54	863
1979	90	129	134	103	91	7	0	0	0	0	90	43	687
1992	48	91	382	77	2	0	0	0	12	22	26	15	675
Mean	83	98	126	144	77	2	5	11	39	42	102	91	821

BWANGA

(92.000; Lat. 3° 01'; Long. 31° 44'; Alt. 1200m)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969		140	183	154	45	0	0	151					
1973	134	122	95	150	87	0	0	39	81	71	123	79	980
1975	68	164	143	148	59	5	2	5	137	107	75	111	1055
1976	39	102	76	101	41	13	4	11	17	34	101	105	643
1977	0	64	80	422	112	11	0	57	7	14	103	81	950
1978	82	217	184	146	54	9	8	32	33	94	94	154	1107
1979	93	124	138	180	78	18	0	2	2	30	141	215	1020
1980	86	53	189	39	109	1	0	3	21	37	176	117	831
1981	91	83	211	173	111	0	0	11	25	95	78	66	944
1982	112	61	55	178	164	5	0	1	58	140	234	99	1105
1983	61	50	184	285	62	0	0	37	47	114	87	70	995
1984	102	67	57	165	23	0	11	46	20	48	189	117	847
1985	153	131	147	344	67	3	0	0	53	54	113	124	1189
1986	78	76	165	258	102	3	0	3	59	80	161	174	1159
1987	187	118	197	166	48	12	0	4	90	58	175	110	1165
1988					35	2	41	21	48	130			
1990	6	157	240	141	0	0	20	47	105	106	155		
Mean	89	111	145	184	77	5	4	19	47	77	130	120	1008

Source: Meteorological Department Dar es Salaam

I.2 Other climatic data

Other climatic data used in this survey (temperature, humidity, sunshine, radiation and evapotranspiration) were obtained for four meteorological stations in and around the district (Biharamulo, Bukoba, Mwanza and Tabora). Source of these data is the FAO Agro-meteorological unit.

BIHARAMULO METEOROLOGIC STATION

(92.31000; Lat. 2° 58'; Long. 31° 19'; Alt. 4850ft; 15 yr record)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean maximum temperature (°C)	26.1	26.1	25.6	25.0	25.0	25.6	26.1	26.7	26.7	26.7	26.1	25.0	25.9
Mean minimum temperature (°C)	16.7	16.7	16.7	16.7	16.1	15.6	15.6	16.1	16.7	16.7	16.7	16.7	16.4
Relative humidity (%)	79	76	79	82	80	66	62	63	71	70	76	78	74
Wind run (km/day)	78	112	121	95	112	199	199	156	147	138	121	112	133
Sunshine (hr/day)	7.4	7.7	7.5	7.9	8.1	9.3	9.5	9.0	8.3	7.7	6.9	7.2	8.0
Radiation (MJ/m²/day)	20.5	21.6	21.2	21.1	20.1	20.9	21.6	22.0	21.1	21.5	19.8	19.8	21.0
ETo-Penman (mm/day)	3.9	4.2	4.1	3.9	3.7	4.3	4.6	4.6	4.5	4.4	4.0	3.8	

BUKOBA METEOROLOGIC STATION

(91.31002 ; Lat. 1° 20"; Long. 31° 49"; Alt. 1137m; 60 yr record)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean maximum temperature (°C)	26.7	26.7	26.6	26.1	25.9	26.1	25.7	25.7	26.1	26.3	26.3	26.4	26.2
Mean minimum temperature (°C)	16.0	16.2	16.3	16.7	16.8	16.0	15.2	15.4	16.7	15.2	16.4	16.1	16.1
Relative humidity (%)	89	88	89	89	89	87	86	89	85	92	88	88	88
Wind run (km/day)	86	86	86	104	130	164	147	130	86	86	86	86	106
Sunshine (hr/day)	5.9	5.9	6.0	5.9	5.5	5.1	7.9	5.8	5.5	5.3	5.1	5.3	5.8
Radiation (MJ/m²/day)	18.0	18.6	19.0	18.1	16.6	15.4	19.5	17.4	17.9	17.6	16.8	16.9	17.7
ETo-Penman (mm/day)	3.5	3.6	3.6	3.5	3.2	3.1	3.6	3.3	3.4	3.4	3.3	3.3	

TABORA OBSERVATORIUM

(95.32.000; Lat. 5° 02"; Long. 32° 49"; Alt. 1265m; 69 yr record)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean maximum temperature (°C)	27.6	28.1	28.0	27.7	27.8	27.9	28.2	29.4	31.0	32.1	30.7	28.0	28.9
Mean minimum temperature (°C)	17.4	17.5	17.4	17.3	16.3	14.8	14.6	15.8	17.6	18.9	18.8	17.7	17.0
Relative humidity (%)	76	75	76	76	69	61	55	51	49	48	56	72	64
Sunshine (hr/day)	6.7	6.9	7.3	8.0	9.0	10.0	10.6	10.0	9.5	9.2	8.2	7.0	8.5
Radiation (MJ/m²/day)	19.8	20.5	21.1	21.0	20.9	21.3	22.6	23.2	23.8	23.9	22.1	20.0	21.7
ETo-Penman (mm/day)	4.1	4.3	4.5	4.5	4.7	5.0	5.6	6.2	6.6	6.7	5.5	4.3	

MWANZA AIRPORT

(Lat. 2°28"; Long. 32°55"; Alt. 1140m; 13 yr record)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean maximum temperature (°C)	27.2	27.6	27.8	27.5	27.7	28.2	27.9	27.9	28.4	28.1	27.8	27.1	27.8
Mean minimum temperature (°C)	18.4	18.3	18.4	18.3	17.9	16.4	15.5	16.7	17.9	18.4	18.6	18.3	17.8
Relative humidity (%)	77	77	78	81	78	70	76	65	65	70	72	77	73
Wind run (km/day)	190	190	199	190	199	216	251	233	268	251	225	190	217
Sunshine (hr/day)	7.4	7.7	7.4	7.9	8.1	9.3	9.5	9.0	8.3	7.7	6.9	7.1	8.0
Radiation (MJ/m²/day)	20.4	21.6	21.2	21.1	20.1	20.9	21.6	22.0	21.1	21.5	19.8	19.8	21.0
ETo-Penman (mm/day)	4.3	4.6	4.5	4.3	4.2	4.6	4.9	5.0	5.3	5.0	4.6	4.2	

APPENDIX II SOIL PROFILE DESCRIPTIONS AND ANALYTICAL DATA

A total of 118 soil profiles were taken from soil profile pits. In addition, 38 composite samples (for soil fertility analysis) and 84 samples (from 10 soil profiles sampled at two to three different depths in triplicate) for physical characterization (pF analyses to determine the water holding capacity) were taken. Analyses were carried out by the soil laboratory of the NSS in Mlingano. Standard soil analysis that were carried out for all soil samples include:

Particle size distribution,
pH,
Electrical conductivity
Organic carbon,
Nitrogen,
Potassium,
Phosphorous,
Exchangeable bases
Exchangeable acidity,
Cation Exchange Capacity (CEC).

A summary of the analysis methods applied is given in Section II.1. The analytical data and the profile descriptions are given in Section II.3, preceded by a threefold index to the data given in Section II.2. These indices allow the user of this report to search for profile data by soil profile number, by landscape unit and by soil unit, respectively.

II.1 Analytical methods

Internationally-accepted methods and procedures for soil analysis were applied as per standard of the NSS (NSS, 1987). Bulk soil samples, collected in the field, were air-dried and passed through a 2 mm sieve. Determinations were done on the fine-earth fraction and results are reported on the basis of oven-dry weight. The following methods were applied:

Particle size analysis (texture) by pipette method: After destruction of organic matter and other cementing substances with hydrogen peroxide and hydrochloric acid respectively, the soil is chemically dispersed upon addition of sodium hexametaphosphate. Fractions larger than 50 micron (sand) are separated by using USDA standard-sieves. Fractions smaller than 50 micron are determined using the pipette. For composite soil samples the Hydrometer-method was used to determine particle size.

Organic carbon: Wet-acid dichromate digestion according to Walkley and Black.

Total nitrogen: Semi-micro Kjeldahl digestion followed by ammonium distillation and titrimetric determination.

Soil pH: Potentiometrical determination in a 1:2.5 suspension of soil and water (pH-H_2O), and a 1:2.5 suspension of soil and 1M potassium chloride (pH-KCL).

Exchangeable bases and cation exchange capacity: Percolation with 1M ammonium acetate (NH_4OAc) at pH 7, ethanol and acidified 1M KCL. In the first percolate determination of potassium and sodium by flame photometer and calcium and magnesium by atomic absorption spectrophotometer. In the last percolate determination of CEC by distillation and titration.

Available phosphorous: Kurtz-Bray I method. Extraction with 0.025 M hydrochloric acid (HCl) and 0.03 M ammonium fluoride (NH4F) and determination of the extracted P by spectro-photometer.

Exchangeable aluminium and hydrogen: Al and H determined upon exchange with 1 M KCL and titration with sodium hydroxide (NaOH); Determination of Al by a second titration after addition of sodium fluoride.

Electrical conductivity (EC): measured in a 1:2.5 suspension of soil and water.

Bulk density: Determined by weighing oven-dried core samples of which the volume is known.

Water retention: Determined by equilibrating samples with water at various suction levels (pF 0, pF 2, pF 2.4, pF 3, pF 4.2) using a pressure-membrane press for high suction values, a pressure-plate extractor for low suction values, and a compressor.

The following calculations underlie the data on exchange properties:

Total exchangeable bases (TEB in cmol(+)/kg soils): sum of exchangeable Ca, Mg, K and Na.

Base saturation (BS in %): TEB divided by CEC (x 100).

II.2 Index tables to soil profiles

Index to soil profile descriptions by profile number							
Profile Number	Soil Unit	Topsheet number	Landscape Unit	x-coord. (m)	y-coord. (m)	Field Code	Page number
1	B11-m	29/4	D31	277,000	9,692,700	NyP7	25
2	R11-m	29/4	D32	276,900	9,692,100	NyP6	26
3	L31-m	29/4	D32	276,900	9,691,400	NyP5	27
4	L31-m	29/4	D32	277,000	9,690,800	NyP4	28
5	L32-m	29/4	D32	276,900	9,689,400	NyP1	29
6	L23-l	29/4	D32	277,000	9,699,900	NyP2	30
7	R23-m	29/4	D32	277,100	9,688,400	Nyp3	31
8	B22-l	29/2	C41	265,900	9,716,500	NyP8	32
9	C14-l	29/2	C41	266,000	9,716,300	NyP9	33
10	C22-m	29/2	C41	266,300	9,716,000	NyP10	34
11	R11-m	29/2	C42	266,900	9,715,700	NyP11	35
12	B21-m	29/2	C31	262,500	9,715,800	NyP14	36
13	C22-l	29/2	C32	262,900	9,715,500	NyP15	37
14	C22-m	29/2	C33	263,200	9,715,100	NyP16	38
15	R11-m	29/2	C33	264,000	9,715,000	NyP17	39
16	L21-h	29/2	C21	266,800	9,714,700	NyP12	40
17	L11-h	29/2	C21	267,300	9,713,700	NyP13	41
18	B41-m	29/2	C21	269,500	9,710,000	NyP13	42
19	L23-m	30/2	B62	311,700	9,712,400	RuP1	43
20	R21-m	30/2	B64	323,100	9,710,900	CP2	44
21	L23-m	19/3	F32	354,300	9,734,900	IP2	45
22	L32-m	19/3	F32	355,300	9,734,800	IP3	46
23	S12-m	19/3	F32	356,200	9,734,900	IP4	47
24	L23-m	19/3	F24	353,700	9,735,200	IP1	48
25	S24-m	31/1	F22	350,200	9,703,000	ChbP1	49
26	S24-l	31/1	F22	349,900	9,702,800	ChbP2	50
27	S12-l	31/1	F31	349,400	9,702,500	ChbP3	51
28	S21-l	31/2	F12	370,800	9,710,500	CP1	52
29	L22-l	45/2	F42	375,900	9,663,900	MK1	53
30	S22-m	45/2	F42	376,100	9,663,500	MK2	54
31	S25-m	45/2	F42	376,200	9,663,100	MK3	55
32	B21-m	45/2	F41	376,300	9,663,000	MK4	56
33	R12-m	44/1	A33	284,300	9,653,600	KALP1	57
34	L11-m	44/1	A32	285,000	9,653,500	KALP2	58
35	L14-h	44/1	A32	286,300	9,653,000	KALP3	59
36	R21-m	44/4	F42	332,000	9,640,500	BMVP3	60
37	L23-l	44/2	A22	326,100	9,643,300	BYZP1	61
38	L23-l	44/2	A22	325,300	9,643,500	BYZP2	62
39	L33-l	44/2	A22	324,800	9,643,700	BYZP3	63
40	S23-l	44/2	A22	324,300	9,643,900	BYZP4	64
41	B12-m	44/2	A21	323,800	9,644,000	BYZP5	65
42	L33-m	29/2	D23	276,200	9,707,700	BMTP2	66
43	L14-m	29/2	D23	276,300	9,707,300	BMTP3	67
44	L32-m	29/2	D23	276,400	9,707,000	BMTP4	68
45	B21-m	29/2	D21	276,800	9,706,100	BMTP5	69
46	B21-m	29/2	D21	276,600	9,700,000	BLWP1	70

Index to soil profile descriptions
By profile number (cont'd)

Profile Number	Soil Unit	Topsheet number	Landscape Unit	x-coord. (m)	y-coord. (m)	Field Code	Page number
47	C13-m	29/2	D22	276,700	9,699,600	BLWP2	71
48	C23-m	29/2	D22	276,900	9,699,300	BLWP3	72
49	L31-h	29/2	D22	277,000	9,699,000	BLWP4	73
50	B42-m	29/2	C21	270,600	9,709,000	BNBP1	74
51	C12-m	29/2	C21	270,000	9,708,800	BNBP2	75
52	C13-l	29/2	D23	276,700	9,708,500	BNBP3	76
53	L13-l	29/2	D23	276,400	9,708,200	BNBP4	77
54	B41-m	29/2	D21	277,000	9,708,500	BNBP5	78
55	B21-l	29/2	D21	275,000	9,699,200	BNGWP1	79
56	C23-l	29/2	D22	274,500	9,700,500	BNGWP2	80
57	S24-l	31/3	F53	343,100	9,692,000	BKAP1	81
58	L22-l	31/3	F53	342,800	9,691,900	BKAP2	82
59	L22-l	31/3	F53	342,600	9,691,700	BKAP3	83
60	L22-l	31/3	F53	342,500	9,691,500	BKAP4	84
61	L22-m	31/3	F53	342,200	9,691,200	BKAP5	85
62	B11-m	31/3	F51	335,600	9,691,200	BNYKP1	86
63	L22-m	30/4	F52	332,200	9,691,800	BNYKP2	87
64	L22-m	30/4	F52	331,900	9,692,100	BNYKP3	88
65	L22-h	30/4	F52	331,700	9,692,300	BNYKP4	89
66	L21-m	30/4	F52	331,100	9,692,500	BNYKP5	90
67	B21-m	31/3	F41	348,300	9,690,000	BNGGP5	91
68	L32-l	31/3	F42	348,200	9,690,300	BNGGP4	92
69	L33-l	31/3	F42	348,100	9,690,600	BNGGP3	93
70	R24-l	31/3	F42	247,900	9,690,800	BNGGP2	94
71	L32-m	31/3	F42	247,500	9,691,300	BNGGP1	95
72	C23-l	31/3	E33	338,500	9,692,500	BSLP5	96
73	L33-l	31/3	E33	338,000	9,691,900	BSLP4	97
74	R24-l	31/3	E33	337,800	9,691,300	BSLP3	98
75	L23-l	31/3	E33	337,500	9,691,000	BSLP2	99
76	B21-m	31/3	E31	337,300	9,690,700	BSLP1	100
77	S12-h	30/2	B53	320,200	9,713,500	RUBP1	101
78	L12-h	30/2	B53	320,700	9,713,300	RUBP2	102
79	R23-l	30/2	B53	321,100	9,713,300	RUBP3	103
80	L32-m	19/3	F24	359,700	9,737,800	KATEP1	104
81	S25-h	19/3	F12	359,900	9,737,500	KATEP2	105
82	S24-l	19/3	F12	360,200	9,737,200	KATEP3	106
83	S21-m	19/3	F12	360,900	9,736,400	KATEP4	107
84	B21-l	19/3	F11	359,900	9,737,200	KATEP5	108
85	S25-l	19/3	F24	358,700	9,737,100	KATEP6	109
86	R23-l	19/3	F24	358,400	9,737,000	KATEP7	110
87	S11-h	19/3	F32	357,500	9,733,700	RUTP1	111
88	L32-l	19/3	F12	358,600	9,733,400	RUTP2	112
89	L22-l	19/3	F12	359,400	9,733,500	RUTP3	113
90	S24-m	19/3	F11	360,000	9,733,600	RUTP4	114
91	L13-l	44/1	A12	286,400	9,648,500	KALEP1	115
93	L13-m	44/1	A12	284,700	9,650,500	KALEP3	116
94	B22-l	44/1	A11	281,500	9,647,700	KANYP1	117
95	R13-l	44/1	A12	282,700	9,649,000	KANYP2	118

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By profile number (cont'd)

Profile Number	Soil Unit	Topsheet number	Landscape Unit	x-coord. (m)	y-coord. (m)	Field Code	Page number
96	R23-m	29/4	D33	267,400	9,691,500	KITP1	119
97	R23-m	29/4	D33	267,500	9,691,000	KITP2	120
98	B21-m	29/4	D33	267,700	9,690,500	KITP3	121
99	B21-m	29/4	D31	264,900	9,690,300	KITP4	122
101	C33-l	44/4	A41	315,200	9,633,300	MVP1	123
102	C32-m	44/4	A41	313,700	9,632,700	MVP2	124
103	L32-m	45/1	F23	356,700	9,666,400	BRP1	125
104	R21-h	45/1	F23	357,200	9,666,200	BRP2	126
105	S22-m	45/1	F23	357,500	9,666,000	BRP3	127
106	B41-m	45/1	F21	358,000	9,665,800	BRP4	128
107	L13-l	45/2	E34	367,300	9,647,100	IPA1	129
108	R22-m	45/2	E34	367,250	9,647,300	IPA2	130
109	L22-l	45/2	E34	367,100	9,647,900	IPA3	131
110	B22-l	45/2	E31	367,100	9,648,000	IPA4	132
111	R21-h	45/2	E33	377,300	9,653,000	IPA5	133
112	L22-h	31/3	F42	346,600	9,673,600	IPA6	134
113	C23-l	31/3	E33	338,100	9,678,100	IPA7	135
114	S21-m	31/4	E12	370,000	9,686,500	KbaP1	136
115	L13-l	31/4	E22	364,500	9,678,700	KbaP2	137
116	R24-m	31/4	E22	363,700	9,677,950	KbaP3	138
117	L13-l	31/4	E22	363,100	9,677,600	KbaP4	139
118	B31-m	31/4	E11	361,400	9,677,100	KbaP5	140
120	S12-m	30/3	B62	299,500	9,681,500	LUSP1	141

Index to soil profile descriptions by landscape unit

Landscape Unit	Soil Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
A11	B22-l	44/1	94	281,500	9,647,700	KANYP1	117
A12	L13-l	44/1	91	286,400	9,648,500	KALEP1	115
A12	L13-m	44/1	93	284,700	9,650,500	KALEP3	116
A12	R13-l	44/1	95	282,700	9,649,000	KANYP2	118
A21	B12-m	44/2	41	323,800	9,644,000	BYZP5	65
A22	L23-l	44/2	37	326,100	9,643,300	BYZP1	61
A22	L23-l	44/2	38	325,300	9,643,500	BYZP2	62
A22	L33-l	44/2	39	324,800	9,643,700	BYZP3	63
A22	S23-l	44/2	40	324,300	9,643,900	BYZP4	64
A32	L11-m	44/1	34	285,000	9,653,500	KALP2	58
A32	L14-h	44/1	35	286,300	9,653,000	KALP3	59
A33	R12-m	44/1	33	284,300	9,653,600	KALP1	57
A41	C33-l	44/4	101	315,200	9,633,300	MVP1	123
A41	C32-m	44/4	102	313,700	9,632,700	MVP2	124
B53	S12-h	30/2	77	320,200	9,713,500	RUBP1	101
B53	L12-h	30/2	78	320,700	9,713,300	RUBP2	102
B53	R23-l	30/2	79	321,100	9,713,300	RUBP3	103
B62	L23-m	30/2	19	311,700	9,712,400	RuP1	43
B62	S12-m	30/3	120	299,500	9,681,500	LUSP1	141
B64	R21-m	30/2	20	323,100	9,710,900	CP2	44
C21	L21-h	29/2	16	266,800	9,714,700	NyP12	40
C21	L11-h	29/2	17	267,300	9,713,700	NyP13	41
C21	B41-m	29/2	18	269,500	9,710,000	NyP13	42
C21	B42-m	29/2	50	270,600	9,709,000	BNBP1	74
C21	C12-m	29/2	51	270,000	9,708,800	BNBP2	75
C31	B21-m	29/2	12	262,500	9,715,800	NyP14	36
C32	C22-l	29/2	13	262,900	9,715,500	NyP15	37
C33	C22-m	29/2	14	263,200	9,715,100	NyP16	38
C33	R11-m	29/2	15	264,000	9,715,000	NyP17	39
C41	B22-l	29/2	8	265,900	9,716,500	NyP8	32
C41	C14-l	29/2	9	266,000	9,716,300	NyP9	33
C41	C22-m	29/2	10	266,300	9,716,000	NyP10	34
C42	R11-m	29/2	11	266,900	9,715,700	NyP11	35
D21	B21-m	29/2	45	276,800	9,706,100	BMTP5	69
D21	B21-m	29/2	46	276,600	9,700,000	BLWP1	70
D21	B41-m	29/2	54	277,000	9,708,500	BNBP5	78
D21	B21-l	29/2	55	275,000	9,699,200	BNGWP1	79
D22	C13-m	29/2	47	276,700	9,699,600	BLWP2	71
D22	C23-m	29/2	48	276,900	9,699,300	BLWP3	72
D22	L31-h	29/2	49	277,000	9,699,000	BLWP4	73
D22	C23-l	29/2	56	274,500	9,700,500	BNGWP2	80
D23	L33-m	29/2	42	276,200	9,707,700	BMTP2	66
D23	L14-m	29/2	43	276,300	9,707,300	BMTP3	67
D23	L32-m	29/2	44	276,400	9,707,000	BMTP4	68
D23	C13-l	29/2	52	276,700	9,708,500	BNBP3	76
D23	L13-l	29/2	53	276,400	9,708,200	BNBP4	77
D31	B11-m	29/4	1	277,000	9,692,700	NyP7	25

Index to soil profile descriptions By landscape unit (cont'd)							
Landscape Unit	Soil Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
D31	B21-m	29/4	99	264,900	9,690,300	KITP4	122
D32	R11-m	29/4	2	276,900	9,692,100	NyP6	26
D32	L31-m	29/4	3	276,900	9,691,400	NyP5	27
D32	L31-m	29/4	4	277,000	9,690,800	NyP4	28
D32	L32-m	29/4	5	276,900	9,689,400	NyP1	29
D32	L23-l	29/4	6	277,000	9,699,900	NyP2	30
D32	R23-m	29/4	7	277,100	9,688,400	Nyp3	31
D33	R23-m	29/4	96	267,400	9,691,500	KITP1	119
D33	R23-m	29/4	97	267,500	9,691,000	KITP2	120
D33	B21-m	29/4	98	267,700	9,690,500	KITP3	121
E11	B31-m	31/4	118	361,400	9,677,100	KbaP5	140
E12	S21-m	31/4	114	370,000	9,686,500	KbaP1	136
E22	L13-l	31/4	115	364,500	9,678,700	KbaP2	137
E22	R24-m	31/4	116	363,700	9,677,950	KbaP3	138
E22	L13-l	31/4	117	363,100	9,677,600	KbaP4	139
E31	B21-m	31/3	76	337,300	9,690,700	BSLP1	100
E31	B22-l	45/2	110	367,100	9,648,000	IPA4	132
E33	C23-l	31/3	72	338,500	9,692,500	BSLP5	96
E33	L33-l	31/3	73	338,000	9,691,900	BSLP4	97
E33	R24-l	31/3	74	337,800	9,691,300	BSLP3	98
E33	L23-l	31/3	75	337,500	9,691,000	BSLP2	99
E33	R21-h	45/2	111	377,300	9,653,000	IPA5	133
E33	C23-l	31/3	113	338,100	9,678,100	IPA7	135
E34	L13-l	45/2	107	367,300	9,647,100	IPA1	129
E34	R22-m	45/2	108	367,250	9,647,300	IPA2	130
E34	L22-l	45/2	109	367,100	9,647,900	IPA3	131
F11	B21-l	19/3	84	359,900	9,737,200	KATEP5	108
F11	S24-m	19/3	90	360,000	9,733,600	RUTP4	114
F12	S21-l	31/2	28	370,800	9,710,500	CP1	52
F12	S25-h	19/3	81	359,900	9,737,500	KATEP2	105
F12	S24-l	19/3	82	360,200	9,737,200	KATEP3	106
F12	S21-m	19/3	83	360,900	9,736,400	KATEP4	107
F12	L32-l	19/3	88	358,600	9,733,400	RUTP2	112
F12	L22-l	19/3	89	359,400	9,733,500	RUTP3	113
F21	B41-m	45/1	106	358,000	9,665,800	BRP4	128
F22	S24-m	31/1	25	350,200	9,703,000	ChbP1	49
F22	S24-l	31/1	26	349,900	9,702,800	ChbP2	50
F23	L32-m	45/1	103	356,700	9,666,400	BRP1	125
F23	R21-h	45/1	104	357,200	9,666,200	BRP2	126
F23	S22-m	45/1	105	357,500	9,666,000	BRP3	127
F24	L23-m	19/3	24	353,700	9,735,200	IP1	48
F24	L32-m	19/3	80	359,700	9,737,800	KATEP1	104
F24	S25-l	19/3	85	358,700	9,737,100	KATEP6	109
F24	R23-l	19/3	86	358,400	9,737,000	KATEP7	110
F31	S12-l	31/1	27	349,400	9,702,500	ChbP3	51
F32	L23-m	19/3	21	354,300	9,734,900	IP2	45
F32	L32-m	19/3	22	355,300	9,734,800	IP3	46
F32	S12-m	19/3	23	356,200	9,734,900	IP4	47

Index to soil profile descriptions by landscape unit (cont'd)							
Landscape Unit	Soil Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
F32	S11-h	19/3	87	357,500	9,733,700	RUTP1	111
F41	B21-m	45/2	32	376,300	9,663,000	MK4	56
F41	B21-m	31/3	67	348,300	9,690,000	BNGGP5	91
F42	L22-l	45/2	29	375,900	9,663,900	MK1	53
F42	S22-m	45/2	30	376,100	9,663,500	MK2	54
F42	S25-m	45/2	31	376,200	9,663,100	MK3	55
F42	R21-m	44/4	36	332,000	9,640,500	BMVP3	60
F42	L32-l	31/3	68	348,200	9,690,300	BNGGP4	92
F42	L33-l	31/3	69	348,100	9,690,600	BNGGP3	93
F42	R24-l	31/3	70	247,900	9,690,800	BNGGP2	94
F42	L32-m	31/3	71	247,500	9,691,300	BNGGP1	95
F42	L22-h	31/3	112	346,600	9,673,600	IPA6	134
F51	B11-m	31/3	62	335,600	9,691,200	BNYKP1	86
F52	L22-m	30/4	63	332,200	9,691,800	BNYKP2	87
F52	L22-m	30/4	64	331,900	9,692,100	BNYKP3	88
F52	L22-h	30/4	65	331,700	9,692,300	BNYKP4	89
F52	L21-m	30/4	66	331,100	9,692,500	BNYKP5	90
F53	S24-l	31/3	57	343,100	9,692,000	BKAP1	81
F53	L22-l	31/3	58	342,800	9,691,900	BKAP2	82
F53	L22-l	31/3	59	342,600	9,691,700	BKAP3	83
F53	L22-l	31/3	60	342,500	9,691,500	BKAP4	84
F53	L22-m	31/3	61	342,200	9,691,200	BKAP5	85

Index to soil profile descriptions by soil unit

Soil Unit	Landscape Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
B11-m	D31	29/4	1	277,000	9,692,700	NyP7	25
B11-m	F51	31/3	62	335,600	9,691,200	BNYKP1	86
B12-m	A21	44/2	41	323,800	9,644,000	BYZP5	65
B21-l	D21	29/2	55	275,000	9,699,200	BNGWP1	79
B21-l	F11	19/3	84	359,900	9,737,200	KATEP5	108
B21-m	C31	29/2	12	262,500	9,715,800	NyP14	36
B21-m	D21	29/2	45	276,800	9,706,100	BMTP5	69
B21-m	D21	29/2	46	276,600	9,700,000	BLWP1	70
B21-m	D31	29/4	99	264,900	9,690,300	KITP4	122
B21-m	D33	29/4	98	267,700	9,690,500	KITP3	121
B21-m	E31	31/3	76	337,300	9,690,700	BSLP1	100
B21-m	F41	31/3	67	348,300	9,690,000	BNGGP5	91
B21-m	F41	45/2	32	376,300	9,663,000	MK4	56
B22-l	A11	44/1	94	281,500	9,647,700	KANYP1	117
B22-l	C41	29/2	8	265,900	9,716,500	NyP8	32
B22-l	E31	45/2	110	367,100	9,648,000	IPA4	132
B31-m	E11	31/4	118	361,400	9,677,100	KbaP5	140
B41-m	C21	29/2	18	269,500	9,710,000	NyP13	42
B41-m	D21	29/2	54	277,000	9,708,500	BNBP5	78
B41-m	F21	45/1	106	358,000	9,665,800	BRP4	128
B42-m	C21	29/2	50	270,600	9,709,000	BNBP1	74
C12-m	C21	29/2	51	270,000	9,708,800	BNBP2	75
C13-l	D23	29/2	52	276,700	9,708,500	BNBP3	76
C13-m	D22	29/2	47	276,700	9,699,600	BLWP2	71
C14-l	C41	29/2	9	266,000	9,716,300	NyP9	33
C22-l	C32	29/2	13	262,900	9,715,500	NyP15	37
C22-m	C33	29/2	14	263,200	9,715,100	NyP16	38
C22-m	C41	29/2	10	266,300	9,716,000	NyP10	34
C23-l	D22	29/2	56	274,500	9,700,500	BNGWP2	80
C23-l	E33	31/3	72	338,500	9,692,500	BSLP5	96
C23-l	E33	31/3	113	338,100	9,678,100	IPA7	135
C23-m	D22	29/2	48	276,900	9,699,300	BLWP3	72
C32-m	A41	44/4	102	313,700	9,632,700	MVP2	124
C33-l	A41	44/4	101	315,200	9,633,300	MVP1	123
L11-h	C21	29/2	17	267,300	9,713,700	NyP13	41
L11-m	A32	44/1	34	285,000	9,653,500	KALP2	58
L12-h	B53	30/2	78	320,700	9,713,300	RUBP2	102
L13-l	A12	44/1	91	286,400	9,648,500	KALEP1	115
L13-l	D23	29/2	53	276,400	9,708,200	BNBP4	77
L13-l	E22	31/4	115	364,500	9,678,700	KbaP2	137
L13-l	E22	31/4	117	363,100	9,677,600	KbaP4	139
L13-l	E34	45/2	107	367,300	9,647,100	IPA1	129
L13-m	A12	44/1	93	284,700	9,650,500	KALEP3	116
L14-h	A32	44/1	35	286,300	9,653,000	KALP3	59
L14-m	D23	29/2	43	276,300	9,707,300	BMTP3	67
L21-h	C21	29/2	16	266,800	9,714,700	NyP12	40
L21-m	F52	30/4	66	331,100	9,692,500	BNYKP5	90

Index to soil profile descriptions by soil unit (cont'd)

Soil Unit	Landscape Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
L22-h	F42	31/3	112	346,600	9,673,600	IPA6	134
L22-h	F52	30/4	65	331,700	9,692,300	BNYKP4	89
L22-l	E34	45/2	109	367,100	9,647,900	IPA3	131
L22-l	F12	19/3	89	359,400	9,733,500	RUTP3	113
L22-l	F42	45/2	29	375,900	9,663,900	MK1	53
L22-l	F53	31/3	58	342,800	9,691,900	BKAP2	82
L22-l	F53	31/3	59	342,600	9,691,700	BKAP3	83
L22-l	F53	31/3	60	342,500	9,691,500	BKAP4	84
L22-m	F52	30/4	63	332,200	9,691,800	BNYKP2	87
L22-m	F52	30/4	64	331,900	9,692,100	BNYKP3	88
L22-m	F53	31/3	61	342,200	9,691,200	BKAP5	85
L23-l	A22	44/2	37	326,100	9,643,300	BYZP1	61
L23-l	A22	44/2	38	325,300	9,643,500	BYZP2	62
L23-l	D32	29/4	6	277,000	9,699,900	NyP2	30
L23-l	E33	31/3	75	337,500	9,691,000	BSLP2	99
L23-m	B62	30/2	19	311,700	9,712,400	RuP1	43
L23-m	F24	19/3	24	353,700	9,735,200	IP1	48
L23-m	F32	19/3	21	354,300	9,734,900	IP2	45
L31-h	D22	29/2	49	277,000	9,699,000	BLWP4	73
L31-m	D32	29/4	3	276,900	9,691,400	NyP5	27
L31-m	D32	29/4	4	277,000	9,690,800	NyP4	28
L32-l	F12	19/3	88	358,600	9,733,400	RUTP2	112
L32-l	F42	31/3	68	348,200	9,690,300	BNGGP4	92
L32-m	D23	29/2	44	276,400	9,707,000	BMTP4	68
L32-m	D32	29/4	5	276,900	9,689,400	NyP1	29
L32-m	F23	45/1	103	356,700	9,666,400	BRP1	125
L32-m	F24	19/3	80	359,700	9,737,800	KATEP1	104
L32-m	F32	19/3	22	355,300	9,734,800	IP3	46
L32-m	F42	31/3	71	247,500	9,691,300	BNGGP1	95
L33-l	A22	44/2	39	324,800	9,643,700	BYZP3	63
L33-l	E33	31/3	73	338,000	9,691,900	BSLP4	97
L33-l	F42	31/3	69	348,100	9,690,600	BNGGP3	93
L33-m	D23	29/2	42	276,200	9,707,700	BMTP2	66
R11-m	C33	29/2	15	264,000	9,715,000	NyP17	39
R11-m	C42	29/2	11	266,900	9,715,700	NyP11	35
R11-m	D32	29/4	2	276,900	9,692,100	NyP6	26
R12-m	A33	44/1	33	284,300	9,653,600	KALP1	57
R13-l	A12	44/1	95	282,700	9,649,000	KANYP2	118
R21-h	E33	45/2	111	377,300	9,653,000	IPA5	133
R21-h	F23	45/1	104	357,200	9,666,200	BRP2	126
R21-m	B64	30/2	20	323,100	9,710,900	CP2	44
R21-m	F42	44/4	36	332,000	9,640,500	BMVP3	60
R22-m	E34	45/2	108	367,250	9,647,300	IPA2	130
R23-l	B53	30/2	79	321,100	9,713,300	RUBP3	103
R23-l	F24	19/3	86	358,400	9,737,000	KATEP7	110
R23-m	D32	29/4	7	277,100	9,688,400	Nyp3	31
R23-m	D33	29/4	96	267,400	9,691,500	KITP1	119
R23-m	D33	29/4	97	267,500	9,691,000	KITP2	120

Index to soil profile descriptions by soil unit (cont'd)							
Soil Unit	Landscape Unit	Topsheet number	Profile Number	x-coord. (m)	y-coord. (m)	Field code	Page number
R24-l	E33	31/3	74	337,800	9,691,300	BSLP3	98
R24-l	F42	31/3	70	247,900	9,690,800	BNGGP2	94
R24-m	E22	31/4	116	363,700	9,677,950	KbaP3	138
S11-h	F32	19/3	87	357,500	9,733,700	RUTP1	111
S12-h	B53	30/2	77	320,200	9,713,500	RUBP1	101
S12-l	F31	31/1	27	349,400	9,702,500	ChbP3	51
S12-m	B62	30/3	120	299,500	9,681,500	LUSP1	141
S12-m	F32	19/3	23	356,200	9,734,900	IP4	47
S21-l	F12	31/2	28	370,800	9,710,500	CP1	52
S21-m	E12	31/4	114	370,000	9,686,500	KbaP1	136
S21-m	F12	19/3	83	360,900	9,736,400	KATEP4	107
S22-m	F23	45/1	105	357,500	9,666,000	BRP3	127
S22-m	F42	45/2	30	376,100	9,663,500	MK2	54
S23-l	A22	44/2	40	324,300	9,643,900	BYZP4	64
S24-l	F12	19/3	82	360,200	9,737,200	KATEP3	106
S24-l	F22	31/1	26	349,900	9,702,800	ChbP2	50
S24-l	F53	31/3	57	343,100	9,692,000	BKAP1	81
S24-m	F11	19/3	90	360,000	9,733,600	RUTP4	114
S24-m	F22	31/1	25	350,200	9,703,000	ChbP1	49
S25-h	F12	19/3	81	359,900	9,737,500	KATEP2	105
S25-l	F24	19/3	85	358,700	9,737,100	KATEP6	109
S25-m	F42	45/2	31	376,200	9,663,100	MK3	55

II.3 Soil profile descriptions and analytical data

Profile number: P1	**AE Zone:** Western	**Soil code:** B11-m
Map sheet number: 29/4 2		
Location: Mangasuri village, 1.5 Km S of Mabale village	Altitude (m): 1295	Soil name: Orubumba (Ibambasi type)
District: Biharamulo	Vegetation: Sorghum with Scattered Brachestegia trees	FAO Soil unit: Mollic Planosol
Landscape unit: D31	Land use: Crop production	Soil Taxonomy: Mollic Albaqualf
Land form: Valley bottom	Other features: Ridging	Drainage class: Poor
Macro-relief: Flat		Date described: 04/09/1996
Slope gradient (%): 1		
Site position: Centre of valley		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Stream deposits derived from granites and schists		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Apg	0-15	Black (10YR 2/1)	Sandy loam	Moderate fine and medium sub-angular blocky	Slightly hard (dry), friable (moist), slightly sticky, slightly plastic (wet)	-	Many very fine pores and roots; few very fine distinct sharp brown (7.5YR 4/4) mottles	Clear smooth
AEg	15-35	Very dark greyish brown (10YR 3/2)	Sandy loam	Moderate fine and coarse blocky	Extremely hard (dry), friable (moist), slightly sticky, slightly plastic (wet)	-	Few very fine pores; few very fine roots; abundant fine, distinct sharp brown (7.5YR 4/4) mottles	Clear smooth
EAg	35-65	Dark brown (10YR 3/3)	As above	Moderate fine and coarse blocky	Extremely hard, firm, sticky and plastic	-	Few very fine pores; few very fine roots; abundant fine distinct sharp brown (7.5YR 4/4) mottles	Clear smooth
Btg1	65-100	Very dark greyish brown (10YR 3/2)	Clay	Very coarse blocky to massive	Extremely hard (dry), firm (moist), sticky and plastic (wet)	-	Few very fine pores; few very fine roots; abundant fine, distinct sharp brown (7.5YR 4/4) mottles	Gradual smooth
Btg2	100-150+	Dark greyish brown (10YR 4/2)	as above	Very coarse blocky	Extremely hard (dry), extremely firm (mosit) sticky and plastic	-	As above	-

ANALYTICAL DATA

Depth	*Particle size distribution*								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable. cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					*Silt*		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg	cmol/kg			%		%
0-20	2	14	14	25	13	27	-	13	SL	5.7	4.6	0.03	1.3	0.12	11	1.79	3.87	1.76	0.03	0.02			9.8	65.3		58		
30-50	1	12	12	22	17	27	-	16	SL	5.4	3.9	0.01	0.6	0.04	15	1.64	2.58	1.48	0.01	0.02	0.12	0.61	10.5	61.8		39		6
70-100	2	8	8	15	9	16	-	46	C	5.6	3.7	0.02	0.3	0.02	15	0.71	4.36	2.85	0.03	0.1			13.2	28.0		56		

Profile number: P2	**AE Zone:** Western	**Soil code:** R11-m
Map sheet number: 29/4 2	Altitude (m): 1310	Soil name: Orukiri
Location: Mangasini village. 0.3 Km NE of old Nyakahura village	Vegetation: Fallow vegetation with young Combretum and Brachestegia spp	FAO Soil unit: Mollic Leptosol (skeletic phase)
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Lithic Haplustoll
Landscape unit: D32	Other features: Small longitudinal ridges around fields	Drainage class: Excessive
Land form: Plain ridge		Date described: 28/08/1996
Macro-relief: Undulating		
Slope gradient (%): 3		
Site position: Lower slope		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Residual deposits derived from granites and schists		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	*Coarse Material*	Other features	Boundary
Ah	0-20	Dark brown (7.5YR 3/3)	Very gravelly sand clay loam	Very weak fine coarse	Slightly sticky, slightly plastic (wet)	Dominant quartz gravel	Common very fine pores; abundant fine roots	Abrupt smooth
C/R	20-50	as above		-	-	Dominant granite gravel	-	-
R	50+						Weathering rock	

ANALYTICAL DATA

Depth	*Particle size*								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	*Exchangeable cations*						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	6	5	12	21	11	12	-	33	SCL	5.6	4.2	0.02	2.6	0.14	18	3.78	1.89	0.74	0.1	0.02			4.8	6.7		57		

Profile number: P3	**AE Zone:** Western	**Soil code:** L31-m
Map sheet number: 29/2	Altitude (m): 1275	Soil name: Oruduha
Location: 0.4 Km NE of old Nyakahura village towards Mahale	Vegetation: Cassava with scattered Brachestegia spp	FAO Soil unit: Luvic Phaeozem
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Pachic Paleustoll
Landscape unit: D32	Other features: Ridging	Drainage class: Well
Land form: Plain ridge		Date described: 28/08/1996
Macro-relief: Undulating		
Slope gradient (%): 4		Remarks: Classification is provisional as reliable CEC data are missing
Site position: Middle slope		
Geological unit: Karagwe-Ankolean system (Lower Division)		
Parent material: Residual deposits derived from granites and schists		

Horizon designation	Depth Cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	*Coarse Material*	Other features	Boundary
Ap	0-15	Dark reddish brown (5YR 3/2)	Sandy clay	Moderate fine granular and blocky	Slightly hard, very friable, slightly sticky, slightly plastic	-	Many very fine, many very fine roots	Clear smooth
AB	15-40	Dark reddish brown (2.5YR3/3)	Sandy Clay	Moderate fine and medium, granular and blocky	Hard friable slightly sticky, slightly plastic	-	Many very fine pores; many very fine roots; very few thin clay cutans	Gradual smooth
Bt1	40-75	Dark reddish brown (2.5YR 3/3)	Clay	Moderate fine and medium, granular and blocky	Slightly hard, very friable, slightly sticky, slightly plastic	-	Many very fine pores; many very fine roots; very few thin clay cutans	Gradual smooth
Bt2	75-150	Dark red (2.5YR 3/6)	as above	Weak medium and fine blocky	Slightly hard, very friable, slightly sticky, slightly plastic		Many very fine pores; many very fine roots; very few thin clay cutans;	
B/C	150+					Dominant quartz gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	eCEC	BS		EAl P
	Sand					silt																					
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine	clay									Ca	Mg	K	Na	H	Al					
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg		%		
0-20	2	4	14	21	11	11	-	37	SC	5.9	4.7	0.03	2	0.09	22	1.26	2.88	2.7	0.1	0.03			8.8	18.3	65		
30-50	0	3	13	15	16	8	-	45	SC	5.1	4	0.01	1.1	0.05	22	0.42	0.12	0.22	0.02	0.02	0.12	2.27	?	4.3			
70-100	1	2	7	15	12	12	-	51	C	5.6	4.2	0.04	0.5	0.03	17	0.32	0.05	0.03	0.02	0.02			?	3.4			

Profile number: P4	**AE Zone:** Western	**Soil code:** L31-m
Map sheet number: 30/3	Altitude (m): 1350	Soil name: Oruduha
Location: 2.5 km E of Nyakahura at Mangasini village	Vegetation: Fallow vegetation	FAO Soil unit: Luvic Phaeozem
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Pachic Paleustoll
Land form: Plain ridge	Other features: Few low termite mounds	Drainage class: Well
Macro-relief: Undulating		Date described: 23/8/1996
Slope gradient (%): 2		
Site position: Ridge summit		
Geological unit: Karagwe-Ankolean system (Lower division)		
Parent material: Residual deposits derived from granites and schists		

Horizon designation	Depth Cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Dark brown (7.5YR 3/3)	Sand clay loam	Strong medium and fine coarse	Soft, very friable, slightly sticky, slightly plastic		Many very fine pores; many very fine roots	Clear smooth
AB	10-30	Dark reddish brown (5YR 3/3)	As above	Strong fine and medium sub-angular blocky	Very hard, friable sticky plastic	-	Many very fine pores; many fine and medium roots; very few thin clay cutans	Clear smooth
Bt1	30-60	Dark reddish brown (2.5YR 2.5/3)	Clay	Moderate, fine and medium sub-angular blocky	Very hard, friable slightly sticky, slightly plastic	-	Many fine pores; many very fine and fine roots; with very few thin clay cutans	gradual smooth
Bt2	60-95	Dark reddish brown (2.5YR 2.5/4)	As above	Moderate, fine blocky	Slightly soft, very friable, slightly sticky, slightly plastic	-	Many very fine pores; many fine very few medium roots	as above
Bt3	95-150+	Dark reddish brown (2.5YR 2.5/4)	As above	Weak medium and fine blocky	Slightly hard, very friable, slightly sticky, slightly plastic	-	Many very fine pores; many very fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. p	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Ca	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%	-	mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-25	1	2	12	24	15	14	-	32	SCL	6.4	5.3	0.04	1.6	0.08	20	0.73	3.26	1.76	0.2	0.03	-	-	6.73	16.9		78		
30-50	1	2	8	18	13	11	-	47	C	5.8	4.3	0.01	0.9	0.03	30	0.54	1.02	0.64	0.05	0.03	-	-	2.81	4.1	3.7	62		
70-100	0	2	6	16	14	13	-	49	C	5.9	4.4	0.004	0.5	0.02	25	0.38	0.38	0.34	0.05	0.04	-	-	1.23	1.5	1.7	66		

Profile number: P5	**AE Zone:** Western	**Soil code :** L32-m
Map sheet number: 29/4	Altitude (m): 1350	Soil name: Oruduha
Location: 2 Km from Nyakahura village	Vegetation: Fallow vegetation dominated by Hyperrenia spp	FAO Soil unit: Haplic Acrisols
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Typic Kandiustult
Landscape unit: D32	Other features: Few low termite mounds	Drainage class: Well
Land form: Plain ridge		Date described: 28/8/1996
Macro-relief: Undulating		
Slope gradient (%): 2		
Site position: Ridge summit		
Geological unit: Karagwe-Ankolean system (Lower division)		
Parent material: Residual deposits derived from granites and schists		

Horizon Designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-25	Very dark greyish brown (10YR 3/2)	Sand clay loam	Strong, medium and coarse block and sub-angular blocky	Hard, friable, slightly sticky, slightly plastic	-	Many fine and medium pores; many fine roots	Clear smooth
AB	25-55	Brown (10YR 4/3)	Sand clay loam	Strong coarse sub-angular blocky	Hard extremely firm, slightly sticky, slightly plastic	-	Many fine and medium pores; many fine roots	Gradual smooth
Bt1	55-95	Strong brown (7.5YR 4/6)	Sand clay loam	As above	Slightly hard, very friable, slightly sticky, slightly plastic	-	Few fine pores; many fine and medium roots; few thin clay cutans	Diffuse wavy
Bt2	95-130	Strong brown (7.5YR 4/6)	Sandy clay	As above	Slightly hard, friable, slightly sticky, slightly plastic	-	Many very fine pores; few fine roots; few very thin clay cutans	Gradual smooth
Bt3	130-180+	Strong brown (7.5YR 4/6)	As above	As above	As above	-	Many fine pores; many very fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine											Ca	Mg	K	Na	H	Al					
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m		%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg				
0-20	2	5	12	23	17	18	-	23	SCL	6	5.2	0.07		1.2	0.11	11	2.52	3.23	1.01	0.08	0.04	-	-	6.85	24.6	64		
30-50	3	5	12	19	14	15	-	32	SCL	5.2	4.3	0.23		0.9	0.06	15	2.32	1.78	1.12	0.2	0.03	0.02	0.41	8.28	23.1	38		5
80-100	2	4	8	16	16	17	-	37	SC	4.9	4	0.18		0.6	0.04	15	1.3	0.46	0.41	0.15	0.04	0.02	1.12	6.29	15.4	17		10

Profile number: P6	**AE Zone:** Western	**Soil code:** L23-1
Map sheet number: 29/4	Altitude (m): 1340	Soil name: Oruduha
Location: 1.4 Km N. of Nyakahura village near UNHCR officers' camp.	Vegetation: Fallow vegetation, mainly Hyperrenia spp	FAO Soil unit: Haplic Acrisols
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Typic Rhodustult
Landscape unit: D32	Other features: Few low termite mounds	Drainage class: Well
Land form: Plain Ridge		Date described: 28/8/1996
Macro-relief: Undulating		
Slope gradient (%): 3		Remark: concerns road cut, profile probably disturbed
Site position: Middle slope		
Geological unit: Karagwe-Ankolean system (Lower division)		
Parent material: Residual deposits derived from granites and schists		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-30	Dark brown (7.5YR 3/3)	Sandy clay loam	Strong, fine and medium sub-angular blocky	Slightly hard, friable, slightly plastic, slightly sticky	-	Many very fine and fine pores; many very fine and fine roots	Clear smooth
AB	30-70	Dark reddish brown (5YR ¾)	As above	Moderate, fine and medium blocky	Slightly hard, very friable, slightly sticky, slightly plastic		As above	Abrupt smooth
B/C	70-120	As above	As above, but extremely gravelly	Weak medium blocky	As above	50-80 % quartz gravel	Many fine and medium pores; few very fine roots	Abrupt smooth
2B	120-170+	Dark red (2.5YR 3/6)	Sandy clay loam	Weak, fine and medium blocky	As above		As above	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	4	14	27	15	12	-	26	SCL	5	4.2	0.07	0.9	0.06	15	1.37	0.86	0.35	0.06	0.04	0.12	0.61	6.18			21		
30-50	2	3	14	22	15	15	-	29	SCL	4.4	4	0.06	0.6	0.04	15	0.45	0.28	1.11	0.03	0.03	0.07	1.42	15.05			10		
100-130	2	4	17	25	15	14	-	23	SCL	5.9	4.9	0.05	1.1	0.06	18	1.8	2.01	1.09	0.13	0.03	0.02	0	5.05			65		

Profile number: P7	**AE Zone:** Western	**Soil code:** R23-m
Map sheet number: 29/4	Altitude (m): 1325	Soil name: Oruchekebuyu
Location : 2.1 Km of South of Profile no.5	Vegetation: Sorghum (in ridges) and few scattered bananas.	FAO Soil unit: Haplic Acrisols, skeletic phase
District: Biharamulo	Land use: Crop production	Soil Taxonomy: Typic Kanhaplustult
Landscape unit: D32	Other features: Few low termite mounds	Drainage class: Well
Land form: Plain ridge		Date described: 28/8/1996
Macro-relief: Undulating		
Slope gradient (%): 6		Remark: samples of 0-20 and 30-50cm are likely to have been switched
Site position: Lower slope		
Geological unit: Karagwe-Ankolean system (Lower division)		
Parent material: Residual deposits derived from granites and schists		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-25	Dark brown (7.5YR 3/3)	Sandy clay loam	Moderate fine and medium subangular blocky	Slightly hard, very friable, slightly sticky, slightly plastic	-	Many very fine and fine pores; many very fine and fine roots	Clear smooth
AB	25-50	Dark reddish brown (5YR 3/4)	Sandy clay loam	Moderate, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	Many fine pores; few very fine roots; few termite nests	Abrupt smooth
B-C	50-70	Dark reddish brown (5YR 3/4)	Extremely gravelly sandy clay loam	Weak, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	>50% quartz gravel		Abrupt wavy
2Bt	70-100+	Dark red (2.5YR 3/6)	Clay loam	-	Slightly sticky, slightly plastic		-	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	3	5	15	19	17	-	39	SCL	6	4.3	0.01	0.3	0.02	15	0.41	0.07	0.05	0.12	0.03	-	-	?	?		?		
30-50	3	4	13	19	13	14	-	34	SCL	4.9	4.1	0.04	0.7	0.04	18	0.51	0.64	0.4	0.1	0.04	0.02	1.24	6.97	18.4	7.2	17		
80-110	4	4	7	14	14	20	-	37	SCL	4.8	4.2	0.05	0.3	0.02	15	0.47	0.35	0.24	0.05	0.03	0.39	0.92	6.19	15.9	5.4	11		

Profile number: P8	**AE Zone:** Western	**Soil code:** B22-1
Map sheet no.: 29/2	Altitude (m): 1500	FAO Soil unit: Gleyic Alisol
Location : Kafuha village near bridge to Lumasi Refugee Camp.	Vegetation: Horticultural crops (tomato, amaranthus and cabbage)	Soil Taxonomy: Typic Albaquult
District: Biharamulo	Land use: Crop production	Drainage class: Poor
Landscape unit: C41	Other features: within the vicinity of the profile there are large termite mounds	Date described: 23/7/1996
Land form: Valley bottom		
Macro-relief: Almost flat		
Slope gradient (%): 0		
Site position: Valley centre		
Geological unit: Karagwe-Ankolean System (Upper Division)		
Parent material: Stream deposits derived from argellites and phyllites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	*Consistency*	Coarse Material	Other features	Boundary
Apg	0-20	Very dark 10YR 3/1)	Clay loam	Moderate, medium and fine, granular and sub-angular blocky	Extremely hard (dry), firm (moist), slightly sticky, slightly plastic	-	many very fine pores; many very fine roots abundant, fine, sharp, strong brown (7.5R 4/6) mottles.	Abrupt smooth
AEg	20-50	Dark grey (10YR 4/1)	As above	weak, medium and fine granular and sub-angular blocky	Firm (moist), sticky and plastic (wet)	-	Mottles as above, many very fine pores: many very fine roots;	Clear smooth
Btg1	50-70	Dark greyish brown (10YR 4/2)	As above	Weak, medium and fine sub-angular blocky	Firm (moist) sticky and plastic (wet)	-	Mottle as above, many very fine pores: many very fine roots.	Clear smooth
Btg2	70-90	Dark yellowish brown (10YR 4/6)	Heavy clay	Weak, medium and fine sub-angular blocky	Firm (moist) sticky and plastic (wet)	-	Mottles as above, many very fine pores: many very fine roots	Clear smooth
Btg3	90-150+	Yellowish brown (10YR 5/8)	Heavy clay	Weak, medium and fine sub-angular blocky	Firm (moist) sticky and plastic (wet)	-	Mottles as above, many very fine pores; many very fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg		%		%
0-20	0	1	5	8	8	39	-	39	CL	4.6	3.6	0.21	5.3	0.38	14	1.33	3.46	1.73	0.02	0.04	0.35	2.51	32.4	69.7		16		8
30-50	1	3	9	10	8	34	-	35	CL	4.8	3.6	0.05	1.6	0.11	14	0.03	2.49	1.18	0.01	0.03	0.91	2.60	25.8	69.1		4		10
70-100	0	1	4	6	7	36	-	46	C	5.1	3.5	0.03	0.5	0.05	10	1.03	4.78	1.62	0.01	0.04	0.34	2.78	24.5	52.3		26		11

Profile number: P9	**AE Zone:** Western	**Soil code:** C22-1
Map sheet no.: 29/2	Altitude (m) : 1540	FAO Soil unit: Humic Acrisols, rudic / petroferric phase
Location : Kafuha village 0.4 Km from Profile no.8	Vegetation: Sweet potatoes and sorghum	Soil Taxonomy: Ustic Kandihumult
District: Biharamulo	Land use: Crop cultivation	Drainage class: Well
Landscape unit: C41		Date described: 23/7/1996
Land form: Footslope		
Macro-relief: Sloping		Remark: Texture data from laboratory do not match with field information
Slope gradient (%): 9		
Site position: Upper slope		
Geological unit: Karagwe-Ankolean System (Upper Division)		
Parent material: Slope wash deposits derived from phyllites and argellites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	*Coarse Material*	Other features	Boundary
Ap	0-15	Dark reddish brown (5YR 3/2)	Sandy clay loam	Moderate medium and fine granular and blocky	Sloghtly hard (dry) friable (moist), slightly sticky, slightly plastic	-	Many fine pores; many fine roots	Clear smooth
AB	15-30	Dark reddish brown (2.5YR 3/3)	Clay	Moderate, medium and fine, sub-angular blocky	Soft (dry), very friable (moist), slightly, slightly plastic (wet)	-	Many very fine pores; many fine few coarse roots	gradual smooth
Bt	30-70	Dark reddish brown (2.5YR 2.5/3)	Clay	Weak, medium and fine blocky	Very friable (moist), slightly sticky, slightly plastic (wet)	-	Many fine pores; many very fine roots	gradual smooth
Bcs	70-110	Dark reddish brown (2.5YR 2.5/3)	Very gravelly clay	Structureless	Slightly sticky, non-plastic	Very frequent secondary iron stone gravel	Many very fine pores; few very fine roots	abrupt smooth
Bms	110+	-			-		Ironstone pan over rotten rock	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable actions						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	2	6	8	6	18	-	56	C	5.1	3.8	0.05	2	0.11	18	0.91	9.94	3.93	0.13	0.02	0.23	3.2	48.47	83.0		29		7
30-50	4	2	5	8	6	16	-	59	C	5.1	3.8	0.02	1.7	0.19	8	0.3	0.55	0.21	0.11	0.02	0.08	4.88	15.82	23.9	9.92	6		31
60-70	2	5	4	7	5	19	-	58	C	5.6	4.6	0.08	1.6	0.14	11	0.21	0.17	0.06	0.14	0.02	-	-	0.75	20.9	0.67	3		

Profile number: P10	**AE Zone:** Western	**Soil code:** C22-m
Map sheet no. 29/2 Location: Kafuha village District: Biharamulo Landscape unit: C41 Land form: Footslope Macro-relief: Sloping Slope gradient (%): 10 Site position: Middle slope Geological unit: Karagwe-Ankolean System (Upper Division) Parent material: Slope wash deposits derived from phyllites and argillites	Altitude (m): 1590 Vegetation: Fallow vegetation after sorghum Land use: Crop production Other features: Low (<0.4 m) termite mounds	FAO Soil unit: Humic Acrisol Soil Taxonomy: Ustic Kandihumult Drainage class: Well Date described: 23/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	*Other features*	Boundary
Ap	0-20	Dark reddish brown (5YR 3/2)	Clay	Moderate, fine, angular blocky	Hard (dry), friable (moist) slightly sticky, slightly plastic (wet)	-	Many very fine pores, few very fine and fine roots	Clear smooth
AB	20-45	Dark reddish brown (5YR 3/4)	Clay	Moderate, medium and coarse, sub-angular blocky	Extremely hard (dry), friable (moist), slightly sticky; slightly plastic (wet)	-	Many very fine pores; few very fine roots	Gradual smooth
Bu1	45-70	Dark reddish brown (2.5YR 2.5/4)	As above	Moderate, fine and medium blocky	Hard (dry), friable (moist), slightly sticky, slightly plastic (wet)	-	Many very fine, few medium pores; few very fine, very few medium roots	Gradual smooth
Bu2	70-90	Dark reddish brown (2.5YR 2.5/3)	As above	Moderate, medium and fine, blocky and angular blocky	Slightly hard (dry), friable (moist), slightly sticky, slightly plastic (wet)		Many very fine pores; few very fine roots	Gradual smooth
Bu3	90-150+	as above	As above	Moderate, medium and fine, blocky and angular blocky	Slightly hard (dry), friable (moist)l slightly sticky, slightly plastic (wet)		Many very fine pores; very fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	2	4	5	5	21	-	61	C	5.6	4.6	0.08	2.7	0.16	16	1.52	8.04	3.22	0.09	0.02	-	-	21.06	30.1		54		
30-50	1	2	4	5	5	17	-	66	C	5.5	4.1	0.03	2.0	0.11	18	0.64	4.18	1.64	0.05	0.02	-	-	11.33	14.1	8.92	52		
70-90	1	1	3	4	6	16		69	C	4.8	3.8	0.03	1.3	0.08	16	0.21	1.49	0.52	0.02	0.03	0.46	4.31	21.3	29.0	9.90	10		20

Profile number: P11 Map sheet no: 29/4 Location: Kafuha village District: Biharamulo Landscape unit: C42 Land form: Hill ridge Macro-relief: Steep Slope gradient (%): 2 Site position: Ridge summit Geological unit: Karagwe-Ankolean System (Upper Division) Parent material: Residual deposits derived from phyllites and quartzites	**AE Zone:** Western Altitude (m): 1610 Vegetation: Hyparhennia grasses and young Miombo woodland trees Land use: Hunting and livestock production	**Soil code:** R11-h FAO Soil unit: Mollic Leptosol , skeletic phase Soil Taxonomy: Lithic Haplustoll Drainage class: Excessively drained Date described: 23/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	*Consistence*	Coarse Material	Other features	Boundary
Ap	0-15	Black (10YR 2/1)	Very gravelly clay	Moderate, medium and fine crumb	Slightly soft (dry), very friable (moist) non-sticky, non-plastic	Very frequent secondary ironstone gravelly	Many fine and medium pores; many very fine roots	Abrupt smooth
ABcs	15-40	Dark brown (10YR 3/2)	Very gravelly clay	could not be determined due to excessive gravel	Very soft (dry), very friable (moist)	As above	As above	clear smooth
Bcs	40+	as above		-		As above, but compacted	-	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	7	5	4	5	5	33	-	41	C	6.9	6.3	0.18	4.32	0.39	11	32.4	35.62	10.14	0.5	0.02	-	-	47.22	104.6		98		

Profile number: P12	**AE Zone:** Western	**Soil code:** B21-m
Map sheet number: 29/4	Altitude (m) : 1350	FAO Soil unit: Gleyic Phaeozem
Location : Lukole/Lumasi Refugee Camp	Vegetation: Maize, sweet potatoes, beans	Soil Taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Crop production on Cambered beds	Drainage class: Poor to somewhat imperfectly drained
Landscape unit: C31	Other features: Recent clearance of vegetation	Date described: 23/7/1996
Land form: Valley bottom		
Macro-relief: Flat		
Slope gradient (%): 0		
Site position: Valley centre		
Geological unit: Karagwe-Ankolean System (Upper Division)		
Parent material: Stream deposits derived from phyllites and argillites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Very dark grey (10YR 3/1)	Loam	Moderate, medium and fine granular and blocky	Extremely hard (dry), firm (moist), slightly sticky, slightly plastic (wet)		Common fine and medium pores; many very fine (roots	Clear smooth
ABg	15-30	Dark brown (10YR 3/3)	Loam	Weak, coarse and medium, blocky	Very hard (dry), firm (moist), slightly sticky, slightly plastic (wet)		Many very fine, common medium pores; common very fine, few medium roots	Clear smooth
Btg1	30-55	Dark grey (10YR 4/1)	Clay loam	Weak coarse and medium blocky	Many, very fine pores: mottles, very had (dry), firm (moist), slightly sticky, slightly plastic (wet)		Many very fine, common medium pores; common very fine, few medium roots.	Clear smooth
Btg2	55-80	as above	Clay loam	Very weak coarse and medium blocky	Slightly hard, friable, sticky and plastic (wet)		Many, very fine pores; few fine roots; common, fine, distinct strong brown mottles.	Clear smooth
Btg3	80-120	Dark brown (7.5YR 3/2)	Clay	Very weak coarse and medium blocky	Slightly hard, friable, sticky and plastic (wet)		Many, very fine pores: few fine roots; common, fine, distinct strong brown mottles	Clear smooth
Btg4	120-150+	Dark brown (7.5YR 3/2)	Clay	Very weak coarse and medium blocky				

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	3	10	14	10	42	-	18	L	6.2	4.8	0.04	2.4	0.22	11	28.84	7.17	2.3	0.05	0.02	-	-	12.56	56.4.2		76		
30-50	1	2	6	13	10	40	-	28	CL	5.7	3.9	0.02	1.3	0.08	16	3.24	4.08	1.54	0.01	0.04	-	-	9.53	29.4		58		
70-100	0	2	6	10	10	33		39	CL	6	3.8	0.03	0.7	0.07	10	3.06	4.58	1.89	0.01	0.13	-	-	9.58	22.8		69		

Profile number: P13	**AE Zone:** Western	**Soil code:** C22-1
Map sheet number: 29/4 Location: Lukole/Lumasi Refugee Camp District: Biharamulo Landscape unit: C32 Land form: Footslope Macro relief: Gently sloping Slope gradient (%): 2 Site position: Lower slope Geological unit: Karagwe-Ankolean System (Upper Division) Parent material: Slope wash deposits derived from phyllites	Altitude (m): 1350 Vegetation: Maize, sweet potatoes, beans Land use: Crop production Other features: Recent clearance of vegetation	FAO Soil unit: Humic Acrisol Soil Taxonomy: Ustic Kandihumult Drainage class: Well Date described: 23/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/4)	Clay	Strong, medium and fine granular	Hard (dry), very friable (moist),slightly sticky slightly plastick (wet)		Common fine and medium pores; many very fine roots	Clear smooth
AB	15-30	Dark brown (7.5YR ¾)	Clay	Moderate medium and fine granular and blocky	Slightly hard (dry), friable (moist), slightly sticky, slightly plastic (wet)		Many very fine, common medium pores; common very fine, few medium roots	Gradual smooth
Bt1	30-65	Yellowish red (5YR 4/6)	Clay	Weak moderate and fine blocky	Slightly hard (dry), very friable (moist), slightly sticky, slightly plastic (wet)		Many very fine, common medium pores; common very fine, few medium roots	As above
Bt2	65-115	as above	Clay	Moderate medium and fine blocky	Soft (dry), very friable (moist), slightly sticky and plastic (wet)		Many, very fine pores; few fine roots	As above
Bt3	115-160+	Dark reddish brown (5YR ¾)	Clay	Moderate medium and fine blocky	As above		Many, very fine pores; few fine roots	As above

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	2	7	10	5	18	-	57	C	5.1	3.8	0.02	1.9	0.17	11	0.41	0.81	0.2	0.02	0.02	0.02	3.01	9.71	13.7	7.6	11		31
30-50	1	2	4	8	5	18	-	62	C	5.2	3.9	0.01	1.3	0.08	16	0.11	0.12	0.03	0.01	0.02	0.34	3.2	8.65	11.9	6.0	2		37
70-100	1	2	3	5	5	20	-	64	C	5.6	3.8	0.01	0.9	0.08	11	0.95	0.11	0.02	0.01	0.02	-	-	?	?	0.25?	?		

Profile number: P14	**AE Zone:** Western	**Soil code:** C22-m
Map sheet number: 29/4	Altitude (m): 1455	FAO Soil unit: Humic Acrisol
Location: Lumasi Refugee Camp area 1 Km from Profile no.15	Vegetation: Bushed woodland vegetation	Soil Taxonomy: Ustic Kandihumult
District: Biharamulo	Land use: Firewood collection.	Drainage class: Well
Landscape unit: C33	Other features: Slight gully and sheet erosion	Date described: 23/7/1996
Land form: Flat topped plateau ridge		
Macro relief: Rolling		
Slope gradient (%): 5		
Site position: Lower ridges slope		
Geological unit: Karagwe-Ankolean System (Upper Division)		
Parent material: Residual deposits derived from phyllites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	*Other features*	Boundary
Ah	0-25	Dark brown (7.5YR 3/3)	Clay	Strong, fine, coarse and blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	Many very fine many medium pores: common very fine roots	Clear wavy
AB	25-40	Dark reddish brown (5YR 3/4)	Clay	Moderate medium and fine sub-angular blocky	Soft (dry), very friable (moist), non-sticky, non-plastic (wet)		Many very fine and fine pores; many very fine few medium roots	Clear smooth
Bt	40-65	Yellowish red (5YR 4/6)	Clay	Moderately, medium and fine blocky	Soft, very fine, slightly sticky, slightly plastic		Many very fine pores; many very fine few medium roots	Clear smooth
Btcs	65-120	Yellowish red (5YR 4/6)	Very gravelly clay	Moderately, medium and fine blocky	Soft, very fine, slightly sticky, slightly plastic	>40 secondary ironstone gravel	-	
Bcm	120+						Weathering secondary ironstone	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	1	3	4	4	16	-	68	C	5.5	4.5	0.03	3.9	0.24	16	2.68	3.88	2.63	0.08	0.02	-	-	12.71	13.0	9.72	52		
30-40	2	1	2	5	5	14	-	71	C	5.4	4	0.01	1.6	0.16	10	0.26	0.23	0.08	0.01	0.02	2.39	0	5.69	5.8	3.85	6		

Profile number: P15	**AE Zone:** Western	**Soil code:** R11-m
Map sheet number: 29/4 Location – Village Lumasi Refugee Camp District: Biharamulo Landscape unit: C33 Land form: Flat topped plateau ridge Macro relief: Rolling Slope gradient (%): 2 Site position: Ridge summit Geological unit: Karagwe-Ankolean System (Upper Division) Parent material: Residual deposits derived from phyllites	Altitude (m): 1540 Vegetation: Bushed woodland vegetation Land use: Firewood collection. Other features: Slight gully and sheet erosion	FAO Soil unit: Mollic Leptosol, skeletic and petroferric phase Soil Taxonomy: Lithic Haplustoll Drainage class: Well Date described: 30/8/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	*Other features*	Boundary
Ahcs	0-20	Very dark greyish brown (10YR 3/2)	Clay loam	Moderate, fine and medium granular	Very hard (dry) very friable (moist); slightly sticky; slightly plastic		Many fine pores; many very fine roots	Abrupt smooth
Abcs	20-30	Dark brown (7.5YR 3/2)	As above	Very hard, very friable, slightly sticky, slightly plastic	Very had, very friable, slightly sticky slightly plastic		Many fine pores; many very fine roots	Gradual smooth
Bcs	30-40	Dark brown (7.5YR 3/2)	Very gravelly clay	Very hard, very friable, slightly sticky, slightly plastic	Hard (dry), very friable (moist); slightly sticky slightly sticky (wet)	Very frequent secondary ironstone gravel	Many fine pores; many very fine roots	Abrupt wavy
Bms	40+						Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	1	2	7	4	45	-	41	CL	5.7	4.7	0.09	3	0.17	18	4.68	8.21	3.07	0.09	0.05	-	-	19.36			59		
30-40	0	1	2	3	3	47	-	44	C	6	4.7	0.05	0.9	0.07	13	4.24	6.17	3.11	0.1	0.04	-	-	14.27			66		

Profile number: P16	**AE Zone:** Western	**Soil code:** L21-h
Map sheet no. 29/2 Location: Nyamtama village. 2.4 Km from Lumasi bridge District: Biharamulo Landscape unit: C21 Land form: Footslope Macro relief: Sloping Slope gradient (%): 2 Site position: Lower slope Geological unit: Karagwe-Ankolean System (Upper Division) Parent material: Slope wash deposits derived from phyllites	*Altitude (m) : 1400* Vegetation: Banana. coffee Land use: Crop production	FAO Soil unit: Haplic Phaeozem Soil Taxonomy: Cumulic Haplustoll Drainage class: Well Date described: 23/7/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	*Consistence*	Coarse Material	Other features	Boundary
Ap	0-30	Very dark greyish brown (10YR 3/2)	Silt loam	Moderately. medium and coarse sub-angular blocky	Slightly soft (dry). friable (moist), slightly sticky, slightly plastic (wet)	-	Many fine pores: many fine and medium roots	Clear smooth
AB	30-50	Dark brown (10YR 3/3)	Silt clay loam	Moderate, medium and coarse sub-angular blocky	Slightly sticky slightly plastic (wet), slightly hard (dry), friable (moist)	-	Many fine and medium pores: many fine and medium roots	Clear smooth
2Bw1	50-80	Brown (10YR 4/3)	Loam	Augueed	Slightly sticky and slightly plastic (moist)	Few crushed quartz fragments -	-	Gradual smooth
2Bw2	80-100	Dark brown (10YR 3/3)	As above	Augered	Sticky and plastic	-	-	-
2Bw3	100-150+	Very dark greyish brown (10YR 3/2)	As above	Augered	-		-	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	1	2	4	7	59	-	26	ZL	7.3	6.8	0.17	3.3	0.29	11	29.84	16.91	3.5	0.13	0.02	-	-	18.69	59.2		100		
30-50	1	1	2	4	8	55	-	29	ZCL	7.1	6.1	0.05	1.5	0.15	10	14.79	7.29	2.36	0.03	0.03	-	-	9.43	27.31		100		
70-100	5	7	4	4	7	48	-	25	L	6.9	5.6	0.04	0.9	0.11	8	7.16	4.22	1.11	0.03	0.02	-	-	5.49	18.4		98		

Profile number: P17	**AE Zone:** Western	**Soil code:** L11-h
Map sheet no.: 29/2	Altitude (m): 1410	FAO Soil unit: Haplic Phaeozem
Location : Nyamtama village, 2.1 Km from Profile 16	Vegetation: Banana	Soil Taxonomy: Cumulic Haplustoll
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: C21		Date described: 23/7/1996
Land form: Footslope		
Macro relief: Sloping		
Slope gradient (%): 9		
Site position: Upper slope		
Geological unit: Karagwe-Ankolean System (Upper Division)		
Parent material: Slope wash deposits derived from phyllites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	*Coarse Material*	Other features	Boundary
Ap	0-10	Dark brown (19YR 3/3)	Silt loam	Moderate fine crumb	Soft (dry), very friable (moist), slightly sticky, slightly plastic (wet)	-	Many fine pores: many very fine roots	Clear smooth
AB	10-30	Very dark greyish brown (10YR 3/2)	Silt clay loam	Moderate fine crumb	Slightly hard (dry), friable (moist), slightly sticky, slightly plastic (wet)	-	Many fine pores: many fine roots	Clear smooth
BA	30-50+	Very dark greyish brown (10YR 3/2)	Clay	Moderate fine angular blocky	Slightly hard (dry), friable (moist), slightly sticky, slightly plastic (wet)	-	Few fine pores: few fine and very fine roots	clear smooth

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/k g	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
20-30	3	3	3	4	6	55	-	26	SiL	6.8	5.9	0.13	8.9	0.74	12	30.06	19.46	6.6	0.2	0.02	-	-	27.66	72.2		95		
30-50	2	2	2	3	5	55	-	31	SiCL	6.6	5.6	0.05	3.7	0.19	19	6.49	12.66	2.84	0.3	0.02	-	-	17.98	46.1		88		

Profile number: P18	**AE Zone:** Western	**Soil code:** B41-m
Map sheet no.: 29/2	Altitude (m): 1320	FAO Soil unit: Mollic Gleysol
Location: Nyabugombe village. 2 km from junction to Nyabugombe primary School	Vegetation: Banana. sugarcane, and cocoyam	Soil Taxonomy: Fluvaquentic
District: Biharamulo	Land use: Crop production.	Drainage class: imperfect
Landscape unit: C21	Other features: Scattered settlements, few low (0.25m) termite mounds.	Date described: 1/9/96
Land form: Footslope		
Macro relief: Sloping		
Slope gradient (%): 1		
Site position: Lower slope towards minor valley bottom		
Geological unit: Karagwe-Ankolean System (Middle Division)		
Parent material: Slope-wash and stream deposits derived from phyllites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Apg	0-20	Dark grey (7.5YR 4/1)	Silt loam	Moderate; medium and coarse subangular blocky	Extremely hard; firm; slightly sticky; slightly plastic	-	Many fine pores; many very fine and fine abundant; fine, distinct sharp strong brown mottles 7.5YR 5/8)	Clear smooth
Cg1	20-40	Very dark grey (7.5YR 3/1)	Clay loam	Moderate; coarse; blocky	Extremely hard; firm; slightly sticky; slightly plastic	-	Many fine pores; many very fine and fine abundant; fine, distinct sharp strong brown mottles (7.5YR 5/8)	as above
Ccg2	40-70	Brown (7.5YR 5/2)	Heavy clay	Massive	Extremely hard, extremely firm; sticky and plastic		Few very fine, very few fine pores; few very fine roots; mottles as above	as above
Ccg3	70-120+	As above	Sandy clay loam	As above	Extremely hard, extremely firm; sticky and plastic	-	-	-

ANALYTICAL DATA

Depth	*Particle size*								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	7	12	16	8	22	-	33	CL	6.2	5	0.11	1.7	0.12	14	30.61	18.21	10.1	0.03	0.02	-	-	39.39			72		
30-50	1	3	6	8	4	21	-	57	C	7	5.7	0.26	0.8	0.05	16	28.87	30.25	16.13	0.02	0.02	-	-	45.96			100		
70-80	2	6	10	11	5	12		54	C	8.3	6.7	0.36	0.4	0.03	13	18.22	30.25	15.96	0.02	0.02	-	-	32.34			100		

Profile number: P19	**AE Zone:** Western	**Soil code:** L23-m
Map sheet no: 19/3 Location : Ruziba-Rugondo village. Summit of Rugondo Hill District: Biharamulo Landscape unit: B62 Land form: Plateau ridge Macro-relief: Hilly Slope gradient (%): 0 Site position: Ridge summit Geological unit: Bukoba Sandstone (Bukoban System) Parent material: Residual deposits derived from sandstones	Altitude (m): 1560 Vegetation: Fallow / bushland vegetation Land use: Livestock production Other features: Clearing for cultivation: slight sheet erosion	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 15/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistency	Coarse Material	Other features	*Boundary*
Ap	0-15	Dark reddish brown (5YR 3/2)	Sandy loam	Moderate fine granular	Soft; very friable; non-sticky non-plastic	-	Many fine pores; many very fine roots	Clear smooth
AB	15-30	Dark reddish brown (2.5 YR 3/3)	Sandy loam	Moderate fine granular	Slightly hard; very friable; non-sticky; non-plastic	-	Many fine pores; many very fine few coarse roots.	Gradual smooth
Bt	30-60	Dark reddish brown (2.5YR 3/4)	Sandy clay loam	Moderate fine blocky	Slightly hard; very friable; slightly sticky; slightly plastic	-	Many very fine and fine pores; many very fine roots.	As above
Btcs1	60-80	Dark reddish brown (2.5YR 3/4)	Gravelly sandy clay loam	Moderate medium and coarse blocky	Slightly hard; very friable; slightly sticky; slightly plastic	Frequent secondary ironstone gravel	Many very fine pores; many very fine; common medium roots.	As above
Btcs2	80-150+	Dark reddish brown (2.5YR ¾)	Very gravelly sandy clay loam	Moderate medium blocky	Slightly hard; very friable; slightly sticky; slightly plastic	As above, but dominant	Many medium pores; many very fine (root)	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-15	1	6	35	23	5	7	-	23	SL	5.6	4.5	0.02	2.7	0.19	14	2.78	4.26	1.32	0.03	0.02	-	-	10.05	32.0		56		
30-60	1	4	28	29	6	5	-	27	SCL	5.3	4	0.01	0.7	0.05	14	0.11	0.06	0.02	0.01	0.02	0.86	1.92	6.02	19.7		2		32

Profile number: P20	**AE Zone:** Western	**Soil code:** R21-m
Map sheet no.: 19/3	Altitude (m) :1470	FAO Soil unit: Luvic Phaeozem
Location : Nyankanga Hill	Vegetation: Forest with about 60 % Brachestegia tree spp.	Soil Taxonomy: Typic Argiustoll
District: Biharamulo	Land use: Forest Reserve	Drainage class: Somewhat excessively
Landscape unit: B64	Other features : slight encroachment by tree cutters and cultivators	Date described: 24/7/1996
Land form: Plateau ridge		
Macro-relief: Steeply dissected		
Slope gradient (%): 14		
Site position: Middle slope		
Geological unit: Bukoba Sandstone (Bukoban System)		
Parent material: Residual deposits derived from sandstones		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Sandy clay loam	Strong; coarse and medium blocky	Extremely hard; friable slightly sticky; slightly plastic	-	Many fine pores; many fine and medium roots	Clear smooth
AB	10-35	Brown (7.5YR 4/3)	Clay loam	Strong: fine and medium subangular blocky	Extremely hard; friable; sticky and slightly plastic		Many fine and medium pores: many fine and coarse roots; many vertical dryness cracks.	Clear smooth
Bt	35-65	Brown (7.5YR 4/3)	Clay loam	Moderate: medium and coarse subangular blocky	Extremely hard; very firm sticky slightly plastic	-	Few fine pores; many fine roots	
CR	65+						Rotten sandstones	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																					
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al							
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg				%		
0-10	1	9	18	16	7	26	23		SCL	6.4	5.4	0.06	3.5	0.32	11	16.34	11.4	5.6	0.1	0.05			20.84	75.4			82		
30-50	1	7	14	13	6	23	36		CL	6.1	4.5	0.02	0.8	0.08	10	27.7	5.03	4.92	0.02	0.05			13.92	36.8			72		

Profile number: P21	AE Zone: Lake shore	**Soil code:** L23-m
Map sheet number: 19/3	Altitude (m): 1220	FAO Soil unit: Haplic Acrisol
Location : Imaraserere	Vegetation: Fallow vegetation dominated by Hyperrenia spp.	Soil Taxonomy: Typic Rhodustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: F32		Date described: 22/7/1996
Land form: Footslope		
Macro-relief: Gently sloping		
Slope gradient (%): 8		
Site position: Upper slope		
Geological unit: Archean Granite		
Parent material: Slope-wash deposits derived from biotite granites		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/2)	Sandy loam	Moderate: fine: granular and blocky	Soft: very friable, non-sticky non plastic	-	Many: fine and very fine pores: many very fine and fine roots	Gradual smooth
AB	15-35	Dark reddish brown (5YR 3/3)	Sandy loam	Strong: medium blocky	Slightly hard; firm: non-sticky and non-plastic	-	Common: fine pores: many very fine roots	Gradual smooth
Bt1	35-60	Dark reddish brown (5YR 3/4)	Sandy loam	Many: medium; blocky	Hard: friable; slightly sticky; slightly plastic	-	Common: fine pores: many very fine roots	Gradual smooth
Bt2	60-85	Yellow red (5YR 4/6)	Sandy clay loam with fine gravel	Medium and fine subangular blocky	Soft; very friable: slightly sticky; slightly plastic	Few fine quartz gravel	Many very fine pores: few very fine roots	Gradual smooth
Bt3	85-110	Yellow red (5YR 4/6)	As above	Weak fine blocky	Soft; very friable: slightly sticky; slightly plastic	As above	Many very fine pores: few very fine roots	Gradual smooth
Bt4	110-150+	Yellow red (5YR 4/6)	As above	Weak fine blocky	Soft: very friable; slightly sticky; slightly plastic	As above	Many fine pores: few fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	PH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	ECEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg			%		
0-15	6	9	20	31	13	11	-	10	SL	6.3	5.2	0.03	0.8	0.06	13	3.59	2.15	0.7	0.06	0.03	-	-	3.87	30.7		76		
30-50	9	12	21	23	9	9	-	17	SL	5.3	4.1	0.02	0.3	0.03	10	1.24	0.45	0.29	0.03	0.03	0.02	0.86	3.73	20.2	9.9	21		
100-120	8	10	17	21	12	12	-	20	SCL	5.5	4.3	0.01	0.2	0.02	10	6.03	1.62	0.82	0.02	0.03	-	-	4.62	22..1		54		

Profile number: P22	**AE Zone:** Lake shore	**Soil code:** L32-m
Map sheet no: 9/3 Location : Imaraserere village District: Biharamulo Landscape unit: F32 Land form: Footslope Macro-relief: Undulating Slope gradient (%): 5 Site position: Upper slope Geological unit: Archean Granite Parent material: Slope-wash deposits derived from biotite granites	Altitude (m): 1200 Vegetation: Fallow vegetation after maize Land use: Crop production Other features: Slight sheet erosion	FAO Soil unit: Haplic Lixisol Soil Taxonomy: Typic Kanhaplustalf Drainage class: Well Date described: 23/7/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Strong brown (7.5YR 3/4)	Loamy sand	Weak fine granular and blocky	Soft, very friable, non sticky non plastic	-	Many very fine (pores) many very fine roots	Clear smooth
AB	15-35	Yellow red (5YR 4/6)	Sandy loam	Moderate fine, granular and blocky	Slightly hard, friable, slight stick, slightly plastic	-	Many fine and very fine pores: many very fine roots.	Gradual smooth
Bt1	35-60	Yellow red (5YR 4/6)	As above	Weak fine blocky	Soft, very fine, slightly sticky, slightly plastic	-	Many fine pores: many very fine roots; few termite nests.	Gradual smooth
Bt2	60-95	Reddish brown (5YR 4/4)	Sandy clay loam	Moderate fine and medium, blocky	Soft; very fine, slightly sticky, slightly plastic	-	Many fine pores; many very fine roots; few termite nests.	Gradual smooth
Bt3	95-125	Yellow red (5YR 4/6)	Sandy clay loam	Weak, fine blocky	Slightly hard; very friable; slightly sticky; slightly plastic	-	Common fine pores: few very fine roots	Diffuse smooth
Bt4	125-150+	Yellow red (5YR 4/6)	As above	Moderate fine and medium blocky	Soft very friable; slightly sticky, slightly plastic	-	as above	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg		%		
0-15	5	10	25	31	10	10	-	9	LS	5.7	4.5	0.02	0.4	0.03	13	2.26	1.22	0.58	0.03	0.03	-	-	3.21	31.2		58		
30-50	5	10	20	25	12	12	-	16	SL	5.5	4	0.02	0.1	0.01	10	1.18	1.05	0.59	0.03	0.03	-	-	3.21	19.4		53		
100-120	7	9	18	20	12	9	-	25	SCL	6	4	0.02	0.1	0.01	10	1.24	0.57	0.15	0.07	0.03	-	-	1.21	4.4		68		

Profile number: P23	**AE Zone:** Lake Shore	**Soil code:** S12-m
Map sheet number: 19/3 Location: 3.2 Km west from Bupandwampuli centre. Imaraserere. District: Biharamulo Landscape unit: F32 Land form: Footslope Macro-relief: Undulating Slope gradient (%): 2 Site position: Lower slope Geological unit: Archean Granite Parent material: Slope-wash deposits derived from biotite granites	Altitude (m): 1180 Vegetation: Cassava Land use: Crop production	FAO Soil unit: Haplic Alisol Soil Taxonomy: Arenic Haplustult Drainage class: Well Date described: 23/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (10YR 3/3)	Loamy sand	Moderate fine granular	Soft, very friable, non-sticky, non-plastic	-	Many fine pores; may fine roots; few termite nests;	Clear smooth
AB	15-40	Brown (7.5YR 4/3)	Loamy sand	Medium fine granular and blocky	Soft, very friable, non-sticky, non-plastic	-	Many fine pores; many very fine, roots	Gradual smooth
Bt1	40-55	Brown (7.5YR 4/4)	Loamy sand	Weak, fine blocky	Soft, very friable, non-sticky, non-plastic	-	Many fine pores; many very fine, few fine roots	As above
BC	55+			-	-	Dominant granite gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable. Cations						CECs	CECe	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg			%		
0-15	5	10	25	31	11	13	-	5	LS	6.3	5.1	0.01	0.7	0.04	18	8.16	1.69	0.49	0.03	0.03	-	-	2.95	45.6		76		
30-50	4	11	27	31	10	8	-	9	LS	5.7	4.2	0.02	0.2	0.02	10	2.23	0.54	0.22	0.01	0.03	0	0.34	2.07	20.8		39		

Profile number: P24	**AE Zone:** Eastern	**Soil code:** L23-m
Map sheet number: 19/3 Location: Bupandwampuli 200 m E of village centre District: Biharamulo Landscape unit: F24 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 4 Site position: Upper slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	Altitude (m): 1210 Vegetation: Fallow vegetation after maize Land use: Crop cultivation Other features: Slight sheet erosion	FAO Soil unit: Haplic/Ferric Acrisols Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 22/7/1996

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Dark brown (10YR 3/3)	Loamy sand	Moderate fine and medium blocky	Soft very firm; non-sticky; non-plastic		Many fine; few coarse (pates) many fine roots	Gradual smooth
AB	20-30	Dark brown (7.5YR 3/4)	Sandy loam	Moderate medium and coarse blocky	Slightly hard, very friable, non-sticky non-plastic		Many very fine pores: many fine roots: few vertical dryness cracks	Gradual smooth
Bt1	30-55	Yellowish red (5YR 4/6)	Sand loam	Moderate medium and coarse subangular blocky	Slightly hard; very friable; slightly sticky; slightly plastic		Many very fine pores: many very fine roots: one big large termite nest of diameter 5 cm.	Gradual smooth
Bt2	55-85	Yellowish red (5YR 4/6)	Sand loam	Moderate medium and coarse subangular blocky	Slightly hard; very friable; slightly sticky: slightly plastic	Dominant >90%; fine and medium, weathered and fresh; sub-rounded quartz gravel -	Many very fine pores; many very fine roots: one big large termite nest of diameter 5 cm,	Gradual smooth
BC	85-150+					Dominant granite gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	7	25	36	14	4	-	12	LS	5.8	4.7	0.06	0.7	0.06	12	1.84	1.28	0.57	0.1	0.04	-	-	3.21	20.9		62		
30-50	4	7	18	27	13	12	-	19	SL	5.1	4	0.04	0.3	0.02	15	0.59	1.18	0.62	0.05	0.05	0	1.44	8.56	43.5		22		17

Profile number: P25	**AE Zone:** Eastern	***Soil code:*** *S24-m*
Map number: 31/1 Location: Chabulongo District: Biharamulo Landscape unit: F22 Landform: Fan slope Macro-relief: Very gently sloping Slope gradient (%): 1 Site position: Lower Geological unit: Archean Granite Parent material: Stream deposits derived from biotite granites	Altitude (m): 1200 Vegetation: Bushland Land use: Livestock production Other features: Few termite mounds; slight sheet erosion; 2 mm thick surface seal	FAO Soil unit: Gleyic Arenosol Soil taxonomy: Arenic Albaquult Drainage class: Imperfect Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-30	Dark greyish brown (10 YR 4/2)	Loamy Sand	Weak, fine and medium prismatic and blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Clear smooth
EA	30-60	Brown (10 YR 4/3)	As above	As above	As above	-	Many, fine and medium, prominent, clear, yellowish red mottles	As above
EBg	60-80+	Dark yellowish brown (10 YR 4/4)	As above	Weak, fine and medium blocky	As above	-	Many, fine and medium, distinct, clear, yellowish red mottles	As above

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2o	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable. Cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	13	22	33	14	7	-	8	LS	5.6	4.2	0.02	0.4	0.02	20	1.12	1.05	0.37	0.05	0.02	-	-	2.71	28.9		55		
30-40	4	13	22	30	14	7		10	LS	5.3	3.9	0.01	0.2	0.02	10	1.89	0.46	0.21	0.05	0.02	0	0.81	3.37	31.7		22		24
70-80	6	15	20	24	13	9		13	LS	5.2	3.8	0.01	0.2	0.02	10	0.4	0.31	0.24	0.05	0.02	0	1.41	5.21	38.5		12		27

Profile number: P26	**AE Zone:** Eastern	**Soil code:** S24-m
Map sheet number: 31/1 Location- village: Chabulongo District: Biharamulo Landscape unit: F22 Landform: Fan slope Macro-relief: Very gently sloping Slope gradient (%): 2 Site position: Middle slope Geological unit: Archean Granite Parent material: Stream deposits derived from biotite granites	Altitude (m): 1220 Vegetation: Fallow vegetation after cotton Land use: Crop production Other features: Ridging; 2 mm thick surface seal; 5 % rock outcrops; slight sheet erosion	FAO Soil unit: Gleyic Arenosol Soil taxonomy: Arenic Albaqualfl Drainage class: Well Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-20	Dark brown (10YR 4/3)	Sand	Weak, fine and medium, granular and blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Abrupt smooth
Eg1	20-50	Yellowish brown (10YR 5/4)	Loamy sand	Weak, fine and medium blocky	as above	-	As above, but with common, fine and medium, prominent reddish brown (5YR 5/4) mottles	As above
Eg2	50-90+	Pale brown (10YR 6/3)	Sand	as above	as above	-	-As above, but few distinct mottles	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	14	33	30	12	6	-	4	S	5.4	4.3	0.02	0.3	0.02	15	3.85	0.72	0.3	0.03	0.02	0.08	0.02	2.6	57.5		41		1
30-40	1	14	34	27	9	9	-	6	LS	5.8	3.7	0.01	0.1	0.01	10	0.98	0.31	0.24	0.03	0.03	-	-	0.98	14.7	10.2	62		
70-80	1	16	33	26	11	12	-	1	S	6.8	4.6	0.01	0.1	0.01	10	0.66	0.03	0.03	0.03	0.03	-	-	0.13?	7.5		96?		

Profile number: P27

Map number: *31/1*

Location: Chabulongo
District: Biharamulo
Landscape unit: F31
Landform: Footslope
Macro-relief: Gently sloping
Slope gradient (%): 5
Site position: Upper slope
Geological unit: Archean Granite
Parent material: Slope-wash deposits derived from granites

AE Zone: Eastern

Altitude (m): 1200
Vegetation: Bushland
Land use: Grazing
Other features : Few termite mounds; slight sheet erosion; 2 mm thigh surface seal

Soil code: S12-1

FAO Soil unit: Haplic Acrisol
Soil taxonomy: Arenic Haplustult
Drainage class: Moderately well drained
Date described: 24/8/1996

Remark: field texture is more sandy than laboratory data show

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-20	Dark brown (10YR 4/3)	Sand	Weak, fine and medium prismatic and blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Clear smooth
AB	20-40	Strong brown (7.5YR 4/6)	Sandy loam	As above	As above	-	Many, fine and medium, prominent, clear, yellowish red mottles	As above
Btg1	40-70	Brown (7.5YR 4/4)	Sandy oam	Weak, fine and medium blocky	As above	-	Many, fine and medium, distinct, clear, yellowish red mottles	As above
Btg2	70-100+	Brown (7.5YR 4/4)	Sandy clay loam	Weak, fine and medium blocky	As above	-	Many, fine and medium, distinct, clear, yellowish red mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	12	31	34	8	8	-	6	S	5	3.8	0.02	0.2	0.02	10	1.12	0.45	0.23	0.05	0.02	0.13	1.01	5.73	92.2		13		18
30-40	1	12	30	25	7	8	-	17	SL	4.9	3.6	0.01	0.3	0.02	15	0.61	1.1	0.17	0.05	0.02	-	-	3.72	20.1	7.9	36		
70-80	2	11	27	22	7	7	-	24	SCL	4.7	3.5	0.02	0.3	0.02	15	0.43	0.11	0.08	0.05	0.02	-	-	0.81	2.1	1.1	32		

Profile number: P28	**AE Zone:** Lake Shore	**Soil code:** S21-I
Map sheet no: 31/2	Altitude (m) : 1150	FAO Soil unit: Haplic Alisol
Location: Chato village, Junction to Mwaloni round Bwina point.	Vegetation: Fallow vegetation dominated by Hyperrenia spp.	Soil Taxonomy: Arenic Haplustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: F12	Other features : Ridging	Date described: 24/7/1996
Land form: Lake-plain flats		
Macro-relief: Almost flat		
Slope gradient (%): 2		
Site position: Middle of plain flat		
Geological unit: Archean Granite		
Parent material: Lake deposits derived from undifferentiated granites		

Horizon designation	Depth Cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (10YR 3/3)	Loamy sand	Moderate: fine and medium blocky	Soft (dry); very friable (moist); slightly sticky; slightly plastic (wet)	-	Many fine pores: many fine and medium roots	Clear smooth
AB	15-45	Brown (7.5YR 4/4)	Loamy sand	Moderate: fine and medium blocky	Slightly hard (d); very fine (moist); non-sticky (wet)	-	Many fine pores; few fine, medium coarse roots.	Gradual smooth
Bt1	45-65	As above	Sandy loam	Weak: medium and coarse blocky	Slightly hard (dry); firm, non-sticky; non-plastic	-	Many fine (pore); few fine and medium roots.	Diffuse smooth
Bt2	65-100	As above	As above	Weak: medium and coarse blocky	Slightly hard (dry); firm, non-sticky; non-plastic	-	Many fine few coarse pores: many fine few medium roots.	Clear smooth
Bt3	100-120	Strong brown (7.5YR 4/6)	As above	Weak: medium and coarse blocky	Slightly hard (dry); firm, non-sticky non plastic		Many fine few coarse pores: many fine few medium roots.	Gradual smooth
Bt4	120-150+	Brown (7.5YR 4/4)	Sandy clay loam	Weak: fine blocky	Slightly hard; very friable; non-sticky; non-plastic	-	As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					silt		clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		%
0-15	14	25	21	18	9	8	-	5	LS	4	3.3	0.22	2.1	0.2	11	11.23	0.36	0.25	0.12	0.04	0.28	1.1	5.65	71.0		14		19
30-50	16	28	18	13	7	9	-	9	SL	4.5	3.6	0.09	0.2	0.02	10	1.84	0.54	0.21	0.11	0.03	0.02	1.82	7.8	84.4		11		23
100-120	11	21	20	17	10	12	-	9	SL	4.5	3.6	0.13	0.2	0.01	20	29.89	0.69	0.3	0.2	0.04	0.02	1.57	7.72	83.6		16		20

Profile number: P29	**AE Zone:** Eastern	**Soil code:** L22-1
Map sheet number: 45/2 Location: Kasaka village District: Biharamulo Landscape unit: F42 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 2 Site position: Ridge summit Geological unit: Archean Granite Parent material: Residual deposits derived from leucogranites	Altitude (m): 1260 Vegetation: Fallow vegetation with young Brachestegia spp. Land use: Crop production	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 23.08.1996.

Horizon designation	Depthcm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Brown (7.5YR 4/3)	Sandy loam	Strong, medium and coarse, blocky	Hard, friable, slightly sticky slightly plastic		Many fine, few medium pores; many fine, few coarse roots	Clear smooth
AB	20-55	Strong brown (7.5YR 4/6)	Sandy clay loam	Strong, medium and coarse, blocky	Very hard, fine slightly sticky, slightly plastic		Few fine and medium pores; few fine and coarse roots, few scattered charcoal fragments	Gradual smooth
Bt1	55-95	Strong brown (7.5YR 5/8)	Sandy clay loam	Weak, medium and fine blocky	Very friable, slightly sticky, slightly plastic		Many fine, and very fine pores; few medium many fine roots	As above
Bt2	95-120+	Strong brown (7.5YR 5/6)	Sandy clay	Weak, medium and fine blocky	Very few, slightly sticky, slightly plastic		Many very fine pores; very few fine roots; few, thin clay cutans	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	14	25	26	10	6	-	14	SL	5.2	4	0.02	0.5	0.02	10	3.45	0.29	0.15	0.02	0.03	0.02	0.6	2.58	14.9	7.93	19		23
30-50	4	9	15	20	10	8	-	34	SCL	4.6	3.8	0.05	0.3	0.02	15	1.02	0.19	0.14	0.01	0.03	0.02	1.82	7.37	20.8	6.50	5		25
80-100	4	7	12	19	13	9	-	36	SC	4.8	3.8	0.01	0.2	0.05	10	0.32	0.32	0.13	0.01	0.03	0	1.81	7.19	19.4	6.39	7		25

Profile number: P30	**AE Zone:** Eastern	**Soil Code:** S22-m
Map number: 42/2 Location : Kasaka village District: Biharamulo Landscape unit: F23 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from leucogranites	Altitude (m): 1250 Vegetation: Grasses fallow after maize Land use: Crop production	FAO Soil unit: Haplic Phaeozem Soil Taxonomy: Typic Haplustoll Drainage class: Well Date described: 23.08.1996.

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistency	Coarse Material	Other features	*Boundary*
Ah	0-20	Dark brown (7.5YR 3/2)	Loamy sand	Moderate, medium and fine, blocky	Slightly hard, very friable non-sticky, non-plastic	-	Many very fine pores: many very fine roots	Clear smooth
AB	20-45	Brown (7.5YR 4/3)	Sand	Weak, fine and medium blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many very fine pores: many very fine roots	Gradual smooth
Bt1	45-80	Brown (7.5YR 4/3)	As above	Weak, fine and medium, angular and blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many very fine pores; many very fine roots	As above
Bt2	80-120	Brown (7.5YR 4/4)	As above	Weak, fine and medium, angular and blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many fine pores: few fine roots;	As above
Bt3	120-155+	Brown (7.5YR 5/4)	As above	Weak, fine and medium, angular and blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many fine pores: few very fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					*Silt*		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	12	26	22	18	9	8	-	5	LS	6.1	5.2	0.02	0.8	0.07	11	3.02	1.11	0.58	0.01	0.03	-	-	2.4	32.0		72		
30-50	11	21	24	23	9	8	-	4	S	5.6	4.2	0.01	0.3	0.02	15	1.16	0.16	0.15	0.01	0.03	-	-	0.64	8.5	8.75	55		
70-90	8	21	24	25	11	7	-	4	S	5.5	4.2	0.01	0.1	0.01	10	0.8	0.13	0.1	0.01	0.03	-	-	0.52	10.5	6.75	52		

Profile number: P31	**AE Zone:** Eastern	**Soil Code:** S25-m
Map sheet number: 45/2 Location : Kasaka village District: Biharamulo Landscape unit: F42 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from leucogranites	Altitude (m): 1240 Vegetation: Maize with few Acacia spp. and young Brachestegia spp. Land use: Crop production	FAO Soil unit: Gleyic Arenosol Soil Taxonomy: Aquic Kanhaplustult Drainage class: Moderately well Date described: 23.08.1996.

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/2)	Sand	Moderate, medium and fine, blocky	Soft, very friable non-sticky, non-plastic		Many very fine pores; many very fine roots	Abrupt smooth
AB	15-45	Brown (7.5YR 4/3)	Sand	Weak, fine and medium blocky	Slightly hard, very friable, non-sticky, non-plastic		Many very fine pores; many very fine roots	gradual smooth
Eg1	45-80	Brown (7.5YR 5/4)	Sand	Weak, fine and medium, angular and blocky	Soft, very friable non-sticky, non-plastic		Many very fine pores; many very fine roots, few faint strong brown (7.5YR 5/6) mottles	as above
Eg2	80-120	Strong brown (7.5YR 5/6)	Loamy sand	Weak, fine and medium, angular and blocky	Soft, very friable non-sticky, non-plastic		Many fine pores; few fine roots; strong brown mottles (7.5YR 5/6)	as above
Btg	120-155	Brown (7.5YR 5/4)	Loamy sand	Weak, fine and medium, angular and blocky	Soft, very friable non-sticky, non-plastic		As above	

ANALYTICAL DATA

Depth	*Particle size*								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations							CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	8	26	26	22	8	7	-	3	S	5.9	4.9	0.02	0.5	0.04	13	6.16	0.66	0.17	0.01	0.03	-	-		1.32	27.3	66		
30-50	6	23	26	26	8	6	-	5	S	5.5	4.2	0.01	0.2	0.01	20	3.02	0.11	0.04	0.01	0.03	-	-		0.37	3.4	51		
70-90	5	20	25	28	10	6	-	6	LS	5.5	4.1	0.01	0.1	0.01	10	1.37	0.09	0.06	0.01	0.03	-	-		0.39	4.8	49		

Profile number: P32	**AE Zone:** Eastern	**Soil code:** B21-m
Map sheet no.: 45/2	Altitude (m): 1235	FAO Soil unit: Gleyic Phaeozem, inundic phase
Location: 9 Km W from the main road in Kasaka valley	Vegetation: Fallow vegetation dominated by grasses	Soil Taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Crop production	Drainage class: Imperfect
Landscape unit: F41	Other features : Soil is calcareous with hard calcium carbonate concretions at depth	Date described: 23/08/1996
Land form: Valley bottom		
Macro-relief: Flat		
Slope gradient (%): 0		
Site position: Centre of valley		
Geological unit: Archean Granite		
Parent material: Stream deposits derived from undifferentiated granites		

Horizon designation	*Depth* cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistency	Coarse Material	Other features	Boundary
Apg	0-25	Very dark grey (10YR 3/1)	Silt loam	Moderate medium and coarse blocky	Slightly hard, firm slightly sticky slightly plastic	-	Few fine pores; many very fine roots; very few, very fine, faint sharp brown (7.5YR 4/3) mottles	Clear smooth
Btg1	25-50	Very dark grey (10YR 3/1)	Silt loam	Massive	Extremely hard, extremely firm, sticky and plastic	-	Few very fine pores; many fine roots; few new vertical and horizontal dryness cracks and very few, very fine brown mottles (7.5YR 4/3) along root channels.	Clear smooth
Btgck1	50-80	Very dark grey (10YR 3/1)	Heavy clay	Massive	Extremely hard, extremely firm, sticky and plastic	Few coarse and medium CaCO3 concretions	Few very fine pores; many fine roots; few new vertical and horizontal dryness cracks and very few, very fine brown mottles (7.5YR 4/3) along roots channels, few coarse and	Clear smooth
Btgck2	80-100+	Dark grey (10YR 4/1)	Heavy clay	Massive	Extremely hard, extremely firm, sticky and plastic	As above	Few very fine pores; many fine roots; few new vertical and horizontal dryness cracks and very few, very fine brown mottles (7.5YR 4/3) along roots channels, few coarse and	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable Cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-25	2	2	4	10	12	54	-	16	ZL	6.3	5	0.07	4.1	0.38	11	5.4	8.5	2.05	0.02	0.3	-	-	14.3	63.8		76		
30-50	3	11	9	7	5	19	-	46	C	7.4	6	0.28	1.2	0.11	11	31.59	12.64	6.62	0.01	0.8	-	-	17.76	36.0		100		
70-100	2	3	3	4	5	24	-	59	C	8.5	6.9	0.35	0.4	0.03	13	2.89	19.57	9.79	0.02	0.1	-	-	19.65	32.6		100		

Profile number: P33	**AE Zone:** Southern	**Soil Code:** R12-m
Map sheet number: 44/1 Location: Kalenge village, 3.5 km W of the police post District: Biharamulo Landscape unit: A33 Land form: Hill ridge Macro-relief: Steep Slope gradient (%): 20 Site position: Upper slope Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Residual deposits derived from cherts and limestones	Altitude (m): 1240 Vegetation: Grasses with few Acacia spp. and young Brachestegia spp. Land use: Livestock production: wood production (building poles, fire wood)	FAO Soil unit: Umbric Leptosol, rudic and skeletic phase Soil Taxonomy: Lithic Humitropept Drainage class: Excessive Date described: 12/07/1996.

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Brown (10YR 4/3)	Very gravelly clay loam	Weak fine, granular and crumb	Slightly hard, very friable, slightly sticky, slightly plastic	Very frequent secondary ironstone gravel	Abundant very fine and fine pores; many fine roots	Clear smooth
AB	10-25	Dark brown (7.5YR 3/3)	Very gravelly sandy clay	Weak fine, granular and crumb	Slightly hard, very friable slightly sticky, slightly plastic	As above	Abundant fine and medium pores; many few and medium roots	?
BmsR	25+						Chert rock and secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg			%		
0-10	4	5	10	14	8	20	-	39	CL	6.3	5.3	0.04	3.2	0.17	19	8.34	6.9	3.61	0.06	0.04	-	-	13.84	27.3		77		
10-25	4	4	9	13	7	21	-	42	C	5.3	4	0.02	2.2	0.12	18	2.43	3.34	1.73	0.03	0.04	0.02	0.92	13.52	27.0		38		7

Profile number: P34	**AE Zone:** Southern	**Soil code:** L11-m
Map sheet number: 44/1	Altitude (m): 1240	FAO Soil unit: Luvic Phaeozem
Location : West of Kalenge village. 2.1 km in Kasunzu's farm	Vegetation: Banana, papaya and cassava with few Acacia spp.	Soil Taxonomy: Typic Argiustoll
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: A32		Date described: 25/08/1996.
Land form: Footslope		
Macro-relief: Gently sloping		
Slope gradient (%): 5		
Site position: Upper slope		
Geological unit: Uha Sandstone Group (Bukoban System)		
Parent material: Slope-wash deposits derived from fine grained sandstones		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistency	Coarse Material	Other features	Boundary
Ap	0-20	Very dark greyish brown (10YR 3/2)	Sand clay loam	Moderate, fine and medium granular	Very hard (dry), friable, slightly sticky, slightly plastic (wet)	-	Many fine pores: many fine roots; few termite nests 2-4 cm	Abrupt smooth
AB	20-40	Very dark greyish brown (10YR 3/2)	Clay loam	Moderate coarse blocky	Extremely hard, friable slightly sticky, slightly plastic	-	Many fine few medium pores: many fine roots	Gradual smooth
Bt1	40-65	Dark yellowish brown (10YR 4/4)	As above	Weak medium and fine blocky	Hard friable sticky and plastic	-	Many fine few medium pores; few fine and very fine roots; some few termite nests with 2-4 cm in diameter	Gradual smooth
Bt2	65-95	Greyish brown (10YR 5/2)	Clay	Weak, fine and medium blocky	Hard friable sticky and plastic	-	Very few medium and fine pores; few very fine and fine roots	Gradual smooth
Bt3	95-125	Brown (10YR 5/3)	As above	Weak, fine and medium block	Soft, very friable slightly sticky slightly plastic	Few (5 -10%)-dark reddish gravel slightly weathered irregular chert gravel	Many fine few medium pores	Gradual smooth
Bt4	125-150+	Pale brown (10YR 6/3)	As above	Weak, fine and medium block	Soft, very friable slightly sticky slightly plastic	Frequent (10-30%)-dark reddish gravel slightly weathered irregular chert gravel	Many fine few medium pores	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay									Ca	Mg	K	Na	H	Al						
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine			1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
cm	%	%	%	%	%	%	%	%																				
0-20	1	4	14	19	10	27	-	25	SCL	6.2	5.3	0.09	1.8	0.09	20	18.26	5.72	1.25	0.06	0.03	-	-	9.54	31.0		74		
40-65	1	3	9	13	8	27	-	39	CL	6	4.8	0.02	0.5	0.04	13	5.02	4.31	2.82	0.03	0.03	-	-	10.57	25.8		68		
65-95	1	2	7	11	8	29	-	42	C	6.2	5	0.02	0.5	0.04	13	3.8	5.24	3.93	0.03	0.04	-	-	12.32	28.1		75		

Profile number: P35	**AE Zone:** Southern	**Soil code:** L14-h
Map sheet number: 44/1 Location : West of Kalenge village. 5.1 km in Kasunzu's farm District: Biharamulo Landscape unit: A32 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 2 Site position: Middle slope Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Slope-wash deposits derived from fine grained sandstones	Altitude (m): 1210 Vegetation: Banana, papaya and cassava with scattered Acacia spp. Land use: Crop production	FAO Soil unit: Ferric (?) Alisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 25/08/1996.

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistency	Coarse Material	Other features	Boundary
Ap	0-15	Brown (7.5YR 5/3)	Loamy sand	Weak, fine and medium blocky	Soft when dry, very friable when moist, non-sticky and non-plasite when wet	-	Many fine pores; many fine roots; few termite nests 2-4 cm	Clear smooth
AB	15-30	Dark brown (7.5YR 3/3)	As above	Weak, fine blocky	Hard when dry, very friable when moist, slightly sticky and slightly-plasite when wet	-	Many fine few medium pores; many fine roots	Gradual way
Bt1	30-60	Reddish brown (5YR 5/3)	Sandy loam	Weak medium and fine blocky	Extremely hard when dry, friable when moist, slightly sticky and slightly-plasite when wet	-	Many fine few medium pores; few fine and very fine roots; some few termite nests with 2-4 cm in diameter	Clear smooth
Bt2	60-85	Reddish brown (5YR 5/3)	As above	Weak medium and fine blocky	Hard when dry, friable when moist, slightly sticky and slightly-plasite when wet	-	Very few medium and fine pores; few very fine and fine roots	Diffuse smooth
Bt3	85-125	Reddish brown (5YR 5/4)	Sandy clay loam	Very weak, fine block	Firm when dry, very friable when moist, slightly sticky and slightly-plasite when wet		Many fine few medium	Gradual smooth
Bt4	125-150+	Yellowish red (5YR 6/4)	As above	Very weak, fine and medium blocky	Hard when dry, very friable when moist, slightly sticky and slightly-plasite when wet	some few (5 -10%)-dark reddish gravel slightly weathered irregular chert gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5		dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg	cmol/kg			%		
0-15	0	5	36	31	8	15	-	5	LS	6.6	6.5	0.02	0.4	0.05	8	3.8	1.59	0.59	0.55	0.03	-	-	2.54			89		
30-60	0	5	27	24	8	19	-	17	SL	5.3	4	0.03	0.2	0.02	10	1.96	1.48	0.55	0.02	0.03	0.14	0.34	5.56			37		6
85-110	0	3	23	20	7	16	-	31	SCL	4.9	3.7	0.02	0.2	0.01	20	1.14	0.93	0.44	0.01	0.04	0.12	1.63	8.57			17		19

Profile number: P36	**AE Zone:** Eastern	**Soil code:** R21-m
Map sheet number: 44/1 Location : West of Kayenze District: Biharamulo Landscape unit: F42 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Ridge summit Geological unit: Archean Granite Parent material: Residual deposits derived from leucogranites	Altitude (m): 1220 Vegetation: Fallow vegetation Land use: Crop production	FAO Soil unit: Luvic Phaeozem, skeletic phase Soil Taxonomy: Typic Argiustoll Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap1	0-5	Very dark greyish brown (10 YR 3/2)	Loamy sand	moderate, fine blocky	slightly hard, very friable, non sticky, non plastic	-	rich in slightly humified organic matter	Clear smooth
Ap2	5-20	Yellowish brown (10 YR 5/4)	As above	moderate, fine and medium blocky	slightly hard, friable, slightly sticky, slightly plastic	2 %, fine, slightly hard, irregular, ferruginous	>1 %, small charcoal pieces	gradual smooth
Bt1	20-45	Dark yellowish brown 10YR 4/6)	Sandy loam	moderate, fine and medium blocky	as above	As above	1 %, 2 cm diameter ant nests	as above
Btcs1	45-75	Yellowish brown (10 YR 5/8)	As above, but very gravelly	-	as above	50 %, as above plus 30 % fine, very slightly weathered irregular quartz	-	gradual wavy
Btcs2	75-110	as above	as above	as above	-	30 % ferruginous and 60 % quartz gravel		as above
Bms	110+		-	-	-		secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	13	21	32	13	8	-	9	LS	6.2	5.2	0.04	2.7	0.18	15	3.8	1.03	0.54	0.1	0.02	-	-	2.28		3	74		
30-40	9	10	19	26	12	8		16	LS	5.6	4	0.02	0.3	0.02	15	0.84	0.18	0.2	0.1	0.02	-	-	0.89	3.7	3.13	56		

Profile number: P37	**AE Zone:** Southern	**Soil code:** L23-1
Map sheet number: 44/2 Location- village: Kayenze District: Biharamulo Landscape unit: A22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Ridge summit Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Residual deposits derived from fine grained sandstones	Altitude (m): 1230 Vegetation: Miombo woodland vegetation Land use: Wood production; hunting & gathering Other features: Few small termite mounds.	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark reddish brown (5 YR 3/3)	Sandy clay loam	Moderate, fine blocky and fine crumb	Friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	10-25	Dark reddish brown (2.5 YR 3/4)	As above	Moderate, fine and medium blocky	As above	-	As above	As above
Bt1	25-60	Dark red (2.5 YR 3/6)	As above	As above	As above	-	As above	Gradual smooth
Bt2	60-100	Red (2.5 YR 4/6)	As above	As above	Friable, sticky and plastic	-	-	As above
Bt3	100-120+	as above	As above	As above	As above	-	-	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	6	23	32	10	6	-	22	SCL	4.8	3.9	0.03	0.6	0.04	15	0.75	0.43	0.74	0.03	0.03	0.04	1.41	7.26	30.3		10		19
30-40	3	9	23	28	8	6	-	23	SCL	4.7	3.7	0.02	0.3	0.02	15	0.59	0.15	0.1	0.01	0.02	0.02	1.61	6.59	27.3	8.3	4		24
60-80	2	6	17	29	12	7	-	27	SCL	5	3.8	0.01	0.2	0.01	20	0.32	0.2	0.08	0.01	0.02	0.12	1.21	4.56	16.1	6.07	7		27

Profile number: P38	**AE Zone:** Southern	**Soil code:** L23-1
Map sheet number: 44/2 Location- village: Nyakayenze District: Biharamulo Landscape unit: A22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Upper ridge slope Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Residual deposits derived from fine grained sandstones	Altitude (m): 1220 Vegetation: Miombo woodland vegetation Land use: Wood production; hunting & gathering Other features: Few small termite mounds	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark brown (7.5 YR 3/4)	Loamy sand	Moderate, fine and medium blocky	Slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet	-	High biological activity	clear smooth
AB	10-30	Yellowish red (5 YR 4/6)	Loamy sand	As above	As above	-	as above	as above
Bt1	30-50	Yellowish red (5 YR 4/6)	Sandy clay loam	As above	As above	-	-	as above
Bt2	50-80	Red (2.5 YR 4/6)	As above	As above	As above, but sticky and plastic when wet	-	-	gradual smooth
Bt3	80-130+	Red (2.5 YR 4/8)	As above	As above	As above	-	-	clear smooth

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	14	34	22	5	2	-	18	LS	5.1	4.1	0.03	0.6	0.06	10	1.51	0.51	0.33	0.05	0.03	0.02	0.71	4.34	62.5		21		16
30-40	1	4	16	31	13	5	-	30	SCL	5.0	3.9	0.01	0.2	0.02	10	0.51	0.38	0.19	0.01	0.03	0.02	1.65	6.51	21.0	7.60	9		25
60-80	1	4	16	31	13	5	-	30	SCL	4.9	3.8	0.01	0.2	0.01	20	0.11	0.11	0.13	0.01	0.02	0.06	1.67	5.41	17.4	6.67	5		31

Profile number: P39	**AE Zone:** Southern	**Soil code:** L33-1
Map sheet number: 44/2 Location: Nyakayenze District: Biharamulo Landscape unit: A22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Middle slope Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Residual deposits derived from fine grained sandstones	Altitude (m): 1210 Vegetation: Miombo woodland vegetation Land use: Wood production; hunting & gathering Other features: Few small termite mounds	FAO Soil unit: Ferric Acrisol, petroferric phase Soil Taxonomy: Rhodic/Typic Kandiustult Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	*Boundary*
Ah	0-15	Brown (7.5 YR 4/4)	Sandy clay loam	Moderate, fine and medium blocky	Friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	15-25	Yellowish red (5 YR 4/6)	As above	As above	As above	-	As above	As above
Bt1	25-50	Red (2.5 YR 4/6)	Sandy clay	As above	Friable, sticky and plastic	-	-	As above
Bt2	50-70	Red (2.5 YR 4/80	As above	As above	As above	-	-	Gradual smooth
Btcs	70-80	as above	Very gravelly sandy clay loam	As above	As above	Very frequent (>50%) fine secundary ironstone gravel		Clear smooth
Bms	80+		-		-		Secondary ironstone pan	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay									Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	8	22	23	9	7	-	27	SCL	5	4	0.02	0.6	0.06	10	0.32	0.57	0.15	0.05	0.03	0.02	1.36	6.41	21.5	8.07	12		21
30-40	4	6	17	17	10	8	-	38	SC	5	3.9	0.01	0.4	0.03	13	0.05	0.45	0.15	0.03	0.02	0.12	1.57	6.5	16.1	6.16	10		24
60-80	8	8	13	18	11	8	-	34	SCL	5.1	4.1	0.01	0.4	0.03	13	0.05	0.63	0.25	0.02	0.02	0.12	0.91	5	13.5	5.74	18		18

Profile number: P40 Map sheet number: 44/2 Location- village: Nyakayenze District: Biharamulo Landscape unit: A22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Lower slope Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Residual deposits derived from fine grained sandstones	**AE Zone:** Southern Altitude (m): 1200 Vegetation: Miombo woodland vegetation Land use: Wood production: hunting & gathering Other features: Common termite mound: slight sheet erosion	**Soil code:** S23-1 FAO Soil unit: Haplic Alisol Soil Taxonomy: Arenic Haplustult Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	*Boundary*
Ah	0-5	Very dark grey (10 YR 3/1)	Loamy sand	Moderate, fine and medium blocky	Very friable, non sticky, non plastic	-	High biological activity	Clear smooth
AB	5-15	Very dark greyish brown (10 YR 4/2)	Loamy sand	Moderate, fine blocky	As above	-	As above	As above
Bt1	15-35	Brown (10 YR 4/3)	Sandy loam	Moderate medium blocky	Friable, slightly sticky and slightly plastic		As above	As above
Bt2	35-80	Dark yellowish brown (10 YR 4/4)	Sand loam	As above	As above		As above	As above
Bt3	80-130+	Dark yellowish brown (10YR 5/4)	Sandy clay loam	As above	As above		-	-

ANALYTICAL DATA

Depth	*Particle size*								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail.P	Exchangeable cations						CECs	CECe	eCEC	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																					
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al							
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg				%		&
0-20	3	13	42	23	4	5	-	10	LS	5	3.9	0.02	0.4	0.03	13	1.74	0.61	0.17	0.03	0.02	0.02	1.01	5.6	52.4			15		18
30-40	1	7	24	31	14	13	-	10	SL	4.6	3.6	0.02	0.4	0.03	13	0.85	0.36	0.09	0.02	0.02	0.1	2.22	10.6	102			5		22
60-80	1	8	25	31	13	9	-	13	SL	4.7	3.5	0.01	0.2	0.03	7	0.85	0.26	0.09	0.02	0.03	0.18	2.32	11.6	87.7			3		20

Profile number: P41	**AE Zone:** Southern	**Soil code:** B12-m
Map sheet number: 44/2 Location: Nyakayenze District: Biharamulo Landscape unit: A21 Landform: Valley bottom Macro-relief: Flat Slope gradient (%): 0 Site position: Valley centre Geological unit: Uha Sandstone Group (Bukoban System) Parent material: Stream deposits derived from fine grained sandstones	Altitude (m): 1190 Vegetation: Grassland vegetation Land use: Livestock production; hunting	FAO Soil unit: Eutric Planosol Soil Taxonomy: Typic Albaqualf Drainage class: Poor Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahg	0-10	Very dark greyish brown (10YR 3/2)	Loamy sand	Moderate, medium blocky	Friable, slightly sticky, slightly plastic	-	High biological activity; common, fine, distinct, clear, strong brown mottles	Clear smooth
Eg1	10-25	Yellowish brown (10YR 5/4)	Loamy sand	Weak, coarse blocky	Very friable, non sticky, non plastic	-	Many, medium, prominent, sharp, strong brown mottles	As above
Eg2	25-35	Brown (10YR 4/3)	Sandy loam	Weak, medium and coarse blocky	Friable, sticky and plastic	-	As above	As above
Btg1	35-80	Dark greyish brown (10YR 4/2)	Sandy clay loam	as above	Friable, sticky and slightly	-	As above	Gradual smooth
Btg2	80-100	Greyish brown (10YR 5/2)	Clay	as above	As above	-	As above	
Btg3	100-130+	Pale brown (10YR 6/3)	Clay	as above	As above		Many, moderate, prominent, clear yellowish brown and strong brown mottles	As above

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	6	28	33	13	12	-	6	LS	5.6	3.9	0.02	0.3	0.02	15	1.06	0.56	0.41	0.01	0.04	-	-	1.89	26.5		54		
30-40	1	5	20	24	14	17	-	19	SL	5.5	3.6	0.02	0.4	0.03	13	0.87	1.39	1.18	0.01	0.04	-	-	5.14	24.9		51		
60-80	2	4	14	19	14	18	-	29	SCL	6.2	3.5	0.02	0.3	0.03	10	0.2	1.8	1.59	0.01	0.24	-	-	4.79	15.5		76		

Profile number: P42	**AE Zone:** Western	**Soil code:** L23-m
Map sheet number: 29/2 Location: Misoroti District: Biharamulo Landscape unit: D23 Landform: Footslope Macro-relief: Gently sloping Slope gradient (%): 5 Site position: Upper slope Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Slope wash deposits derived from schists	Altitude (m): 1340 Vegetation: Woodland Land use: Wood production. hunting & gathering	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Very dark greyish brown (10YR 2/2)	Sandy loam	Moderate. fine and medium blocky	Friable, slightly hard slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	10-25	Dark brown (7.5YR 3/4)	Sandy loam	Moderate. medium blocky	Friable, slightly hard slightly sticky. slightly plastic	-	As above	As above
Bt1	25-55	Yellowish red (5YR 4/6)	Sandy clay loam	Moderate. fine and medium blocky	Friable, slightly hard slightly sticky, slightly plastic	-	-	As above
Bt2	55-85	As above	As above but very gravelly	Moderate very fine blocky	Slightly sticky and slightly plastic	Very frequent (60%) fine and medium sized quartz gravel	-	Gradual smooth
Bt3	85+	-	As above			Dominant quartz gravel and rock fragments	-	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	7	16	25	15	18	-	16	SL	6.1	4.9	0.03	1.7	0.10	17	3.66	3.00	1.53	0.10	0.02	-	-	15	29.8		58		
30-40	8	6	11	25	13	17	-	20	SCL	5.1	3.8	0.01	0.6	0.06	10	0.45	0.16	0.02	0.03	0.02	0.2	1.77	5.18	23.0	11	4		34
60-80	21	5	5	12	18	18	-	21	SCL	5.1	3.9	0.01	0.6	0.05	12	1.9	0	0.02	0.01	0.02	-	-	0.8 ?	?		?		

Profile number: P43	**AE Zone:** Western	**Soil code:** L14-m
Map sheet number: 29/2 Location: Misoroti District: Biharamulo Landscape unit: D23 Landform: Footslope Macro-relief: Gently sloping Slope gradient: (%): 5 Site position: Middle slope Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Slope-wash deposits derived from schists	Altitude (m): 1320 Vegetation: Woodland Land use: Wood production, hunting & gathering	FAO Soil unit: Ferric Alisol Soil Taxonomy: Typic Rhodustult Drainage class : Well Date described: 27/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Black (10YR 2/1)	Sandy loam	Moderate, fine and medium blocky	Slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet	-	High biological activity	Clear smooth
AB	15-30	Dark brown (7.5YR 3/4)	Sandy loam	Moderate, medium blocky	Slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet	-	-	as above
Bt1	30-70	Dark reddish brown (5YR ¾)	Sandy clay loam	Moderate, fine and medium blocky	Slightly hard when dry, friable when moist, sticky and plastic when wet	-	-	as above
Bt2	70-130+	Yellowish red (5YR 4/6)	Clay loam	Moderate, fine and medium blocky	Soft when dry, very friable when moist, sticky and plastic when wet	-	-	Gradual smooth

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		%
0-20	5	7	16	24	16	16	-	18	SL	5.2	4.0	0.02	1.1	0.1	11	2.56	1.13	0.41	0.05	0.03	-	-	3.77	14.8	9.0	43		
30-40	3	6	12	18	13	19	-	29	SCL	5	3.8	0.01	0.7	0.07	10	0.19	0.43	0.12	0.03	0.02	0.12	2.24	8.22	25.9	10.2	7		27
60-80	2	4	8	15	14	19	-	38	CL	4.9	3.7	0.01	0.6	0.04	15	0.33	0.13	0.05	0.03	0.02	0.22	3.06	10.97	27.3	9.2	2		28

Profile number: P44	**AE Zone:** Western	**Soil code:** L32-m
Map sheet number: 29/2	Altitude (m): 1290	FAO Soil unit: Haplic Acrisol
Location: Nyakayenze	Vegetation: Woodland	Soil Taxonomy: Typic Kandiustalf
District: Biharamulo	Land use: Wood production. hunting & gathering	Drainage class: Well
Landscape unit: D23		Date described: 28/8/1996
Landform: Footslope		
Macro-relief: Gently sloping		
Slope gradient; (%): 5		
Site position: Lower slope		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Slope-wash deposits derived from schists		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Black (10YR 2/1)	Sandy clay loam	Moderate. medium blocky	Slightly hard, friable, slightly sticky. slightly plastic	-	high biological activity	clear smooth
AB	10-30	Dark brown (7.5YR3/4)	As above	Weak. coarse blocky	Slightly hard, friable, sticky and plastic	-	-	as above
Bt1	30-75	As above	As above	Weak. medium and coarse blocky	Slightly hard, friable, sticky and plastic	-	-	as above
Bt2	75-130+	Yellowish red (5YR 4/6)	Sandy clay	As above	Soft, very friable, sticky and plastic	-	-	gradual smooth

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	8	20	22	9	13	-	27	SCL	5.6	4.5	0.02	1.4	0.09	16	2.10	2.42	1.40	0.05	0.02			7.07	21.0		55		
30-40	2	7	16	19	9	13	-	34	SCL	5.1	3.8	0.01	.08	0.06	13	2.10	0.57	0.12	0.02	0.03			1.80	2.9	2.18	41		
60-80	2	4	12	19	11	15	-	37	SC	5.1	3.7	0.01	.08	0.05	16	1.36	0.11	0.03	0.02	0.02			0.46?	?	0.49	<39		

Profile number: P45	**AE Zone:** Western	**Soil code:** B12-m
Map sheet number: 44/2 Location: Nyakayenze District: Biharamulo Landscape unit: D21 Landform: Valley bottom Macro-relief: Flat Slope gradient (%): 0 Site position: Centre of valley Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Stream deposits derived from schists	Altitude (m): 1270 Vegetation: Bushland Land use: Livestock production, hunting & gathering	FAO Soil unit: Gleyic Phaeozem Soil Taxonomy: Abruptic Argiaquoll Drainage class: Imperfect Date described: 27/8/1996.

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahg	0-10	Dark grey (10YR 4/1)	Clay loam	Moderate, medium and coarse blocky	Extremely hard, friable, slightly sticky, slightly plastic	-	High biological activity; common, fine, distinct, clear, strong brown mottles	Clear smooth
ABg	10-40	Brown (10YR 5/3)	Clay loam	Moderate, medium blocky	As above	-	Many, medium, prominent, sharp, strong brown mottles	As above
Btg1	40-100+	As above	Clay	Weak, medium and coarse blocky	As above	-	As above	As above

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	5	10	15	10	19	-	38	CL	6.4	5.4	0.07	3.2	0.25	13	1.78	10.27	3.98	0.12	0.03	-	-	18.23	39.6		79		
30-40	1	7	7	10	8	15	-	52	C	6.2	4.7	0.02	2.3	0.18	13	0.2	6.83	3.4	0.02	0.02	-	-	14.26	23.0		72		
60-80	2	5	6	8	7	13	-	59	C	6.2	4.6	0.02	1.7	0.1	17	0.05	5.03	3.11	0.03	0.03	-	-	10.93	15.6		75		

Profile number: P46	**AE Zone:** Eastern	**Soil code:** B21-m
Map sheet number: 29/2	Altitude (m): 1350	FAO Soil unit: Gleyic Phaeozem
Location: Lwabya	Vegetation: Woodland	Soil Taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Wood production. hunting	Drainage class : Imperfectly
Landscape unit: D21		Date described: 31/8/1996
Landform: Valley bottom		
Macro-relief: Flat		
Slope gradient (%): 0		
Site position: Centre of Valley		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Stream deposits derived from schists		

Designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Black (10YR 2/1)	Silty clay loam	Strong, fine crumb and blocky	Slightly hard, friable, slightly sticky, plastic	-	High biological activity	clear smooth
Btg1	15-60	Dark greyish brown (10YR 4/2)	Silty clay	Strong, medium blocky	Friable, sticky, plastic	-	Many, medium, prominent, clear yellowish red mottles	as above
Btg2	60-140+	Greyish brown (10YR 5/2)	As above	As above	Extremely firm, sticky, plastic		Many, medium, prominent, clear yellowish brown mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	0	1	4	10	52	0	33	CL	6.2	5.2	0.06	4.3	0.38	11	34.31	10.99	4.65	0.2	0.03			21.2	51.1		75		
30-40	0	0	1	3	8	45	0	43	C	5.9	4	0.01	0.6	0.04	15	0.88	3.1	1.94	0.11	0.06			7.9	17.0		66		
60-80	0	0	1	2	8	43	0	46	C	6.1	4	0.01	0.5	0.03	17	0.47	3.18	2.05	0.1	0.06			7.8	15.9	11.7	69		

Profile number: P47	**AE Zone:** Western	**Soil code:** 13-m
Map sheet number: 29/2 Location: Lwabya District: Biharamulo Landscape unit: D22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Lower ridge slope Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Residual deposits derived from schists	Altitude (m): 1290 Vegetation: Woodland Land use: Wood production and hunting	FAO Soil unit: Ferric(?) or Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 31/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-10	Dark reddish brown (5YR 3/2)	Silty clay loam	Moderate, fine and medium blocky	Slightly hard, friable, sticky, plastic	-	High biological activity	Clear smooth
Bt1	10-30	As above	As above	Moderate, medium blocky	Friable, sticky, plastic	-	Many, thin clay coatings; many channels filled by dark reddish brown clay material	As above
Bt2	30-60	Dark reddish brown (5YR 3/3)	Silty clay	As above	As above	-	As above	As above
Bt3	60-120+	Dark reddish brown (2.5YR 2.5/4)	As above	Moderate, fine and medium blocky	As above	-	As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	1	1	3	6	50	38		CL	5.7	4.5	0.05	2.6	0.22	12	11.86	4.95	3.5	0.13	0.03			15.0	32.6		57		
30-40	1	1	2	5	9	42	40		C	5	3.5	0.01	0.8	0.07	11	0.7	1.24	0.99	0.03	0.02			6.51	14.4	5.7	35		
60-80	1	0	1	2	4	44	48		C	5.6	3.5	0.02	0.6	0.05	12	0.46	1.62	1.61	0.05	0.1			6.0	11.3	7.0	56		

Profile number: P48	**AE Zone:** Western	**Soil code:** C23-1
Map sheet number: 29/2 Location: Lwabya District: Biharamulo Landscape unit: D22 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Middle slope Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Residual deposits derived from schists	Altitude (m): 1310 Vegetation: Woodland Land use: Wood production, hunting	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Rhodic Kandiustult Drainage class: Well Date described: 31/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark reddish brown (5YR 3/3)	Clay	Strong, fine and medium blocky	Slightly hard, friable, sticky, plastic	-	High biological activity; shiny ped faces	Clear smooth
Bt1	10-20	Dark reddish brown (2.5 YR ¾)	As above	As above	Slightly hard, friable, sticky, plastic	-	High biological activity; many, medium clay coatings	As above
Bt2	20-60	Dark red (2.5YR 3/6)	As above	Strong, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	As above	As above
Bt3	60-130+	As above	As above	As above	As above		Many, thin clay coatings	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations							CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																					
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al							
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS-m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg				%		
0-20	2	2	8	17	9	10	-	52	C	5.8	4	0.04	2	0.2	10	0.41	2.22	1.48	0.05	0.02	-	-	6.08	7.8	7.25	62		
30-40	1	2	6	15	10	10	-	56	C	5.1	3.9	0.02	0.9	0.05	18	0.36	0.12	0.05	0.03	0.02	0.3	2.1	6.03	9.2	4.68	4		35
60-80	1	1	3	11	9	10	-	65	C	5.3	4.3	0.02	1.6	0.11	15	0.041	0.56	0.1	0.02	0.02	0.23	1.35	4.96	5.2	3.51	14		27

Profile number: P49	AE Zone: Western	**Soil code:** L31-h
Map sheet number: 29/2	Altitude (m): 1350	
Location: Lwabya	Vegetation: Woodland	FAO Soil unit: Luvic Phaeozem
District: Biharamulo	Land use: Wood production and hunting	Soil Taxonomy: Pachic Paleustoll
Landscape unit: D22		Drainage class: Well
Landform: Plain ridge		
Macro-relief: Gently sloping		Date described: 31/8/1996
Slope gradient (%): 5		
Site position: Ridge summit near rock outcrop		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Residual deposits derived from schists		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark reddish brown (5YR 3/3)	Loam	Moderate, fine and medium blocky	Slightly hard, friable, sticky, plastic	-	High biological activity; many channels filled with clay	Clear smooth
AB	10-30	Dark reddish brown (5YR 3/4)	As above	As above	As above		As above; channels filled with clay	As above
Bt1	30-60	Dark reddish brown (2.5YR 3/4)	Sandy clay loam	As above	As above		As above	As above
Bt2	60-120+	Dark red (2.5YR 3/6)	Sandy clay	As above	Slightly hard, friable, slightly sticky, plastic	-	As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	2	8	21	15	30	-	22	CL	6.5	5.6	0.04	2.6	0.18	14	2.8	7.12	4.16	0.13	0.02	-	-	13.61	50.0		84		
30-40	1	2	9	26	16	12	-	34	SCL	5.6	4.2	0.01	1	0.08	13	0.21	1.48	2.27	0.03	0.02	-	-	6.91	17.4	11.2	55		
60-80	3	3	8	19	16	13	-	38	SC	5.7	4.2	0.01	0.7	0.05	14	0.07	1.28	1.96	0.02	0.02	-	-	5.66	13.1	8.63	58		

Profile number: P50	**AE Zone:** Eastern	**Soil code:** B42-m
Map sheet number: 29/2 Location : Nyabugombe District: Biharamulo Landscape unit: C21 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 0 Site position: Lower slope Geological unit: Karagwe-Ankolean System (Middle Division) Parent material: Slope was deposits derived from phyllites	Altitude (m): 1310 Vegetation : Woodland Land use: Wood production and hunting	FAO Soil unit: Umbric Gleysol Soil Taxonomy: Typic Tropaquept Drainage class: Imperfectly Date described: 29/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Silty clay	Moderate, fine crumb and medium blocky	Slightly hard, friable, slightly sticky, plastic	-	Vertical dryness cracks with about 5mm diameter	Clear smooth
AB	10-25	As above	Silty clay	Moderate, fine and medium blocky	As above	-	-	Clear , wavy
Btg1	25-45	Dark grey (10YR 4/2)	Silty clay	Moderate, medium and coarse blocky	Extremely hard, friable, sticky, plastic	-	Common, fine, faint, diffuse, dark yellowish brown (10YR 4/4) mottles	Clear smooth
Btg2	45-100+	As above	As above	As above	As above	-	Many, moderate distinct, clear dark yellowish brown (10YR 4/4) mottles	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Mediu m	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		%
0-20	0	0	0	1	1	46	-	52	ZC	5.5	4.6	0.1	1.5	0.11	14	10.69	6.75	4.34	0.21	0.23	-	-	22.17	39.8		52		
30-40	0	0	0	0	0	43	-	57	ZC	5.3	4	0.15	0.6	0.06	10	0.5	3.65	3.28	0.05	0.13	0.12	0.41	16.61	28.1		43		2
60-80	0	0	0	0	1	48	-	51	ZC	4.8	3.8	0.41	0.4	0.03	13	0.37	2.42	2.29	0.03	0.3	0.2	0.53	18.61	35.7	11.3	27		3

Profile number: P51 Map sheet number: 29/2 Location: Nyabugombe District: Biharamulo Landscape unit: C21 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 5 Site position: Middle slope Geological unit: Karagwe-Ankolean System (Middle Division) Parent material: Slope-wash deposits derived from phyllites	**AE Zone:** Western Altitude (m): 1310 Vegetation: Woodland Land use: Wood production and hunting.	**Soil code:** C12-m FAO Soil unit: Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 31/8/1996 Remark: laboratory data of P51 and P52 are partly identical and may therefor be unreliable

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Dark brown (10YR 3/3)	Clay loam	Moderate, fine and medium blocky	Slightly hard, friable, sticky, plastic	-	High biological activity	Clear smooth
AB	15-30	Dark yellowish brown (10YR 4/4)	Clay	As above	As above	Ver few (2 %) fine, slightly hard, irregular secondary ironstone gravel	As above; clay coatings along cylindrical channels	Clear smooth
Bt	30-125+	Dark yellowish brown (10YR 4/6)	As above	As above	As above	As above, but medium and hard	As above	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	2	3	7	11	43		30	CL	6.1	5	0.07	2.5	0.18	14	4.25	3.66	2.5	0.23	0.02	-	-	8.92	21.4		72		
30-40	3	1	1	3	7	35		50	C	5.2	3.7	0.02	1	0.12	8	0.81	1.53	0.8	0.13	0.02	0.18	2.06	10.98	20.0	9.44	23		19
60-80	2	1	2	4	7	38		46	C	5.1	3.7	0.02	0.7	0.05	14	0.67	0.92	0.44	0.1	0.02	0.13	3.4	12.85	26.4	10.9	12		26

Profile number: P52	**AE Zone:** Western	**Soil code:** C13-1
Map sheet number: 29/2 Location -Village: Nyabugombe District: Biharamulo Landscape unit: D23 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 5 Site position: Lower slope at transition to plain ridge Geological unit: Karagwe-Ankolean System (Lower Division) Parent material: Slope-wash deposits derived from schists	Altitude (m): 1310 Vegetation: Woodland Land use: Wood production. hunting	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Rhodustult Drainage class: Well Date described: 29/8/1996 Remark: laboratory data of P51 and P52 are partly identical and may therefor be unreliable

Horizon designation	Depth (cm)	Colour when moist (Munseli colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Dark reddish brown (5YR 3/3)	Sandy clay	Moderate. fine and medium blocky	Slightly hard. friable. sticky. plastic	-	High biological activity	Clear smooth
AB	15-30	Dark reddish brown (5YR ¾)	As above	As above	As above	-	As above	As above
Bt1	30-65	As above	Clay	Moderate. fine blocky	As above			As above
Bt2	60-120+	Red (2.5YR 4/6)	As above	As above	As above	-	-	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H20	pH KCl	EC	Org. C	Total N	C/ N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	8	14	16	8	10	-	42	SC	5.5	4.5	0.03	0.6	0.05	12	2.5	2.42	1.46	0.06	0.02	-	-	7.62	16.7		52		
30-40	3	1	1	3	7	35	-	50	C	5.2	3.7	0.02	1	0.12	8	0.81	1.53	0.8	0.13	0.02	0.18	2.06	10.98	20.0	11.0	10		19
60-80	2	1	2	4	7	38	-	46	C	5.1	3.7	0.02	0.7	0.05	14	0.67	0.92	0.44	0.1	0.02	0.13	3.4	12.85	26.4	12.9	3		26

Profile number: P53	**AE Zone:** Western	**Soil code:** L13-1
Map sheet number: 29/2 Location : Nyabugombe District: Biharamulo Landscape unit: D23 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 2 Site position: Upper slope Geological unit: Karagwe-Ankolean System (Middle Division) Parent material: Residual deposits derived from schists	Altitude (m): 1340 Vegetation: Woodland Land use: Wood production, hunting & gathering	FAO Soil unit: Haplic Alisol petroferric phase Soil Taxonomy: Petroferric Haplustult Drainage class : Well Date described : 29/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark yellowish brown (10YR 4/4)	Sandy clay loam	Moderate, medium blocky	Slightly hard, friable, slightly sticky, slightly plastic		High biological activity	Clear smooth
AB	10-25	Dark brown (10YR 3/3)	As above	Moderate, fine and medium blocky	As above	-	As above	As above
Bt	25-60	Dark brown (7.5 YR 3/4)	As above	As above	As above		As above	Abrupt and smooth
Bms	60+	-				-	Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand				Silt		Clay																					
	Very	Coarse	Medium	Fine	Very	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/k	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	7	18	21	9	10	-	32	SCL	5.1	3.9	0.01	1.2	0.08	15	0.54	0.58	0.34	0.03	0.02	0.03	1.73	7.58	19.9	8.53	13		23
30-40	4	14	28	18	5	7	-	24	SCL	4.8	3.9	0.01	0.8	0.08	10	0.54	0.14	0.04	0.02	0.02	0.03	2.02	7.09	26.3	9.46	3		28

Profile number: P54	**AE Zone:** Western	**Soil code:** B41-m
Map sheet number: 29/2	Altitude (m): 1280	FAO Soil unit: Mollic Gleysol
Location: Lwabya	Vegetation: Woodland	Soil Taxonomy: Fluvaquentic Endoaquoll
District: Biharamulo	Land use: Wood production, hunting & gathering	Drainage class: Imperfectly
Landscape unit: D21		Date described: 31/8/1996
Land form: Valley fan slope		
Macro-relief: Very gently sloping		
Slope gradient (%): 2		
Site position: Middle slope		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Stream deposits derived from schists		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Loam	Moderate, fine and medium blocky	Hard, friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
ABg	10-25	Very dark greyish brown (10YR 3/2)	Clay loam	Moderate, medium blocky	Extremely hard, friable, sticky, plastic		As above; many, fine and medium, distinct, clear reddish yellow mottles	Clear smooth
Bg1	25-65	Dark yellowish brown (10YR ¾)	as above	Moderate, medium and coarse blocky	As above		Many, fine and medium, faint, diffuse reddish yellow mottles	Clear smooth
Bg2	65-100+	Brown (10YR 4/3)	as above	Weak, medium and coarse blocky	As above	-	As above and very few, fine and medium, prominent, sharp red mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	3	9	17	18	32	-	20	L	6.3	5.3	0.08	1.7	0.13	13	15.7	3.97	1.4	0.14	0.02	-	-	7.28			76		28
30-40	1	2	4	10	18	35	-	30	CL	7.9	6.9	0.18	0.8	0.05	16	4.9	4.85	1.94	0.2	0.03	-	-	5.4			100		38
60-80	0	2	5	11	18	36		28	CL	5.6	4.3	0.04	0.9	0.03	17	0.37	1.44	0.37	0.05	0.03	-	-	3.63			52		27

Profile number: P55	**AE Zone:** Western	**Soil code:** B21-1
Map sheet number: 29/2	Altitude (m): 1280	FAO Soil unit: Gleyic Phaeozem
Location -Village: Lwabya	Vegetation: Woodland	Soil Taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Wood production, hunting & gathering	Drainage class: Imperfectly
Landscape unit: D21		Date described: 31/8/1996
Land form: Valley fan slope		
Macro-relief: Very gently sloping		
Slope gradient (%): 2		
Site position: Lower slope		
Geological unit: Karagwe-Ankolean System (Lower Division)		
Parent material: Stream deposits derived from schists		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Loam	Moderate, fine and medium blocky	Friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
ABg	10-25	Very dark greyish brown (10YR 3/2)	Loam	Moderate, medium blocky	Extremely hard, friable, sticky, plastic		As above; many, fine and medium, distinct, clear reddish yellow mottles	Clear smooth
Btg1	25-65	Dark yellowish brown (10YR 3/4)	Clay	Moderate, medium and coarse blocky	As above		Many, fine and medium, faint, diffuse reddish yellow mottles	Clear smooth
Btg2	65-100+	Brown (10YR 4/3)	Clay	Weak, medium and coarse blocky	As above	-	As above and very few, fine and medium, prominent, sharp red mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable. cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	1	2	6	21	47		23	L	5.4	3.9	0.03	1.7	0.12	14	7.95	3.73	1.31	0.06	0.04			10.71	39.2		48		
30-40	0	1	2	4	8	32		53	C	5.6	3.8	0.04	0.8	0.06	13	8.02	8.73	3.01	0.05	0.12			21.27	38.5		56		
60-80	0	1	2	4	8	34		51	C	5.7	4.2	0.07	0.8	0.07	11	25.37	12.06	3.85	0.11	0.20			26.16	49.7		62		

Profile number: P56	**AE Zone:** Western	**Soil code:** C23-1
Map sheet number: 29/2 Location: Nyungwe District: Biharamulo Landscape unit: D22 Landform: Plain ridge Macro-relief: Gently sloping Slope gradient (%): 3 Site position: Ridge summit Geological unit: Karagwe-Ankolean System (Lower Division) Parent: Residual deposits derived from schists	Altitude (m): 1350 Vegetation: Woodland Land use: Wood production. hunting.	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Rhodic Kandiustult Drainage class: Well Date described: 29/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark reddish brown (2.5YR ¾)	Sandy clay	Moderate, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	10-20	Dark reddish brown (2.5YR 3/6)	As above	As above	Slightly hard, friable, sticky, plastic		As above; clay coatings along channels	As above
Bt1	20-45	Red (2.5YR 4/6)	As above	As above	As above		As above	As above
Bt2	45-75	As above	Clay	Moderate, medium and coarse blocky	As above	2% fine, slightly hard secondary ironstone gravel	As above	As above
Bt3	75-85	Dark reddish brown (2.5YR ¾)	As above	Moderate, fine and medium blocky	As above	As above	As above	As above
Bt4	85-120+	Red (2.5YR 4/6)	As above	As above	As above	As above	-	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EALP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	4	12	24	11	10	-	37	SC	5.6	4.3	0.04	0.9	0.05	18	0.71	1.61	0.44	0.14	0.02	-	-	4.09	27.9		54		
30-40	3	4	8	20	12	11	-	42	SC	5.5	4.2	0.02	0.6	0.04	15	0.52	1.36	0.18	0.05	0.02	-	-	3.29	15.3		49		
60-80	3	3	7	17	13	12		45	C	5.6	4.1	0.02	0.5	0.03	17	0.24	2.08	0.44	0.03	0.02	-	-	4.67	9.8	6.75	55		

Profile number: P57	**AE Zone:** Eastern	**Soil code :** S24-1
Map sheet number: 31/3	Altitude (m) : 1120	FAO Soil unit : Gleyic Arenosol
Location: Kagoma	Vegetation: Bushed grassland	Soil Taxonomy: Arenic Albaquult
District: Biharamulo	Land use: Livestock production	Drainage class: Imperfectly
Landscape unit: F53	Other features: Large termite mounds	Date described : 31/8/1996
Land form: Footslope		
Macro-relief: Gently sloping		
Slope gradient (%): 1		
Site position: Lower slope towards valley centre		
Geological unit: Archean Granite		
Parent material: Slope-wash deposits derived from leucogranites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahg	0-15	Dark greyish brown (10YR 4/2)	Sand	Moderate, fine crumb	very friable, non sticky, non plastic	1% fine, slightly hard, irregular, secondary ironstone gravel	lower boundary with thin, loose, horizontal sand lamellae ? very few, 3 cm diameter ant nests; fine distinct, clear mottles	Clear smooth
ABg	15-25	As above	As above	Moderate, medium blocky	as above	As above	As above-	As above
Btg1	25-85	As above	Loamy sand	As above	as above	As above	Many medium, distinct, dark reddish brown and strong brown mottles	Gradual smooth
Btg2	85-100+	Very dark greyish brown (10YR 3/2)	As above	As above	as above	As above	As above	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	24	38	15	10	7		5	S	5.2	3.8	0.02	0.6	0.04	15	1.52	0.29	0.11	0.02	0.02	0.03	0.91	3.21	52.0		14		28
30-40	1	17	37	24	6	8		7	LS	5.3	3.8	0.01	0.3	0.02	15	0.99	0.15	0.08	0.02	0.02	0.02	1.46	3.8	50.0		7		33
60-80	0	19	34	21	7	9		10	LS	4.8	3.6	0.02	0.2	0.02	10	0.59	0.15	0.11	0.03	0.03	0.03	1.81	6.75	65.5		5		27

Profile number: P58	**AE Zone:** Eastern	**Soil code:** L22-1
Map sheet number: 31/3 Location - Village : Kagoma District: Biharamulo Landscape unit: F53 Land form: Footslope Macro-relief: Undulating Slope gradient (%): 5 Site position: Middle slope Geological unit: Archean Granite Parent material: Slope wash deposits derived from leucogranites	Altitude (m) : 1120 Vegetation: Bushed fallow vegetation Land use : Crop production Other features: Large termite mounds	FAO Soil unit : Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described : 23/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-15	Dark brown (7.5 YR 3/3)	Sandy loam	Moderate. fine and medium blocky	Slightly hard. friable. slightly sticky. slightly plastic	-	High biological activity	Clear smooth
AB	15-25	Dark brown (7.5 YR 3/4)	As above	Moderate. medium blocky	As above	-	As above	As above
Bt1	25-50	Brown (7.5 YR 4/4)	Sandy clay loam	As above	As above	-	As above	As above
Bt2	50-90	Brown (7.5 YR 4/3)	As above	As above	Friable, slightly sticky. slightly plastic		As above	As above
Bt3	90-150+	Strong brown (7.5 YR 4/6)	As above	As above	As above		-	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	10	27	32	8	5		17	SL	5.2	4.1	0.02	0.4	0.03	13	1.53	0.47	0.18	0.02	0.02	0.08	0.56	3.09	16.8	8.31	22		18
30-40	1	8	24	28	8	6		25	SCL	4.7	3.9	0.03	0.4	0.03	13	1.01	0.24	0.08	0.02	0.03	0	1.62	7.11	26.8	7.96	5		23
60-80	1	11	27	32	2	4		23	SCL	4.8	3.9	0.02	0.2	0.02	10	0.87	0.21	0.09	0.02	0.02	0.03	1.39	5.33	22.3	7.65	6		28

Profile number: P59	**AE Zone:** Eastern	**Soil code:** L22-1
Map sheet no: 31/3	Altitude: 1280	FAO soil unit: Haplic Acrisol
Location: Kagoma	Vegetation: Fallow vegetation after cotton	Soil taxonomy: Kanhaplic Haplustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: F53	Other features: -	Date described: 28/10/96
Landform: Plain ridge		
Macro-relief: Undulating		
slope gradient (%): 5		
Site position: Middle slope		
Geological unit: Archean Granite		
Parent material: Residual deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Dark brown (10YR 3/3)	Sandy loam	moderate, fine granular and fine blocky	soft, very friable, non sticky, non plastic	-	high biological activity	clear smooth
AB	10-30	Brown (10 YR 4/3)	Sandy loam	moderate, fine and medium blocky	slightly hard, very friable, slightly sticky, slightly plastic	-	as above; very few, 2 cm diameter ant nests	as above
Bt1	30-70	Dark yellowish brown (10 YR 4/4)	Sandy clay loam	as above	as above	-	-	as above
Bt2	70-100	As above	as above	as above	as above	-	-	gradual smooth
Bt3	100-140+	Dark yellowish brown (10 YR 4/6)	as above	as above	-	-	1 m diameter granite boulder	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	7	24	36	10	6	-	16	SL	5.1	4.1	0.03	0.5	0.03	17	1.41	0.79	0.37	0.05	0.02	0.08	0.3	3.12			39		10
30-40	0	-	19	32	9	7	-	28	SCL	4.9	3.9	0.02	0.4	0.02	20	0.34	0.63	0.13	0.1	0.02	0.03	1.31	6.17			14		21
60-80	1	5	18	29	10	7		30	SCL	5	4	0.01	0.3	0.02	15	0.83	0.41	0.11	0.05	0.03	0.05	1.42	5.59			11		25

Profile number: P60	**AE Zone:** Eastern	**Soil code:** L22-1
Map sheet no: 31/3 Location: Kagoma village District: Biharamulo Landscape unit: F53 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Upper slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	Altitude (m): 1300 Vegetation: Bushland Land use: Cultivation Other features: Ridging; slight sheet erosion; 5 mm thick, very friable surface crust: 15% rock outcrops	FAO soil unit: Haplic Acrisol Soil taxonomy: Kanhaplic Haplustult Drainage class: Well Date described:26/08/96

Description	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Very dark greyish brown (10YR 3/2)	Sandy loam	Moderate. fine granular and blocky	Soft. very friable. non sticky, non plastic			clear smooth
AB	15-30	Dark yellowish brown (10YR 3/6)	As above	Moderate. fine and medium blocky	Slightly hard, very friable, slightly sticky, slightly plastic			As above
Bt1	30-70	Dark brown (10 YR 3/4)	Sandy clay loam	As above	Slightly hard, friable, slightly sticky, slightly plastic			As above
Bt2	70-100	Yellowish brown (10 YR ¾)	As above	As above	As above		-	gradual smooth
Bt3	100-140+	As above	As above	As above	As above		Granite boulders	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	exchangeable cations							CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																					
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al							
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg				%		%
0-20	1	12	30	28	10	7	-	12	SL	5.4	4.3	0.05	0.5	0.03	17	3.12	0.95	0.25	0.05	0.02	0.07	0.16	3.13	21.9		41		
30-40	1	11	25	24	9	7	-	23	SCL	4.9	3.9	0.02	0.3	0.02	15	0.49	0.43	0.16	0.06	0.02	0.12	1.2	5.69	23.4	8.65	12		.21
60-80	1	9	19	24	12	9		26	SCL	4.7	4	0.04	0.2	0.02	10	0.35	0.09	0.08	0.05	0.03	0.03	1.6	6.71	25.0	7.23	4		24

Profile number: P61	**AE Zone:** Eastern	**Soil code:** L22-m
Map sheet no: 31/3	Altitude: 1320	FAO soil unit: Haplic Acrisol
Location: Kagoma village	Vegetation: Fallow after cotton	Soil taxonomy: Kanhaplic Haplustult
District: Biharamulo	Land use Crop production	Drainage: Well
Landscape unit: F53	Other features: Ridging: slight sheet erosion: 20% rock outcrops	Date described: 23/8/1996
Landform: Plain ridge		
Macro-relief Undulating		
Slope gradient (%): 1		
Slope position : Ridge summit		
Geological unit: Archean Granite		
Parent material: Residual deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-25	Very dark greyish brown (10YR 3/2)	Sandy loam	Moderate, fine blocky	slightly hard, very friable, non sticky, non plastic		-	clear smooth
Bt1	25-50	Dark brown (7.5 YR 3/3)	Sandy clay loam	As above	slightly hard, friable, slightly sticky, slightly plastic		-	gradual smooth
Bt2	50-120	Dark brown (7.5 YR 3/4)	As above	Moderate, fine and medium blocky	as above	-	-	abrupt wavy
Bt3R	120+	-	-	-	-	-	Granite boulders	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	13	27	28	10	9	-	11	SL	5.6	4.5	0.03	0.6	0.03	20	1.53	1.06	0.52	0.02	0.03	-	-	2.91	21.0		56		
30-40	1	11	22	24	11	10	-	21	SCL	5.2	3.9	0.01	0.5	0.03	17	0.41	0.47	0.25	0.1	0.02	0.08	1.57	5.08	21.8	11.9	17		31
60-80	1	10	18	21	12	10		28	SCL	4.8	3.8	0.03	0.4	0.02	20	0.23	2.04	0.57	0.02	0.02	0.03	2.18	16.2	56.4		16		13

Profile number: P62	**AE Zone:** Eastern	**Soil code:** B11-m
Map sheet number: 30/4 Location: Nyamazike District: Biharamulo Landscape unit: F51 Landform: Valley bottom Macro-relief: Almost flat Slope gradient (%): 2 Site position: Edge of valley bottom Geological unit: Archean Granite Parent material: Stream deposits derived from granites	Altitude(m): 1320 Vegetation: Bushed grassland Land use: Wood and livestock production Other features : 1 %. large termite mounds	FAO soil unit: Mollic Planosol Soil taxonomy: Typic Argialboll Drainage class : Imperfect Date described: 23/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahg	0-10	Black (10 YR 2/1)	Loamy sand	Moderate. fine and medium blocky	Friable. slightly sticky, slightly plastic		Common, fine. distinct. sharp, dark brown mottles	Clear smooth
AEg	10-20	Very dark greyish brown (10YR 3/2)	As above	Moderate. medium blocky	Hard. friable, very slightly sticky. very slightly plastic		As above	As above
Eg	20-40	Dark greyish brown (10YR 4/2)	As above	As above	Extremely hard. friable. slightly sticky. slightly plastic		Many. fine, distinct. sharp dark brown mottles	Abrupt smooth
Btg1	40-80	Very dark greyish brown (10YR 3/2)	Clay	Strong, medium blocky	Extremely hard. firm. sticky, plastic firm, sticky. plastic		As above	Diffuse smooth
Btg2	80-100	Dark grey (10YR 4/1)	As above	As above	Firm. sticky. plastic firm, sticky. plastic		Many. medium, distinct, clear brownish yellow and dark brown mottles	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	12	30	29	10	11	-	7	LS	5.7	4.5	0.05	1.1	0.1	11	1.94	2.78	0.79	0.1	0.04	-	-	6.63	69.1		56		
30-40	1	11	30	29	11	12	-	6	LS	5.8	3.9	0.02	0.3	0.02	15	6.55	0.86	0.3	0.05	0.04	-	-	2.02	28.7		62		
60-80	1	9	17	12	5	9		47	C	5.7	3.7	0.03	0.5	0.03	17	0.35	7.9	4.45	0.02	0.2	-	-	21.67	45.0		58		

Profile number: P63	**AE Zone:** Eastern	**Soil code:** L22-m
Map sheet number: 30/4	Altitude (m): 1340	FAO Soil unit: Haplic Acrisol
Location: Nyamazike	Vegetation: Bushland	Soil taxonomy: Kanhaplic Haplustult
District: Biharamulo	Land use: Livestock production.	Drainage class: Well
Landscape unit: F52	Other features: 1 %, large termite mounds	Date described: 23/8/1996
Landform: Foot slope		
Macro-relief: Undulating.		
Slope gradient (%): 5		
Site position: Lower slope		
Geological unit: Archean Granite		
Parent material: Slope-wash deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark greyish brown (10 YR 4/2)	Loamy sand	Moderate. fine blocky	Friable. non sticky, non plastic	-	High biological activity	Clear smooth
AB	10-25	Dark yellowish brown (10 YR ¾)	As above	Moderate. fine and medium blocky	As above		As above	As above
Bt1	25-60	Dark yellowish brown (10 YR 4/4)	Sandy clay loam	Moderate. medium blocky	Slightly hard. , non sticky. non plastic	-	As above	Gradual smooth
Bt2	60-100	Dark yellowish brown (10 YR 4/6)	As above	As above	Slightly hard. friable. slightly sticky, slightly plastic	-	-	Diffuse. smooth
Bt3	100-130+	As above	As above	As above	Slightly hard, sticky, plastic	-	-	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	10	34	32	7	7	-	10	LS	5.9	4.7	0.02	0.5	0.03	17	0.86	1.65	0.62	0.02	0.02	-	-	3.67	31.7		63		
30-40	0	6	25	29	9	9	-	22	SCL	5.1	3.8	0.01	0.4	0.03	13	0.38	0.37	0.38	0.1	0.02	0.03	1.29	5.62	23.7	9.95	15		23
60-80	1	7	22	26	9	8		27	SCL	5.2	3.9	0.01	0.3	0.02	15	0.3	0.39	0.33	0.1	0.03	0.03	1.32	5.05	17.6	8.15	17		26

Profile number: P64	**AE Zone:** Eastern	**Soil code:** L22-m
Map sheet number: 30/4 Location: Nyamazike District: Biharamulo Landscape unit: F52 Landform: Footslope Macro-relief: Undulating. Slope gradient (%): 5 Site position: Middle slope Geological unit: Archean Granite Parent material: Slope-wash deposits derived from biotite granites	Altitude (m): 1360 Vegetation: Bushland Land use: Livestock production	FAO Soil unit: Haplic Acrisol Soil taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap1	0-25	Very dark greyish brown (10YR 3/2)	Loamy sand	Moderate, fine granular, fine and medium blocky	Friable, non sticky, non plastic	-	High biological activity	Clear wavy
Ap2	25-50	Dark brown (10YR 3/3)	Sandy loam	Moderate fine blocky	Slightly hard, very slightly sticky, very slightly plastic	-	As above	Clear smooth
Bt1	50-70	Dark yellowish brown (10YR 3/4)	Sandy clay loam	Moderate, medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	As above	Gradual smooth
Bt2	70-95	Yellowish brown (10YR 5/6)	As above	As above	Slightly hard, friable sticky, plastic	-	As above	Diffuse smooth
Bt3	95-130+	As above	As above	as above	As above		As above	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	11	33	30	6	9	-	10	LS	6.1	4.9	0.03	0.6	0.04	15	0.72	1.46	0.59	0.1	0.03	-	-	3.03	24.3		72		
30-40	1	8	30	29	7	9	-	16	SL	5.6	4.3	0.02	0.4	0.02	20	0.45	0.77	0.64	0.2	0.02	-	-	3.13	17.1	10.2	52		
60-80	0	9	21	17	5	25		23	SCL	5.4	4.1	0.01	0.3	0.02	15	0.25	0.76	0.86	0.05	0.02	0.13	0.51	5.07	20.7	10.1	33		10

Profile number: P65	**AE Zone:** Eastern	**Soil code:** L22-h
Map sheet number: 30/4 Location: Nyamazike District: Biharamulo Landscape unit: F52 Landform: Footslope Macro-relief: Sloping Slope gradient (%): 10 Site position: Upper slope Geological unit: Archean Granite Parent material: Slope-wash deposits derived from biotite granites	Altitude (m): 1410 Vegetation: Bushland Land use: Livestock production Other features: Very slight sheet erosion	FAO Soil unit: Haplic Acrisol Soil taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 23/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-10	Very dark greyish brown (10YR 3/2)	Sandy loam	Moderate. fine granular and fine blocky	Friable. non sticky. non plastic	-	High biological activity	Clear smooth
AB	10-25	Dark brown (10YR 3/3)	As above	Moderate. fine blocky moderate. fine and medium blocky	Slightly hard. non sticky non plastic	-	As above	As above
Bt1	25-50	As above	As above	As above	Slightly hard, friable. non sticky, non plastic	-	-	As above
Bt2	50-70	Dark yellowish brown (10YR 3/4)	Sandy clay loam	As above	As above.	-	-	Gradual smooth
Bt3	70-90	Brown (7.5YR 4/4)	Sandy clay loam	As above	As above	-		As above
Bt4	90-130+	Strong brown (7.5YR 4/6)	As above	As above	As above	-	-	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	12	26	25	9	19	-	8	SL	7.3	6.1	0.05	0.8	0.05	16	0.81	3.03	0.78	0.12	0.02	-	-	3.59	34.9		100		
30-40	3	12	12	40	7	8	-	18	SL	5.4	3.9	0.02	0.4	0.03	13	0.76	0.75	0.42	0.1	0.02	0.11	0.5	4.13	20.7	10.6	31		12
60-80	10	10	25	20	6	19		20	SCL	5	3.8	0.03	0.3	0.02	15	0.69	0.75	0.5	0.1	0.02	0.09	1.12	7.37	35.8		19		15

Profile number: P66	**AE Zone:** Eastern	**Soil code:** L21-m
Map sheet number: 30/4	Altitude (m): 1410	FAO Soil unit: Luvic Phaeozem
Location: Nyamazike	Vegetation: Bushland	Soil taxonomy: Typic Argiustoll
District: Biharamulo	Land use: Livestock production	Drainage class: Well
Landscape unit: F52	Other features: Very slight sheet erosion	Date described: 23/8/1996
Landform: Footslope		
Macro relief: Gently sloping		
Slope gradient (%): 3		
Site position: Upper slope / summit		
Geological unit: Archean Granite		
Parent material: Slope-wash deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-20	Dark brown (10YR 3/3)	Sandy clay loam	Moderate, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	-	Clear smooth
Bt1	20-35	Dark brown (7.5 YR 3/3)	Sandy clay	As above	Slightly hard, friable, sticky, plastic	-	-	As above
Bt2	35-45	Brown (7.5YR 4/4)	Clay	Moderate, medium blocky	As above	-	-	As above
Bcs	45-55+	as above	As above, but gravelly	As above	As above	Few, fine, fresh, irregular, quartz; frequent, fine and medium, hard, irregular secondary ironstone gravel	-	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	9	25	18	10	11	-	25	SCL	6.3	5.3	0.04	2.1	0.21	10	0.33	5.21	2.99	0.1	0.03	-	-	10.64	34.2		78		
30-40	3	9	12	14	9	12	-	41	SC	5.9	4.3	0.02	1.3	0.11	12	1.01	3.4	2.42	0.05	0.02	-	-	9.06	18.9		65		
40-50	3	5	9	14	11	16		42	C	6.3	5	0.03	1	0.1	10	0.05	5.31	3.22	0.14	0.03	-	-	11.01	23.8		79		

Profile number: P67	**AE Zone:** Eastern	**Soil code:** B21-m
Map sheet no: 31/3	Altitude (m): 1250	FAO soil unit: Gleyic Phaeozem
Location: Nyamigogo village	Vegetation: Bushed grassland fallow after paddy rice	Soil taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Livestock and crop production	Drainage class: Poor
Landscape unit: F41	Other features: Bunding for paddy	Date described: 23/8/1996
Landform: Valley bottom		
Macro-relief: Undulating		
Slope gradient (%): 0		
Site position: Valley centre		
Geological unit: Archean Granite		
Parent material: Stream deposits derived from undifferentiated granites		

Designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Apg	0-15	Black (10YR 2/1)	Loam	Moderate, medium blocky	Extremely hard, friable, sticky, plastic		Many, fine, distinct, clear, brownish yellow mottles	Clear smooth
ABg	15-25	As above	Clay	As above	As above	-	As above + yellowish brown	As above
Bt1	25-45	Very dark brown (10YR 2/2)	As above	As above	As above	-	As above + yellowish brown	As above
Bt2	45-75	Black (10YR 2/1)	As above	As above	As above	-	-	As above
Btck	75-100+	Very dark grey (10YR 3/1)	As above	Moderate, fine and medium blocky	Friable, sticky, plastic	Many, fine, soft, round $CaCo_3$ nodules strong reaction with 10% HCl	Many, fine, prominent, brownish yellow mottles;	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	5	17	20	8	33	-	16	L	5.7	3.9	0.02	1.2	0.12	10	1.62	3.59	2.11	0.03	0.1	-	-	10.41	57.6		56		
30-40	1	4	10	9	4	24	-	48	C	5.5	3.4	0.05	1.1	0.1	11	2.13	12.59	7.83	0.03	0.3	-	-	38.64	78.2		53		
60-80	2	6	15	12	4	12	-	49	C	6.6	5	0.09	0.4	0.03	13	12.26	18.56	10.35	0.05	0.41	-	-	11.01	68.4		87		

Profile number: P68	**AE Zone:** Eastern	**Soil code:** L32-1
Map sheet no: 31/3 Location: Nyamigogo village District: Biharamulo Landscape unit: F43 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Lower slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	Altitude (m): 1260 Vegetation: Bushed grassland fallow Land use: Crop and livestock production Other features: Ridging; very slight sheet erosion	FAO soil unit: Haplic Acrisol Soil taxonomy: Typic Kandiustult Drainage class: Well Date described: 24/8/1996

Designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-10	Dark brown (10YR 3/3)	Sandy clay loam	Moderate, fine granular; fine and medium blocky	Soft, very friable, slightly sticky, slightly plastic	Very few secondary ironstone gravel	High biological activity	Clear smooth
AB	10-25	Dark yellowish brown (10YR 3/6)	As above	Moderate, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	As above	As above	As above
Bt1	25-45	Dark yellowish brown (10YR 4/4)	As above	As above	As above	As above	As above	As above
Bt2	45-60	Dark yellowish brown (10YR 4/6)	Sandy clay	As above	As above	As above	As above	Gradual smooth
Bt3	60-105+	Yellowish brown (10YR 5/6)	As above	As above	As above	As above	As above	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	4	18	30	11	8	-	27	SCL	5	4.1	0.02	0.7	0.05	14	0.75	1.6	0.58	0.1	0.02	0.03	0.3	6.56	21.9	9.74	35		5
30-40	1	3	13	26	11	14	-	32	SCL	5	3.8	0.02	0.4	0.03	13	0.72	0.43	0.18	0.02	0.02	0.09	1.68	7.42	21.9	7.56	9		23
60-80	0	3	12	25	12	12		36	SC	5.2	4	0.01	0.3	0.02	15	0.32	0.75	0.23	0.02	0.02	0.01	1.23	5.26	13.8	6.28	19		28

Profile number: P69	**AE Zone:** Eastern	**Soil code:** L33-1
Map sheet no: 31/3 Location: Nyamigogo village District: Biharamulo Landscape unit: F42 Landform: Plain ridge Macro-relief: Undulating Slope gradient (%): 5 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	Altitude (m): 1270 Vegetation: Bushed fallow Land use: Crop production	FAO soil unit: Ferric Acrisol Soil taxonomy: Typic Kandiustult Drainage class: Well Date described: :24/8/1996

Designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-15	Dark yellowish brown (10YR 3/6)	Sandy clay loam	Moderate, fine and medium blocky	Soft, very friable, slightly sticky, slightly plastic	5%, fine, slightly hard, spherical, secondary ironstone gravel	-	Clear smooth
Bt1	15-55	Strong brown (7.5YR 4/6)	Sandy clay	Moderate, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	As above	few charcoal pieces	As above
Bt2	55-90	Yellowish red (5YR 4/6)	Sandy clay	As above	As above	As above		Gradual smooth
Bt3	90-135+	As above	as above	As above	Soft, very friable, slightly sticky, slightly plastic	As above	-	

ANALYTICAL DATA.

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	5	22	30	9	6	-	27	SCL	5.3	4	0.01	0.6	0.04	15	0.11	0.69	0.28	0.03	0.02	0.05	0.81	4.09	12.9	6.96	25		20
30-40	1	4	17	24	9	8	-	37	SC	5.3	4	0.01	0.5	0.03	17	1.18	0.13	0.1	0.02	0.03	0.01	1.43	4.1	9.7	4.65	7		35
60-80	0	4	12	20	11	9		44	SC	5.3	4	0.01	0.3	0.02	15	0.04	0.08	0.05	0.02	0.02	0.15	1.33	4.13	8.7	3.75	4		32

Profile number: P70	**AE Zone:** Eastern	**Soil code:** R24-I
Map sheet no: 31/3	Altitude (m): 1280	FAO soil unit: Ferric Acrisol. skeletic and petroferric phase
Location: Nyamigogo village	Vegetation: Wooded bushland	Soil taxonomy: Petroferric Haplustult
District: Biharamulo	Land use: Wood and livestock production	Drainage class: well
Landscape unit: F42		Date described: 24/8/1996
Landform: Plain ridge		
Macro-relief: Undulating		
Slope gradient (%): 1		
Site position: Upper ridge slope		
Geological unit: Archean Granite		
Parent material: Residual deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark brown (10YR 3/3)	Sandy loam	Moderate. fine blocky	Slightly hard. friable. slightly sticky, slightly plastic	5%. fine, hard. irregular. secondary ironstone gravel	-	Clear smooth
Bt1	10-20	Brown (7.5YR 4/4)	As above	Moderate. fine and medium blocky	As above	As above	-	Gradual smooth
Bt2	20-40	Strong brown (7.5YR 4/6)	Sandy clay loam as above	As above	As above	As above		Abrupt wavy
Bcs	40+					>50%, fine, hard. irregular. secondary ironstone gravel	Secondary ironstone pan within 1 m depth	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	5	20	23	6	31	-	14	SL	5.8	4.5	0.03	1	0.05	20	-	1.28	0.61	0.06	0.02	-	-	3.18	15.6		62		
30-40	0	6	26	31	8	7	-	22	SCL	5.4	4	0.01	0.7	0.04	18	0.37	0.06	0.06	0.03	0.03	0.03	1.22	2.98 ?	10.4	6.5	6?		41

Profile number: P71	**AE Zone:** Eastern	**Soil code:** L32-m
Map sheet no: 31/3	Altitude (m): 1280	FAO soil unit: Haplic Acrisol, petroferric phase
Location: Nyamigogo village	Vegetation: Bushed woodland	Soil taxonomy: Typic Kandiustult
District: Biharamulo	Land use: Wood and livestock production	Drainage class: Well
Landscape unit: F43		Date described: 24/8/1996
Landform: Plain ridge		
Macro-relief: Undulating		
Slope gradient (%): 0		
Site position: Ridge summit		
Geological unit: Archean Granite		
Parent material: Residual deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-30	Dark brown (10YR 3/3)	Sandy loam	Moderate, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	Thin, loose, horizontal lamellae	Clear smooth
AB	3-10	Dark brown (7.5YR 3/4)	as above	Moderate, fine and medium blocky	As above	-	Slighlly more compact than Ah	As above
Bt1	10-25	Brown (7.5YR 4/4)	Sandy clay loam	As above	As above	-	Common, medium ant nests	As above
Bt2	25-85	Strong brown (7.5YR 4/6)	as above	As above	As above	Few, fine and very fine, slighlty hard, irregular, secondary ironstone gravel	-	Gradual smooth
Btcs	85-90	As above	as above, but very gravelly	As above	As above	>50%, fine and very fine, slighlty hard, irregular secondary ironstone gravel	-	Abrupt wavy
Bms	90-105+	-	-	-	-		Secondary ironstone pan	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	5	25	30	8	12	-	19	SL	6	4.7	0.02	0.8	0.04	20	1.21	1.41	0.77	0.06	0.03	-	-	3.29			69		
30-40	2	6	25	29	8	6	-	24	SCL	5.1	3.9	0.01	0.6	0.05	12	0.42	0.14	0.08	0.02	0.04	0.07	1.32	4.39			6		30
60-80	1	6	16	24	10	13		30	SCL	5.3	3.9	0.01	0.5	0.03	17	0.16	0.05	0.04	0.02	0.02	0.03	1.64	3.91			3		42

Profile number: P 72	**AE Zone:** Eastern	**Soil code:** C23-1
Map sheet number: 31/3 Location – Village : Songambele District: Biharamulo Landscape unit: E33 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 1 Site position: Summit Geological unit: Nyanzian System Parent material: Residual deposits derived from greenstones (meta-basalts)	Altitude (m) : 1340 Vegetation: Bushed woodland Land use: Wood and livestock production Other features : Slight sheet erosion	FAO soil unit: Haplic Acrisol Soil Taxonomy: Rhodic Kandiustult Drainage class: Well Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark brown (7.5YR 3/2)	Sandy clay loam	Moderate. medium blocky	Slightly friable. slightly sticky, slightly plastic	-	-	Clear smooth
AB	10-25	Dark reddish brown (5YR 3/4)	As above	As above	As above	-	-	As above
Bt1	25-45	Dark reddish brown (2.5YR 3/4)	Sandy clay	As above	As above	-	-	As above
Bt2	45-700	Dark red (2.5YR 3/6)	Above	As above	As above	2 %. fine, slightly hard, spherical. secondary ironstone gravel	Charcoal pieces: few. small ant nests	Gradual smooth
Bt3	70-120+	As above	Above	As above	As above	As above	-	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	7	24	26	8	5	-	28	SCL	5.4	4.2	0.02	1.2	0.09	13	1.15	1.28	0.76	0.05	0.02	0.03	0.51	5.89	16.8	9.46	36		9
30-40	1	6	20	25	8	5	-	35	SC	5.3	3.9	0.01	0.6	0.06	10	0.24	0.05	0.06	0.02	0.02	0.03	1.74	4.36	10.7	5.49	3		40
60-80	1	5	16	22	9	7		40	SC	5.4	3.9	0.004	0.5	0.03	17	0.2	0.04	0.04	0.01	0.03	0.11	1.7	4.2	9.3	4.83	3		40

Profile number: P 73	**AE Zone:** Eastern	**Soil code:** L33-1
Map sheet number: 31/3 Location – Village : Songambele District: Biharamulo Landscape unit: E33 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Upper ridge slope Geological unit: Nyanzian System Parent material: Residual deposits derived from greenstones (meta-basalts)	Altitude (m) : 1330 Vegetation: Bushed woodland Land use: Wood and livestock production Other features : Slight sheet erosion	FAO soil unit: Ferric Acrisol Soil Taxonomy: Rhodic Kandiustult Drainage class: Well Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-15	Dark reddish brown (5YR 3/3)	Sandy clay loam	Moderate. fine and medium blocky	Slightly hard. friable. slightly sticky. slightly plastic	-	-	Clear smooth
Bt1	15-30	Dark reddish brown (5YR ¾)	as above	As above	As above	1 %. fine, hard. irregular. secondary ironstone gravel	-	Gradual smooth
Bt2	30-55	As above	as above	As above	As above	As above	-	Abrupt wavy
Btcs	55-100+	Dark reddish brown (2.5YR 4/4)	as above	As above	As above	>50% fine, hard, irregular, secondary ironstone gravel	-	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	11	28	25	7	5	-	22	SCL	5.4	4.1	0.01	1	0.09	11	0.94	0.98	0.53	0.01	0.02	0.13	0.51	4.54	16.1	9.91	34		11
30-40	2	8	25	24	8	6	-	27	SCL	5.3	4	0.01	0.6	0.03	20	0.17	0.03	0.04	0.01	0.02	0.03	1.52	3.84	12.0	6.11	3		40
60-80	2	7	21	23	10	6		31	SCL	5.3	4	0.01	0.6	0.03	20	0.27	1.06	0.22	0.02	0.02	0.03	1.56	6.47	18.9	9.39	20		24

Profile number: P 74	**AE Zone:** Eastern	**Soil code:** R24-1
Map sheet number: 31/3 Location – Village : Songambele District: Biharamulo Landscape unit: E33 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Middle ridge slope Geological unit: Nyanzian System Parent material: Residual deposits derived from greenstones (meta-basalts)	Altitude (m) : 1310 Vegetation: Bushed woodland Land use: Wood and livestock production Other features : Slight sheet erosion	FAO soil unit: Humic Cambisol, skeletic phase Soil Taxonomy: Ustoxic Dystropept Drainage class: Well Date described: 24/8/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahcs	0-10	Dark brown (7.5 YR 3/2)	Sandy clay loam	moderate, fine and medium blocky	slightly hard, friable, slightly sticky, slightly plastic	5 %, fine, hard, irregular, secondary ironstone gravel		Clear smooth
Bcs1	10-30	Dark reddish brown (5YR 3/3)	as above	as above	as above	As above		As above
Bcs2	30-50	Dark reddish brown (5YR 3/4)	as above	-	-	As above		Abrupt wavy
Bcs3	50-110+	Yellowish red (5YR 4/6)	-	-	-	>50 %, fine, hard, irregular, secondary ironstone gravel		-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	6	26	28	9	6	-	23	SCL	5.3	4.3	0.01	0.9	0.08	11	0.66	1.29	0.56	0.02	0.02	0.04	0.45	5.67			33		8
30-40	3	9	25	18	13	6	-	26	SCL	5.1	4	0.01	0.6	0.04	15	0.15	0.2	0.07	0.01	0.02	0.09	1.42	4.64			6		31

Profile number: P 75	**AE Zone:** Eastern	**Soil code:** L23-1
Map sheet number: 31/3	Altitude (m): 1290	FAO soil unit: Haplic Acrisol
Location – Village : Songambele	Vegetation: Bushed woodland	Soil Taxonomy: Kanhaplic Haplustult
District: Biharamulo	Land use: Wood and livestock production	Drainage class: Well
Landscape unit: E33	Other features : Slight sheet erosion	Date described: 24/8/1996
Land form: Plain ridge		
Macro-relief: Undulating		
Slope gradient (%): 3		
Site position: Lower ridge slope		
Geological unit: Nyanzian System		
Parent material: Residual deposits derived from greenstones (meta-basalts)		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ahcs	0-15	Dark brown (7.5 R 3/2)	Sandy clay loam	Moderate, fine and medium blocky	Slightly friable, slightly sticky, slightly plastic	5 %, fine, hard, irregular, secondary ironstone gravel	-	Clear smooth
Btcs1	15-35	Dark reddish brown (5YR 3/4)	As above	As above	As above	As above	-	As above
Btcs2	35-65	As above	As above	As above	As above	As above		Abrupt wavy
Btcs3	65-120+	Yellowish red (5YR 4/6)	As above	As above	Friable slightly sticky, slightly plastic	>50 %, fine, hard, irregular, secondary ironstone gravel	-	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg			%		
0-20	3	12	29	21	7	6	-	22	SCL	5.2	4.1	0.01	0.1	0.06	2	0.89	0.92	0.38	0.02	0.02	0.06	0.96	5.62	25.1	10.7	24		17
30-40	2	5	20	26	12	7	-	28	SCL	5.1	4	0.01	0.1	0.04	3	0.03	0.08	0.04	0.01	0.02	0.05	1.69	5.25	18.4	6.75	3		32

Profile number: P 76	**AE Zone:** Eastern	**Soil code:** B21-m
Map sheet number: 31/3	Altitude (m) : 1270	FAO soil unit: Gleyic Phaeozem
Location – Village : Songambele	Vegetation: Grassland	Soil Taxonomy: Vertic Argiaquoll
District: Biharamulo	Land use: Livestock production	Drainage class: Imperfect
Landscape unit: E33		Date described: 24/8/1996
Land form: Valley bottom		
Macro-relief: Flat		
Slope gradient (%): 1		
Site position: Centre of valley floor		
Geological unit: Nyanzian System		
Parent material: Stream wash deposits derived from greenstones (meta-basalts)		

Horizon designation	Depth cm	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Black (10YR 2/1)	Clay loam	moderate, medium blocky	Extremely hard, friable, slightly sticky, slightly plastic	-	Many, fine distinct, clear, brownish yellow (10YR 6/6) mottles	Clear smooth
BAg	10-20	As above	Clay	as above	Extremely hard, firm, sticky, plastic	-	As above, but mixed with yellowish brown (10YR 5/6) mottles	As above
Btg1	20-60	As above	as above	as above	As above	-	As above, but dominant yellowish brown (10YR 5/6) mottles	As above
Btg2	60-120+	Very dark greyish brown (10YR 2/2)	as above	as above	Firm, sticky, plastic	-	As above , but slightly calcareous	-

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	4	9	12	8	27	-	39	CL	6.2	4.8	0.03	3.4	0.17	20	16.45	17.08	5.38	0.05	0.01	-	-	29.63	67.3		76		
30-40	1	4	10	12	6	16	-	51	C	6.1	4.6	0.08	1	0.08	1	14.01	14.59	7.09	0.03	0.2	-	-	31.75	60.3		69		
60-80	1	13	10	15	6	13		42	C	6.2	5	0.02	0.8	0.06	13	5.78	12.03	7.39	0.02	0.25	-	-	26.6	61.4		74		

Profile number: P77	**AE Zone:** Western	**Soil code:** S12-h
Map sheet number: 30/2	Altitude (m): 1450	FAO soil unit: Haplic Alisol
Location: Rusabya	Vegetation: Bushland	Soil Taxonomy: Arenic Haplustult
District: Biharamulo	Land use: Wood and livestock production	Drainage class: Well
Landscape unit: B53	Other features: Few termite mounds; 1-2 mm surface seal; slight sheet erosion	Date described: 15/7/1996
Land form: Foot slope		
Macro-relief: Moderately steep		
Slope gradient (%): 13		
Site position: Upper		
Geological unit: Bukoba Sandstone (Bukoban System)		
Parent material: Residual deposits derived from fine grained sandstones		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Very dark greyish brown (10YR 2/2)	Loamy fine sand	Weak. fine blocky	Slightly hard. friable. non sticky. non plastic	-	high biological activity	abrupt smooth
AB	10-50	Brown (10YR 4/3)	As above	As above	As above	-	as above	as above
Bt1	50-90	Brown (7.5YR 4/4)	Fine sandy loam	Weak. very fine and fine blocky	Slightly hard. friable. slightly sticky. slightly plastic	Very few. very fine. hard irregular. sandstone fragments	as above	as above
Bt2	90-170	Brown (7.5YR 4/6)	As above	As above	As above	as above	As above	
CR	170+						Weathering sandstones	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	2	20	52	11	7	-	8	LS	6.5	5.5	0.05	2.4	0.14	17	6.56	7.8	2.96	0.05	0.02	-	-	13.21?	135.1?		82		
30-50	0	2	21	54	10	6	-	7	LS	5.3	3.8	0.01	0.8	0.05	16	1.05	0.36	0.21	0.01	0.02	0.03	1.2	3.97	45.3		15		30
70-80	0	2	20	49	11	6		12	SL	4.8	3.7	0.01	0.4	0.02	20	0.25	0.06	0.05	0.01	0.02	0.13	2.2	8.52	67.7		2		26

Profile number: P78	**AE Zone:** Western	**Soil code:** L12-m
Map sheet number: 30/2	Altitude (m): 1400	FAO soil unit: Luvic Phaeozem
Location: Rusabya	Vegetation: Bushland fallow	Soil Taxonomy: Typic Paleustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: B53	Other features: Ridging	Date described: 15/7/1996
Land form: Foot slope		
Macro-relief: Moderately steep		
Slope gradient (%): 5		
Site position: Middle		
Geological unit: Bukoba Sandstone (Bukoban System)		
Parent material: Residual deposits derived from dolerites and fine grained sandstones		

Horizon description	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-20	Very dusky red (2.5YR 2.5/2)	Loamy sandy	Weak, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	20-40	Dusky red (2.5YR 3/2)	As above	As above	As above	-	As above	As above
Bt1	40-70	Dark red (10R 3/6)	Sandy loam	As above	Friable, slightly sticky, slightly plastic	-	As above	As above
Bt2	70+	Dusky red (10R 3/4)	Sandy clay loam	As above	As above	-	As above	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	2	23	49	9	6	-	11	LS	6.5	5.6	0.05	1.4	0.12	12	0.93	5.7	1.65	0.1	0.03	-	-	8.6	65.5		87		
30-50	0	2	22	47	10	6	-	13	SL	6.7	5.7	0.04	1	0.07	14	1.32	4.71	1.3	0.1	0.02	-	-	6.66	43.5		92		
70-80	0	2	18	35	8	6		31	SCL	5.9	4	0.01	0.2	0.02	10	0.97	4.23	0.99	0.1	0.02	-	-	8.09	25.5		66		

Profile number: P79	**AE Zone:** Western	**Soil code:** R23-1
Map sheet number: 30/2	Altitude (m): 1400	FAO soil unit: Haplic Acrisol, skeletic phase
Location: Rusabya	Vegetation: Bushland fallow	Soil Taxonomy: Typic Kanhaplustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: B53	Other features: Ridging	Date described: 15/7/1996
Land form: Foot slope		
Macro-relief: Moderately steep		
Slope gradient (%): 5		
Site position: Lower slope		
Geological unit: Bukoba Sandstone (Bukoban System)		
Parent material: Residual deposits derived from shales and fine grained sandstones		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ah	0-10	Dark reddish brown (5YR 3/3)	Sandy clay loam	Weak, fine blocky	Slightly hard, friable, slightly sticky, slightly plastic	Few, fine and medium, hard irregular, secondary ironstone gravel	-	Abrupt smooth
Btcs1	10-30	Dark reddish brown (5YR ¾)	Sand clay loam	As above	As above	Many, fine and medium, hard irregular, secondary ironstone gravel	-	As above
Btcs2	30-60+	-		-	-	As above but dominant		

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	3	17	22	30	25	-	3	SCL	5.4	4.1	0.02	1.7	0.11	15	1.48	1.88	1.33	0.05	0.03	0.11	0.61	8.91	28.8		37		7
30-60	2	3	17	27	10	12	-	29	SCL	4.7	3.7	0.02	0.4	0.09	4	0.61	0.1	0.09	0.03	0.03	0	2.88	6.52	21.1	10.8	4		44

Profile number: P80	**AE Zone:** Lake Shore	**Soil code:** L32-m
Map sheet no: 31/3	Altitude (m): 1180	FAO soil unit: Haplic Acrisol
Location: Katemwa village	Vegetation: Bush fallow	Soil taxonomy: Typic Kandiustult
District: Biharamulo	Land use: Crop production	Drainage: Well
Landscape unit: F24	Other features: Ridging; slight sheet erosion	Date described: 22/8/1996
Landform: Plain ridge		
Macro-relief Undulating		
Slope gradient (%): 6		
Site position: Upper slope		
Geological unit: Archean Granite		
Parent material: Residual deposits derived from biotite granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell colour code)	Texture	Structure	Consistence	Coarse material	Other features	Boundary
Ap	0-10	Dark yellowish brown (10YR 4/4)	Loamy Sand	Weak. fine and medium. blocky	Slightly hard. friable, non sticky, non plastic		High biological activity	Clear smooth
AB	10-40	Brown (7.5YR 4/4)	Sandy loam	As above	Slightly hard, friable, slightly sticky, slightly plastic	Few, fine, hard, irregular secondary ironstone gravel	As above	As above
Btcs1	40-70	Strong brown (7.5YR 4/6)	Sandy clay loam	As above	As above	As above, but frequent	-	As above
Btcs2	70-130+	As above	As above	As above	As above	As above, but very frequent	-	

ANALYTICAL DATA

Depth	Particle size								Texture Class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	4	15	46	20	6	-	7	LS	6.1	4.5	0.02	0.3	0.02	15	0.68	0.49	0.1	0.05	0.02	-	-	0.9	8.6	9.43	73		
30-40	8	9	16	25	14	9	-	19	SL	5.3	4	0.01	0.2	0.02	10	3.49	0.15	0.07	0.06	0.02	0	1.28	3.43	17.0	8.32	8		37
70-80	6	8	13	24	17	12	-	20	SCL	5.4	4	0.01	0.2	0.01	20	1.24	0.03	0.04	0.1	0.02	0	1.2	2.84	13.2	6.95	7		42

Profile number: P81	AE Zone: Lake shore	**Soil code:** S25-h
Map sheet number: 19/3 Location: Katemwa village District: Biharamulo Landscape unit: F12 Land form: Lake terraces Macro-relief: Gently undulating Slope gradient (%): 7 Site position: Middle of 35m-terrace Geological unit: Archean Granite Parent material: Lake deposits derived from undifferentiated granites	Altitude (m): 1170 Vegetation: Fallow Land use: Crop production Other features: Ridging; 1 mm thick surface seal; slight sheet erosion	FAO Soil unit: Luvic Arenosol Soil Taxonomy: Arenic Kanhaplustult Drainage class: Well Date described: 24/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Brown (10YR 4/3)	Loamy sand	Weak, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Abrupt smooth
AB	10-30	Dark yellowish brown (10YR 4/4)	As above	As above	As above	Very few, fine, hard, irregular, secondary ironstone gravel	As above	Abrupt smooth
Btcs	30-70	Dark yellowish brown (10YR 4/6)	As above	As above	As above	Frequent, fine and medium, hard, irregular, secondary ironstone gravel	-	Abrupt smooth
CR	70+						Hard granites	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	PH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	6	15	26	30	10	8		5	LS	7.0	6.0	0.03	0.6	0.06	10	1.09	3.75	0.96	0.06	0.03			4.7	81.2		100		
30-50	6	9	24	32	13	9		7	LS	6.7	5.2	0.02	0.2	0.01	20	27.8	0.95	0.28	0.03	0.02			1.4	17.0		92		
60-80	8	13	24	25	11	10		9	LS	5.3	4.0	0.01	0.2	0.01	20	3.09	0.23	0.07	0.02	0.03	0.01	0.84	2.7	27.4		13		31

Profile number: P82 Map sheet number: 19/3 Location: Katemwa village District: Biharamulo Landscape unit: F12 Land form: Lake terraces Macro-relief: Gently undulating Slope gradient (%): 1 Site position: Backslope of 25-m terrace Geological unit: Archean Granite Parent material: Lake deposits derived from undifferentiated granites	**AE Zone:** Lake shore Altitude (m): 1160 Vegetation: Fallow Land use: Crop production Other features: Ridging; 1 mm thick surface seal; slight sheet erosion	**Soil code:** S24-1 FAO Soil unit: Gleyic Arenosol Soil Taxonomy: Aeric Albaquult Drainage class: Imperfect Date described: 24/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-30	Dark greyish brown (10YR 4/2)	Loamy sand	Weak, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Abrupt smooth
Btg1	30-60	Dark yellowish brown (10YR 4/4)	As above	As above	As above		As above	Abrupt smooth
Btgcs1	60-80	As above	As above	As above	As above	Very frequent, fine and medium, hard, irregular, secondary ironstone gravel	-	Abrupt smooth
Btgcs2	80+					As above but dominant		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	13	17	23	23	11	9	-	4	LS	5.4	4.3	0.03	0.6	0.06	10	1.51	1.01	0.33	0.02	0.03	0.09	0.04	3.1	62.5		45		1
30-50	11	13	21	27	11	8	-	9	LS	5.3	4.1	0.01	0.1	0.01	10	3.36	0.25	0.05	0.01	0.02	0.05	0.22	1.4	14.4	6.76	24		16
60-80	8	14	27	25	11	9	-	6	LS	6.1	4.1	0.01	0.1	0.01	10	0.69	0.43	0.13	0.01	0.03	-	-	0.83	12.2	10.00	72		

Profile number: P83	**AE Zone:** Lake shore	**Soil code:** S21-m
Map sheet number: 19/3	Altitude (m): 1140	FAO Soil unit: Haplic Phaeozem
Location: Kasenda village	Vegetation: Fallow	Soil Taxonomy: Typic Haplustoll
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: F12	Other features: Ridging: 1 mm thick surface seal; slight sheet erosion	Date described: 24/08/1996
Land form: Lake terraces		
Macro-relief: Gently undulating		
Slope gradient (%): 1		
Site position: Beach ridge of 5m terrace		
Geological unit: Archean Granite		
Parent material: Lake deposits derived from undifferentiated granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-25	Very dark greyish brown (10YR 3/2)	Sand	Weak, fine and medium blocky	Friable, non sticky, non plastic	-	High biological activity	Abrupt smooth
AB	25-40	Dark brown (10YR 3/3)	As above	As above	As above		As above	Abrupt smooth
Bw1	40-70	Dark yellowish brown (10YR 4/3)	As above	As above	As above		-	Abrupt smooth
Bw2	70-110+	Dark yellowish brown (10YR 4/4)	As above	As above	As above			

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-25	4	9	17	38	21	6	-	5	S	6.3	5.7	0.07	0.8	0.04	20	1	3.21	0.95	0.1	0.02	-	-	5.71	98.2		75		
30-40	4	10	20	38	18	5	-	5	S	6.6	5.5	0.02	0.4	0.02	20	26.56	1.89	0.53	0.02	0.02	-	-	2.89	49.8		85		
70-80	3	8	19	39	21	6	-	4	S	6.4	5.1	0.01	0.1	0.01	10	25.2	0.69	0.18	0.02	0.02	-	-	1.15	26.3		79		

Profile number: P84	**AE Zone:** Lake shore	**Soil code:** B21-1
Map sheet number: 19/3 Location: Katemwa District: Biharamulo Landscape unit: F11 Land form: Valley bottom Macro-relief: Gently undulating Slope gradient (%): 1 Site position: Edge of valley floor Geological unit: Archean Granite Parent material: Lake deposits derived from undifferentiated granites	Altitude (m): 1160 Vegetation: Fallow after paddy Land use: Crop production	FAO Soil unit: Gleyic Phaeozem Soil Taxonomy: Abruptic Argiaquoll Drainage class: Imperfect Date described: 24/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Apg	0-30	Very dark greyish brown (10YR 3/2)	Sandy clay loam	Moderate, fine and medium blocky	Friable, slightly sticky, slightly plastic	-	Many fine and medium sized prominent dark yellowish brown (10YR 4/4) mottles	Abrupt smooth
ABg	30-50	Very dark grey (10YR 3/1)	Clay	Moderate, fine and medium blocky and prismatic	Sticky and plastic		Common fine and medium sized, distinct dark yellowish brown (10YR 4/4) mottles	Abrupt smooth
Btr	50-90+	Grey (7.5YR 5/1)	As above	As above	As above		Fluctuating groundwater	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	ECEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg			%		
0-30	2	6	15	24	10	16	-	27	SCL	5.4	3.6	0.05	1.3	0.09	14	27.23	7.62	2.42	0.13	0.05	0.01	1.05	25.64	90.1		40		4
30-40	2	6	13	17	7	11	-	44	C	6	4.3	0.06	0.7	0.05	14	0.48	15.78	4.87	0.21	0.03	-	-	30.72	68.2		68		
70-80	1	4	9	13	7	12	-	54	C	6.5	5.1	0.12	0.5	0.03	17	0.19	22.91	6.12	0.35	0.05	-	-	33.78	61.6		87		

Profile number: P85	AE Zone: Lake shore	Soil code: S25-1
Map sheet number: 19/3 Location: Katemwa District: Biharamulo Landscape unit: F24 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 6 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	Altitude (m): 1170 Vegetation: Fallow Land use: Crop production Other features: Ridging	FAO Soil unit: Luvic Arenosol Soil Taxonomy: Arenic Kanhaplustult Drainage class: Somewhat excessive Date described: 24/08/1996 Remark: Texture analysis topsoil does not correspond with field observation that profile is sandy throughout

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-30	Brown (10YR 4/3)	Sandy loam	Weak, fine and medium blocky	Friable	-	High biological activity	Abrupt smooth
AE	20-40	Brown (7.5YR 4/4)	Loamy sand	As above	As above		As above	Clear smooth
EB2	40-60	Strong brown (7.5YR 4/6)	As above	Weak, fine and medium blocky and granular	As above		-	As above
EB2	60-100+	As above	Sand	As above	As above			

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	8	19	30	15	9	-	14	SL	4.8	3.8	0.04	0.3	0.02	15	1.62	0.35	0.12	0.02	0.03	0.01	0.5	3.22	29.2		16		
30-40	5	8	19	37	16	9	-	6	LS	4.8	3.8	0.01	0.2	0.01	20	0.16	0.04	0.02	0.01	0.02	0	1.1	3.4	53.3		3		
70-80	9	8	16	37	18	11	-	1	S	5.3	4.1	0.004	0.1	0.01	10	0.06	0.02	0.01	0.01	0.02	0.12	0.35	1.23	8.1		5		

Profile number: P86 Map sheet number: 19/3 Location: Katemwa District: Biharamulo Landscape unit: F24 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 5 Site position: Upper slope Geological unit: Archean Granite Parent material: Residual deposits derived from biotite granites	**AE Zone:** Lake shore Altitude (m): 1150 Vegetation: Bush fallow Land use: Crop production Other features: Ridging. slight sheet erosion	**Soil code:** R23-1 FAO Soil unit: Haplic Acrisol. skeletic phase Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 23/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Brown (10YR 4/3)	Sandy laom	Weak. fine and medium blocky	Friable	-	High biological activity	Abrupt smooth
AB	15-35	Brown (7.5YR 4/4)	As above	As above	As above	Frequent secondary ironstone gravel	As above	Clear smooth
Btcs1	35-50	Strong brown (7.5YR 4/6)	Sandy clay loam	As above	As above	As above but very frequent	-	As above
Btcs2	50+	As above			As above	As above but dominant		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-15	4	10	24	30	11	8	-	13	SL	4.5	3.8	0.04	0.6	0.04	15	6.58	0.27	0.1	0.05	0.03	0.01	1.3	7.04	49.5		6		18
30-40	5	8	17	27	13	10	-	20	SCL	4.7	3.9	0.02	0.3	0.03	10	1.17	0.2	0.06	0.02	0.02	0	1.22	5.07	23.9	7.6	6		24

Profile number: P87	AE Zone: Lake shore	**Soil code:** S11-h
Map sheet number: 19/3 Location: Rutunguru village District: Biharamulo Landscape unit: F32 Land form: Footslope Macro-relief: Gently undulating Slope gradient (%): 2 Site position: Upper slope Geological unit: Archean Granite Parent material: Slope-wash deposits derived from biotite granites	Altitude (m): 1200 Vegetation: Fallow Land use: Crop production Other features: Ridging, slight sheet erosion	FAO Soil unit: Haplic Phaeozem Soil Taxonomy: Typic Argiustoll Drainage class: Well Date described: 23/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Dark brown (10YR 3/3)	Sandy loam	Moderate, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Clear smooth
AB	20-40	Brown (7.5YR 3/4)	Sand	Weak, fine and medium blocky	As above		As above	As above
Bt1	40-60	Brown (7.5YR 4/4)	Sand	As above	As above		-	As above
Bt2	60-100	Brown (7.5YR 4/4)	Sandy loam	As above	Slightly hard, friable, slightly sticky, slightly plastic	Very frequent fine and medium sized quartz gravel		
Bt3	100+					As above		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	8	21	32	14	9	-	12	SL	6.5	5.5	0.05	0.7	0.07	10	3.37	2.91	0.93	0.08	0.02	-	-	4.86	34.7		81		
30-40	6	10	17	37	13	9		8	S	6.6	5.4	0.03	0.4	0.02	20	1.78	1.68	0.51	0.08	0.03	-	-	2.74	29.3		84		
70-80	5	10	22	27	12	9		15	SL	6.3	4.8	0.02	0.2	0.01	20	1.78	0.66	0.35	0.12	0.02	-	-	1.51	8.7	7.67	76		

Profile number: P88	**AE Zone:** - Lake shore	**Soil code :** L32/1
Map sheet number: 19/3	Altitude (m): 1160	FAO Soil unit: Haplic Acrisol
Location: Rutunguru village	Vegetation: Fallow	Soil Taxonomy: Typic Haplustult
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: F12	Other features: Ridging, slight sheet erosion	Date described: 23/08/1996
Land form: Lake terrace		
Macro-relief: Gently undulating		
Slope gradient (%): 3		
Site position: Middle of 25-m terrace		
Geological unit: Archean Granite		
Parent material: Lake deposits derived from undifferentiated granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-30	Dark brown (10YR 4/3)	Loamy sand	Weak, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Clear smooth
AB	30-50	Brown (7.5YR 4/4)	Sandy loam	As above	As above		As above	As above
Bt1	50-80	Strong brown (7.5YR 4/6)	Sandy clay loam	As above	Slightly hard, friable, slightly sticky, slightly plastic		-	As above
Bt2	80-140+	As above	As above	As above	As above			

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-30	3	11	27	34	10	6	-	9	LS	5.3	4.1	0.03	0.4	0.03	13	3	0.34	0.19	0.05	0.02	0.02	0.38	2.08	18.7	11.1	29		18
30-40	5	10	19	26	13	10	-	17	SL	5.2	3.9	0.01	0.2	0.01	20	0.96	0.12	0.09	0.05	0.02	0.03	1.22	3.56	19.8	9.00	8		34
70-80	2	7	17	26	15	10	-	23	SCL	5.3	3.9	0.01	0.1	0.01	10	0.52	0	0.07	0.03	0.02	0	1.24	3.02	12.7	5.91	4		41

Profile number: P89	**AE Zone:** Lake shore	**Soil code :** L22/1
Map sheet number: 19/3 Location: Rutunguru village District: Biharamulo Landscape unit: F12 Land form: Lake terrace Macro-relief: Gently undulating Slope gradient (%): 2 Site position: Middle of 15-m terrace Geological unit: Archean Granite Parent material: Lake deposits derived from undifferentiated granites	Altitude (m): 1150 Vegetation: Fallow Land use: Crop production Other features: Ridging, slight sheet erosion	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 23/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Dark brown (10YR 4/3)	Loamy sand	Weak, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	High biological activity	Clear smooth
AB	20-40	Brown (7.5YR 4/4)	Sandy loam	As above	As above		As above	As above
Bt1	40-70	Strong brown (7.5YR 4/6)	Sandy clay loam	As above	Slightly hard, friable, slightly sticky, slightly plastic		-	As above
Bt2	70-110+	As above	As above	As above	As above	Frequent fine and medium sized quartz gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	7	19	39	14	8	-	8	LS	5.7	4.2	0.02	0.3	0.03	10	1.69	0.34	0.12	0.07	0.02	-	-	0.93	7.9	6.88	59		
30-40	5	8	19	35	12	8	-	13	SL	5.4	4	0.01	0.2	0.02	10	0.92	0.4	0.15	0.05	0.02	0.08	0.46	2.52	17.8	8.92	25		18
70-80	4	6	13	28	17	11	-	21	SCL	5.1	3.9	0.01	0.2	0.01	20	0.68	0.09	0.29	0.05	0.03	0.01	1.09	3.71	16.7	7.43	12		29

Profile number: P90	**AE Zone:** Lake shore	**Soil code :** S24-m
Map sheet number: 19/3	Altitude (m): 1140	FAO Soil unit: Gleyic Arenosol
Location: Rutunguru village	Vegetation: Fallow	Soil Taxonomy: Typic Albaquult
District: Biharamulo	Land use: Crop production	Drainage class: Imperfect
Landscape unit: F11	Other features: Ridging, slight sheet erosion	Date described: 23/08/1996
Land form: Valley bottom		
Macro-relief: Gently undulating		
Slope gradient (%): 2		
Site position: Beach ridge at edge of valley floor		
Geological unit: Archean Granite		
Parent material: Lake deposits derived from undifferentiated granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Apg	0-20	Very dark greyish brown (10YR 3/2)	Loamy sand	Weak, fine and medium blocky	Friable, non sticky, non plastic	-	Many, fine and medium, prominent, clear, dark brown mottles	Clear smooth
ABg	20-40	Dark greyish brown (10YR 4/2)	Sandy loam	As above	slightly hard, friable, non sticky, non plastic	-	Many, fine and medium, prominent, clear, strong brown mottles	As above
Btg1	40-70	As above (10YR 4/2)	As above	As above	as above	-	Many, fine and medium, prominent, clear, yellowish brown mottles	As above
Btg2	70-120+	Greyish brown (10YR 5/2)	Sandy clay loam	As above	Friable, slightly sticky, slightly plastic	-	Many, fine and medium, prominent, clear, dark brown mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	14	26	27	11	10		6	LS	6	3.2	0.03	0.15	0.02	7	1	0.46	0.03	0.02	0.03			0.8			72		
30-40	4	15	26	27	11	10	-	7	SL	6	3.8	0.02	0.15	0.01	15	0.8	0.48	0.06	0.01	0.02	-	-	0.83			69		
70-80	2	10	24	30	11	10	-	13	SL	5.5	3.7	0.02	0.43	0.03	11	0.04	0.85	0.28	0.01	0.04	-	-	2.67			52		

Profile number: P91	**AE Zone:** Southern	**Soil code :** L13-1
Map sheet number: 44/1	Altitude (m): 1150	FAO Soil unit: Humic Alisol
Location: Kalenge village	Vegetation: Bushland	Soil Taxonomy: Ustic Haplohumult
District: Biharamulo	Land use: Wood production, hunting & gathering	Drainage class: Moderate
Landscape unit: A12		Date described: 27/08/1996
Land form: Fan slope		
Macro-relief: Almost flat		
Slope gradient (%): 1		
Site position: Lower slope		
Geological unit: Uha Group (Bukoban System)		
Parent material: Stream deposits derived from cherts, limestones and sandstones		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-30	Very dark brown (10YR 2/2)	Clay loam	Weak, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-		Clear smooth
AB	30-50	Dark greyish brown (10YR 4/2)	Silty clay loam	As above	Slightly hard, friable, sticky, plastic	-		As above
Bt	50-80	Yellowish brown (10YR 5/4)	Silty clay	As above	Hard, firm, sticky, plastic	-		As above
Btg	80-120+	Brownish yellow (10YR 6/6)	As above	As above	As above	-	Common, fine, faint, yellowish brown (10YR 5/8)mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	cmol/kg	cmol/kg			%		
0-30	0	0	2	7	21	43	-	27	CL	4.4	3.4	0.05	4.1	0.25	16	0.65	0.82	0.75	0.05	0.03	-	-	7.17	11.4		23		
30-40	1	1	2	5	7	48	-	36	ZCL	5.1	3.4	0.02	1.5	0.12	13	0.43	1.15	0.93	0.01	0.05	0.55	7.03	27.77	73.0		8		25
70-80	0	0	1	5	6	46	-	42	ZC	5.4	3.3	0.01	0.4	0.04	10	0.31	1.01	1.04	0.01	0.06	0.13	9.05	23.06	54.0		9		39

Profile number: P93	**AE Zone:** Southern	**Soil code :** L13-m
Map sheet number: 44/1 Location: Kalenge village District: Biharamulo Landscape unit: A12 Land form: Fan slope Macro-relief: Gently sloping Slope gradient (%): 3 Site position: Upper slope Geological unit: Uha Group (Bukoban System) Parent material: Stream deposits derived from cherts, limestones and sandstones	Altitude (m): 1160 Vegetation: Fallow Land use: Crop production	FAO Soil unit: Haplic Alisol Soil Taxonomy: Typic Haplustult Drainage class: Well Date described: 27/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Dark brown (10YR 4/3)	Sandy loam	Weak, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-		Clear smooth
Bt1	20-40	Yellowish brown (10YR 5/4)	As above	As above	As above	-		As above
Bt2	40-70	As above	As above	As above	As above	-		As above
Bt3	70-100+	Yellowish brown (10YR 5/8)	Sandy clay loam	As above	As above	-		-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	5	29	26	14	20		5	SL	5.8	5.2	0.05	0.5	0.03	17	5.71	1.73	0.76	0.03	0.02			4.03	70.6		63		
30-40	0	4	22	22	13	24		15	SL	5.0	3.7	0.02	0.2	0.02	10	1.13	0.87	0.53	0.01	0.02	0.01	1.21	7.36	47.7		19		16
70-80	0	4	21	19	12	24		20	SCL	5.0	3.6	0.01	0.2	0.02	10	0.91	1.14	0.66	0.01	0.03	0.03	2.22	11.05	54.3		17		20

Profile number: P94	**AE Zone:** Southern	**Soil code :** B22-1
Map sheet number: 44/1 Location: Kanyoni village District: Biharamulo Landscape unit: A11 Land form: Valley bottom Macro-relief: Almost flat Slope gradient (%): 1 Site position: Edge of valley bottom Geological unit: Uha Group (Bukoban System) Parent material: Stream deposits derived from cherts, limestones and sandstones	Altitude (m): 1150 Vegetation: Bush fallow Land use: Crop production	FAO Soil unit: Gleyic Alisol Soil Taxonomy: Aeric Albaquult Drainage class: Imperfect Date described: 27/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Black (10YR 3/1)	Sandy loam	Weak, fine and medium blocky	Slightly hard, friable, non sticky, non plastic	-	-	Abrupt smooth
Btg1	10-30	Dark yellowish brown (10YR 4/3)	Clay loam	As above	Slightly hard, friable, slightly sticky, slightly plastic	-	Very few, fine, faint, clear, dark yellowish brown mottles	Clear smooth
Btg2	30-60	Dark yellowish brown (10YR 4/4)	As above	As above	Slightly hard, friable, sticky, plastic	-	Few, fine, distinct, clear, yellowish brown mottles	As above
Btg3	60-90+	Brown (7.5YR 4/4)	Sandy clay loam	As above	As above	-	Common, fine and medium, prominent, clear, strong brown mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-10	0	1	16	37	16	17	-	13	SL	5.2	4	0.11	2.2	0.2	11	2.73	3.4	1.91	0.03	0.02	0.13	0.1	12.15	76.5		44		1
30-40	0	1	7	16	16	32	-	28	CL	5.2	3.4	0.01	0.5	0.04	13	0.14	0.71	0.41	0.01	0.03	1.05	3.96	14.35	49.5		8		28
70-80	0	1	12	24	15	20	-	28	SCL	5.4	3.5	0.01	0.2	0.02	10	0.46	2.02	0.68	0.02	0.04	0.13	3.43	12.15	42.7		23		28

Profile number: P95	**AE Zone:** Southern	**Soil code :** R13-1
Map sheet number: 44/1	Altitude (m): 1190	FAO Soil unit: Humic Cambisol. skeletic and petroferric phase
Location: Kanyoni village	Vegetation: Bushland	Soil Taxonomy: Lithic Humitropept
District: Biharamulo	Land use: Wood production	Drainage class: Excessive
Landscape unit: A12		Date described: 27/08/1996
Land form: Footslope (included in large fan slope)		
Macro-relief: Almost flat		
Slope gradient (%): 6		
Site position: Upper slope		
Geological unit: Uha Group (Bukoban System)		
Parent material: Slope-wash deposits derived from cherts. limestones and sandstones		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ahcs	0-30	Very dark greyish brown (10YR 3/2)	Sandy loam	Weak. fine and medium blocky	Slightly hard, friable, non sticky. non plastic	Frequent. fine and medium. hard. irregular secondary ironstone gravel	-	clear smooth
Bcs	30-40	-	-	-	-	Very frequent, fine and medium. hard, irregular secondary ironstone gravel		As above
Bms	40+					-	Secondary ironstone pan over rock	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-30	5	7	18	31	12	16		11	SL	5.3	4.1	0.03	0.9	0.05	18	7.78	1.2	0.42	0.05	0.02	0.05	0.38	4.33	31.2		39		9

Profile number: P96	**AE Zone:** Southern	**Soil code :** R23-m
Map sheet number: 29/4 Location: Kitali camp 2 District: Biharamulo Landscape unit: D33 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 6 Site position: Middle slope Geological unit: Lower Division Karagwe-Ankolean System Parent material: Slope-wash deposits derived from schists and crushed granites	Altitude (m): 1400 Vegetation: Bush fallow Land use: Crop production	FAO Soil unit: Haplic Acrisol, skeletic phase Soil Taxonomy: Typic Kandiustult Drainage class: Somewhat excessive Date described: 29/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Very dark greyish brown (10YR 3/2)	Sandy loam	Weak, fine and medium, blocky	Slightly hard, friable, non sticky, non plastic	-	-	Abrupt smooth
Bt1	10-30	Dark brown (7.5YR 3/4)	Sandy clay loam	As above	Slightly hard, friable, slightly sticky, slightly plastic	Very few, fine and medium, fresh and slightly weathered, irregular, quartz	-	Clear smooth
Bt2	30-50	Dark reddish brown (5YR 3/4)	As above	As above	As above	As above but frequent quartz gravel	-	-
Bt3	50+			Quartz gravel		As above but very frequent quartz gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-10	1	6	23	29	12	13	-	16	SL	5.9	5	0.07	1.3	0.1	13	5.41	2.47	1.56	0.12	0.02	-	-	6.22	30.8		67		
10-30	2	4	17	24	12	14	-	27	SCL	5.4	4	0.01	0.7	0.1	7	0.08	0.3	0.31	0.1	0.02	0.01	1.24	3.96	12.1	7.33	18		31

Profile number: P97	**AE Zone:** Southern	**Soil code :** R23-m
Map sheet number: 29/4 Location: Kitali camp 2 District: Biharamulo Landscape unit: D33 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 8 Site position: Lower slope Geological unit: Lower Division Karagwe-Ankolean System Parent material: Slope-wash deposits derived from schists and crushed granites	Altitude (m): 1380 Vegetation: Bush fallow Land use: Crop production	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Kandiustult Drainage class: Excessive Date described: 29/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Very dark greyish brown (10YR 3/2)	Sandy loam	weak, fine and medium blocky	slightly hard, friable, non sticky, non plastic	-	-	Abrupt smooth
Bt1	10-30	Dark reddish brown (5YR 3/4)	Sandy clay loam	as above	slightly hard, friable, slightly plastic	few, fine and medium, fresh, irregular quartz	-	Abrupt wavy
Bt2	30+					As above but very frequent quartz gravel	-	

ANALYTICAL DATA: No samples analyzed

Profile number: P98	**AE Zone:** Southern	**Soil code :** B21-m
Map sheet number: 29/4	Altitude (m): 1360	FAO Soil unit: Gleyic Phaeozem
Location: Kitali camp 2	Vegetation: Fallow	Soil Taxonomy: Abruptic Argiaquoll
District: Biharamulo	Land use: Crop production	Drainage class: Imperfect
Landscape unit: D33		Date described: 29/08/1996
Land form: Footslope		
Macro-relief: Almost flat		
Slope gradient (%): 1		
Site position: Centre of minor valley bottom between two footslopes		
Geological unit: Lower Division Karagwe-Ankolean System		
Parent material: Slope-wash deposits derived from schists and crushed granites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Very dark grey (10YR 3/1)	Loam	Moderate, medium granular and blocky	Slightly hard, friable, slightly sticky, slightly plastic	-	-	Abrupt smooth
ABg1	20-40	Brown (10YR 4/3)	Clay	Moderate, fine and medium blocky	As above	-	Few, very fine and fine, faint, clear, dark brown mottles	Clear smooth
Btg1	40-70	Very dark greyish brown (10YR 3/2)	As above	As above	Friable, slightly sticky, slightly plastic	-	Many, fine and medium, prominent, clear, red mottles	As above
Btg2	70-100+	Very dark greyish brown (10YR 3/1)	As above	As above	Friable, sticky, plastic	Some gravel	As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	3	13	21	14	30	-	18	L	5.7	4.5	0.03	2.4	0.16	15	4.93	4.79	2.18	0.05	0.03	-	-	11.37	49.8		62		
30-40	2	5	11	15	9	18	-	40	C	5.7	3.7	0.02	1	0.06	17	1.98	4.03	2.47	0.05	0.05	-	-	11.38	26.0		58		
70-80	1	2	7	10	8	20		52	C	7	5.5	0.11	0.7	0.04	18	1.79	12.65	6.45	0.14	0.2	-	-	18.69	34.6		100		

Profile number: P99	**AE Zone:** Southern	**Soil code :** B21-m
Map sheet number: 29/4 Location: Kitali camp 2 District: Biharamulo Landscape unit: D31 Land form: Valley bottom Macro-relief: Almost flat Slope gradient (%): 1 Site position: Centre of valley bottom Geological unit: Lower Division Karagwe-Ankolean System Parent material: Stream deposits derived from schists and crushed granites	Altitude (m): 1350 Vegetation: Fallow Land use: Crop production	FAO Soil unit: Gleyic Phaeozem Soil Taxonomy: Abruptic Argiaquoll Drainage class: Imperfect Date described: 30/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Very dark grey (10YR 3/1)	Silty clay loam	Moderate, fine and medium granular	Slightly hard, friable, slightly sticky, slightly plastic	-	-	Abrupt smooth
ABg1	20-40	Very dark brown (10YR 2/2)	As above	Moderate, fine and medium, prismatic and blocky	As above	-	Few, fine and medium, distinct, yellowish brown mottles	Clear smooth
Btg1	40-70	Light brownish brown (10YR 6/2)	As above	As above	As above	-	Common, fine and medium, prominent, clear, yellowish brown mottles	As above
Btg2	70-120+	As above	Silty clay	As above	As above	-	Many, fine and medium, prominent, clear, yellowish brown mottles	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	0	0	2	7	59	-	31	ZCL	6.1	5.4	0.16	7.8	0.57	14	7.66	16.31	6.63	0.2	0.03	-	-	31.31			74		
30-40	0	0	0	2	7	59	-	32	ZCL	5.7	3.8	0.03	2.2	0.07	31	2.82	2.64	0.98	0.03	0.09	-	-	6.68			56		
70-80	0	0	0	1	4	51		44	ZC	5.7	3.5	0.03	0.6	0.05	12	3.16	1.97	1.25	0.03	0.12	-	-	5.91			57		

Profile number: P101	**AE Zone:** Southern	Soil code : C33-1
Map sheet number: 44/1 Location: Kalenge village District: Biharamulo Landscape unit: A41 Land form: Plateau plain Macro-relief: Gently sloping Slope gradient (%): 3 Site position: Slightly depressed part of plain flat Geological unit: Uha Group (Bukoban System) Parent material: Residual deposits derived from cherts and limestones	Altitude (m): 1270 Vegetation: Woodland Land use: Wood production, hunting & gathering	FAO Soil unit: Humic Ferralsol Soil Taxonomy: Humic Xantic Acrustox Drainage class: Well Date described: 06/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Dark brown (10YR 4/3)	Clay loam	Weak, fine and medium blocky	Slightly hard, friable, slightly sticky, slightly plastic	-		Abrupt smooth
AB	10-30	Brown (7.5YR 4/4)	As above	As above	As above	-		Clear smooth
Bcs1	30-60	Strong brown (7.5YR 5/6)	Clay	As above	As above	Frequent fine , hard, irregular secondary ironstone gravel-		As above
Bcs2	60+	-	Gravel			As above but very frequent		-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-10	1	5	15	14	5	24	-	36	CL	5.1	4	0.02	2.2	0.14	15	0.16	0.96	0.5	0.02	0.03	0.08	1.09	6.7			40		16
40-50	1	3	14	18	8	9	-	47	C	5.3	4.1	0.01	1.2	0.08	15	0.1	0.09	0.03	0.01	0.02	0.09	1.19	2.98			48		40

Profile number: P102	**AE Zone:** Southern	**Soil code :** C33-m
Map sheet number: 44/1	Altitude (m): 1270	FAO Soil unit: Rhodic Ferralsol
Location: Kalenge village	Vegetation: Woodland	Soil Taxonomy: Rhodic Acrustox
District: Biharamulo	Land use: Wood production, hunting & gathering	Drainage class: Well
Landscape unit: A41		Date described: 06/09/1996
Land form: Plateau plain		
Macro-relief: Gently sloping		
Slope gradient (%): 3		
Site position: Slightly elevated part of plain flat		
Geological unit: Uha Group (Bukoban System)		
Parent material: Residual deposits derived from cherts and limestones		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-20	Very dusky red (2.5YR 2.5/3)	Sandy clay	Weak, fine, blocky	Friable, slightly sticky, slightly plastic	-	High biological activity	Clear smooth
AB	20-40	Dark red (2.5YR 3/6)	As above	As above	As above	-	As above	As above
Bs1	40-70	As above	Clay	Weak, fine and medium, blocky	Slightly hard, friable, slightly sticky, slightly plastic		As above	As above
Bs2	70-110+	Red (2.5YR 4/6)	As above	As above	As above		As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	Cmol/kg	Cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	5	16	21	8	7	-	41	SC	5.2	4.2	0.07	3.4	0.2	17	4.07	2.88	1.55	0.1	0.03	0.14	1.48	14.37	26.8		32		10
40-50	1	3	10	17	8	6	-	55	C	5.7	3.9	0.01	0.6	0.04	15	0.29	0.12	0.06	0.01	0.02	-	-	0.36?	?	.38	58		
80-90	1	2	8	14	9	7	-	59	C	5.6	3.9	0.004	0.4	0.004	10	0.12	0.1	0.04	0.01	0.03	-	-	0.32?	?	.31	56		

Profile number: P103	**AE Zone:** Eastern	**Soil code:** L32-m
Map sheet number: 45/1 Location: Igando village District: Biharamulo Landscape unit: F23 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 2 Site position: Ridge summit Geological unit: Archean Granite Parent material: Residual deposits derived from leuco-granites	Altitude (m): 1220 Vegetation: Grass fallow Land use: Crop production Other features: Ridging	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Typic Kandiustult Drainage class: Well Date described: 25/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/3)	Sandy clay loam	Strong. medium and coarse blocky	Hard. friable. slightly sticky slightly plastic	-	High biological activity	Abrupt smooth
AB	15-40	Brown (7.5YR 4/4)	As above	As above	Very hard. friable. slightly sticky slightly plastic		As above	Clear smooth
Bt1	40-65	Strong brown (7.5YR 4/6)	Sandy clay	Strong. fine and medium blocky	Slightly hard. friable. slightly sticky slightly plastic		-	Abrupt smooth
Bt2	60-100+	As above	As above. but extremely gravelly	-	As above	Dominant fine and medium sized quartz and granite fragments		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	9	16	27	11	9	-	23	SCL	6.3	5	0.04	0.9	0.07	13	2.46	2.24	0.69	0.13	0.03	-	-	4.12	14.0		75		
30-50	7	6	11	20	11	9	-	36	SC	5.3	4	0.03	0.3	0.02	15	0.84	0.62	0.17	0.1	0.02	0.12	1.23	5.26	13.8	6.28	17		23
70-100	11	10	12	13	10	9		35	SC	6.3	5.4	0.02	0.47	0.03	16	0.53	2.04	0.58	0.05	0.03			3.41	8.4	7.71	79		

Profile number: P104	**AE Zone:** Eastern	**Soil code:** R21-h
Map sheet number: 45/1 Location: Igando village District: Biharamulo Landscape unit: F23 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from leuco-granites	Altitude (m): 1200 Vegetation: Grass fallow after maize Land use: Crop production Other features: Ridging	FAO Soil unit: Luvic Phaeozem, skeletic phase Soil Taxonomy: Typic Argiustoll Drainage class: Well Date described: 25/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-25	Dark brown (7.5YR 3/2)	Loamy sand	Strong medium and coarse blocky	Slightly hard, very friable slightly sticky, slightly plastic		Many very fine few medium pores; many very fine roots	Abrupt smooth
Bw1	25-65	Strong brown	Very gravelly sandy clay	Can not be determined due to too much gravel	Slightly sticky slightly plastic	60-80% fine and medium slightly weathered sub-rounded granite gravel	Many fine pores, very few fine roots	
Bw2	65+					As above but dominant		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	10	15	22	24	11	8	-	10	LS	6.5	5.6	0.04	1	0.08	13	3.44	3.25	1.5	0.05	0.03	-	-	5.62	46.2		86		
30-50	11	10	12	13	10	9	-	35	SC	6.3	5.4	0.02	0.47	0.03	16	0.53	2.04	0.58	0.05	0.03	-	-	3.65	9.1	7.71	74		

Profile number: P105	**AE Zone:** Eastern	**Soil code:** S22-m
Map sheet number: 45/1 Location: Igando village, 900 m east of P104 District: Biharamulo Landscape unit: F23 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 3 Site position: Lower slope Geological unit: Archean Granite Parent material: Residual deposits derived from leuco-granites	Altitude (m): 1195 Vegetation: Grass fallow after maize Land use: Crop production Other features: Ridging	FAO Soil unit: Haplic Phaeozem Soil Taxonomy: Typic Haplustoll Drainage class: Well Date described: 25/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-20	Dark brown (7.5YR 3/2)	Sand	Moderate medium and fine angular blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many very fine pores, many very fine roots	Clear smooth
AE	20-35	Dark brown (7.5YR 3/2)	As above	Weak medium and fine angular blocky	Slightly hard, very friable, non-sticky, non-plastic	-	Many very fine pores, few very fine roots	Gradual smooth
EA	35-65	Brown (7.5YR 4/3)	As above	Moderate, medium and coarse blocky	Hard very friable, non-sticky non-plastic.	-	Many very fine pores, few very fine roots.	Gradual smooth
Eu	65-90	Light brown (7.5YR 6/2)	Loamy sand	Moderate, medium and coarse blocky	Hard very friable, non-sticky non-plastic	-	Few very fine pores, few very fine roots; compacted horizon.	Clear smooth
Bs1	90-120	Reddish brown (5YR 5/3)	Coarse sand	Weak fine blocky	Very hard very fine non-sticky, non-plastic	-	Few fine pores, very few, very fine roots.	Clear smooth
Bs2	120-135	Reddish brown (5YR 5/3)	As above	Structureless, porous massive	Very hard very fine non-sticky, non-plastic	-	Few fine pores, very few, very fine roots,	-
Bms	135+						Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	7	16	22	30	13	9	-	3	S	6.4	5.4	0.02	0.6	0.03	20	2.87	1.21	0.3	0.02	0.03	-	-	1.97	8.8		79		
30-50	7	16	22	31	11	10		3	S	6	4.9	0.01	0.2	0.02	10	1.61	0.69	0.12	0.02	0.02	-	-	1.25	45.7		68		
80-100	14	17	20	24	10	12	-	3	LS	6.3	5.2	0.01	0.1	0.01	10	0.78	0.46	0.16	0.03	0.02	-	-	0.89	35.0		75		

Profile number: P106	**AE Zone:** Eastern	**Soil code:** B41-m
Map sheet number: 45/1 Location: Igando village District: Biharamulo Landscape unit: F23 Land form: Valley bottom Macro-relief: Flat Slope gradient (%): 1 Site position: Lower slope Geological unit: Archean Granite Parent material: Stream deposits derived from undifferentiated granites	Altitude (m): 1190 Vegetation: Grass fallow after maize Land use: Crop production	FAO Soil unit: Mollic Gleysol Soil Taxonomy: Fluvaquentic Endoaquoll Drainage class: Poor Date described: 25/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Apg	0-20	Very dark grey (10YR 3/1)	Clay loam	Moderate medium and fine granular and blocky	Friable slightly sticky slightly plastic	-	Many fine and medium pores, abundant fine and medium roots, many fine sharp strong brown (7.5YR 4/6) mottles	Abrupt smooth
ACg	18-35	Very dark grey (10YR 3/1)	Clay loam	Weak, fine, blocky	Friable, slightly sticky, slightly plastic	-	Many fine pores, many fine roots, few strong brown (7.5YR 4/6) mottles.	Diffuse smooth
2Cg1	35-40	Brown (10YR 4/2)	Sand	Could not be determined, very wet soil	Very friable, non-sticky, non-plastic	-	Few, fine roots, mottles (as above)	as above
2Cg2	40-55+	Brown (10YR 4/2)	As above			-	Ground water	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	3	6	17	14	31	-	27	CL	6.1	4.9	0.07	2.9	0.29	10	3.26	7.06	1.89	0.03	0.05	-	-	12.54	26.3		72		
30-40	8	23	31	21	6	7	-	4	S	6.5	4.3	0.01	0.1	0.01	10	1.86	0.43	0.11	0.01	0.04	-	-	0.73	35.7		81		

Profile number: P107	**AE Zone:** Eastern	**Soil code:** L13-1
Map sheet number: 45/2 Location: Chinsabi village. 200m east of Iyeta Hill District: Biharamulo Landscape unit: E34 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 4 Site position: Upper slope Geological unit: Kavirondian System Parent material: Residual deposits derived from sand- and siltstones	Altitude (m): 1240 Vegetation: Woodland Land use: Wood production. hunting & gathering	FAO Soil unit: Haplic Alisol Soil Taxonomy: Typic Haplustult Drainage class: Well Date described: 05/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-5	Dark brown (7.5YR 3/2)	Sandy loam	Very weak fine granular	Very friable, slightly sticky, slightly plastic	-	Many very fine and fine pores, many very fin roots	Clear smooth
AB	5-30	Strong brown (7.5YR 4/6)	As above	Moderate fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Many very fine pores, many very fine roots	Clear smooth
Bt1	30-60	Strong brown (7.5YR 5/8)	Sand clay loam	Moderate fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Many very fine pores, few fine very few coarse roots	Gradual smooth
Bt2	60-85	Strong brown (7.5YR 5/6)	As above	Moderate fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Common fine pores, few fine very few coarse roots	Clear smooth
Bt3	85-100	Strong brown (7.5YR 5/8)	As above	Weak fine and coarse Blocky	Slightly hard, very friable, slightly sticky, slightly plastic	-	Common fine pores, few fine very few coarse roots	Clear smooth
CR	100+		-		-	-	Weathering sandstone	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	3	29	37	9	10	-	11	SL	5.3	4.1	0.04	0.6	0.04	15	4.47	0.94	0.52	0.02	0.02	0	0.71	5.14			29		14
30-50	2	3	18	25	11	17	-	24	SCL	4.8	3.7	0.01	0.1	0.01	10	0.86	0.58	0.24	0.01	0.02	0.18	2.63	11.44			7		23
70-100	2	2	16	24	13	20		23	SCL	4.9	3.7	0.01	0.1	0.01	10	0.55	0.29	0.14	0.02	0.03	0	2.6	9.06			5		29

Profile number: P108	**AE Zone:** Eastern	**Soil code:** R22-m
Map sheet number: 45/2	Altitude (m): 1220	FAO Soil unit: Haplic Alisol. skeletic phase
Location: Chinsabi village. 200m east of Iyeta Hill	Vegetation: Woodland	Soil Taxonomy: Typic Haplustult
District: Biharamulo	Land use: Wood production. hunting & gathering	Drainage class: Well
Landscape unit: E34		Date described: 05/09/1996
Land form: Footslope		
Macro-relief: Gently sloping		
Slope gradient (%): 5		
Site position: Middle slope		
Geological unit: Kavirondian System		
Parent material: Residual deposits derived from sand- and siltstones		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Very dark grey (7.5YR 3/1)	Sandy loam	Moderate. fine granular	Very friable. slightly sticky. slightly plastic	-	Many fine pores. many very fine few fine roots	Clear smooth
AB	10-45	Strong brown (7.5YR 4/6)	as above	Weak fine and medium blocky	as above	-	Many fine pores. many very fine. few medium. very few coarse roots	Gradual smooth
Bt1	45-80	as above	Very gravelly sandy clay loam	Very weak fine blocky	as above	Very frequent sandstone (?) gravel	as above	as above
CR	80+		-		-	-	Weathering sandstone	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	3	26	31	10	16	-	13	SL	6	5.2	0.05	1.1	0.12	9	2.51	2.26	1.29	0.02	0.02	-	-	5.28	32.2		68		
30-50	2	3	21	22	11	18	-	23	SCL	4.9	3.9	0.06	0.4	0.02	20	29.45	0.72	0.6	0.01	0.03	0.02	1.64	8.39	34.7		16		20

Profile number: P109	AE Zone: Eastern	Soil code: L22-1
Map sheet number: 45/2 Location: Chinsabi village, 200m east of Iyeta Hill District: Biharamulo Landscape unit: E34 Land form: Footslope Macro-relief: Gently sloping Slope gradient (%): 5 Site position: Lower slope Geological unit: Kavirondian System Parent material: Residual deposits derived from sand- and siltstones	Altitude (m): 1200 Vegetation: Cassava Land use: Crop production	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 05/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/2)	Sand clay loam	Moderate fine sub-angular blocky	Very friable, non-sticky, non-plastic	-	Many very fine, few medium pores, common very fine roots with some termite activity	Clear smooth
AB	15-40	Brown (7.5YR 5/4)	as above	Moderate fine granular and sub-angular blocky	Very friable, non-sticky, non-plastic; extremely hard, friable, non sticky, non-plastic	-	Many very fine, few medium pores, common very fine roots with some termite activity	Clear smooth
Btg1	40-75	As above	as above	Moderate medium sub-angular blocky	Extremely hard, friable, non-sticky, non-plastic	-	Common, very fine and medium pores, few very fine and very fine roots; few, coarse faint, dark yellowish brown (10YR 4/4) mottles	Gradual smooth
Btg2	75-120	As above (7.5YR 5/4)	as above	Moderate fine blocky	Extremely hard, friable, non-sticky, non-plastic	-	Common, fine	as above
Bcs	120+					Dominant secondary ironstone gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	8	6	10	17	9	38		12	L	5.2	4.1	.01	1.2	.12	10	1.9	0.9	0.16	0.06	0.02	0.03	0.7	2.5	10.8		46		28
30-50	1	4	21	28	11	25	-	10	SL	5.3	4	0.01	0.18	0.02	9	1.59	0.72	0.14	0.01	0.03	0.04	0.8	1.96	22.9		40		32

Profile number: P110	**AE Zone:** Eastern	**Soil code:** B22-1
Map sheet number: 45/2 Location: Chinsabi village. 200m east of Iyeta Hill District: Biharamulo Landscape unit: E31 Land form: Valley bottom Macro-relief: Flat Slope gradient (%): 5 Site position: Edge of valley bottom Geological unit: Nyanzian/Kavirondian System Parent material: Stream deposits derived from undifferentiated greenstones/sandstones	Altitude (m): 1180 Vegetation: Woodland Land use: Wood production. hunting & gathering	FAO Soil unit: Gleyic Alisol Soil Taxonomy: Vertic Albaquult Drainage class: Imperfect Date described: 05/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Loam	Moderate fine sub-angular blocky	Friable, slightly sticky, slightly plastic	-	Common very fine pores. many fine very few coarse roots.	Clear smooth
ABg	10-40	Dark greyish brown (10YR 4/2)	As above	Weak medium and coarse blocky	Friable, sticky and plastic	-	Many very fine pores, very fine coarse many fine roots, many faint very fine dark yellowish brown (10YR 4/6) mottles.	Gradual smooth
Btg1	40-70	as above	Clay loam	Structureless massive ?	As above	Few fine, hard rounded and sub-rounded iron and manganese concretions	Few fine pores, very few fine roots, many fine distinct dark yellowish brown (10YR 4/6) mottles.	As above
Btg2	70-100	Grey (10YR 5/1)	As above	Structureless massive ?	Slightly sticky slightly plastic	Few fine, hard rounded and sub-rounded iron and manganese concretions	Few fine pores, very few fine roots, many fine distinct dark yellowish brown (10YR 4/6) mottles. , soils reacts with 10% HCl	Clear smooth
Btg3	100-140+	Greyish brown (2.5Y 5)	As above	Structureless massive ?	Friable ,Sticky and plastic	-	As above	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	11	3	9	14	9	35		19	L	3.5	3	0.07	1.5	0.12	13	11.27	4.84	3.01	0.13	0.03	0.02	1.06	39.52			20		3
30-50	1	3	8	13	9	30	-	36	CL	5.1	3.5	0.07	0.6	0.03	20	10.32	9.09	2.36	0.01	0.11	0.08	4.72	45.47			25		10
70-100	1	3	6	10	7	35		38	CL	5.8	4.3	0.09	0.7	0.04	18	5.75	19.35	3.98	0.01	0.2			38.0	98.1		62		

Profile number: P111	**AE Zone:** Eastern	**Soil code:** R21-h
Map sheet number: 45/2	Altitude (m): 1210	FAO Soil unit: Luvic Phaeozem, skeletic and petroferric phase
Location: Iparamasa village	Vegetation: Cassava	Soil Taxonomy: Typic Argiustoll
District: Biharamulo	Land use: Crop production	Drainage class: Well
Landscape unit: E33		Date described: 06/09/1996
Land form: Plain ridge		
Macro-relief: Gently undulating		
Slope gradient (%): 3		
Site position: Middle slope		
Geological unit: Nyanzian System		
Parent material: Residual deposits derived from greenstones (meta-basalts)		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Dark brown (7.5YR 3/2)	Sandy clay loam	Moderate, fine and medium, granular and blocky	Very friable, slightly sticky, slightly plastic	-	Common fine pores, many very fine, very few coarse roots	Clear smooth
ABcs	10-20	Dark brown (7.5YR 3/2)	Slightly gravelly sandy clay loam	Weak, fine granular and blocky	Very friable, slightly sticky, slightly plastic	20% secondary ironstone gravel	Common fine pores, many very fine and many fine roots	gradual smooth
Bcs	20-65	Dark reddish brown (5YR ¾)	Very gravelly sandy clay	Too much gravel	Too much gravel	80% secondary ironstone gravel	Many fine pores, common fine roots	
Bms	65+						Boulders of secondary ironstone	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	6	14	20	8	22	-	29	SCL	7.1	6.2	0.13	3.9	0.32	12	6.48	17.25	2.47	0.14	0.02	-	-	18.93	51.8		100		
30-50	11	4	10	16	7	11	-	41	SC	7.1	6.1	0.04	1	0.06	17	0.07	4.91	1.63	0.03	0.02	-	-	6.22	12.7		100		

Profile number: P112	**AE Zone:** Eastern	**Soil code:** L22-h
Map sheet number: 31/3 Location: Ihanga village District: Biharamulo Landscape unit: F42 Land form: Plain ridge Macro-relief: Undulating Slope gradient (%): 4 Site position: Middle slope Geological unit: Archean Granite Parent material: Residual deposits derived from leuco-granites	Altitude (m): 1240 Vegetation: Grass fallow after maize Land use: Crop production Other features: Ridging	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Kanhaplic Haplustult Drainage class: Well Date described: 25/08/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Very dark grey (10YR 3/1)	Loamy sand	Moderate fine and medium granular and coarse	Very friable, non-sticky, non-plastic	-	Common very fine pores, common very fine few very fine roots	Clear smooth
AB	10-35	Dark brown (7.5YR 3/3)	As above	Weak medium and coarse sub-angular blocky	Very friable, non-sticky, non-plastic	-	Many very fine pores few fine roots	Gradual smooth
Bt1	35-60	Dark brown (7.5YR ¾)	Sandy loam	Moderate fine and medium granular and coarse	Hard, very friable, non-sticky, non-plastic	-	As above	As above
Bt2	60-100	Strong brown (7.5YR 4/6)	As above	as above	as above	-	As above	As above
Bt3	100-150	as above, but slighly more red when dry	As above	as above	as above	-	As above	-

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			- %		
0-20	6	14	17	28	16	12	-	7	LS	6.6	5.6	0.05	0.6	0.04	15	2.93	6.55	2.26	0.1	0.03	-	-	10.4	140.9		86		
30-50	5	14	19	25	14	12	-	11	SL	5.9	4.7	0.03	0.3	0.02	15	0.75	1.2	0.49	0.03	0.02	-	-	2.68	128.6		65		
70-100	7	16	16	21	12	13		15	SL	5.1	3.8	0.01	0.3	0.02	15	0.75	0.37	0.24	0.01	0.02	0.58	2.91	10.59	68.6		6		27

Profile number: P113	**AE Zone:** Eastern	**Soil code:** C23-1
Map sheet number: 45/2 Location: Isambala village District: Biharamulo Landscape unit: E33 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 3 Site position: Middle slope Geological unit: Nyanzian System Parent material: Residual deposits derived from greenstones (meta-basalts)	Altitude (m): 1280 Vegetation: Woodland Land use: Wood and livestock production	FAO Soil unit: Haplic Acrisol Soil Taxonomy: Rhodic Kandisustult Drainage class: Well Date described: 06/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-25	Dark reddish brown (2.5YR 2.5/4)	Clay	Strong, fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Common fine, fine few coarse roots	Clear smooth
AB	25-60	Dark red (2.5YR 3/6)	As above	Moderate fine and medium sub-angular blocky	Very friable, slightly sticky, slightly plastic	-	Common fine, fine few coarse roots	Gradual smooth
Bcs	60-100	Dark reddish brown (2.5YR 2.5/4)	As above	As above	Very friable, slightly sticky, slightly plastic	Frequent secondary ironstone gravel	Common fine, fine few coarse roots	-
Bms	100+						Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	1	4	11	21	6	12	-	45	C	5.4	4.1	0.01	1.5	0.12	13	0.04	0.51	0.23	0.01	0.02	0.02	1.49	4.85	7.4	5.07	16		31
30-50	2	3	10	18	9	11	-	47	C	5.3	4	0.004	1.2	0.1	12	0.28	0.11	0.03	0.02	0.02	0.02	1.61	3.93	5.8	3.85	5		41
70-100	3	2	6	15	9	12		53	C	5.4	4.2	0.01	0.8	0.04	20	0.01	0.05	tr	0.01	0.02	0.13	1.05	2.57	3.3	2.38	3		41

Profile number: P114	**AE Zone:** Eastern	**Soil code:** S21-m
Map sheet number: 45/2	Altitude (m): 1280	FAO Soil unit: Gleyic Phaeozem
Location: Ilangala village	Vegetation: Bushland	Soil Taxonomy: Aquic Argiustoll
District: Biharamulo	Land use: Livestock production	Drainage class: Imperfect/moderate
Landscape unit: E12		Date described: 06/09/1996
Land form: Lake terrace		
Macro-relief: Almost flat		
Slope gradient (%): 1		
Site position: Beach ridge		
Geological unit: Nyanzian System		
Parent material: Lake-shore deposits mainly derived from greenstones and quartzites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-15	Very dark grey (10YR 3/1)	Loamy sand	Weak. fine sub-angular blocky	Friable. non-sticky. non-plastic	-	Many very fine pores. many very fine few fine roots	Clear smooth
AB	15-45	Very dark greyish brown (10YR 3/2)	As above	Weak. fine sub-angular blocky	Friable. non-sticky. non-plastic	-	Common very fine pores. many very fine few fine roots	Gradual smooth
Bg1	45-80	Brown (10YR 4/3)	As above	Weak. fine sub-angular blocky	Friable. non-sticky. non-plastic	-	Common very fine pores. few medium many very fine roots. few faint strong brown (7.5YR 4/6) mottles	Gradual smooth
Btg1	80-100	Brown (10YR 5/3)	Sandy loam	Weak fine and medium blocky	Friable. non-sticky. non-plastic	-	Many very fine pores. many very fine and few medium roots. many distinct strong brown (7.5YR 4/6) mottles	Gradual smooth
Btg2	100-150	Dark yellowish brown (10YR 4/4)	As above	Weak medium blocky	Friable. non-sticky. non-plastic		Many very fine pores. many very fine roots. many distinct strong brown (7.5YR	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
Cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	17	22	22	18	7	9	-	5	LS	6.1	5.2	0.04	0.8	0.05	16	29.09	2.33	0.86	0.03	0.02	-	-	4.56	75.2		71		
30-50	8	19	28	21	8	10	-	6	LS	6.5	5.3	0.02	0.2	0.02	10	8.9	1.66	0.65	0.01	0.02	-	-	2.85	44.2		82		
70-100	11	21	25	14	6	9	-	14	SL	6.2	4.7	0.01	0.1	0.01	10	3.74	1.11	0.39	0.01	0.02	-	-	2.01	13.6	10.9	76		

Profile number: P115	**AE Zone:** Eastern	**Soil code:** LI3-1
Map sheet number: 31/4 Location: Kasala village District: Biharamulo Landscape unit: E22 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 2 Site position: Ridge summit Geological unit: Nyanzian System Parent material: Residual deposits derived from iron-rich quarzites (banded ironstone)	Altitude (m): 1190 Vegetation: Cassava Land use: Crop production	FAO Soil unit: Haplic Alisol Soil Taxonomy: Typic Haplustult Drainage class: Well Date described: 04/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-15	Dark brown (7.5YR 3/3)	Sandy clay loam	Moderate, medium and coarse sub-angular blocky	Very friable, slightly sticky, slightly plastic	-	Many very fine pores, many very fine, very few coarse roots;	Clear smooth
AB	15-40	Dark brown (7.5YR ¾)	As above	Moderate, fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Many very fine pores, many very fine roots	Clear smooth
Bt	40-75	Strong brown (7.5YR 4/6)	As above	Moderate, fine and medium blocky	Very friable, slightly sticky, slightly plastic	-	Many very fine pores, many very fine roots	Clear smooth
Bcs	75-100	Strong brown (7.5YR 4/6)	As above, but very gravelly			Dominant secondary ironstone gravel		

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay									Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	4	12	24	22	7	11	-	20	SCL	5	4	0.05	0.8	0.05	16	1.5	1.53	0.64	0.01	0.03	0.02	0.51	7.21	32.1		31		7
30-50	5	10	16	17	10	12	-	30	SCL	4.9	3.8	0.01	0.4	0.03	13	0.37	0.35	0.09	0.02	0.02	0.12	2.15	7.64	24.1	9.17	6		28
60-70	4	10	13	26	6	13	-	28	SCL	5.1	3.8	0.01	0.6	0.03	20	0.84	0.27	0.06	0.01	0.03	0	2.51	7.58	24.9	10.29	5		33

Profile number: P116	**AE Zone:** Eastern	**Soil code:** R24-m
Map sheet number: 31/4 Location: Kasala village District: Biharamulo Landscape unit: E22 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 2 Site position: Middle ridge slope Geological unit: Nyanzian System Parent material: Residual deposits derived from iron-rich quarzites (banded ironstone)	Altitude (m): 1185 Vegetation: Bushland Land use: Livestock production	FAO Soil unit: Ferric Acrisol, petroferric phase Soil Taxonomy: Petroferric Haplustult Drainage class: Well Date described: 04/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Dark brown (7.5YR 3/3)	Sandy clay	Strong, medium and coarse granular and sub-angular blocky	Very friable, slightly sticky, slightly plastic	-	Common fine pores, many very fine few coarse roots	Clear smooth
AB	10-35	Dark reddish brown (5YR ¾)	As above	Moderate, medium angular blocky and sub-angular blocky	Very friable, slightly sticky, slightly plastic	-	Common fine pores, many very fine few coarse roots	Clear smooth
Btcs	35-75	Reddish brown (5YR 4/4)	Very gravelly clay	Can not be determined due to too much gravel	as above	20 % secondary ironstone gravel	As above	Clear smooth
Bms	75+	As above	-	-	-		Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	3	6	12	17	8	15	-	39	SC	5.8	4.8	0.03	2	0.16	13	3.74	4.04	2.11	0.02	0.02	-	-	9.83	20.1		63		21
30-50	4	6	10	14	8	15	-	43	C	5.6	4.1	0.01	1.3	0.12	11	0.3	1.55	0.63	0.02	0.02	-	-	4.04	6.4		55		23

Profile number: P117	**AE Zone:** Eastern	**Soil code:** L13-1
Map sheet number: 31/4 Location: Kasala village District: Biharamulo Landscape unit: E22 Land form: Plain ridge Macro-relief: Gently undulating Slope gradient (%): 4 Site position: Lower ridge slope Geological unit: Nyanzian System Parent material: Residual deposits derived from iron-rich quarzites (banded ironstone)	Altitude (m): 1180 Vegetation: Cassava Land use: Crop production	FAO Soil unit: Haplic Alisol, petroferric phase Soil Taxonomy: Petroferric Haplustult Drainage class: Well Date described: 04/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ap	0-10	Dark brown (7.5YR 3/3)	Sandy clay loam	Moderate, fine and medium blocky	Very friable slightly sticky and slightly plastic	-	Many very fine pores, many very fine roots	Clear smooth
AB	10-30	Dark brown (7.5YR 4/4)	As above, but very gravelly	As above	As above	Few secondary ironstone gravel	As above	Gradual smooth
Bt1	30-60	Strong brown (7.5YR 5/6)	as above, but slightly gravelly	Moderate, coarse blocky	As above	As above but frequent	As above	Gradual smooth
Bms	60+						Secondary ironstone pan	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	5	5	10	32	15	8	-	25	SCL	5.2	3.9	0.01	0.8	0.07	11	0.41	1.15	0.42	0.01	0.03	0	1.48	7.02	24.9		23		21
30-50	4	4	6	25	16	15	-	30	SCL	5.1	3.8	0.01	0.4	0.03	13	0.16	0.86	0.29	0.01	0.02	0.02	2.84	10.1	32.3		12		28

Profile number: P118	**AE Zone:** Eastern	**Soil code:** B31-m
Map sheet number: 31/4	Altitude (m): 1160	FAO Soil unit: Eutric Vertisol.
Location: Kasala village	Vegetation: Bushland	Soil Taxonomy: Ustic Endoaquert
District: Biharamulo	Land use: Livestock production	Drainage class: Imperfect
Landscape unit: E11		Date described: 04/09/1996
Land form: Valley bottom		
Macro-relief: Flat		
Slope gradient (%): 4		
Site position: Centre of valley		
Geological unit: Nyanzian System		
Parent material: Stream- and lake deposits derived from greenstones and quarzites		

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-10	Black (10YR 2/1)	Clay laom	Moderate, fine and medium granular and blocky	Firm, sticky and plastic	-	Many very fine pores, few very fine roots	Clear smooth
AB	10-35	Very dark grey (10YR 3/1)	Heavy clay	Weak, moderate, sub-angular blocky	Very firm, sticky and plastic	-	Many very fine pores, many very fine roots	Gradual smooth
Bg1	35-60	as above	As above	Structureless massive?	Very firm, sticky and plastic	-	Many very fine pores, few very fine roots	Gradual smooth
Bg2	60-100	as above	As above	as above ?	Very firm, sticky and plastic	-	Many fine and very fine pores, very few fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECc	eCEC	BS	ESP	EAlP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	2	7	12	16	8	22	-	33	CL	6.2	5	0.11	1.7	0.12	14	30.61	18.21	10.1	0.03	0.02	-	-	39.39	114.2		72		
30-50	1	3	6	8	4	21	-	57	C	7	5.7	0.26	0.8	0.05	16	28.87	30.25	16.13	0.02	0.02	-	-	45.96	79.2		100		
70-80	2	6	10	11	5	12		54	C	8.3	6.7	0.36	0.4	0.03	13	18.22	30.25	15.96	0.02	0.02	-	-	32.34	59.1		100		

Profile number: P120	AE Zone: Western	Soil code: S12-m
Map sheet number: 30/3 Location: Lushahunga village District: Biharamulo Landscape unit: B62 Land form: Plateau ridge Macro-relief: Sloping Slope gradient (%): 6 Site position: Ridge summit Geological unit: Bukoba Sandstone (Bukoban System) Parent material: Residual deposits derived from quartzitic andstones	Altitude (m): 1650 Vegetation: Bushland Land use: Wood production, hunting & gathering	FAO Soil unit: Haplic Alisol. Soil Taxonomy: Acenic Haplustult Drainage class: Well Date described: 04/09/1996

Horizon designation	Depth (cm)	Colour when moist (Munsell code)	Texture	Structure	Consistence	Coarse Material	Other features	Boundary
Ah	0-20	Very dark greyish brown (10YR 3/2)	Loamy sand	Weak, fine blocky	Friable, non-sticky and non-plastic	-	Many very fine and fine pores, many fine and very fine roots	Abrupt smooth
AB	20-40	Dark brown (10YR 3/3)	As above	As above	As above	-	Common very fine and fine and few medium pores, many fine and very fine roots	Clear smooth
Bt1	40-70	Dark yellowish brown (10YR 4/4)	As above	As above	Friable, slightly sticky and slightly-plastic	-	Few very fine, common fine medium pores, common medium, fine and very fine roots	As above
Bt2	70-110+	Brown (7.5YR 4/4)	Sandy loam	As above	Slighily hard, friable, slightly sticky and slightly-plastic	-	Few fine and medium pores, few medium and fine roots	

ANALYTICAL DATA

Depth	Particle size								Texture class	pH H2O	pH KCl	EC	Org. C	Total N	C/N	Avail. P	Exchangeable cations						CECs	CECe	eCEC	BS	ESP	EAIP
	Sand					Silt		Clay																				
	Very coarse	Coarse	Medium	Fine	Very fine	Coarse	Fine										Ca	Mg	K	Na	H	Al						
cm	%	%	%	%	%	%	%	%		1:2.5	1:2.5	DS/m	%	%		mg/kg	Cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg			%		
0-20	0	1	11	25	51	4		8	LS	5.8	4.5	0.02	1.1	0.08	14	3.84	1.72	0.81	0.05	0.02			4.19	38.6		62		
40-50	0	2	15	37	31	4		11	LS	4.9	3.8	0.01	0.5	0.05	10	0.66	0.23	0.23	0.02	0.02	0.23	1.72	7.00	59.1		7		25
70-80	0	2	11	31	28	10		18	SL	5.1	3.7	0.01	0.3	0.03	10	0.33	0.24	0.10	0.01	002	0.03	2.36	7.29	38.8		5		32

II.4 Moisture retention and bulk density data of selected soils

Profile Number	Depth	Moisture content				BD	AWC
	cm	PF 2.0 Vol. %	pF 2.4 vol. %	pF 3.0 vol. %	pF 4.2 vol. %	Mg/m3	cm
P36	5-10	9.9	9.5	5.8	5.1	1.4	
	"	8.3	7.8	4.7	4.1	1.3	
	"	9.7	9.3	5.6	5.0	1.5	
	Average	9.3	8.9	5.4	4.7	1.4	4.6
	35-40	7.3	10.9	12.2	7.1	1.4	
	"	17.7	11.1	7.9	7.0	1.4	
	"	15.1	12.3	9.3	7.2	1.4	
	average	13.4	11.4	9.8	7.1	1.4	6.3
P37	5-10	23.2	20.4	15.7	11.9	1.2	
	"	23.7	20.6	15.9	12.9	1.3	
	"	24.4	21.5	16.8	13.5	1.3	
	average	23.8	20.8	16.1	12.8	1.3	11.0
	35-40	26.8	24.2	18.7	16.0	1.4	
	"	27.5	24.8	19.3	16.5	1.5	
	"	27.7	25.4	20.0	16.8	1.5	
	average	27.3	24.8	19.3	16.4	1.5	10.9
	85-90	24.1	21.3	16.5	14.4	1.3	
	"	23.7	20.9	17.5	15.0	1.3	
	"	22.3	19.4	16.9	14.3	1.2	
	average	23.4	20.5	17.0	14.6	1.3	8.8
P43	5-10	21.6	18.3	12.1	9.6	1.4	
	"	23.8	20.9	14.0	11.5	1.6	
	"	25.2	23.0	14.1	11.2	1.5	
	average	23.5	20.7	13.4	10.8	1.5	12.8
	35-40	26.9	23.8	19.5	16.6	1.5	
	"	26.5	24.2	19.1	15.5	1.5	
	"	23.7	21.3	17.2	9.6	1.4	
	average	25.7	23.1	18.6	13.9	1.5	11.8
	85-90	24.6	21.5	16.5	13.8	1.3	
	"	24.5	21.0	15.6	12.7	1.3	
	"	24.9	21.9	16.9	14.0	1.3	
	average	24.7	21.5	16.3	13.5	1.3	11.2

Moisture retention and bulk density data of selected soils (cont'd).

Profile Number	Depth	Moisture content				BD	AWC
		PF 2.0	pF 2.4	pF 3.0	pF 4.2		
	cm	Vol. %	vol. %	vol. %	vol. %	Mg/m3	cm
P44	5-10	24.1	21.9	17.1	14.4	1.5	
	"	24.3	21.9	17.3	14.7	1.5	
	"	23.4	21.0	15.8	13.7	1.4	
	average	23.9	21.6	16.7	14.3	1.5	9.7
	35-40	25.3	22.8	18.9	15.6	1.4	
	"	24.2	21.7	17.1	14.1	1.3	
	"	24.8	22.3	17.2	14.5	1.4	
	average	24.8	22.3	17.7	14.7	1.4	10.0
	85-90	23.2	20.4	15.9	13.3	1.2	
	"	26.9	23.4	16.0	13.2	1.2	
	"	24.9	21.6	16.3	13.5	1.2	
	average	25.0	21.8	16.1	13.3	1.2	11.7
P48	5-10	26.0	24.7	21.8	20.4	1.3	
	"	24.7	23.5	20.6	19.1	1.2	
	"	25.6	24.1	21.2	19.8	1.3	
	average	25.4	24.1	21.2	19.8	1.3	5.7
	35-40	25.1	23.6	20.9	19.7	1.2	
	"	26.1	24.6	22.0	20.5	1.2	
	"	26.5	24.8	21.9	20.8	1.2	
	average	25.9	24.3	21.6	20.3	1.2	5.6
	85-90	26.1	24.5	21.0	19.6	1.2	
	"	27.2	25.1	21.9	20.1	1.2	
	"	24.3	22.8	19.3	18.1	1.1	
	average	25.9	24.1	20.7	19.3	1.1	6.6
P91	0-5	8.0	4.6	4.5	0.6	1.5	
	"	8.4	5.2	4.4	1.2	1.5	
	"	8.6	5.7	4.8	1.3	1.6	
	average	8.3	5.2	4.6	1.0	1.5	7.3
	30-35	14.2	7.7	10.6	2.9	1.6	
	"	16.9	12.7	12.3	5.7	1.8	
	"	12.3	17.4	13.8	16.4	-	
	average	14.5	12.6	12.2	8.3	1.7	6.1
	75-80	22.1	21.8	17.5	14.0	1.5	
	"	22.3	21.3	17.6	14.3	1.5	
	"	22.1	21.5	16.6	13.6	1.6	
	average	22.2	21.5	17.2	14.0	1.6	8.2

Moisture retention and bulk density data of selected soils (cont'd).

Profile Number	Depth	Moisture content				BD	AWC
	cm	PF 2.0 Vol. %	pF 2.4 vol. %	pF 3.0 vol. %	pF 4.2 vol. %	Mg/m3	cm
P93	0-5	6.7	3.7	5.0	0.6	1.6	
	"	7.8	3.7	4.2	0.5	1.3	
	"	7.5	4.0	4.0	0.3	1.5	
	average	7.3	3.8	4.4	0.5	1.4	6.9
	40-45	11.5	5.2	6.9	0.7	1.4	
	"	13.5	6.6	8.3	1.2	1.7	
	"	13.9	5.2	9.3	1.2	1.7	
	average	13.0	5.7	8.2	1.0	1.6	11.9
	70-75	18.7	14.8	9.7	3.7	1.6	
	"	19.5	14.7	10.0	3.8	1.6	
	"	19.5	15.0	11.1	4.2	1.7	
	average	19.2	14.8	10.3	3.9	1.6	15.3
P102	0-5	27.2	26.1	19.2	18.0	1.3	
	"	24.1	23.4	18.5	17.0	1.2	
	"	22.1	21.5	17.9	16.3	1.2	
	average	24.5	23.7	18.5	17.1	1.2	7.4
	35-40	25.5	25.1	22.4	20.2	1.3	
	"	26.4	24.9	21.9	20.3	1.4	
	"	23.3	21.8	19.4	18.2	1.2	
	average	25.1	23.9	21.2	19.6	1.3	5.5
	75-80	30.0	29.5	25.0	23.5	1.4	
	"	30.6	28.7	24.3	23.0	1.4	
	"	29.8	28.4	23.4	22.0	1.3	
	average	30.1	28.9	24.2	22.8	1.3	7.3
P103	0-5	13.8	12.8	8.4	6.6	1.1	
	"	19.2	17.0	5.8	5.5	1.2	
	"	16.0	13.6	8.4	5.5	1.2	
	average	16.3	14.5	7.5	5.9	1.1	10.5
	30-35	15.8	14.3	9.0	6.4	1.4	
	"	15.1	13.2	9.0	6.4	1.4	
	"	16.1	14.8	9.5	6.7	1.5	
	average	15.7	14.1	9.2	6.5	1.5	9.2
	70-75	21.9	18.8	8.5	9.3	1.4	
	"	20.2	15.2	11.5	4.9	1.3	
	"	23.3	21.3	12.3	9.4	1.4	
	average	21.8	18.4	10.8	7.9	1.4	13.9

Moisture retention and bulk density data of selected soils (cont'd).

Profile Number	Depth cm	Moisture content PF 2.0 Vol. %	pF 2.4 vol. %	pF 3.0 vol. %	pF 4.2 vol. %	BD Mg/m3	AWC cm
P113	5-10	32.3	30.3	21.4	19.4	1.4	
	"	27.4	25.6	17.1	16.6	1.3	
	"	32.9	30.6	20.8	17.1	1.4	
	average	30.9	28.8	19.8	17.7	1.4	13.2
	55-60	27.1	24.6	17.8	17.3	1.2	
	"	31.1	27.9	21.1	19.0	1.3	
	"	26.4	24.0	19.6	16.6	1.2	
	average	28.2	25.5	19.5	17.6	1.2	10.6

II.5 Analytical data of composite topsoil samples (0-25 cm)

Sample Number	Top-Sheet Number	x-coord. (m)	y-coord. (m)	Field number	Map unit	Soil unit	Particle size				pH		EC	Org. C	Total N	C/N	Avail.P	CEC	Exgangeable cations						BS
							sand	Silt %		clay	H20	KCL	1:2.5				Bray I		Ca	Mg	K	Na	Al	H	
							%	Fine	Coarse	%	1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	%
F01	45/2	377300	9653000	IPAC1/P111	E33	R21-h	52	12	12	24	7.0	6.8	0.30	5.9	0.34	17	9.56	36.50	29.44	7.93	0.20	0.03			100
F02	31/3	346600	9673600	IHAC/P112	F42	L22-h	76	6	6	12	7.0	6.1	0.03	0.7	0.04	18	7.38	2.76	2.21	0.58	0.05	0.03			100
F03	45/2	367250	9647300	IPAC2/P108	E34	R22-m	36	17	10	37	6.8	5.9	0.06	3.1	0.27	11	0.55	17.09	12.32	3.78	0.11	0.03			95
F04	44/1	284700	9650500	C2/KALEP2	A12	L13-m	60	12	10	18	6.3	5.3	0.04	0.6	0.05	12	6.33	2.18	1.07	0.56	0.05	0.02			78
F05	44/1	286300	9653000	C2/KALEP3	A32	L14-h	60	14	10	16	6.8	5.8	0.04	0.6	0.04	15	9.80	3.07	2.10	0.59	0.10	0.03			92
F06	30/3	299800	9679500	Lusa7/A301	B53	L12-m	52	10	10	28	5.6	4.6	0.06	1.1	0.08	14	1.27	6.14	2.45	0.86	0.10	0.03			56
F07	?	?	?	CT1	?	?	40	24	14	22	5.9	4.4	0.02	1.0	0.09	11	0.94	6.92	3.24	1.17	0.05	0.04			65
F08	?	?	?	CT2	?	?	56	8	12	24	6.4	5.2	0.07	0.9	0.07	13	1.72	4.73	2.66	1.06	0.20	0.02			83
F09	29/4	264900	9690300	CT3	D31	B21-m	54	6	8	32	5.5	4.2	0.04	1.0	0.08	13	1.44	3.08	1.01	0.50	0.10	0.02			53
F10	29/4	267400	9691500	CT4	D33	R23-m	54	6	12	28	5.5	4.3	0.05	0.9	0.05	18	1.70	3.71	1.23	0.58	0.10	0.02			52
F11	29/4	267500	9691000	CT5	D33	R23-m	24	20	8	48	6.2	5.2	0.09	2.8	0.18	16	trace	23.62	11.33	5.29	0.13	0.02			71
F12	29/4	276900	9691400	CT6	D32	L31-m	72	6	6	16	6.0	4.7	0.06	0.9	0.08	11	5.39	3.19	1.57	0.53	0.05	0.02			68
F13	29/4	277000	9690800	CT7	D32	L31-m	64	8	4	24	5.4	4.0	0.03	0.7	0.05	14	1.49	2.80	0.73	0.47	0.06	0.03	0.82	0.01	46
F14	44/4	332000	9640500	CT8/P36	F42	R21-m	44	8	8	40	5.6	4.7	0.12	2.2	0.14	16	1.07	15.93	5.79	2.84	0.11	0.02			55
F15	44/2	326100	9643200	CT9/P37	A22	L33-l	76	6	4	14	6.3	5.3	0.05	0.6	0.04	15	1.45	3.59	1.97	0.57	0.10	0.02			74
F16	30/2	314500	9696300	CT10/A455	B65	R21-m	44	14	12	30	6.2	5.2	0.06	1.5	0.18	8	1.70	9.94	5.27	1.75	0.11	0.03			72
F17	30/2	314500	9696400	CT11/A454	B45	R11-m	62	10	8	20	6.5	5.5	0.06	0.9	0.06	15	1.44	5.52	3.13	1.45	0.20	0.02			87
F18	30/2	313300	9697000	CT12/A451	B42	L22-m	54	8	12	26	6.3	5.3	0.05	1.1	0.06	18	2.58	8.09	4.77	1.26	0.10	0.02			76
F19	30/2	312500	9697500	CT13/A452	B42	L14-m	16	42	6	36	5.6	4.8	0.08	3.0	0.16	19	4.47	15.04	5.49	2.81	0.10	0.02			56
F20	30/2	312100	9697500	CT14/A453	B42	L12-m	14	32	18	36	5.6	4.9	0.03	3.1	0.19	16	8.84	15.42	4.66	3.18	0.15	0.03			52
F21	29/2	270600	9709000	CT15/P16	C21	B42-m	46	12	6	36	5.0	3.8	0.13	2.6	0.15	17	0.54	12.54	1.75	0.65	0.10	0.02	2.09	0.03	20
F22	29/2	270000	9708800	CT16/P17	C21	C12-m	40	12	10	38	5.7	4.8	0.02	2.9	0.15	19	1.91	15.41	6.04	2.93	0.10	0.02			59
F23	29/2	269900	9798800	CT17/P18	C21	C12-m	40	10	10	40	5.4	4.1	0.06	2.2	0.14	16	0.31	13.07	3.53	1.21	0.05	0.02	1.04	0.03	37
F24	29/2	263200	9715100	CT18	C33	C22-m	24	18	12	46	5.0	4.0	0.30	2.6	0.14	19	1.49	23.39	4.27	2.36	0.05	0.03	0.83	0.18	29
F25	29/2	264000	9715000	CT19	C33	R11-m	30	24	18	28	5.4	4.9	0.03	5.4	0.33	16	12.96	40.83	12.51	6.01	0.06	0.04	0.01	0.07	46

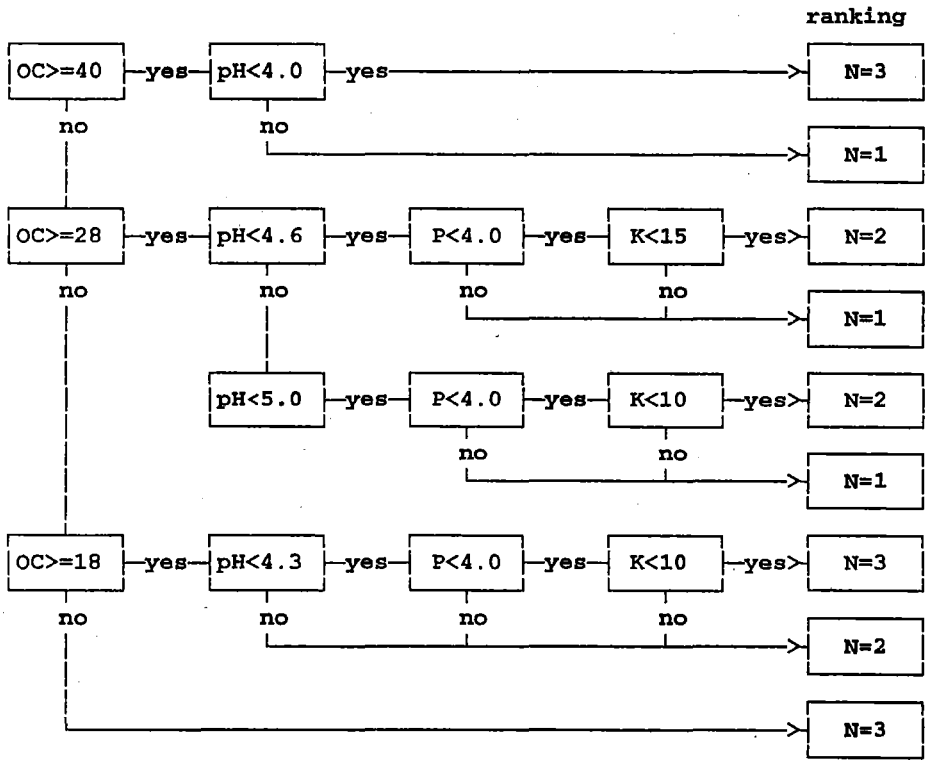
II.5 *Analytical data of composite topsoil samples (cont'd).*

Sample Number	Top-sheet Number	X-coord. (m)	y-coord. (m)	Field number	Map unit	Soil unit	Particle size				pH		EC	Org.C	Total N	C/N	Avail. P	CEC	Exgangeable cations						BS
							sand	Silt %		clay	H20	KCL	1:2.5				Bray I		Ca	Mg	K	Na	Al	H	
							%	Fine	Coarse	%	1:2.5	1:2.5	dS/m	%	%		mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	%
F26	29/2	266900	9715700	CT20/P11	C42	R12-m	44	10	10	36	5.8	4.7	0.02	1.7	0.12	14	2.14	8.47	3.35	1.81	0.06	0.03			62
F27	29/2	263200	9715100	CT21	C33	C22-m	36	8	8	48	5.5	4.1	0.04	1.9	0.11	17	1.60	9.13	2.24	1.07	0.05	0.02	0.67	0.08	37
F28	29/2	262900	9715500	CT22	C32	C22-l	22	32	6	40	5.1	3.9	0.03	2.4	0.12	20	26.71	12.53	2.34	1.49	0.10	0.03	0.97	0.08	32
F29	29/2	276700	9708500	CT23/P52	D23	C13-l	22	28	14	36	5.2	3.9	0.08	2.4	0.14	17	2.53	11.28	2.84	1.46	0.10	0.03	0.39	0.03	39
F30	29/2	277000	9708500	CT24/P54	D21	B41-m	2	26	10	62	5.3	4.3	0.03	3.6	0.21	17	3.97	22.04	5.87	3.94	0.12	0.03	0.17	0.01	45
F31	29/2	275000	9699200	CT25/P55	D21	B21-l	36	10	32	22	5.9	4.8	0.04	1.4	0.10	14	2.08	5.51	2.72	0.79	0.05	0.02			65
F32	29/2	745000	9700500	CT26/P56	D22	C23-l	52	12	12	24	6.0	5.0	0.15	1.7	0.11	15	7.36	7.50	3.29	1.69	0.10	0.02			68
F33	29/2	276200	9707700	CT27/P42	D23	L33-m	52	10	10	28	6.1	5.0	0.03	1.8	0.11	16	1.93	8.13	3.70	1.94	0.10	0.03			71
F34	29/2	276300	9707300	CT28/P43	D23	L14-m	22	30	18	30	5.5	4.5	0.04	2.7	0.15	18	6.35	16.17	5.11	3.22	0.06	0.02			52
F35	29/2	276400	9707000	CT29/P44	D23	L32-m	64	6	10	20	5.5	4.4	0.05	1.9	0.12	16	12.56	9.32	3.25	1.54	0.12	0.03			53
F36	29/2	276800	9706100	CT30/P45	D21	B21-m	72	4	10	14	5.4	4.1	0.01	0.6	0.06	10	1.08	2.91	0.36	0.31	0.01	0.03	0.50	0.07	24
F37	30/4	311500	9693200	CT31/A442	B42	L13-m	70	6	8	16	6.1	5.1	0.02	1.0	0.07	14	1.60	5.31	2.76	1.02	0.02	0.02			72
F38	30/4	312000	9692800	CT32/A441	B41	B42-l	32	26	12	30	5.1	3.8	0.02	3.8	0.25	15	2.70	16.67	3.49	1.70	0.05	0.03	0.73	0.03	32

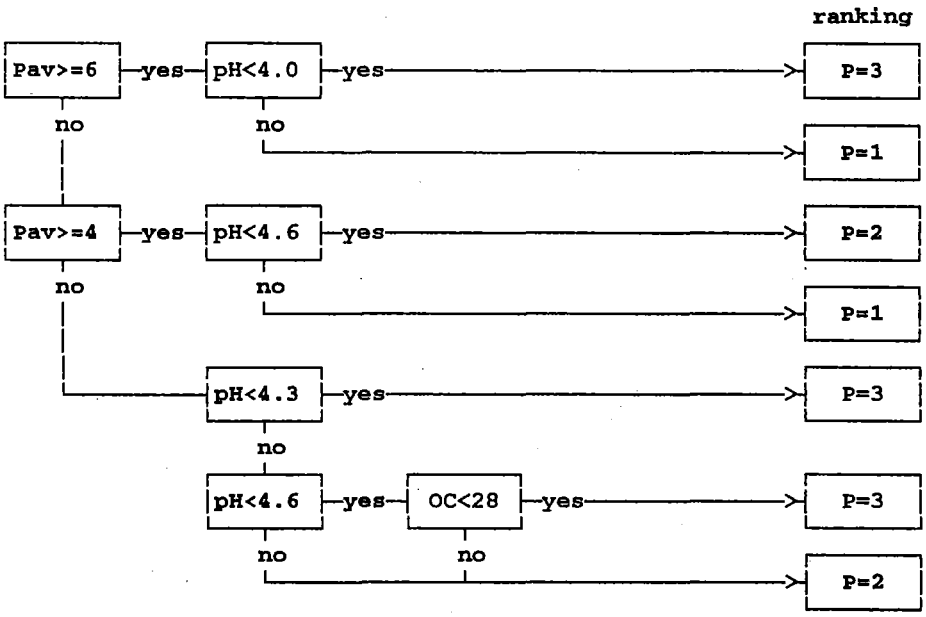
APPENDIX III THE KISII SOIL FERTILITY RATING SYSTEM

III.1 Nutrient ratings

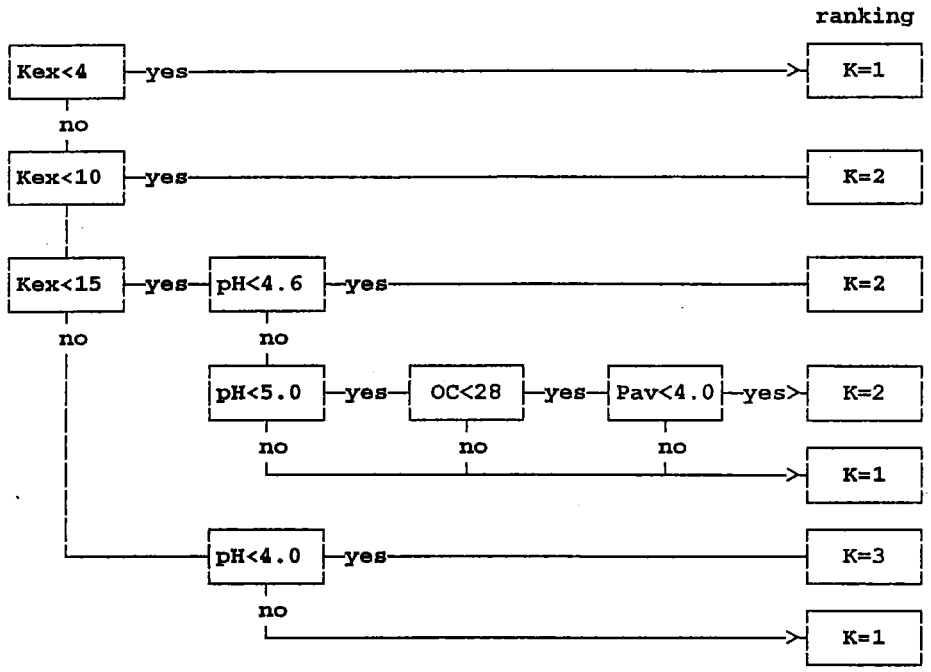
Decision tree for ranking available nitrogen (N):



Decision tree for ranking available phosphorous (P):



Decision tree for ranking available potassium (K):



Explanation:
OC = Organic carbon (g/kg soil)
pH = pH KCl (1:2.5)
Pav= Available phosphorous (g/kg)
Kex= Exchangeable potassium (meq/kg soil)

Ranking:
1 = adequate
2 = marginal
3 = deficient

Remark:
Available phosphorous is supposed to have been determined by the Olson method, however if available P has been determined according to the Bray-II method the data can be used instead, as for P-values below 6 g/kg results of both methods do not deviate significantly.

III.2 Soil Fertility Rating

P-ranking = 1

N-ranking	1	2	3
3	311 A3	312 B2	313 B4
2	211 A2	212 A3	312 B2
1	111 A1	112 A2	113 A3

N-ranking

P-ranking = 2

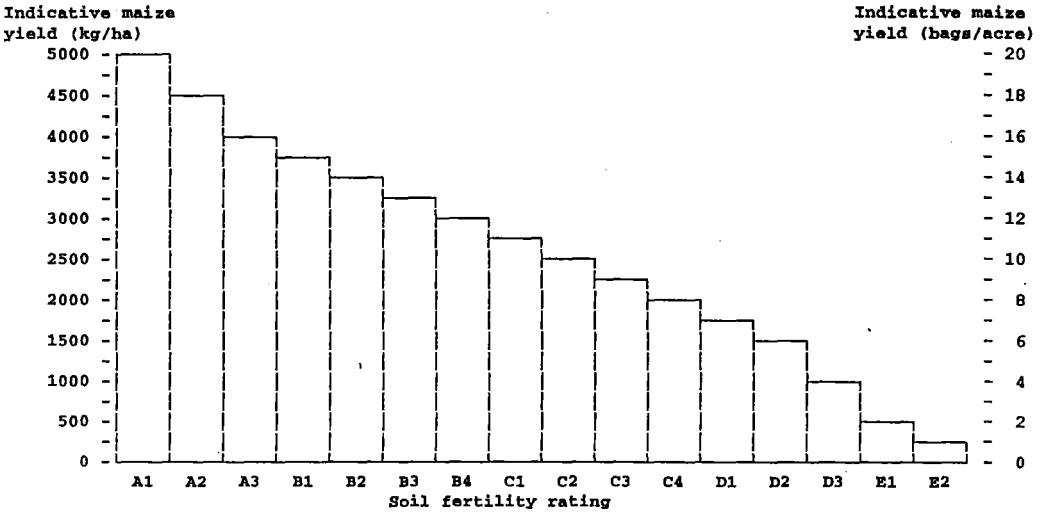
N-ranking	1	2	3
3	321 C1	322 C3	323 D1
2	221 B3	222 C1	223 C3
1	121 B1	122 B3	123 C1

N-ranking

P-ranking = 3

K-ranking	1	2	3
3	331 D2	332 D3	333 E1
2	231 C4	232 D2	233 D3
1	131 C2	132 C4	133 D2

N-ranking



III.3 Soil Fertility Classification:

Rating	Soil fertility class	Indicative Maize Yield	
		ton/ha	bags/acre
A3 - A1	high	4 - 5	16 - 20
B4 - B1	moderately high	3 - 4	12 - 16
C4 - C1	low	2 - 3	8 - 16
D3 - D1	very low	1 - 2	4 - 8
E2 - E1	extremely low	< 1	< 4