Land Resource Inventory and Appraisal of the Kahama District, Shinyanga Region, Tanzania

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Land Resources Inventory and Appraisal of the Kahama District, Shinyanga Region, Tanzania

Volume II: Annexes

J.A. Eschweiler
D.N. Kimaro
F.M. Banzi
G.J. Kajuri

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ABSTRACT

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A reconnaissance level land resources survey has been carried out from September to December, 1996, of the Kahama District, Shinyanga Region, Tanzania. The report contains an inventory of (a) topographic and socio-political information, (b) the physical environment (in terms of agro-climate, geology, water resources, physiography, soils, major land systems, agro-ecological zones and cells), (c) present land use/land cover, and (d) the prevailing farming systems. The data are stored in a data base and their spatial distribution is shown through a series of maps. A generalised land suitability appraisal is carried out to guide agricultural development at the district level. The appraisal provides a brief and general overview of the land suitability of Kahama's major soil groups by agro-ecological zone for some major types of land use, notably rainfed cropping under traditional and improved traditional management, irrigated cropping under traditional management, forestry and extensive grazing.

Keywords: land resources survey, land suitability appraisal, land use types, soil data base, Kahama District, Tanzania.

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ANNEX I: DESCRIPTION OF METHODS

Prior to any fieldwork relevant existing information was collected from various sources, such as existing reports, topographic and other thematic maps at a relevant scale. Such information was obtained from the District Council and the various technical district offices (located within Kahama-town), regional offices in Shinyanga (notably the DHV Office), Dodoma (i.e. Min. of Energy and Minerals; geological maps), Dar es Salam (Met. Dept.; meteorological data), Tanga (NSS; natural resources data) and Ukiriguru (ARTI; farming systems data).

As a bases for plotting any georeferenced information, SC-DLO prepared a topographic base map of the district at a scale of 1:250,000 derived from the existing topographic maps covering the entire district at a scale of 1:50,000 (See Annex Ia (topographic maps); note that most of these mapsheets are based on surveys carried out 25 to 35 years ago). This map shows the main towns and villages, primary and secondary roads, gazetted Forest Reserves, main streams and contour lines (at a 100 m interval). Furthermore SC-DLO provided satelite images at a scale of 1:250,000 covering the entire district (see Annex Ia; satellite imagery).

Since the survey was carried out at reconnaissance level, most of the results are of a generalized nature and some variation must be expected within the identified mapping units.

I.1 Preliminary desk studies

During preliminary desk studies, following the interpretation of the satelite images (Landsat TM6, bands 3 (red), 4 (near infra-red) and 5 (mid infra-red) of 11-07-1994 (2 images) and 05-08-1994 (1 image covering the remaining small eastern part of the district), comparisons with other existing information, and local knowledge provided by relevant technical officers, tentative thematic maps were drawn on transparant copies of the base map. The boundaries were verified in the field during the survey and the most common units described accordingly. In this way preliminary maps were prepared showing geology, physiography, soils, hydrology, land use/land cover and protected areas. The same procedure also assisted in the delineation of farming systems zones. Climatic data obtained from the historical records of various (mainly rainfall) stations within and around the district were analysed and monthly long-term averages calculated and plotted on a map (notably rainfall and temperature data). After the finalization of these thematic maps, soils/physiography data were combined with climatic data to define "agro-ecological zones". These zones were evaluated for their suitability for various types of land use.

I.2 Fieldwork

The study team spent about three (3) months in Kahama District of which a total of about ten weeks was spent in the field, from the end of September till December 1996. In view of the approaching rainy season (rains were expected to start sometime in November) which could affect field accessibility (considering the rather poor condition of the district road network) the survey started in the far north and south of the district and gradually progressed towards Kahama town.

Two survey teams, concentrating on soil/physiography and land use aspects, carried out most of the fieldwork; each team was headed by a soil surveyor from the NSS and assisted by two District Officers. A number of casual labourers were employed to dig soil profile pits. A third team, consisting of the team leader and various technical officers concentrated on land use and land cover, hydrology, climatic aspects, geology, protected areas and farming systems. Vehicles and drivers were made

available to the teams by the District Council.

A free survey method was used, making use of existing roads and motorable tracks. Visits were also paid to local authorities (such as Ward Executive Officers, Village Chairmen, etc.) and discussions were held with a number of farmers met in their fields.

I.3 Laboratory analyses

A total of 292 soil samples were taken from soil profile pits. In addition 53 composite samples (for soil fertility analysis) and 90 samples (from 10 soil profiles sampled at three depths in triplicate) for pF analyses (to determine the available water holding capacity) were taken and analysed at the soil laboratory of the NSS in Mlingano (for sampling details see Annex Ib). The following standard soil analysis were carried out: particle size distribution, pH, organic Carbon, Nitrogen, Potassium, Phosphorus, exchangeable bases and Cation Exchange Capacity. Analysis of Carbonates and Electrical Conductivity were carried out for some samples derived from alluvial deposits. Methods of analysis are presented in Annex I.c.

I.4 Socio-political data

The boundaries of Kahama District were verified in the field with the assistance of local authorities (such as ward executives, village chairmen and village elderlies). After showing the survey team the exact location of the district border in the field, the coordinates were recorded using a GPS (GTM-grid) and these coordinates were subsequently plotted onto the 1:50,000 topomaps and later transferred to the 1:250,000 base map. Accordingly, the initial borders obtained from the Kahama District map of 1981 (scale 1:250,000) were revised/ updated. Here it should also be noted that the district map of 1981, still included the Bukombe area, now a separate district.

The location of villages was derived from the 1:50,000 topomaps and given to the District Council (Town Planning) for updating/verification. It appeared that frequently villages had been misspelled, had not been given correct names, or, at times, were even mislocated on the 1:50,000 scale maps. Obviously new villages had also been formed since the time these maps were produced (most mapsheets are based on information obtained 25-35 years ago and urgently require a complete revision).

The same applies to the location of primary and secondary roads; although correct in most places new roads have been put in and some of the old ones no longer exist. However, the road system has not been updated.

I.5 Natural resources data

I.5.1 Climate

An inventory of the historical records of stations collecting meteorological data was made (see Annex Id). Within Kahama District there is only one station with reasonably long and continuous records for a number of parameters. Annual monthly data on rainfall, temperature (mean minimum and mean maximum), relative humidity and windspeed was only found for Kahama station (15 years of records). Therefore a search was also done for stations bordering Kahama District to obtain the same information from a similar environment but usually yielded only information on rainfall. In

addition to rainfall, temperature data from a similar environment was only found for Mwanhala (Tabora District; original data Met. Dept., Dar es Salam), Urambo, Tabora Airport and Tabora Observatory (Tabora District; FAO, 1984) and Nyegezi Mission (Shinyanga District; East African Met. Dept., 1970). For Urambo, Tabora Airport and Tabora Observatory long-term averages (30 years) were also obtained for the other parameters mentioned above plus hours of sunshine and potential evapotranspiration.

Sufficiently long records of rainfall from within Kahama District were obtained for 11 stations (see Annex Ic). In addition rainfall records were obtained for 8 stations outside the district but near the district border.

The above information provided the basis for the Agroclimatic Zones Map. The map was produced by combining the information for mean annual rainfall and temperature as derived from these stations.

I.5.2 Geology

Mapsheet 17 of the geological maps of Tanzania, at a scale of 1:250,000, served as a basis and largely incorporates Kahama District. However this map is based on a survey carried out between 1937 and 1939 ((Dept. of Lands and Mines, 1945) and although of high quality, the delineation of the mapping units was improved through the use of satelite imagery. The information presented on the geological map of Kahama District as attached to this report relates basically to the parent material from which the soils were derived. The location of economically valuable minerals were also indicated. Note that although much of Kahama District is currently under prospection for gold, only those locations were indicated for which economic exploitation has been confirmed or where small-scale mining is currently taking place.

I.5.3 Hydrology

The boundaries of the catchment areas of the major streams draining the district were drawn based on the configuration of the contourlines as shown on the base map, the direction of flow and final outlets identified. The major streams were derived from the topomaps at a scale of 1:50,000, with some updating from the satelite imagery. The location of dams, major springs, shallow wells and boreholes was obtained using a GPS. Most of this work had already been completed by the District Water Dept. and the survey assisted in completing this information. Note that the development of shallow wells and springs and the drilling of boreholes is an ongoing activity of the Water Dept. and therefore the hydrology map does not give a complete picture. The location of dams was derived from the topomaps at a scale of 1:50,000, most of them were checked and those still functioning were retained and some updating was done. Not indicated on the map are some places along the tarmac road where ponds are found due to the excavation of materials for road construction. Some of these appear to contain water throughout the year. Also near Nyang'wale, where small-scale diamond mining occurs, due to excavation, a large perennial pond has formed.

I.5.4 Physiography

No accurate information appeared to be available and relief,slopes and landforms were mainly measured and assessed in the field. Using satelite imagery, landforms were delineated and differences in elevation were derived from the contourlines on the 1:50,000 topomaps which have contour

intervals of 20 m.

I.5.5 Soils

No surveys were carried out at the district level before and only very few detailed surveys had been done (at a scale of less than 1:50,000). Therefore an inventory of physiography and soils was considered to be of prime importance. During the survey, a total of 104 soil profile pits and 524 augerings were made and their characteristics recorded on standard NSS field sheets (see Annex Ie). The location of each observation was marked directly on the 1:50,000 scale topomaps using the GPS (GTM grid) and later copied to a master sheet at a scale of 1:250,000.

A preliminary soil classification system was developed using local terminology, based on the results of preliminary investigations elsewhere in Sukumaland (SC-DLO 1995, RTI 1995, RTI 1996) and the names frequently used by the farmers of Kahama District to characterise different soils. An attempt was made to correlate these soils with the commonly used and recently revised FAO/UNESCO soil classification system (FAO, 1990).

A preliminary basemap was drawn based on parent material and landforms. A rapid reconnaissance survey was carried out during the first week of the survey to identify the main soils occuring within the district. According to the spatial distribution of parent material and landforms three major land systems could easily be identified using the satelite imagery. Subsequently the spatial distribution of the various soil types within each land system was obtained during the survey and subseqeuntly grouped into major soil groups. With all data collected and after obtaining the laboratory results, the final legend for the Soil Map was designed and the preliminary map adjusted according to the findings.

I.6 Present land use and land cover

The Land Use and Land Cover Map was derived from the interpretation of the satellite imagery and subsequent field checking of each of the identified mapping units. A preliminary legend was designed separating major land uses: crop cultivation (subdivided into traditional rainfed cropping and wetland rice cultivation) and natural and semi-natural vegetation (subdivided into woodland, bushland/savanna, and shrubland). The commonly grown crop mix was identified in the field, while major vegetation species/composition was obtained from DNRD/ DALDO and cross-checked in the field. Note that practically all land is also used for grazing by livestock but it was not possible to map such areas as separate units. This is due to the fact that grazing is not concentrated or restricted to a particular tract of land. Seasonally flooded areas (mbuga's) are the most frequently (but not exclusively) grazed areas. However, in such places wetland cultivation is also rather common, hence these areas usually have multiple functions. In fact, this may often be the case; mbuga's are also used to obtain roofing material (thatch) and water (also through water-harvesting, i.e., the storage of water in excavations for the dry season).

I.7 Farming systems

An inventory was made of the prevailing farming systems, based on existing information (RTI 1995, 1996) and additional field visits (accompanied by District Agricultural Officers). The main farming system zones were identified and delineated using also the satellite imagery.

1.8 The land resources database

Upon completion of the laboratory analyses and after all maps were drawn, a series of computerized data bases were developed containing the most salient features with regard to parent material, soils/physiography and present land use and land cover. These data bases were created using Access 97. Apart from functioning as a general data base, from which a wide range of characteristics can be extracted, they can be used for further data analysis and processing and application in, for instance, computerized land suitability assessments.

I.9 Physical land suitability evaluation

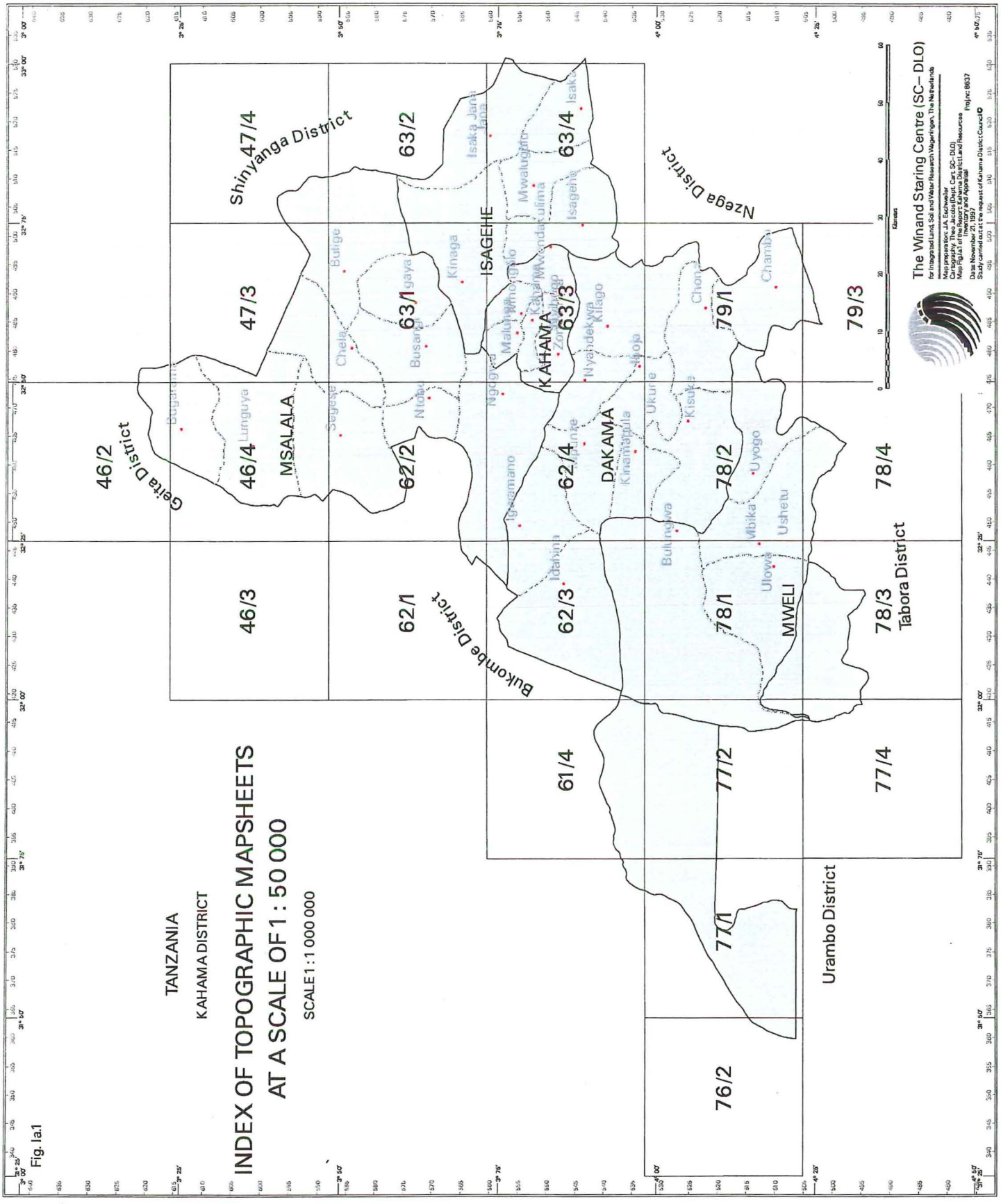
The Agroclimate Map was superimposed on the Soils and Physiography Map and the new land units were grouped into Agro-ecological Zones and Cells. Agro-ecological zones are defined as a combination of major soil/physiography units (or Land Systems) with one particular agroclimatic zone (FAO, 1978). Agro-ecological cells result from a subdivision of agro-ecological zones. The Agro-ecological Zones and Cells Map is used as a basis for generalised land suitability assessment conform the FAO Framework for Land Evaluation (FAO 1976). An assessment was made for some major kinds of land use notably rainfed cropping (at two levels of management) and to a less detailed extent for a) irrigated cropping, b) forestry and, c) extensive grazing (FAO 1983, 1984, 1987).

I.10 Area measurements

Areas were measured from the final 1:250,000 scale maps using a Geographic Information System. Such measurement is fully computerised and highly accurate. Considering the reconnaissance nature of the survey, all figures presented have been rounded off to the nearest hundred hectares. Some differences between the total extent of all mapping units of each map are therefore to be expected.

ANNEX Ia: INDICES OF TOPOGRAPHIC MAPS, SATELLITE IMAGERY AND AERIAL PHOTOGRAPHS

Index of topographical maps at a scale of 1:50,000 - Kahama District (Figure Ia.1).



Index of satellite imagery at a scale of 1:250,000 (Figure Ia.2).

Colour composite of Landsat TM images, R G B = 4 5 3

Image specifications :

satellite : Landsat TM5

bands : 3 : red
4 : near-infrared
5 : mid-infrared

dates : a : 11 July 1994
b : 05 August 1994

Scale

20000 0 Meters

1 : 1000000

Fig Ia.2 Kahama District, index of satellite imagery

Index of Aerial photography at a scale of 1:50,000 - Kahama District

Status as per December 1996 (from N to S):

Available: Missing:

Run	Photo number	Year
15	4424-4453	O-90
16	4348-4363	O-90
17	4242-4259	O-90
18	4193-4215	O-90
19	2564-2548	N-90
19	9327-9313	N-93
20	8161-8142	N-93
21	8258-8280	N-93
22	8310-8288	N-93
23	8409-8427	N-93
23	2702	N-89
23	8396-8398	N-93
24	8458-8435	N-93
25	8485-8489	N-93
26	9388-9408	N-93
27	9409-9428	N-93
28	9429-9451	N-93
29	9479-9499	N-89
30	9500-9517	N-89

Run	Photo number	Year
22	8311-8312	N-93
23	2703	N-89
23	8395-8392	N-93
24	8458-8462	N-93
25	8484-8472	N-93
26	9525-9536	N-93
27	9553-9537	N-93
	TOTAL	56

Available from the District Council together with a flight index map (prepared as part of this study).

ANNEX Ib: SOIL OBSERVATION AND SAMPLE DETAILS

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - AUGERINGS.

LUGURU		KIKUNGU					NDUHA			IDALAFUMA	LUKILI		LUSENI							
a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	e1	e2	f1	f2	f3	f4	f5	f6	f7	f8	f9
15	25	19	134	180	329	398	13	8	189	10	14	1	39	5	2	45	131	36		43	44
78	209	31	138	183	374		57	11	461	48	17	63	168	22	4	55	136	65		50	54
81	420	202	139	302	378		84	46		52	18	69	210	26	6	205	146	68		67	220
82	440	207	140	362	437		87	272		64	24	71	222	28	20	206	194	113		117	229
95	497	213	147	483	447		88	273		76	30	79	285	34	37	442	512	336		128	239
106	500	216	150	523	517		99	323		77	33	83	368	42	38	491				175	413
	505	225	185				109			80	303	94	488	49	40	496				191	524
		227	261				171			89	324	100		56	41	507				466	
		231	267				188			92	387	101		59	62	516				472	
		234	268				386			93	462	520		60	66					475	
		238	269				388			98	489			61	119						
		240	270				389			104				72	155						
		243	271				391			105				73	170						
		245	280				422			107				74	201						
		248	287				424			167				112	208						
		256	290				443			169				121	211						
		264	338				506			274				132	214						
		265	339				521			278				141	217						
		266	344							390				143	224						
		277	358							423				157	228						
		282	393											158	232						
		284	416											165	242						
		286												174	253						
		291												193	254						
		293												221	257						
		296												244	258						
		304												247	259						
		305												250	262						
		307												252	263						
		308												279	281						
		316												301	288						
		317												311	298						
		322												328	299						
		327												330	309						
		331												343	312						
		334												345	315						
		335												348	318						
		341												351	319						
		346												353	321						
6	7	40	22	6	6	1	18	6	2	20	11	10	7	42	42	9	5	5	-	10	7

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - AUGERINGS (CONT'D).

LUGURU		KIKUNGU					NDUHA			IDALAFUMA	LUKILI		LUSENI							
a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	e1	e2	f1	f2	f3	f4	f5	f6	f7	f8	f9
		349												359	326						
		352												361	333						
		360												365	337						
		363												371	340						
		372												373	342						
		384												379	347						
		395												381	354						
		399												383	357						
		401												397	380						
		410												400	382						
		411												403	402						
		428												404	409						
		430												407	417						
		433												408	418						
		441												412	419						
		449												434	487						
		469												435	501						
		474												438							
		477												439							
		493												444							
		495												448							
		514												467							
		519												485							
														508							
														509							
														510							
														513							
														522							
		22												25	14						
TOTALS:																					
6	7	62	22	6	6	1	17	6	2	20	11	10	7	67	56	9	5	5	-	10	7

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - AUGERINGS (CONT'D).

LUKELE		ITOGORO	MBUGA				
g1	g2	h1	i1	i2	i3	i4	i5
21	51	27	124	3	230	9	212
145	120	103	130	7	332	12	223
149	235	114	179	23	369	16	246
151	236	115	459	29	405	47	
152	237	116	479	32	414	53	
160	366	148	504	35	421	58	
163	454	350		102	446	70	
176	464			118		75	
177	476			122		85	
181	478			123		86	
187				125		90	
190				126		91	
192				127		96	
196				129		97	
200				133		108	
233				135		110	
292				137		111	
294				142		172	
355				144		197	
370				153		241	
375				154		249	
376				156		255	
385				159		283	
392				161			
394				162			
396				164			
406				166			
426				173			
429				178			
431				182			
445				184			
450				186			
451				195			
463				198			
470				199			
484				203			
498				204			
511				215			
515				218			
518				219			
				226			
				251			
				260			

LUKELE		ITOGORO	MBUGA				
g1	g2	h1	i1	i2	i3	i4	i5
				425			
				427			
				432			
				436			
				452			
				453			
				455			
				456			
				457			
				458			
				460			
				465			
				468			
				471			
				473			
				480			
				481			
				482			
				486			
				490			
				492			
				494			
				499			
				502			
				503			
TOTAL:							
40	10	7	6	85	7	23	3

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - AUGERINGS (CONT'D).

LUKELE		ITOGORO	MBUGA				
g1	g2	h1	i1	i2	i3	i4	i5
				275			
				276			
				289			
				295			
				297			
				300			
				306			
				310			
				313			
				314			
				320			
				325			
				356			
				364			
				367			
				377			
				415			

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - SOIL PITS, COMPOSITE SAMPLES AND pF SAMPLES

LUGURU		KIKUNGU					NDUHA			IDALAFUMA	LUKILI		LUSENI								
a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	e1	e2	f1	f2	f3	f4	f5	f6	f7	f8	f9
Soil pits:																					
46	103	30 38 52 66 67 68 75 84 100 104	17 18 27 44 72 79	19	56 57 60 61	26 85 87	8 41 93	3 9 10 71	41 74 91 94 96	25	23	45	35 83	6 13 51 55 58 62 63 64 65 69 78 80 88 95	4 16 22 48 86	32 33 42 59 89	15	7 40 77	49	21 48	98
1	1	11	6	1	4	3	3	4	5	1	1	1	1	14	5	5	1	3	1	2	1
Composite samples:																					
		15 27 35 36 42 47	5 9 19 48	7	23 32		24 44 45 50 53	1 37			25 39		52	2 26 30 31 33 34 41	4 40	14 17		16		8 18	46 51
-	-	6	4	1	2	-	5	2	-	-	2	-	1	7	2	2	-	1		2	2
pF samples:																					
		38			60	26		10	91					6 55	86						
-	-	1	-	-	1	1	-	1	1	-	-	-	-	2	1	-	-	-	-	-	-

Note: Listed are the sample numbers and the total number of soil pits sampled, composite samples taken and soil profiles sampled for determination of pF.

SOIL OBSERVATIONS FREQUENCY DISTRIBUTION (BY SOIL GROUP) - SOIL PITS, COMPOSITE SAMPLES AND pF SAMPLES (CONT'D)

LUKELE		ITOGORO	MBUGA				
g1	g2	h1	i1	i2	i3	i4	i5
Soil pits:							
12	24	2	36	11	101	1	
14	29	20		28		5	
39	37			31		47	
43	90			34		92	
	105			53		102	
				54			
				70			
				73			
				76			
				81			
				82			
				97			
				99			
4	5	2	1	13	1	4	-
Composite samples:							
20	21		13	3		22	
	49			6			
				10			
				11			
				12			
				28			
				29			
				38			
1	2	-	1	8	-	1	-
pF samples:							
	105					47	
-	1	-	-	-	-	1	-

Note: Mbuga soil types were later reduced to two types only i1 and i2.

i1 includes i1 and i2
i2 includes i3 and i4.

Note: Listed are the sample numbers and the total number of soil pits sampled, composite samples taken and soil profiles sampled for determination of pF.

Total number of soil pits: 104
Total number of composite samples: 53
Total number of pF samples: 90 (10 profiles; three horizons sampled (in triplicate)

LISTING OF SOIL SAMPLES TAKEN FOR LABORATORY ANALYSES (KAHAMA)

A) Soil pits

PROFILE No.	SOIL GROUP (TYPE)	NO. (*)	PROFILE No.	SOIL GROUP (TYPE)	NO. (*)
KP 001	Mbuga (i4)	3	KP 044	Kikungu (b2)	3
KP 002	Itogoro (h1)	3	KP 045	Lukili (e2)	2
KP 003	Nduha (c2)	3	KP 046	Luguru (a1)	1
KP 004	Luseni (f3)	3	KP 047	Mbuga (i4)	3
KP 005	Mbuga (i4)	3	KP 048	Luseni (f3)	3
KP 006	Luseni (f2)	3	KP 049	Luseni (f7)	2
KP 007	Luseni (f6)	3	KP 050	not applic.	3
KP 008	Nduha (c1	3	KP 051	Luseni (f2)	3
KP 009	Nduha (c2)	3	KP 052	Kikungu (b1)	3
KP 010	Nduha (c2)	3	KP 053	Mbuga (i2)	3
KP 011	Mbuga (i2)	3	KP 054	Mbuga (i2)	3
KP 012	Lukele (g1)	2	KP 055	Luseni (f2)	3
KP 013	Luseni (f2)	3	KP 056	Kikungu (b4)	3
KP 014	Lukele (g1)	2	KP 057	Kikungu (b4)	3
KP 015	Luseni (f5)	2	KP 058	Luseni (f2)	3
KP 016	Luseni (f3)	3	KP 059	Luseni (f3)	3
KP 017	Kikungu (b2)	3	KP 060	Kikungu (b4)	3
KP 018	Kikungu (b2)	3	KP 061	Kikungu (b4)	3
KP 019	Kikungu (b3)	3	KP 062	Luseni (f2)	3
KP 020	Itogoro (h1)	3	KP 063	Luseni (f2)	3
KP 021	Luseni (f8)	3	KP 064	Luseni (f2)	3
KP 022	Luseni (f3)	3	KP 065	Luseni (f2)	3
KP 023	Lukili (e1)	2	KP 066	Kikungu (b1)	3
KP 024	Lukele (g2)	1	KP 067	Kikungu (b1)	3
KP 025	Idalafuma (d1)	1	KP 068	Kikungu (b1)	3
KP 026	Kikungu (b5)	3	KP 069	Luseni (f2)	3
KP 027	Kikungu (b2)	3	KP 070	Mbuga (i2)	3
KP 028	Mbuga (i2)	3	KP 071	Nduha (c3)	3
KP 029	Lukele (g2)	3	KP 072	Kikungu (b1)	3
KP 030	Kikungu (b1)	3	KP 073	Mbuga (i2)	3
KP 031	Mbuga (i2)	3	KP 074	Nduha (c3)	2
KP 032	Luseni (f4)	3	KP 075	Kikungu (b1)	3
KP 033	Luseni (f4)	3	KP 076	Mbuga (i2)	3
KP 034	Mbuga (i2)	3	KP 077	Luseni (f6)	3
KP 035	Luseni (f1)	3	KP 078	Luseni (f2)	3
KP 036	Mbuga (i1)	3	KP 079	Kikungu (b2)	3
KP 037	Lukele (g2)	3	KP 080	Luseni (f2)	3
KP 038	Kikungu (b1)	3	KP 081	Mbuga (i2)	3
KP 039	Lukele (g1)	2	KP 082	Mbuga (i2)	3
KP 040	Luseni (f6)	3	KP 083	Luseni (f1)	3
KP 041	Nduha (c3)	2	KP 084	Kikungu (b1)	3
KP 042	Luseni (f4)	3	KP 085	Kikungu (b5)	3
KP 043	Luseni (f8)	2	KP 086	Luseni (f3)	3
KP 087	Kikungu (b5)	3	KP 098	Luseni (f9)	3
KP 088	Luseni (f2)	3	KP 099	Mbuga (i2)	3
KP 089	Luseni (f3)	3	KP 100	Kikungu (b1)	3
KP 090	Lukele (g2)	2	KP 101	Mbuga (i3)	3
KP 091	Nduha (c3)	3	KP 102	Mbuga (i4)	3
KP 092	Mbuga (i4)	3	KP 103	Luguru (a2)	1
KP 093	Nduha (c1)	3	KP 104	Kikungu (b1)	3
KP 094	Nduha (c3)	2	KP 105	Lukele (g2)	3
KP 095	Luseni (f2)	3			
KP 096	Nduha (c3)	3	TOTAL SAMPLES		292
KP 097	Mbuga (i2)	3			

(*) Number of samples taken from the soil profile.

B) **Composite samples**

PROFILE No.	SOIL GROUP (TYPE)	PROFILE No.	SOIL GROUP (TYPE)	PROFILE No.	SOIL GROUP (TYPE)
KC 001	Nduha (c2)	KC 021	Lukele (g2)	KC 041	Luseni (f2)
KC 002	Luseni (f2)	KC 022	Mbuga (i4)	KC 042	Kikungu (b1)
KC 003	Mbuga (i2)	KC 023	Kikungu (b4)	KC 043	Lukele (g1)
KC 004	Luseni (f3)	KC 024	Nduha (c1)	KC 044	Nduha (c1)
KC 005	Kikungu (b2)	KC 025	Lukili (e1)	KC 045	Nduha (c1)
KC 006	Mbuga (i2)	KC 026	Luseni (f2)	KC 046	Luseni (f9)
KC 007	Kikungu (b3)	KC 027	Kikungu (b1)	KC 047	Kikungu (b1)
KC 008	Luseni (f8)	KC 028	Mbuga (i2)	KC 048	Luseni (b2)
KC 009	Kikungu (b2)	KC 029	Mbuga (i2)	KC 049	Lukele (g2)
KC 010	Mbuga (i2)	KC 030	Luseni (f2)	KC 050	Nduha (c1)
KC 011	Mbuga (i2)	KC 031	Luseni (f2)	KC 051	Luseni (f9)
KC 012	Mbuga (i2)	KC 032	Kikungu (b4)	KC 052	Luseni (f1)
KC 013	Mbuga (i1)	KC 033	Luseni (f2)	KC 053	Nduha (c1)
KC 014	Luseni (f4)	KC 034	Luseni (f2)		
KC 015	Kikungu (b1)	KC 035	Kikungu (b1)	TOTAL SAMPLES; 53	
KC 016	Luseni (f6)	KC 036	Kikungu (b1)		
KC 017	Luseni (f4)	KC 037	Nduha (c2)		
KC 018	Luseni (f8)	KC 038	Mbuga (i2)		
KC 019	Kikungu (b2)	KC 039	Lukili (e1)		
KC 020	Lukele (g1)	KC 040	Luseni (f3)		

LISTING OF SOIL SAMPLES TAKEN FOR LABORATORY ANALYSES (CONT'D)

C) **pF samples**

PROFILE No.	SOIL GROUP (TYPE)	NO. OF SAMPLES TAKEN (*)
KP 006	Luseni (f2)	3 (x3)
KP 010	Nduha (c2)	3 (x3)
KP 026	Kikungu (b5)	3 (x3)
KP 038	Kikungu (b1)	3 (x3)
KP 047	Mbuga (i4)	3 (x3)
KP 055	Luseni (f2))	3 (x3)
KP 060	Kikungu (b4)	3 (x3)
KP 086	Luseni (f3)	3 (x3)
KP 091	Nduha (c3)	3 (x3)
KP 105	Lukele (g2)	3 (x3)
TOTAL SAMPLES TAKEN; (10x9)		90

(*) All samples taken in triplicate.

ANNEX Ic: LABORATORY METHODS

Soils were analysed according to internationally accepted methods and procedures currently in use in the National Soil Service laboratory at Mlingano, Tanga, Tanzania (NSS, 1987). Collected bulk soil samples 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 determinations were done:

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

Organic carbon: wet-acid dicromatedigestion according to Walkley and Black.

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

Soil pH: potentiometrically 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 CEC: 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 phosphorus: Kurtz-Bray I; extraction with 0.025 M hydrochloric acid (HCL) and 0.03 M ammonium fluoride (NH4F) and determination of the extracted P by spectrophotometer.

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.

Based on part of the above determinations, the following calculations of exchange properties were made:

- 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).

Undisturbed (core) samples were analysed to determine the bulk density and water retention properties of the soils:

- Bulk density: determined by weighing the oven dried core sample of which the volume is known.
- Water retention: determined by equilibrating the 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.

ANNEX Id: METEOROLOGICAL DATA - STATION PARTICULARS (KAHAMA DISTRICT AND SURROUNDINGS).

Station name	District	Lat./Long.		Alt.	Parameter						Tot.Yrs	Years
		S	E	masl	P	T	H	W	S	PET		(period)
Bulungwa	Kahama	4.03	32.13	1200	x						15	42-56
Isaka	"	3.54	32.56	1190	x						15	70-74,76-85
Kahama	"	3.50	32.36	1250	x	x	x	x			74	22-94
Kisuke	"	4.03	32.26	1200	x						21	73-94
Lunguya	"	3.24	32.24	1260	x						8	70,75-76,78-79,82,84-85
Mpera	"	3.56	32.45	1250	x						16	60-68,70-71
Mpunze	"	3.54	32.22	1220	x						11	73-83
Ngaya	"	3.38	32.38	1200	x						15	73-85,87-88
Ntobo	"	3.38	32.27	1200	x						15	74-78,82-90,92
Seeke	"	3.50	32.32	1220	x						20	71-79,81-87,89-91,93
Ushetu	"	4.10	32.14	1200	x						13	73-80,91-95
Ikina	Geita	3.10	32.15	?	x						5	70,72-76
Karumwa	"	3.12	32.39	1140	x						19	70-79,81-89
Massumbwe	Bukombe	3.38	32.11	1160	x						11	73-75,77-86,91-92
Mbogwe	"	3.20	32.10	1280	x						11	73-79,81-82
Mwanhala	Tabora	4.24	33.09	1230	x	x					57	38-91,93-95
Nzunzuli	Shinyanga	3.19	32.53	1200	x						9	73-75,77,79-82,90
Uyowa	Tabora	4.30	31.57	?	x						7	86-92
Usia Dam	Shinyanga	3.52	33.09	1180	x						28	64-76,78-87,89,91-94
Tabora Airp.	Tabora	5.05	32.50	1190	x	x	x	x	x	x	>10	?
Tabora Obs.	"	5.02	32.49	1265	x	x	x	x	x	x	>10	?
Urambo	"	5.04	32.03	1110	x	x	x	x	x	x	>10	?

P = rainfall H = relative humidity S = hours of sunshine
T = temperature W = windspeed PET= potential evapotranspiration

ANNEX Ie: STANDARD NSS SHEETS FOR SOIL DATA RECORDING.

NATIONAL SOIL SERVICE, TANZANIA — SOIL PROFILE DESCRIPTION FORM

PROFILE NO:

Survey area :
Region :
District :
Location :
Mapping unit

Map sheet no :
Coordinates :
Author (s) :
Airphoto no. :
Date :

Soil name : Phase:
Classification: FAO :
Soil Taxonomy :

Season / weather conditions:
Soil moisture regime :
Soil temperature regime :

Landform :
Relief intensity : ..... m
Elevation : ..... m
Macrorelief :
Microrelief :

Parent material :
Geological formation:

SITE CHARACTERISTICS

Slope gradient(%) :
Type of slope :
Length of slope(m):
Position on slope :

SURFACE CHARACTERISTICS

Sealing/crusting : yes/no
thickness : ..... mm; consist.: (d) (m)
Cracking :
Rock outcrops ..... %
Surface stoniness ..... %. Size ..... cm

Ground water level : actual ..... cm.
Perched: yes/no highest : ..... cm lowest ..... cm.
Stagnating hor. : depth ..... cm; design .....
Modified ground water level : yes/no

Nat. drainage class :
Run off :
Infiltration :
Seepage/Spring levels: yes/no

FLOODING / PONDING

Frequency : ..... times/yr.
Duration : ..... days. Depth: ..... cm
In months :

Erosion : water/wind
type :
degree :
Deposition :

Nat. vegetation type:

Composition	Cover%	Dominant species
trees		
shrubs		
herbs		
grasses		
bare ground		

LAND USE/CROPPING SYSTEM

Soil fauna:
Human influences :
Photograph/slide no:

Remarks:

Brief description :

PROFILE CHARACTERISTICS									
HORIZON	symbol								
	depth(cm)								
	bound width topogr.								
COLOUR	dry								
	moist								
MOIST. COND.									
MOTTLING	abundance								
	size								
	contrast								
	sharpness								
	colour								
TEXTURE & COARSE FRAG.									
CONSIST.	dry								
	moist								
	wet								
STRUCT.	grade								
	size								
	form								
CUTANS	quantity								
	thickness								
	type								
PORES	quantity								
	size								
PRIM. MIN. ROCK. FRAGM.	quantity								
	size								
	weath.								
	shape								
	nature								
CONCRETIONS NODULES	quantity								
	size								
	hardness								
	shape								
	type								
REACTION HCl.									
ROOTS	quantity								
	size								
SALTS	EC 1:2.5								
	pH 1:2.5								
OTHER FEATURES									
SAMPLE	no.								
	depth								

SOIL DEPTH ..... cm

REMARKS:

NATIONAL SOIL SERVICE, TANZANIA — SOIL OBSERVATION DESCRIPTION FORM

Observation no. [ ]

Survey area :
Map sheet no. : Photo no:
Location :
Author(s) :
Date :

Soil name :
Classification :
Phase :
Mapping unit :

Parent material :
Landform :
Macrorelief : *flat* *alm. flat* *gently undul.* *undulating* *rolling* *hilly* *mountainous*
Slope gradient :.....%
Elevation.....m.
Slope form :
Microrelief :
Slope length :
Position on slope :

Nat. drainage class : *very poor* *poor* *imperfect* *mod. well* *well* *somewh. exc.* *excessive*
Groundwater level : actual.....cm range from.....to..... cm.
Flooding / Ponding : *never* *very rare* *rare* *infrequent* *frequent* *very frequent* *regular Y/N*
Erosion : *splash & rillwash* *sheet* *rill* *gully* Degree :
Deposition : Overwash : Overblow :

Rock outcrops : *none* *little* *fairly r.* *rocky* *very rocky* *extr. rocky* *rockland*
Surface stoniness : *none* *very few* *fairly st.* *stony* *very stony* *extr. stony* *rubble land*
Alkalinity / Salinity : *none* *slight* *moderate* *strong*
Sealing / Crusting : Cracking :

Landuse :
Vegetation / Crops :

HORIZON			COLOUR	MOISTURE CONDITION	MOTTLING		TEXTURE & COARSE FRAGMENTS	CONSIST-ENCE			STRUCTURE			NODULES			REACTION HCl	pH	OTHER FEATURES
designation	profile sketch	depth (cm)	dry / moist		abundance	colour		dry	moist	wet	grade	size	form	quantity	size	type		Ec / 1:2.5	

Remarks :
Soil depth cm

ANNEX II: QUALITY OF MOISTURE SUPPLY DURING THE MONTHS OF JANUARY AND FEBRUARY FOR 8 RAINFALLS STATIONS IN KAHAMA DISTRICT BASED ON THE ANNUAL CALCULATION OF THE P/PET RATIO.

Bulungwa Station.

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0-0.5	1	7.1	0-0.5	2	14.3
0.5-1	9	64.3	0.5-1	8	57.1
> 1	4	28.6	> 1	4	28.6
Total	14	100	Total	14	100

Isaka station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	2	16.7	0 - 0.5	1	8.3
0.5 - 1	7	58.3	0.5 - 1	5	41.7
> 1	3	25	> 1	6	50
Total	12	100		12	100

Kahama station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0- 0.5	4	6.1	0- 0.5	5	7.6
0.5 - 1	30	45.4	0.5 - 1	26	39.4
> 1	32	48.5	> 1	35	53.0
Total	66	100	Total	66	100

Kisuke station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	2	10.6	0 - 0.5	3	15.8
0.5 - 1	10	52.6	0.5 - 1	8	42.1
> 1	7	36.8	> 1	8	42.1
Total	19	100	Total	19	100

Mpera station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	2	22.2	0 - 0.5	0	0
0.5 - 1	6	66.7	0.5 - 1	2	22.2
> 1	1	11.1	> 1	7	77.8
Total	9	100	Total	9	100

Mpunze station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	0	0	0 - 0.5	2	20
0.5 - 1	6	60	0.5 - 1	3	30
> 1	4	40	> 1	5	50
Total	10	100	Total	10	100

Ngaya station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	2	16.7	0 - 0.5	2	16.7
0.5 - 1	9	75	0.5 - 1	9	75
> 1	1	8.3	> 1	1	8.3
Total	12	100	Total	12	100

Ntobo station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	5	50	0 - 0.5	1	10
0.5 - 1	3	30	0.5 - 1	6	60
> 1	2	20	> 1	3	30
Total	10	100	Total	10	100

Ushetu station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	1	9.1	0 - 0.5	0	0
0.5 - 1	7	63.6	0.5 - 1	4	36.4
> 1	3	27.3	> 1	7	63.6
Total	11	100	Total	11	100

Seeke station

Frequency Distr. January			Frequency Distr. February		
P/PET Range	Freq.	%	P/PET Range	Freq.	%
0 - 0.5	1	6.3	0 - 0.5	1	6.3
0.5 - 1	8	50	0.5 - 1	6	37.5
> 1	7	43.8	> 1	9	56.3
Total	16	100	Total	16	100

ANNEX III: LOCATION AND YIELDS OF SPRINGS, SHALLOW WELLS AND BOREHOLES IN KAHAMA DISTRICT (DATA BY DISTRICT WATER DEPT.).

Springs

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Busangi	Busangi	451.4	9596.4	>5,000
		Nyamigege	448.8	9589.7	>5,000
	Chela	Chela	450.1	9608.6	>5,000
		Chela	445.8	9609.1	>5,000
	Isagehe	Mpera	470.9	9565.8	>5,000
	Isaka	Mwakata	486.2	9570.2	>5,000
	Mwendakulima	Mwendakulima	466.3	9576.6	>5,000
		Mwime	459.0	9572.8	17,800
		Mwime	459.3	9572.5	>5,000
	Ukune	Iboja	447.2	9555.9	>5,000
	Ushetu	Ibelansuha	416.8	9536.7	>5,000
	Zongomera	Ilindi	457.4	9571.1	16,200
		Ilindi	457.7	9571.1	>5,000

Shallow wells

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Bugurama	Buyange	432.9	9634.1	540
		Buyange	430.0	9637.0	490
		Bugurama	434.6	9637.5	800
		Bugurama	436.4	9639.0	820
		Kakola	440.6	9641.0	760
	Bulunga	Shaka	414.9	9556.5	930
	Busangi	Busangi	448.7	9593.2	640
		Busangi	451.4	9596.4	630
		Busangi	450.7	9596.1	620
		Busangi	449.4	9599.7	750
		Busangi	450.8	9597.8	680
		Busangi	452.4	9598.4	650
		Busangi	451.3	9595.3	800
		Busangi	449.7	9594.4	660
	Chambo	Chambo	461.5	9535.4	1,470
		Chambo	463.1	9534.4	1,180
	Chona	Busenda	454.8	9550.4	570
		Busenda	453.8	9549.6	680
		Busenda	456.2	9549.8	460
		Chona	456.7	9546.0	760

Shallow wells (cont'd)

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Jana	Isaka Jana	499.4	9578.0	620
		Isaka Jana	497.9	9580.5	520
		Isaka Jana	497.3	9578.1	1,500
	Kilago	Kilago	454.6	9564.3	890
		Kilago	453.5	9564.1	980
		Tulole	454.2	9558.7	460
		Tulole	454.1	9557.6	1,170
		Tulole	453.7	9557.2	800
		Tulole	452.7	9556.8	1,070
		Tulole	454.3	9555.8	790
		Ufala	453.3	9565.8	940
		Ufala	456.4	9564.9	630
		Ufala	454.6	9566.1	990
	Kinaga	Kinaga	461.1	9587.7	720
		Kinaga	463.2	9588.3	900
		Kinaga	461.0	9587.0	620
		Kinaga	460.4	9586.4	720
	Kinamapula	Kinamapula	433.9	9559.1	1200
		Kinamapula	434.1	9559.2	630
		Kinamapula	434.4	9560.4	1,250
		Kinamapula	433.4	9561.0	620
		Kinamapula	452.7	9560.2	1,180
		Kinamapula	431.8	9558.5	1,130
		Kinamapula	433.2	9557.9	1,140
	Kisuke	Kisuke	483.3	9549.8	780
		Kisuke	439.0	9549.4	450
		Kisuke	437.9	9548.2	780
		Kisuke	436.0	9549.8	460
		Kisuke	436.5	9548.2	770
		Kisuke	436.0	9548.4	690
		Nyamilangano	434.6	9547.8	570
		Nyamilangano	432.9	9548.4	580
		Nyamilangano	433.3	9546.1	1,170
		Nyamilangano	433.0	9545.7	1,150
	Lunguya	Lunguya	433.3	9626.3	650
		Lunguya	432.7	9626.2	550
	Malunga	Busoka	449.9	9580.8	560
		Busoka	451.2	9581.4	460
		Busoka	450.2	9582.4	420
		Busoka	449.5	9582.3	530
		Busoka	448.9	9580.7	570
		Busoka	446.9	9580.6	680
		Kitwana	454.4	9585.1	830
		Kitwana	454.2	9583.2	640

Shallow wells (cont'd)

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Malunga	Kitwana	452.9	9581.8	660
		Kitwana	452.4	9582.0	500
		Kitwana	452.6	9582.9	480
		Malunga	454.2	9577.9	790
		Malunga	454.2	9577.9	760
		Malunga	455.0	9579.1	660
		Malunga	455.3	9578.7	890
		Malunga	455.4	9578.3	500
		Malunga	455.3	9578.1	700
	Mhongolo	Mbulu	460.2	9576.1	600
		Mbulu	460.2	9576.3	600
		Mhongolo	455.7	9579.3	880
		Mhongolo	457.1	9580.1	850
	Mjini	Mjini	455.1	9577.0	850
		Mjini	455.1	9577.0	870
		Mjini	455.0	9577.4	450
		Mjini	453.9	9577.2	880
		Nyahanga	453.5	9570.8	650
		Nyahanga	453.4	9576.8	600
		Shunu	453.4	9577.4	500
	Mpunze	Ifunde	434.0	9568.7	1,400
		Mpunze	429.8	9568.5	160
		Mpunze	430.4	9568.5	150
		Mpunze	431.7	9568.9	740
		Mpunze	432.6	9568.7	730
		Mpunze	432.4	9567.1	1,250
		Mpunze	433.9	9567.6	980
		Sabasabini	426.7	9566.8	900
		Sabasabini	426.7	9568.0	730
		Sabasabini	427.2	9566.3	620
		Sabasabini	428.1	9566.5	1100
		Sabasabini	428.3	9566.2	490
		Sabasabini	428.8	9568.5	990
		Sabasabini	427.3	9568.9	930
	Mwalugulu	Banhi	474.3	9575.8	580
		Banhi	474.7	9576.4	570
		Sungamile	479.9	9571.9	500
		Sungamile	481.2	9572.6	500
		Sungamile	481.0	9570.7	490
		Sungamile	480.1	9570.0	690

Shallow wells (cont'd)

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Mwendakulima	Mwendakulima	465.1	9577.3	600
		Mwendakulima	464.9	9576.1	620
		Mwime	460.0	9574.4	830
		Mwime	461.4	9574.3	800
		Mwime	460.7	9573.0	640
		Mwime	460.6	9572.0	790
	Ngaya	Ngaya	460.2	9599.5	720
		Ngaya	459.1	9598.4	720
		Ngaya	458.0	9600.6	720
		Ngaya	458.2	9599.5	625
	Ngogwa	Ngogwa	444.8	9582.5	530
		Ngogwa	442.7	9582.2	730
		Ngogwa	444.1	9582.1	720
	Ntobo	Bukwangu	437.0	9596.1	540
		Ntobo	440.0	9597.5	650
		Ntobo	440.9	9597.8	720
	Nyandekwa	Bujika	445.3	9564.1	900
		Bujika	445.7	9562.8	920
		Bujika	446.9	9562.4	850
		Bujika	449.0	9561.4	1,700
		Bujika	447.2	9563.8	700
		Lowa	440.2	9569.7	650
		Lowa	440.9	9571.1	530
		Lowa	439.3	9571.7	720
		Lowa	438.8	9570.4	870
		Lowa	437.4	9570.8	830
		Lowa	439.3	9570.0	1,230
		Nyandekwa	445.5	9569.0	550
		Nyandekwa	444.4	9568.3	470
		Nyandekwa	445.1	9567.4	450
		Nyandekwa	444.9	9566.5	470
		Nyandekwa	444.1	9568.5	700
		Nyandekwa	444.4	9569.0	900
		Nyandekwa	445.5	9570.5	520
		Nyandekwa	442.6	9568.2	470
	Nyihogo	Mhungula	454.4	9573.0	650
		Mhungula	454.1	9573.1	560
		Mhungula	453.4	9575.1	550
		Nyihogo	455.1	9575.1	520
		Nyihogo	455.5	9576.2	650
		Nyihogo	455.9	9575.9	600
	Segesse	Shilela	434.9	9618.6	770
		Shilela	434.6	9618.7	760

Shallow wells (cont'd)

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Ukune	Iboja	446.1	9556.1	500
		Iboja	447.7	9557.7	1,120
		Iboja	446.1	9557.2	720
		Iboja	445.0	9559.1	720
		Igalula	449.5	9549.1	830
		Igunda	441.8	9558.3	1,400
		Igunda	442.3	9559.4	1,250
		Igunda	442.3	9560.4	730
		Igunda	440.8	9561.3	730
		Igunda	440.1	9560.6	520
		Igunda	439.4	9559.9	1,750
		Ilwilo	448.1	9551.8	620
		Ilwilo	449.3	9551.2	630
		Ilwilo	450.8	9552.0	640
		Kayenze	440.7	9554.5	570
		Kayenze	439.2	9553.2	690
	Ushetu	Ibelansuha	416.6	9537.4	1800
		Ibelansuha	418.2	9536.7	1500
		Mbika	414.8	9536.0	3,000
	Zongomera	Seeke	446.9	9578.6	900
		Seeke	446.1	9577.8	800
		Seeke	449.5	9576.7	1,190
		Seeke	449.0	9575.9	780
		Seeke	449.4	9575.1	670
		Seeke	449.5	9574.0	800
		Wigehe	452.6	9571.8	1,370
		Wigehe	452.6	9571.8	880
		Zongomera	449.6	9573.5	830
		Zongomera	448.7	9572.4	990
		Zongomera	450.6	9573.1	1,000

Boreholes

Division	Ward	Village	Coordinates		Yield
			E	S	L/h
	Isagehe	Mpera	473.1	9565.3	4,000
	Isaka	Mwakata	488.8	9567.7	19,000
	Kilago	Ufala	454.3	9567.8	600
		Ufala	454.2	9566.8	750
		Ufala	455.2	9567.9	3,000
	Mjini	Shunu	453.4	9577.4	500

ANNEX IV: SOIL MAPPING UNITS AND SOIL PROFILE DESCRIPTIONS

ANNEX IV.1 SOIL MAPPING UNITS

A mapping unit is part of a physiographic unit and is characterized by a particular soil association. In Kahama District three major landforms were recognized, notably (1) Hills (2) Plains and (3) wide valleys (Mbugas). These major landforms are further subdivided into 11 sub-units on the basis of primarily the parent material and topography. The eleven sub-units are further subdivided into 24 mapping units on the basis of soil associations. In this section the mapping units are described in the same order as they are shown in the legend of the soil map. The extent of each mapping unit is given in Annex 5.
For each mapping unit representative soil profile description numbers are indicated. For the description of chemical parameters, the classes indicated in Chapter 3.5.6 (see Volume I) apply. Only the dominant and associated soils are described and this is the reason that at times the soil constituents of a mapping unit may not ad up to 100% (inclusions are taking up the balance).

Soils developed on banded ironstone and/or colluvium derived from this material

Mapping unit A11

Soil classification: Luguru (100%), KP 46.

Rocky land - (stony, rocky and gravelly) with pockets of very shallow, excessively drained, dark brown, very gravelly loams.

Setting
The setting of this mapping unit represents the hills and rock outcrops of the banded ironstone. The dominant slopes are between 15 and 30 percent. The mean elevation is between 1200 and 1470m above sea level. The lands are covered by miombo woodland and bushes. The main land use type is extensive grazing and fuel wood/timber collection.

Soil profile properties
The soils are mainly characterized by rock outcrops, stones and boulders associated with very shallow, dark brown, very gravelly loams over banded ironstone rocks.

Soil physical properties
The soils are excessively drained (high external runoff) and the rooting depth is limited by the underlying bedrock, high amounts of gravels and stones occur near the surface.

Soil chemical properties
The soil reaction is moderately acid. The CEC is high. The organic matter content is low (percent organic matter is moderate as shown by CN ratio of 13. Nitrogen and phosphorus levels are low. Exchangeable Potassium is moderate.

Mapping unit A21

Soil classification: Nduha (40%) profile KP8,9,10
Lukili (30%) profile KP 45
Idalafuma (25%) profile KP 25
Itogoro (5%) profile KP2

Complex of: (very) deep, well drained, strong brown to yellowish red, clay loams to clays and shallow, well to somewhat excessively drained, dark reddish brown to red, gravelly clay loams over laterite at shallow depth and laterite at or near the surface with patches of very thin, dark brown sandy loams or sandy clay loams.

Setting
The unit occupies the undulating plains i.e. footslopes, interfluves and narrow valleys around the banded irostone hills. The slopes are between 5 and 10 percent. The mean elevation ranges between 1190 and 1260m above sea level. The lands are covered with scattered regrowth of miombo woodlands and acacia trees. The main land uses are rainfed cropping with maize, cassava and sorghum as the main crops. Extensive grazing is also practiced.

Soil profile properties
The Nduha soils have 10 to 15cm thick topsoil with strong brown to dark reddish brown friable clay loam. The structure is moderately well developed and is medium sized subangular blocky. The subsoil below that depth is a gravelly clay loam to clay to dark red or strong brown gravelly clay loam to clay. In places the soil is overlying a hard layer of ironstone (laterite). In the subsoil the soil contains over 60% clay and sesquioxides nodules.

The Lukili soil is similar to Nduha soil but having laterite within 50cm from the surface. It is dark brown to yellowish brown gravelly clay loam to clay with moderate structure.

The Idalafuma soil is an important third association having laterite at or near the surface. The thin soil is red to reddish brown or yellowish red gravelly sandy loam or clay loam.

Itogoro soil is a minor soil in the area and it is dark gray sandy clay to sandy clay or clay within a coherent massive structure (hardpan) in the subsoil.

Soil physical properties
The soil has in general low to moderate water holding capacity. The rooting depth is limited by the presence of laterite at or below a depth of 50cm from the surface.

Soil chemical properties
The soils have in general very low levels of Nitrogen, Phosphorus and Potassium. The capacity of the soil to retain nutrient is generally low. Soil reaction is very strongly acid to moderately acid in places, the soils have high aluminium saturation levels (i.e more than 50%). These are toxic levels for many crops.

Mapping unit A31

Soil classification: Lukili (50%) profile KP 45
Idalafuma (40%) profile KP 25
Itogoro (10%) profile KP 2

Complex of: Shallow, well to somewhat excessively drained, dark reddish (strong brown) to reddish brown, gravelly clay loams over laterite at shallow depth and laterite at or near the surface with patches of very thin dark brown sandy loams or sandy clay loams.

Setting
The unit occupies the gently undulating plains i.e footslopes, broad interfluves and narrow valleys around the banded ironstone hills. The slopes are between 2 and 5 percent. The mean elevation ranges between 1180 and 1220m above sea level. The lands are covered with scattered bushes and regrowth of miombo woodland. The main land uses are extensive grazing and scattered rainfed cropping on the lands with better soil i.e where the soil depth is not a serious limitation.

Soil profile and physical properties are similar to those of mapping unit A21 for Lukili, Idalafuma and Itogoro soils.

Soil chemical properties
Soil reaction is strongly acid. Nitrogen, Phosphorus, Potassium and capacity of the soils to retain nutrient are very low. The soil fertility of this mapping unit is general very poor for many crops.

Mapping Unit A32

Soil classification: Lukili (40%), (profiles KP 23 and KP 45)
Idalafuma (30%) profiles KP 25
Nduha (20%) (profiles KP 8,9,10,41,71,74,93,94,96)

A complex of: shallow, well to somewhat excessively drained, reddish brown to red gravelly clay loams to clays over laterite at shallow depth and laterite at or near the surface with pockets of very thin dark brown to brown sandy loams to sandy clay loams and very (moderately) deep, well drained red to dark red, clay loams to clays over laterite at variable depths.

Setting
Gently undulating plains, footslopes, broad interfluves and narrow valleys (2-5% slopes and altitude of 1080-1220m). It occurs mainly in the south western part of the district (close to Usumbwa forest reserve). A large part of this unit comprising shallow soils (Lukili) is under natural vegetation (Miombo) where timber and wood charcoal production are the main land uses. The other part is used for rainfed cropping or grazing. Patches of laterite are exposed at or near the soil surface. Idalafuma soils are common in middle or lower slope positions. These areas are characterised by bare surfaces or short sparse vegetation and or low termite mounds 10-40cm high. Deep to very deep soils (Nduha) occur in places on upper parts (summits) or footslopes and are used for rainfed cropping.

Soil profile properties
Being a complex, the soils of this mapping unit differ in range of characteristics as summarized below. The dominant soil group is Lukili. They are shallow (Kikungu or Nduha) having laterite within 0.5m from the surface. Topsoil is 10-15cm thick, reddish brown or dark brown, sandy loam or clay loam, moderately structured. The subsoil is yellowish red or yellow brown, gravelly sandy clay loam or gravelly clay loam, moderately weak structured.
The second main soil group is Idalafuma. These are very shallow soils having laterite at or near the surface. The soil is 10-20cm deep. They are reddish brown or yellowish red, gravelly sandy loam or sandy clay loam, weakly structured over laterite. The other soil group is Nduha. Top soils are 10-15cm thick strong brown or dark reddish brown, friable, clay loams, moderately structured. Subsoils are yellowish red, friable, clay loam to clay, moderately strong structured. Sesquioxides nodules at

depths are common.

Soil physical properties
The Lukili and Idalafuma soils have low to very low capacity to retain available water owing to limited depth. The Nduha soils on the other hand have good water holding capacity.

Soil chemical properties
The Lukili soils have a moderately to slightly acid soil reaction with low capacity to retain nutrients. Nitrogen (N) and Phosphorus (P) levels are low. Potassium (K) levels are moderate and the base saturation percent (%BS) is low. Idalafuma soils have a moderate to strongly acid soil reaction. Levels of CEC, N,P,K, BS are very low. Nduha soils have moderately acid soil reaction with moderate to high CEC. Levels of N,P,K and BS are low to moderate and they have low levels or organic matter.

Mapping unit A41

Soil classification: Lukili (50%), (profile KP 45)
Idalafuma (30%), (profiles KP 25,71)
Nduha (20%), (profiles KP 8,9,10,41,74,91,93,94,96)

A complex of: shallow to deep, well drained, dark red (strong brown) to yellowish brown gravelly clay loams to clays over gravelly clay loams (strong surfaces) and laterite at or near the surface with pockets of very thin, dark brown to brown, sandy loams to sandy clay loams.

Setting
This unit occurs in almost flat plains or very broad interfluves and lower slopes with an average altitude of 1200-1240m above see level. The slopes range between 0.5 and 2 percent. The soil groups occur in a complex pattern. The Lukili soils are mainly under natural vegetation (miombo woodland). Idalafuma soils are characterized by patches of exposed laterite or very short grasses with sparse short trees and low termite mounds at middle or lower slope positions. The Nduha soils occur mainly at upper or middle slopes or footslopes and are used for rainfed cropping.

Soil profile properties
Similar to A32

Soil physical properties
Similar to A32

Soil chemical properties
The Lukili soils have moderately acid reaction and low CEC. Levels of N,P,K are generally low. Base saturation is low to moderate. The Idalafuma soils have similar properties as those of A32. Nduha soils have strongly acid to moderately acid reaction and moderate CEC. Levels of N,P and K are low. The base saturation is low as well.

Mapping unit A42

Soil classification: Nduha (45%), profiles KP3,74,96
Lukili (25%), (profiles KP23,45)
Idalafuma (20%), (profiles 25,71)

Complex of: very deep to moderately deep or deep, well drained dark to yellowish red, gravelly clay loams and clays, in places over laterite at variable depths and shallow, well to somewhat excessively drained, red, gravelly clay loams over laterite at shallow depth and laterite at or near the surface with pockets of dark red gravelly clay loams and stony surfaces.

Setting
Same as A41 except that this unit occurs at an average altitude of between 1150 -1200m above sea level.

Soil profile properties
Similar to A32

Soil physical properties
Similar to A32

Soil chemical properties
Chemical properties of Lukili and Idalafuma are similar to those of (Lukili and Idafuma) of mapping unit A32. The Nduha soils of this unit have strongly to moderately acid soil reaction and low to moderate cation exchange capacity. Levels of N,P,K in general are low. The percent base saturation is low to moderate.

Soils developed on granites and/or colluvium derived from this material

Mapping Unit B11

Soil classification: Luguru (100%), profile KP103

Rocky land (stony, rocky and gravelly) with pockets of very shallow, excessively drained, dark reddish brown to dark brown gravelly loamy sands to sandy loams.

Setting
The unit occupies the outstanding hills and rock outcrops of the granitic landscape. The dominant slopes are between 15 and 30 percent with mean elevation between 1200 and 1300m above sea level. The unit is mainly covered with bushes and in places scattered miombo woodlands are present. The docminant land uses are extensive grazing and fuelwood.

Soil profile properties
The soil is mainly consisting of rock outcrops, stones and boulders or tors associated with very shallow dark brown or dark reddish brown, gravelly sandy loam and in places gravelly sandy clay loam.

Soil physical properties
The soils are characterized by high runoff because of steep slopes. The unit has severe limitations for cultivation.

Soil chemical properties
Soil reaction is slightly acid. Levels of nitrogen, phosphorus and potassium are very low. The capacity of the soils to retain nutrient is low as well.

Mapping Unit B21

Soil classification: Luseni (55%) profile KP48, KP6
Lukele (35%) profiel KP24
Luguru (10%) profile KP 103

Association of: (very) deep, well to somewhat excessively drained, strong brown (yellowish red) to dark brown or pale brown, loamy sands or gravelly loamy sands in places over laterite at upper and middle slopes, mottled loamy sands are common at middle slopes and very shallow to shallow, imperfectly (moderately well) to somewhat excessively drained, dark greyish brown to dark grey, mottled loamy sands to sandy loams over a hard cemented sandy layer at lower slopes.

Setting

The unit occupies the undulating plains (footslopes, interfluves and narrow valleys) of the granitic landscape. The slopes are between 5 and 10 percent (altitude between 1210 and 1250m above sea level). The dominant vegetation is bushes and miombo woodland and in places where intensive agriculture is practiced planted trees like Cassia siamea, Eucalyptus sp and Mango trees are present. The dominant land use of this unit includes rainfed cropping with maize, cotton, groundnuts and cassava as the main crops.

Soil profile properties

The topsoil of Luseni (15 to 20cm thick) is brown to dark brown, very friable loamy sand to sand. The structure is weakly developed. The subsoil is strong brown or yellowish red, very friable loamy sand to sand. It is structureless single grain in places overlying a laterite. The Luseni soils occupy the upper and middle slopes positions in the landscape or catena. The Lukele soils are second important soils in the association. The topsoil 10cm thick is dark grayish brown mottled loamy sand to sand. It is loose and weakly developed. The soil below a depth of 10 to 40cm is dark grey mottled loamy sand over a hard cemented mottled and porous sandy clay loam layer. This soil occupies mainly the lower positions in the catena. Luguru is a minor soil unit in this mapping unit.

Soil physical properties

The soils have overall low water holding capacity. The rooting depth is limited by laterite, hard pan or a sandy cemented layer and high amounts of aluminium levels. The Lukele soils are susceptible to severe erosion.

Soil chemical properties

Soil reaction is very strongly acid to strongly acid. Nitrogen and phosphorus levels are very low. Potassium levels are low to moderate. The capacity of the soils to retain nutrient is very low. These soils have a high aluminium levels which are detrimental to many crops.

Mapping unit B22

Soil classification: Luguru (55%), profile KP103
Kikungu (25%), (profiles KP17,18,19,26,27,30,38,44,52,56, 57,60,61,66,67,68,72,75,79,84,85,87,100,104)
Luseni (15%), (profiles KP4,6,7,13,15,16,21,22,32,33,35, 40,42,43,48,49,51,55,58,59,62-65,69,77,78,80,83,86,88, 89,95,98)

Association of: Rock outcrops with pockets of very shallow, excessively drained, dark brown, gravelly sandy loams or gravelly loamy sands; very stony surfaces and very deep, well drained

reddish brown (yellowish red) gravelly sandy clay loams to clay loams at upper slopes and very deep, well to somewhat excessively drained yellowish brown to very pale brown sandy loams to loamy sands at middle and lower slopes.

Setting
Undulating plains, footslopes, interfluves and narrow valleys (between 1210-1250 m above sea level). Slopes range between 5-10 percent. The Luguru soil group occupies the tops characterized by rock Tors/outcrops covered with predominantly shrubs and very few trees. The Kikungu soil group occupies the upper slopes or summits, sometimes with very few, localized, rock outcrops. The main land use is settlement and rainfed cropping. The Luseni soil group occupies the middle and lower slope positions but sometimes also the summits/tops of interfluves. The main land uses are settlement, rainfed cropping and light grazing.

Soil profile properties
The Luguru soils are very shallow, bouldery and excessively drained. They are dark brown or brown, gravelly sandy loams or sandy clay loams, very friable and weakly structured. Kikungu soils are very deep and well drained. Topsoils are 15-20cm thick, dark brown or dark reddish brown, sandy loam and moderate to weakly structured. Subsoils are reddish brown to yellowish brown, sandy clay loam or clay, friable and moderately structured. Luseni soils are very deep, well to somewhat excessively drained, topsoils are 10-20cm thick dark brown, brown or dark greyish brown, loamy sands, very friable and weakly structured. Subsoils are yellowish brown, palish brown or greyish brown, loamy sands or sands, very friable to loose, and very weakly structured or single grain.

Soil physical properties
The Luguru soils have generally very low water holding capacities due to coarse texture and limited depth. The rooting depth is limited by the underlying bedrock stones or boulders. The soil depth is 10-20cm. Kikungu soils have low to moderate water holding capacity. The soils are generally deeper than 150cm but root growth may be restricted below a depth of 100cm. Luseni soils have low water holding capacity owing to their sandy texture and low organic matter content. The soils are deeper than 150cm but root growth may be restricted below 100cm depth due to increasing levels of iron and aluminium saturation.

Soil chemical properties
The Luguru soils have moderately acidic reaction and low CEC. Nitrogen and Phosphorus levels are low. Potassium is low to moderate (K 0.43 cmol/kg). Base saturation is about moderate. Kikungu soils have moderately acid reaction and low CEC. Nitrogen levels are low. Levels of phosphorus and potassium are low to moderate. Base saturation is low to moderate. Luseni soils have strong acid to moderately acid reaction and in places are very strongly acid. CEC is very low. Nitrogen levels are very low. Levels of phosphorus and potassium are low to moderate. Base saturation is low.

Mapping unit B23

Soil classification: Luseni (65%) profile KP 80,98
Kikungu (25%), (profiles
KP17,18,19,26,27,30,38,44,52,56,57,60,61,66,67,68,
72,75,79,84,85,87,100,104)

Association of: very deep, well to somewhat excessively drained, strong (yellowish) brown to reddish yellow, sandy loams at middle slopes, greyish to very pale brown, loamy sands to sands at

lower slopes and (very) deep, well drained, yellowish brown to yellowish red, (gravelly) sandy clay loams at upper slopes.

Setting
Similar to MU B22

Soil profile properties
For Luseni soil group - similar to MU B22
For Kikungu soil group - similar to MU B22

Soil physical properties
Similar to MU B22 (excepting Luguru soils)

Soil chemical properties
Luseni soils have moderately acidic soil reaction and very low CEC. Levels of N, P and K are generally very low to low. The base saturation is low to moderate.

Kikungu soils have moderately acidic reaction and very low CEC. Levels of N, P and K are very low to low. The base saturation is just about moderate.

Mapping unit B31

Soil classification: Luseni (40%) profile KP 4,32,88
Kikungu (20%) (profiles KP17,18,19,26,27,30,38,44,52,56,57,60,61, 66,67,68,72,75,79,84,85,87,100,104)
Lukili (20%) (profiles KP23,45)

Association of: very (moderately) deep, well to somewhat excessively drained, light greyish brown, sands, in places with cemented mottled sand layers at middle and lower slopes and very (deep), well drained, strong brown to yellowish red, sandy loams to sandy clay loams or clays, in places with laterite below a depth of 80cm at upper slopes and shallow, well to somewhat excessively drained, strong brown to dark reddish brown, (gravelly) sandy clay loams over laterite at shallow depth at upper slope position.

Setting
Gently undulating plains, footslopes, broad interfluves (between 1240 and 1280m above sea level). The slope ranges between 2 and 5 percent. The Kikungu and Lukili soil groups normally occupy the upper slopes (see B22). They are similar soils differing mainly in soil depth where Lukili is shallow over laterite. Land use is as in B22. The Luseni soil group occupies the middle and lower slopes (see B22).

Soil profile properties
Kikungu soils (see B22). Lukili soils are shallow. Kikungu having laterite within 50cm from the surface. Top soils are 10-15cm thick, dark brown or reddish brown, friable (gravelly), sandy loams and moderately structured. Subsoil is yellowish red, gravelly sandy clay loams overlying gravel over laterite. Luseni soils (similar to B22). Lukili soils have low water holding capacity due to their limited depth. The rooting depth is limited by a laterite layer within 50cm depth.

Soil chemical properties
The Kikungu soils have moderately acid reaction and low CEC. Levels of N,P,K and normally low.

Base saturation is low to moderate. Lukili soils have moderately acidic reaction and low CEC. Levels of N,P and K are low. Base saturation is low. Luseni soils have strongly acidic reaction and low CEC. Levels of N, P, K are low as well. Base saturation is low.

Mapping Unit (MU) B32

Soil Classification: Luseni (60%) profiles KP35,51,55,58,59,62-65,69,77,78,86
Kikungu (20%) profiles KP60,61,66,67,68
Luguru (15%), (profile KP103).

Association of: Very deep, well to somewhat excessively drained, strong (yellowish) brown and/or reddish yellow to greyish (very pale) brown, loamy sands to sands at middle and lower slopes and very deep, well drained, yellowish red to red, sandy clay loams at upper slopes and rock outcrops with pockets of very shallow, excessively drained, brown, gravelly sandy loams and/or gravelly loamy sands; very stony surfaces.

Setting
Similar to MU B31

Soil profile properties
Similar to MU B22

Soil physical properties
Similar to MU B22

Soil chemical properties
Luseni soils have strong acid to slightly acid reaction and very low levels of Nitrogen, Phosphorus and Potassium. Base saturation is low to moderate. Kikungu soils have moderately acid to slightly acid reaction and low levels of nitrogen and phosphorus. Levels of potassium are low to moderate. CEC is very low. Base saturation is moderate. Luguru soils have moderately acid reaction and low CEC. Nitrogen and phosphorus levels are low. Potassium is low to moderate. Base saturation is low.

Mapping unit B33

Soil classification: Luseni (50%) profile KP21, KP22
Lukele (25%) profile KP24
Kikungu (15%) profile KP26
Luguru/Itogoro (10%) profile KP103/KP20

Association of: very deep, well to somewhat excessively drained, yellowish brown to greyish (pale) brown, loamy sands to sands at middle slopes and shallow, imperfectly (moderately well) drained, greyish brown, sandy loams over cemented mottled sandy clay loams at lower slopes and very deep, well drained, strong brown sandy loams to sandy clay loams at upper slopes.

Setting
The land unit occupies the gently undulating plains (i.e. footslopes, broad interfluves and lower slopes). The slopes are between 2 and 5 percent (altitude between 1150 and 1260m above sea level). The vegetation cover includes scattered bushes, regrowth of miombo woodland and some planted trees

in areas with intensive agriculture. The dominant land uses include rainfed cropping with maize, groundnuts, beans, cassava and cowpeas as main crops. Extensive grazing is also being practiced.

Soil profile properties
The topsoil of Luseni soil is about 15cm. It is yellowish brown or dark brown, loose loamy sand to sand and it is weakly developed. The subsoil is yellowish brown or pale brown, loose sand, structureless single grain. This soil occupies mainly the middle positions in the catena. The second important associated soil is Lukele. This soil is 30 to 40 or 50cm thick and it is weakly developed or structureless single grain, overlying a hard cemented sandy layer. It is dark grey mottled, loamy sand overlying a cemented sandy layer which is a mottled and porous sandy clay loam. This soil is found mainly in the lower positions. The third important associated soil is Kikungu. The thick topsoil (about 25cm) is dark brown, very friable, sandy loam. The subsoil below a depth of 30cm is strong brown, moderately developed, very friable, sandy loam or sandy clay loam. This soil occupies mainly the upper position in the catena. Luguru and Itogoro are minor soils in this unit.

Soil physical properties
The rooting depth is limited by a hard pan (cemented sandy layer) or high amounts of aluminium levels in these soils. Available water holding capacity is low.

Soil chemical properties
These are similar to those of mapping unit B21

Mapping Unit (MU) B34

Soil Classification: Luseni (55%), profile KP49,89,95
Lukele (40%), profile KP24

Very deep to moderately deep or shallow, moderately (well) to somewhat excessively drained, dark (yellowish) brown to pale brown, (mottled) loamy sands to sands overlying laterite or a cemented layer at various depths and shallow, moderately well or imperfectly drained, dark brown to brown, mottled, loamy sands to sands, in places, laterite may appear at or near the surface.

Setting
Gently undulating plains, footslopes or broad interfluves at an average altitude of 1150-1260m a.m.s.l. Slope ranges between 2-5%. The Luseni soil group occupies the middle and lower slope positions and in places the top/summits of the broad interfluves. The main land uses include settlements, rainfed cropping (of annual and few perennial crops) and light grazing. The Lukele soil group occupies the lower slope positions. The main land uses are extensive grazing and collection of firewood. These soils are hardly cultivated.

Soil profile properties
Luseni soils are very deep, well to somewhat excessively drained. Top soils are 0-20cm thick, brown or dark greyish brown, loamy sands, very friable and weakly structured. Subsoils are pale brown or light grey, sandy loams or loamy sands, very friable and weakly structured. Lukele soils are shallow to moderately deep, well to somewhat excessively drained soils. Top soils are 10-15cm thick dark (greyish) brown or pale brown (mottled), loamy sands to sands, very friable and weakly structured. Subsoils are greyish brown to brown, mottled sandy loams or loamy sands over a hard cemented, mottled and porous sandy clay loam layer.

Soil physical properties
Luseni soils have low water holding capacity owing to their sandy texture and low organic matter content. The soils are deeper than 150cm but root growth may be restricted below 100cm due to high (toxic) levels of iron (Fe) and aluminium (Al) saturation. Lukele soils have very low water holding capacity. The rooting depth is limited by the presence of a hard pan at shallow depth.

Soil Chemical properties
Luseni soils have strong acid to slightly acid reaction and very low CEC. Levels of the major plant nutrients (Nitrogen, Phosphorus and Potassium) are low. Base saturation is low to moderate. Lukele soils have very strongly acid to strongly acid reaction and very low CEC. Levels of nitrogen, phosphorus and potassium are very low to low. Base saturation is low.

Mapping unit B35

Soil classification: Kikungu (40%) profile KP17,18,19,26
Luseni (25%) profile KP16
Lukele (25%) profile KP12
Luguru/Itogoro (10%) (profiles KP103/KP2,20)

Association of: very deep to deep, well drained, dark (strong) brown to red, gravelly sandy loams or sandy clay loams to sandy loams at upper and middle slopes; and very deep, well to somewhat excessively drained, very pale brown to light grey, loamy sands to sands at middle slopes; and very deep, well to somewhat excessively drained, very pale brown to ligh grey, loamy sands to sands, at middle slopes; and shallow, moderately well to imperfectly drained, dark brown to brown, loamy sands over cemented, mottled sandy clay loams at lower slopes.

Setting
The unit occupies the gently undulating plains i.e footslopes, broad interfluves and lower slopes in the granitic landscape. The slopes are between 2 and 5 percent at an average altitude between 1150 and 1220m above sea level. The land unit is covered with bushes and Acacia trees, scattered regrowth and/r miombo woodland. In places, where agriculture is intensive, the lands are planted with Eucalyptus trees, Cassia siamea and Luceana Leucocephala. The main land use is rainfed cropping with maize, groundnuts, cassava, cotton and fruit trees like mango and citrus as main crops.

Soil profile properties
The Kikungu soil has a 15 to 20 cm thick topsoil. It is dark brown to brown, weakly developed, very friable, sandy loam. The subsoil below a depth of 30cm is dark brown or strong brown to red, very friable, moderately developed sandy loam or sandy clay loam. In places it is gravelly. This soil occupies mainly the upper slopes and some parts of middle slopes. The Luseni soil has 15 to 20cm thick topsoil. It is brown, very friable, weakly developed, loamy sand. The subsoil is very pale brown or light grey, loose and structureless single grain, sand. It occupies the middle position in the landscape. The Lukele soil, to a depth of 40 to 50cm from the surface, is dark brown to brown, mottled, sandy loam. It is overlying a very hard porous, sandy, cemented layer which is consisting of a mottled, sandy clay loam. Luguru and Itogoro are minor soils in this unit.

Soil physical properties
These soils have low to moderate water holding capacity. In the case of Lukele soils, the rooting depth is limited by the presence of a hard cemented layer at shallow depth.

Soil chemical properties
Soil reaction for Kikungu soils is moderately to slightly acid. For Luseni and Lukele soils, soil reaction is very strongly acid to strongly acid. Nitrogen levels are very low. Available phosphorus is low to moderate. Exchangeable potassium and the capacity of the soil to retain nutrient is low.

Mapping Unit (MU) B41

Soil Classification: Luseni (60%) profile KP7
Lukele (30%) profile KP105

Association of: Very (deep) to moderately deep, moderately (well) to somewhat excessively drained, yellowish (very pale) brown to greyish, loamy sands to sands or mottled loamy sands to sandy clay loams over cementd layer and/or laterite and shallow, moderately well to imperfectly drained, very dark greyish to dark greyish brown, mottled loamy sandsover a cemented sandy clay loam layer.

Setting
Almost flat plains, broad interfluves and valleys (mbuga) between 1160-1260m a.m.s.l. Slope ranges between 0.5-2 percent.

The Luseni soil group occupies the middle and lower slope positions and, in places, the top/summits of the broad interfluves. The main land uses include settlements, rainfed cropping (of annual and few perennial crops) and extensive grazing. The Lukele soil group occupies the lower slope positions. The main land uses are light grazing and collection of firewood. These soils are hardly cultivated.

Soil profile properties
Luseni soils are very deep, well to somewhat excessively drained. Top soils are 0-20cm thick, brown or dark greyish brown, loamy sands, very friable and weakly structured. Subsoils are pale brown or light grey, sandy loams or loamy sands, very friable and weakly structured. Lukele soils are shallow to moderately deep, well to somewhat excessively drained soils. Top soils are 10-15cm thick, dark (greyish) brown or pale brown (mottled), loamy sands to sands, very friable and weakly structured. Subsoils are greyish brown to brown, mottled, sandy loams or loamy sands over a hard cemented, mottled and porous sandy clay loam layer.

Soil physical properties
Luseni soils have low water holding capacity owing to their sandy texture and low organic matter content. The soils are deeper than 150cm but root growth may be restricted in the deeper subsoil below 100cm due to high (toxic) levels of iron (Fe) and aluminium (Al) saturation. Lukele soils have very low water holding capacity. The rooting depth is limited by the presence of a hard pan at shallow depth.

Soil chemical properties
Luseni soils have strong acid to slightly acid reaction and very low CEC. Levels of the major plant nutrients (Nitrogen, Phosphorus and Potassium) are low. Base saturation is low to moderate. Lukele soils have moderately acid reaction and very low CEC. Levels of nitrogen, phosphorus and potassium are very low. Base saturation is low.

Mapping unit B42

Soil classification: Lukele (40%) profile KP14
Luseni (35%) profile KP15
Kikungu (15%) profile KP27,44
Itogoro/Luguru (10%)

Complex of: shallow, moderately well to imperfectly drained, dark greyish (yellowish) brown to brown, mottled loamy sands or sands over cemented sandy clay loam layer and shallow to moderately deep, somewhat excessively drained, reddish yellow or yellowish (dark) brown to brown loamy sands to sands over gravel or laterite and very deep, well drained, yellowish (strong) brown to brown sandy loams to sandy clay loams.

Setting
The land unit represents the almost flat plains, very broad interfluves and lower slopes. The slopes are between 0.5 and 2 percent (altitude between 1120 and 1250m above sea level). The vegetation cover is mainly dominated by bushes and regrowth of miombo woodland. The main land use is grazing and few scattered rainfed cropping with sorghum and cassava being the main crops.

Soil profile properties
The Lukele soil, to a depth 40 to 50cm, is dark greyish brown to brown. It is very friable, weakly developed, mottled, loamy sand or sand overlying a cemented mottled sandy clay loam layer. The Luseni soil is 50cm deep and in places it is slightly deeper. It is yellowish or dark brown to brown, very friable, loamy sand to sand overlying a layer of coarse fragments and or laterite. The Kikungu soil has 15 to 20cm thick topsoil. It is dark brown to brown, very friable, weak to moderately structured, sandy loam. The subsoil below a depth of 30cm is moderately structured, very friable, yellowish brown to strong brown, sandy loam to sandy clay loam. Luguru and Itogoro are minor soils.

Soil physical properties
Apart from Kikungu these soils have limited rooting depth due to the presence of laterite, gravels and or a cemented sandy clay loam layer at shallow depth. The soils have, in general, a very low water holding capacity.

Soil chemical properties
Soil reaction is very strongly acid to strongly acid. Percent aluminium saturation is moderate to high and these are toxic levels to many crops. The major nutrient levels, i.e. nitrogen, phosphorus and potassium are very low. The capacity of the soils to retain nutrients is low as well.

Mapping unit B43

Soil classification: Kikungu (100%) profile KP38

Very deep, well drained, red, friable, sandy clay loams.

Setting
The land unit occupies the almost flat plain i.e. broad interfluves in the granitic landscape. The slopes are between 0.5 and 2 percent (altitude between 1150 to 1180m above sea level). The vegetation cover includes few scattered bushes and miombo woodland. The main land use is rainfed cropping with maize, cassava and groundnuts as main crops.

Soil profile properties
The topsoil of this soil is 15cm thick. It is dark red, very friable, weak to moderately structured, sandy loam. The subsoil below a depth of 30cm is red, very friable, moderately structured, sandy clay loam (in places sandy clay).

Soil physical properties
This soil has a moderate to high water holding capacity. The rooting depth is very deep but it may be limited by a high aluminium levels in the subsoils.

Soil chemical properties
Soil reaction is very strongly acid to strongly acid. Aluminium levels may reach toxic levels which is detrimental to many crops. The major nutrient i.e Nitrogen, available Phosphorus and Potassium are very low. The capacity of the soil to retain nutrients is also very low.

Mapping unit B44

Soil classification: Lukele (60%) profile KP39
Luseni (35%) profile KP40
Itogoro (5%) (profile KP2,20)

Complex of: shallow, moderately well to imperfectly drained, dark (greyish) brown, mottled loamy sands to sands over a cemented sandy clay loam layer and very (deep) to moderately deep, moderately (well) to somewhat excessively drained, yellowish brown to pale brown, mottled loamy sands to sands overlying laterite, gravel or a cemented layer at variable depth.

Setting
The setting of this unit is similar to those of mapping unit B41. The mean elevation is between 1180 and 1200m above sea level.

Soil profile properties
The Lukele, to a depth of 40 to 50cm from the surface, is dark greyish brown to greyish brown or pale brown. It is structureless single grain to porous massive, mottled, loamy sand to sand, overlying a mottled cemented sandy clay loam layer.
The Luseni soil has 15 to 20 cm thick topsoil. It is a dark greyish brown, very friable, loamy sand. The subsoil, to a depth of 80 to over 130cm, is yellowish brown to pale brown, mottled loamy sand to sand. It is overlying a laterite gravel and/or a cemented layer at variable depth. Itogoro is a minor soil group in this unit.

Soil physical properties
The rooting depth of these soils is limited by the presence of laterite, coarse fragments and/or a cemented layer in the subsoil. Available water holding capacity is low to moderate.

Soil chemical properties
Soil reaction of these soils are strongly acid. The major nutrients i.e. Nitrogen, Phosphorus and Potassium are generally low. The capacity of the soils to retain nutrient are very low.

Soil developed on alluvial/colluvial deposits of unknown origin

Mapping unit C41

Soil classification: Lukele (55%) profile KP12
Luseni (45%) profile KP13
Itogoro (5%) (profile KP2,20)

Complex of: shallow, moderately well to imperfectly drained, dark brown to brown, mottled, loamy sands to sandy loams over a cemented sandy clay loam layer and very deep, well to somewhat excessively drained, dark yellowish brown to pale brown, loamy sands to sands.

Setting
This land unit occupies the almost flat plains, very broad interfluves, lower slopes and some minor wide valleys or mbugas. The slopes are between 0.5 and 2 percent (altitude between 1150 and 1170m above sea level). The vegetation cover consists mainly of scattered bushes and Acacia trees. The dominant land use is grazing followed by scattered rainfed cropping with cassava, groundnuts, maize and sorghum as main crops.

Soil profile properties
The Lukele soil is 40 to 50cm thick. It is a friable, weakly developed, mottled sandy loam overlying a porous, massive, mottled, cemented, sandy clay loam layer.
The Luseni soil is very deep with a 15 to 20cm thick topsoil. The topsoil is yellowish brown, loose, loamy sand. The subsoil below a depth of 30cm is dark yellowish brown to pale brown, loamy sand.

Soil physical properties
These soils have low water holding capacity. The rooting depth is hampered by the presence of a cemented layer and or high amounts of aluminium levels in the root zone.

Soil chemical properties
Soil reaction is very strongly acid to strongly acid. Aluminium can reach toxic levels which are unfavourable for most crops. The major nutrient i.e Nitrogen, Phosphorus and Potassium are very low. The capacity of the soil to retain nutrients is also low.

Mapping unit C42

Soil classification: Kikungu (45%) profile KP38
Lukili (45%) profile KP23, OBS 30
Itogoro/Lukele (10%) (profiles KP2,20/KP12,24,29,37,39, 90,103)

Complex of: very (deep), well drained, red, friable, sandy clay loams over gravel and or laterite below a depth of 80cm and shallow, well to somewhat excessively drained, yellowish red to red, gravelly sandy clay loams; in places laterite appears at or near the surface.

Setting
The setting of this mapping unit is similar to those of mapping unit C41. The mean elevation ranges between 1180 and 1220m above sea level.

Soil profile properties
The Kikungu soil has a 10 to 15cm thick topsoil. It is dark reddish brown to dark brown, very friable,

weak to moderately, structured, sandy loam to sandy clay loam. The subsoil to a depth of 80cm and deeper is a yellowish red, sandy clay loam. In places, this soil is slightly gravelly or gravelly overlying laterite below a depth of 80cm. The Lukili soil is 30 to 50cm thick from the surface overlying laterite and/or ironstone gravels. It is moderately structured. The soil is a yellowish red to red, gravelly sandy clay loam.

Soil physical properties
These soils have low to moderate water holding capacity. The rooting depth is limited due to the presence of laterite, ironstone gravel and/or high amounts of aluminium saturation.

Soil chemical properties
The soil reaction is strongly acid to moderately acid in places aluminium reaches toxic levels. High amounts of aluminium are unfavourable for most crops. The levels of Nitrogen and Phosphorus are very low. Exchangeable Potassium is low to moderate. The capacity of the soil to retain nutrients is low.

Mapping unit C51

Soil classification: Mbuga (90%) profile KP11,31
Itogoro/Lukele (10%) (profiles KP2,20/KP12,24,29,37,39, 90,103)

Very deep, poorly drained, dark greyish brown to dark grey, mottled, cracking heavy sandy clays and/or clays.

Setting
The unit is part of the Mbuga plain characterized by alluvial/colluvial deposits of unknown origin. The topography is almost flat with dominant slopes ranging between 0.5 and 1 percent at an average elevation between 1130 and 1160m above sea level. The present land use is limited to wet land cultivation of paddy rice with maize being grown on the somewhat higher areas.

Soil profile properties
The topsoil of this soil is 20 to 25cm thick. It is a dark greyish brown to very dark grey (in places mottled), very firm and weakly developed, sandy clay loam to sandy clay. The subsoil below a depth of 30cm is a very hard and very firm, sandy clay or clay. It is weak and/or moderately structured. Calcium carbonate nodules (concretions) may occur in the deeper subsoil. In places, Itogoro and Lukele soils may occur as a minor soil.

Soil physical properties
These soils are poorly drained (in places imperfectly drained). Due to heavy textures workability of the soil is a constraint.

Soil chemical properties
Soil reaction is moderately acid to slightly acid. These levels are favourable for most crops. The supply of soil major nutrients i.e Nitrogen, Phosphorus and Potassium are in general low. The capacity of the soil to retain nutrients is moderate to high. The soils are expected to show response to fertilizer application.

Soils developed on alluvial deposits

Mapping unit D51

Soil classification: Mbuga (100%) (profile KP1,34,36,47,101,102)

Very deep, imperfectly drained, very dark grey, cracking heavy clays. $CaC0_3$ concrections may occur at some depths.

Setting
This unit represents the flat and wide mbuga plains that are forming the lowest parts in Kahama District. Dominant slopes are less than 0.5 percent and mean elevation is just at or below 1200m above sea level. The soils are mainly developed on alluvium, probably derived from Banded Ironstone, and are composed mainly of clays. This unit is under intensive rainfed cropping with maize and chickpeas as the most important crops. A relay cropping system is practised by farmers where maize is planted in the months of November/December (harvested in April/May) followed by chickpeas (planted in April/May and harvested in June/July).

Soil profile properties
The topsoil is about 20cm thick. It is very dark grey, very firm and weakly developed, consisting of clay. The subsoil below a depth of 30cm is very dark grey (in places mottled), very firm and also weakly developed clay. $CaC0_3$ concretions may occur at some depths.

Soil physical properties
These soils have somewhat better drainage (i.e imperfectly drained) and they do not flood during the rainy season. However, due to heavy textures, workability of these soils may be difficult.

Soil chemical properties
The are the most fertile soils in the district. In general, they have moderate levels of organic matter. The major nutrients like Nitrogen and Phosphorus are low. However, the levels of exchangeable Potassium are high. The capacity of the soil to retain nutrients is also high.

Mapping Unit (MU) D52

Soil Classification: Mbuga (100%), Profiles KP05,28,53,54, 70,73,76,81,82,92,97,99.

Very deep, poorly drained, dark grey or grey, mottled, cracking, heavy clays with very dark grey to dark grey, sandy clay loam or clay loam top soils. Calcium carbonate ($CaCO_3$) concretions may occur at some depths.

Setting
Flat and very wide valleys (mbuga's) at an average altitude of 1150-1180m a.m.s.l. Slopes are generally less than 0.5 percent. This unit occupy the wide flat bottomlands. The main land uses are wetland cultivation of paddy rice and dry season grazing.

Soil profile properties
These mbuga soils are very deep, poorly drained and mainly associated with the granitic landscape. Top soils are 10-20cm thick, very dark grey or dark greyish brown, mottled, clay loams or sandy clay loams, firm or very firm and moderately structured. Subsoils are dark grey to grey, very firm

(mottled), heavy sandy clay to clay and moderately structured.

Soil physical properties

The soils have poor workability (very sticky when wet and very/extremely hard when dry) because of heavy texture. The drainage condition is also poor. Rooting depth may be hampered by stagnant water in the root zone.

Soil chemical properties

The soils are strongly acid to moderately acid. The cation exchange capacity of the soil is moderate. Levels of the major plant nutrients (Nitrogen, Phosphorus and Potassium) are low. Base saturation is low to moderate in the top soil but high to very high in the subsoil. This might be due to CaCO3 commonly found (precipitated) at some depth.

ANNEX IV.2 REPRESENTATIVE SOIL PROFILE DESCRIPTIONS AND ANALYTICAL DATA

Soil profiles were described using standard terminology (mostly according to the guidelines for soil profile description, FAO, 1990). Horizon designations are according to Soil Survey Staff (1990). Soils were classified mainly in commonly used local terminology and the FAO/Unesco Soil Map of the World, revised legend (FAO, 1990). Due to data transfer from the NSS computerised database designed some years ago, CEC, Exchangeable cations and TEB are still expressed in me/100g soil (note 1 me/100g soil = 1 cmol(+)/kg soil, the latter unit has now become the standard unit for expressing these values). All profiles were described by NSS senior staff.

Profile : **KP1** Soil unit: D5i2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Location : Chela village
Map sheet no : 47/3
Coordinates : 454029E, 9613615N
Elevation : 1170 m asl.

Parent material : alluvium associated with Banded Ironstone.
Landform : mbuga plain (closed depression) flat with low hummocks.
Slope : 0.5% level to sligtly concave on bottom position.
Surface characteristics : 6 to 8 cm deep cracks.
Natural drainage class : imperfectly drained.
Soil moisture regime : ustic.
Soil temperature regime : isohyperthermic.
Vegetation/land use : woodland (Acacia trees). Used for rainfed cultivation (maize, chickpeas).
Described by : D.N. Kimaro on 15 October 1996

Soil: Very deep, imperfectly drained, very dark grayish brown, cracking clays, with CaCO3 concretions increasing with depth.

Ap 0 - 10 cm: very dark grey (10YR3/1) dry, very dark grey (10YR3/1) moist; clay; very firm moist, sticky and very plastic wet; moderate medium subangular blocks; very fine and fine pores; very few medium irregular hard CaCO3 nodules; many very fine and fine roots; clear smooth boundary to

C1 10 - 50 cm: very dark grey (10YR3/1) dry, very dark greyish brown (10YR3/2) moist; clay; extremely hard dry, extremely firm moist, sticky and very plastic wet; weak coarse prisms; very few medium irregular hard CaCO3 nodules; common very fine roots; gradual smooth boundary to

C2 50 - 80 cm: very dark greyish brown (10YR3/2) dry, dark grey (10YR4/1) moist; clay; extremely hard dry, extremely firm moist, sticky and very plastic wet; weak medium wedge-shaped blocks; frequent medium irregular hard CaCO3 nodules; gradual smooth boundary to

C3 80 - 120 cm: dark brown (10YR4/2) moist; clay; extremely firm moist, sticky and very plastic wet; structureless massive; very frequent large irregular hard CaCO3 nodules.

SOIL CLASSIFICATION: (FAO) Eutric Vertisol Local: Mbuga

Analytical data profile KP 1

Depth (cm)	: 0-20	30-50	80-100
Clay	: 73	77	76
Silt	: 12	9	12
Very fine sand	: 3	3	2
Fine sand	: 5	5	6
Medium sand	: 3	3	2
Coarse sand	: 2	2	1
Very coarse sand	: 2	1	1
Texture class	: C	C	C
pH H20	: 6.5	6.3	8.0
pH KCl	: 4.8	4.9	6.7
EC mS/cm	: 0.08	0.31	0.42
Organic C %	: 1.23	0.98	0.69
Total N %	: 0.06	0.08	0.05
C/N	: 20	12	14
Available P mg/kg	: 2.2	2.6	2.0
CEC me/100g	: 50.6	59.2	16.7
Exch. Ca me/100g	: 28.7	29.1	11.7
Exch. Mg me/100g	: 14.1	14.7	6.8
Exch. K me/100g	: 0.25	0.24	3.56
Exch. Na me/100g	: 0.44	0.36	0.16
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 43.5	44.4	19.2
Base saturation %	: 86	75	100

Profile : **KP2** Soil unit: A4h1

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 47/3
Coordinates : 452573E, 9614484N
Location : Chela village
Elevation : 1220 m asl.

Parent material : colluvium/alluvium derived from Banded Ironstone.
Landform : footslope.
Slope : 1%; straight.
Surface characteristics : few, 1 cm wide cracks.
Natural drainage class : imperfectly to moderately well drained.
Soil moisture regime : ustic.
Soil temperature regime : isohyperthermic
Vegetation/land use : woodland (Acacia trees). Used for rainfed crops.
Influence of past use : cultivation.
Described by : D.N. Kimaro on 15 October 1996.

Soil: Very deep, imperfectly to moderately well drained, dark grayish mottled, slightly cracking clay loams and clays.

Ap 0 - 15 cm: dark grey (10YR4/1) dry, very dark grey (10YR3/1) moist; clay loam; brownish mottles; extremely hard dry, sticky and very plastic wet; weak coarse subangular blocks;

common very fine and fine pores; common very fine and fine roots; very weak, clear smooth boundary to

Cg1 15 - 35 cm: dark brown (10YR3/3) moist; clay loam; brownish mottles; firm moist slightly sticky and plastic et; weak coarse subangular blocks; many fine and few medium pores; few very fine roots; clear smooth boundary to

Cg2 35 - 55 cm: dark grey (10YR4/1) moist; clay; brownish mottles; firm moist, slightly sticky and plastic wet; many fine and few medium pores; few very fine roots; massive structure clear smooth boundary to

Cg3 55 - 90 cm: dark grey (10YR4/1) moist; clay; reddish and brownish mottles; firm moist, slightly sticky plastic wet; massive structure; abrupt smooth boundary to

Cg4 90 - 120 cm: dark grey (10YR4/1) moist; clay; reddish and brownish mottles; firm moist, slightly sticky plastic wet; massive structure.

SOIL CLASSIFICATION: (FAO): Eutric Regosol Local name: Itogoro

Analytical data profile KP 2

Depth (cm)	: 0-20	30-50	80-100
Clay	: 35	45	58
Silt	: 25	21	17
Very fine sand	: 9	6	5
Fine sand	: 15	9	9
Medium sand	: 9	5	6
Coarse sand	: 5	3	3
Very coarse sand	: 2	11	2
Texture class	: CL	C	C
pH H20	: 5.9	5.6	5.5
pH KCl	: 4.3	3.7	3.6
EC mS/cm	: 0.04	0.02	0.07
Organic C %	: 1.71	1.22	0.85
Total N %	: 0.12	0.06	0.05
C/N	: 14	20	17
Available P mg/kg	: 1.8	0.9	3.5
CEC me/100g	: 25.9	19.5	14.5
Exch. Ca me/100g	: 9.6	6.6	3.0
Exch. Mg me/100g	: 6.6	3.5	2.1
Exch. K me/100g	: 0.16	0.07	1.40
Exch. Na me/100g	: 0.44	0.55	0.32
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 16.8	10.7	24.3
Base saturation %	: 65	55	47

Profile : **KP3** Soil unit: A4c2
Survey project : Kahama district
Region : Shinyanga
District : Kahama

Map sheet no. : 46/2
Coordinates : 440089E, 9642187N
Location : Kakola village
Elevation : 1200 m asl.

Parent material : colluvium derived from Banded Ironstone.
Landform : plain.
Slope : 1%; straight.
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic.
Soil temperature regime : isohyperthermic.
Vegetation/land use : miombo woodland. Used for extensive grazing, fuel wood and timber.
Described by : D.N. Kimaro on 16 October 1996

Soil: Deep, well drained, reddish brown to yellowish red, coarse sand clay loams, over laterite.

Ap 0 - 15 cm: yellowish red (5YR4/6) dry, reddish brown (5YR4/4) moist; sandy clay loam; very friable moist, slightly sticky slightly plastic wet; weak medium subangular blocks; many fine and few medium pores; very few small spherical fresh fragments; many very fine roots; fresh quartz rock fragments; clear smooth boundary to

Bw1 15 - 40 cm: light reddish brown (5YR6/4) dry, yellowish red (5YR5/6) moist; sandy clay loam; slightly hard dry, very friable moist, slightly sticky slightly plastic wet; moderately weak medium subangular blocks; many very fine and fine pores; very few small spherical fresh fragments; frequent medium spherical hard sesquioxides nodules; very fine roots; gradual smooth boundary to

Bw2 40 - 70 cm: yellowish red (5YR5/8) moist; sandy clay loam; slightly sticky slightly plastic wet; moderately weak medium subangular blocks; many very fine and fine pores; very few small spherical fresh fragments; frequent medium spherical soft and hard clay and sesquioxides nodules; very fine roots; diffuse smooth boundary to

Bw3 70 - 110 cm: yellowish red (5YR5/8) moist; sandy clay loam; slightly sticky slightly plastic wet; moderately weak medium subangular blocks; many very fine and fine pores; very few small spherical fresh fragments; frequent medium spherical soft and hard clay and sesquioxides nodules; very fine roots.

SOIL CLASSIFICATION: (FAO): Plinthic Acrisol Local name: Nduha

Analytical data profile KP 3

Depth (cm)	: 0-20	30-50	80-100
Clay	: 25	31	39
Silt	: 6	7	11
Very fine sand	: 6	6	9
Fine sand	: 18	17	18
Medium sand	: 25	18	1
Coarse sand	: 13	9	10
Very coarse sand	: 7	12	12
Texture class	: SCL	SCL	SC
pH H20	: 4.6	5.0	5.5
pH KCl	: 3.9	4.0	4.1

EC mS/cm	: 0.06	0.01	0.08
Organic C %	: 0.62	0.63	0.73
Total N %	: 0.05	0.03	0.04
C/N	: 12	21	18
Available P mg/kg	: 1.6	0.87	0.55
CEC me/100g	: 8.5	1.3	1.0
Exch. Ca me/100g	: 1.1	0.2	0.3
Exch. Mg me/100g	: 0.9	0.2	0.2
Exch. K me/100g	: 0.08	0.04	0.04
Exch. Na me/100g	: 0.04	0.04	0.01
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 2.1	0.4	0.5
Base saturation %	: 25	36	56

Profile : **KP4** Soil unit: B3f3

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 434622E, 9637461N
Location : Bugarama village
Elevation : 1240 m asl.

Parent material : colluvium derived from granite.
Landform : plain.
Slope : 3%; straight
Surface characteristics : Erosion: none or slight. Deposition: none.
Natural drainage class : well to somewhat excessively drained
Soil moisture regime : ustic
Soil temperature regime : isohyperthermic
Vegetation/land use : woodland. Used for rainfed crop cultivation. Influence of past use: ploughing, burning.
Described by : D.N. Kimaro on 16 October 1996

Soil: Very deep, well to somewhat excessively drained, yellowish brown to light brownish gray sands.

Ap 0 - 15 cm: pale brown (10YR6/3) dry, yellowish brown (10YR5/4) moist; loamy sand; soft dry, loose moist, non-sticky non-plastic wet; weak medium subangular blocks; many pores; common very fine and fine roots; gradual smooth boundary to

AC 15 - 40 cm: light yellowish brown (10YR6/4) moist; loamy sand; loose moist, non-sticky non-plastic wet; weak medium subangular blocks; many pores; common very fine and fine roots; diffuse smooth boundary to

C1 40 - 70 cm: light yellowish brown (10YR6/4) moist; sand; loose moist, non-sticky non-plastic wet; many pores; very fine roots; structure less (single grain); diffuse smooth boundary to

C2 70 - 110 cm: light brownish grey (10YR6/2) moist; sand; loose moist, non-sticky non-plastic wet; many pores; structure less (single grain); diffuse smooth boundary to

C3 110 - 160 cm: light grey (10YR7/1) moist; sand; loose moist, non-sticky non-plastic wet; many pores; structure less (single grain)

SOIL CLASSIFICATION: (FAO): Ferralic Arenosol Local name: Luseni

Analytical data profile KP 4

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	8	6
Silt	: 2	3	3
Very fine sand	: 5	4	4
Fine sand	: 13	18	20
Medium sand	: 22	29	28
Coarse sand	: 31	26	28
Very coarse sand	: 20	12	11
Texture class	: S	S	S
pH H20	: 5.3	4.9	5.1
pH KCl	: 4.2	4.0	4.2
EC mS/cm	: 0.01	0.08	0.07
Organic C %	: 0.33	0.19	0.16
Total N %	: 0.02	0.02	0.01
C/N	: 17	10	16
Available P mg/kg	: 2.24	2.63	1.05
CEC me/100g	: 1.0	0.7	0.6
Exch. Ca me/100g	: 0.3	0.1	0.1
Exch. Mg me/100g	: 0.1	0.1	0.1
Exch. K me/100g	: 0.03	0.04	0.01
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 0.6	0.3	0.3
Base saturation %	: 46	35	42

Profile : **KP5** Soil unit: D5i2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 4344408E, 9630879N
Location : Ilogi near Lunguya
Elevation : 1200 m asl.

Parent material : alluvium.
Landform : mbuga plain.
Slope : 0.5%; concave
Surface characteristics : wide (7 - 5 cm), deep cracks Erosion: none or slight. Deposition: none.
Natural drainage class : imperfectly drained
Soil moisture regime : ustic.
Soil temperature regime : isohyperthermic.
Vegetation/land use : grassland with Acacia. Used for Extensive grazing, few scattered farms.
Influence of past use : ploughing.
Described by : D.N. Kimaro on 16 October 1996

Soil: Very deep, imperfectly drained, mottled, dark grayish clays with CaCO3 nodules increasing with depth.

Ap 0 - 15 cm: very dark grey (10YR3/1)dry, very dark grey (10YR3/1) moist; clay; reddish and brownish mottles; extremely hard dry, very firm moist, sticky and plastic wet; moderate medium and coarse subangular blocks; few medium and common fine pores; frequent medium irregular hard CaCO3 nodules; common fine roots; clear smooth boundary to

Cg1 15 - 40 cm: dark brown (7.5YR3/2)dry, dark brown (7.5YR3/2) moist; sandy clay; reddish and brownish mottles; extremely hard dry, firm moist, sticky and plastic wet; weak coarse and very coarse irregular compound prisms; common fine and very fine pores; frequent medium irregular hard CaCO3 nodules; few fine roots; clear smooth boundary to

Cg2 40 - 70 cm: dark grey (10YR4/1) moist; sandy clay; reddish and brownish mottles; very firm moist, sticky and plastic wet; weak coarse and very coarse wedge-shaped blocks; frequent medium irregular hard CaCO3 nodules; gradual smooth boundary to

Cg3 70 - 110 cm: dark grey (10YR4/1) moist; clay; brownish mottles; very firm moist, sticky and plastic wet; very weak coarse and very coarse wedge-shaped blocks; many medium and coarse irregular hard CaCO3 nodules; diffuse smooth boundary to

Cg4 100 - 150 cm: dark grey (10YR4/1) moist; brownish mottles; very firm moist; sticky and plastic wet; very weak coarse and very coarse wedge-shaped blocks; many medium and coarse irregular hard CaCO3 nodules.

SOIL CLASSIFICATION: (FAO): Eutric Vertisol Local name: Mbuga

Analytical data profile KP 5

Depth (cm)	: 0-20	30-50	80-100
Clay	: 50	33	53
Silt	: 11	12	15
Very fine sand	: 5	4	3
Fine sand	: 15	15	11
Medium sand	: 12	23	11
Coarse sand	: 4	11	5
Very coarse sand	: 3	2	2
Texture class	: C	SCL	C
pH H20	: 5.8	5.8	6.3
pH KCl	: 4.3	4.3	4.7
EC mS/cm	: 0.06	0.06	0.06
Organic C %	: 2.45	0.91	0.73
Total N %	: 0.12	0.05	0.03
C/N	: 20	18	24
Available P mg/kg	: 5.64	2.97	2.09
CEC me/100g	: 48.6	33.5	39.4
Exch. Ca me/100g	: 18.7	12.6	21.8
Exch. Mg me/100g	: 8.9	5.0	8.6
Exch. K me/100g	: 2.34	1.92	2.15
Exch. Na me/100g	: 0.22	0.25	0.64
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 30.1	19.8	33.2
Base saturation %	: 62	59	79

Profile : **KP6** Soil unit: B2f2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 433385E, 9625697N
Location : Lunguya village
Elevation : 1280 m asl.

Parent material : colluvium.
Landform : plain.
Slope : 3%; straight
Surface characteristics : Outcrops: 15 % Erosion: moderate. Deposition: none.
Natural drainage class : well to somewhat excessively drained
Soil moisture regime : ustic.
Soil temperature regime : isohyperthermic
Vegetation/land use : few planted trees. Used for cultivation of rainfed crops (maize). Influence of past use: ploughing.
Described by : D.N. Kimaro on 16 October 1996

Soil: Very deep, well to somewhat excessively drained, brown over yellowish red, very friable, very coarse loamy sands.

Ap 0 - 15 cm: light brown (7.5YR6/4)dry, brown (7.5YR5/4)moist; sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many pores; common very fine roots; gradual smooth boundary to

Bw1 15 - 40 cm: light brown (7.5YR6/4)dry, strong brown (7.5YR4/6)moist; sand; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many pores; medium roots; few clay balls; gradual smooth boundary to

Bw2 40 - 80 cm: strong brown (7.5YR4/6)dry, strong brown (7.5YR4/6)moist; sand; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many pores; common very fine roots; few clay balls; diffuse smooth boundary to

Bw3 80 - 120 cm: strong brown (7.5YR4/6)dry, yellowish red (5YR5/6)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many pores; few medium roots; diffuse smooth boundary to

Bw4 120 - 170 cm: strong brown (7.5YR5/6)dry, yellowish red (5YR5/6)moist; loamy sand; very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many pores; few medium roots

SOIL CLASSIFICATION: (FAO): Ferralic Arenosol Local name: Luseni

Analytical data profile KP 6

Depth (cm)	: 0-20	30-50	80-100
Clay	: 1	3	5
Silt	: 8	6	9
Very fine sand	: 9	4	7
Fine sand	: 21	13	15
Medium sand	: 18	20	18
Coarse sand	: 22	25	22
Very coarse sand	: 21	29	24
Texture class	: S	S	LS

pH H20	: 5.8	5.2	4.9
pH KCl	: 4.5	4.3	3.9
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.38	0.40	0.21
Total N %	: 0.03	0.02	0.02
C/N	: 13	20	11
Available P mg/kg	: 4.39	1.49	1.15
CEC me/100g	: 1.6	1.3	0.79
Exch. Ca me/100g	: 0.5	0.3	0.1
Exch. Mg me/100g	: 0.2	0.2	0.1
Exch. K me/100g	: 0.34	0.09	0.08
Exch. Na me/100g	: 0.02	0.01	0.02
Exch. H me/100g	: -	0.02	0.04
Exch. Al me/100g	: -	0.12	0.22
TEB me/100g	: 1.1	0.6	0.3
Base saturation %	: 64	46	38
Bulk density g/cm3	: 1.5	1.4	1.6
pF 2	: 7.7	7.8	8.7
pF 2.4	: 5.3	4.8	6.4
pF 3	: 2.0	2.3	3.2
pF 4.2	: 2.0	2.3	3.3

Profile : **KP7** Soil unit: B4f6

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 433693E, 9616681N
Location : Shilela village
Elevation : 1220 m asl.

Parent material : colluvium derived from granite.
Landform : plain.
Slope : 2%; complex
Surface characteristics : Erosion: none or slight. Deposition: none.
Natural drainage class : moderately well drained.
Soil moisture regime : ustic.
Soil moisture regime : isohyperthermic.
Vegetation/land use : miombo woodland. Used for cultivation of rainfed crops (maize). Influence of past use: ploughing.
Described by : D.N. Kimaro on 16 October 1996

Soil: Deep, moderately well drained, brown over very pale to light grayish mottled sandy loams. At about 70 cm occur a weakly cemented sandy layer with mottles hardening into plinthite. The cemented sandy layer is brittle and porous.

Ap 0 - 10 cm: brown (10YR5/3)dry, dark brown to brown (10YR4/3)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; few medium and many fine pores; common very fine roots; clear smooth boundary to

Bwg 10 - 45 cm: reddish yellow (7.5YR6/6)moist; sandy loam; mottles; very friable moist, non-sticky

non-plastic wet; weak coarse subangular blocks; few medium and many fine pores; frequent medium spherical soft nodules; common very fine roots; clear smooth boundary to

BCg 45 - 75 cm: very pale brown (10YR7/3)moist; sandy loam; mottles; non-sticky non-plastic wet; weak coarse subangular blocks; common medium and many fine pores; very frequent medium spherical soft nodules; few very fine roots; clear smooth boundary to

CBg 75 - 110 cm: light grey (10YR7/2)moist; sandy clay loam; brownish mottles; firm moist, non-sticky non-plastic wet; weak very coarse subangular blocks; common medium and many fine pores; very frequent medium spherical soft and hard nodules; brownish mottles, clay and fe/mn nodules are present to a depth of 110cm over laterite

SOIL CLASSIFICATION: (FAO): Plinthic Alisol Local name: Luseni

Analytical data profile KP 7

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	20	24
Silt	: 12	11	11
Very fine sand	: 9	7	10
Fine sand	: 27	22	16
Medium sand	: 27	23	17
Coarse sand	: 10	11	11
Very coarse sand	: 7	6	11
Texture class	: LS	SL	SCL
pH H20	: 4.7	4.6	4.3
pH KCl	: 3.8	3.4	3.3
EC mS/cm	: 0.03	0.01	0.01
Organic C %	: 0.20	0.34	0.25
Total N %	: 0.03	0.03	0.02
C/N	: 7	11	13
Available P mg/kg	: 2.66	0.95	1.02
CEC me/100g	: 8.3	10.0	9.9
Exch. Ca me/100g	: 1.1	1.1	0.8
Exch. Mg me/100g	: 1.0	1.0	0.7
Exch. K me/100g	: 0.09	0.04	0.04
Exch. Na me/100g	: 0.04	0.04	0.04
Exch. H me/100g	: 0.06	0.08	0.18
Exch. Al me/100g	: 0.48	1.96	2.76
TEB me/100g	: 3.0	2.2	1.6
Base saturation %	: 27	22	16

Profile : KP8 Soil unit: A2c1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 47/3
Coordinates : 445900E, 9613656N
Location : Mwazimba village
Elevation : 1260 m asl.

Parent material	: colluvium derived from banded ironstone.
Landform	: plain.
Slope	: 1%; straight
Surface characteristics	: Erosion: moderate. Deposition: none.
Natural drainage class	: well drained
Soil moisture regime	: ustic
Vegetation/land use	: miombo woodland. Used for extensive grazing, few arable farming. Influence of past use: grazing.
Described by	: D.N. Kimaro on 17 October 1996

Soil: Very deep, well drained, dark reddish brown to yellowish red, friable clays with many clay and Fe/Mn nodules (concretions) increasing with depth.

Ap 0 - 10 cm: dark reddish brown (5YR3/4)dry, dark reddish brown (5YR3/3)moist; clay; slightly hard dry, friable moist, sticky and plastic wet; moderate coarse subangular blocks; few medium and many fine pores; very few medium angular weathered fragments; common fine and very fine roots; clear smooth boundary to

AB 10 - 30 cm: dark reddish brown (5YR3/3)dry dark reddish brown (5YR4/3)moist; clay; hard dry, friable moist, sticky and very plastic wet; moderately strong fine to medium and coarse irregular angular blocks; common medium and many fine pores; very few medium angular weathered fragments; frequent medium spherical soft and hard nodules; medium roots; presence of clay and fe/mn nodules; clear smooth boundary to

Bt1 30 - 60 cm: yellowish red (5YR4/6)dry, reddish brown (5YR4/4)moist; clay; hard dry, friable moist, slightly sticky and very plastic wet; moderately strong fine to medium and coarse irregular angular blocks; common medium and many fine pores; very frequent medium irregular soft and hard nodules; medium roots; presence of clay and sesquioxide; gradual smooth boundary to

Bt2 60 - 95 cm: yellowish red (5YR4/6)dry, yellowish red (5YR4/6)moist; clay; hard dry, friable moist, slightly sticky and very plastic wet; strong fine to medium irregular angular blocks; many fine and very fine pores; very frequent medium irregular soft and hard nodules; few fine roots; presence of clay and sesquioxide nodules; diffuse smooth boundary to

Bt3 95 - 130 cm: yellowish red (5YR5/6)dry, yellowish red (5YR5/6)moist; clay; hard dry, friable moist, slightly sticky very platic wet; strong fine to medium irregular angular blocks; many very fine and fine pores; very frequent medium irregular soft and hard nodules; few fine roots; presence of clay and sesquioxide nodules

SOIL CLASSIFICATION: (FAO): Ferric Luvisol Local name: Nduha

Analytical data profile KP 8

Depth (cm)	: 0-20	30-50	80-100
Clay	: 46	57	58
Silt	: 26	21	20
Very fine sand	: 6	4	5
Fine sand	: 10	9	8
Medium sand	: 6	4	0
Coarse sand	: 4	3	4
Very coarse sand	: 2	2	5
Texture class	: C	C	C

pH H20	: 6.0	6.0	5.9
pH KCl	: 5.0	4.9	4.6
EC mS/cm	: 0.04	0.01	0.02
Organic C %	: 2.58	1.34	0.95
Total N %	: 0.14	0.14	0.09
C/N	: 18	10	11
Available P mg/kg	: 0.70	0.29	0.29
CEC me/100g	: 34.7	26.0	25.4
Exch. Ca me/100g	: 11.9	8.8	8.9
Exch. Mg me/100g	: 10.4	8.5	6.8
Exch. K me/100g	: 0.21	0.04	0.04
Exch. Na me/100g	: 0.04	0.07	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 22.6	17.4	15.8
Base saturation %	: 65	67	62

Profile **: KP9** Soil unit: A3c2

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 47/3
Coordinates : 448893E, 9614286N
Location : Mwazimba village
Elevation : 1240 m asl.

Parent material : colluvium derived from Banded Ironstone.
Landform : plain.
Slope : 1%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : miombo woodland. Used for extensive grazing, few arable farming. Influence of past use: grazing and ploughing.
Described by : D.N. Kimaro on 17 October 1996

Soil: Deep, well drained, dark brown over reddish yellow, clay loams (clays) with many clay and sesquioxide concretions (nodules) increasing with depth.

Ap 0 - 10 cm: brown (7.5YR4/4)dry, dark brown (7.5YR3/4)moist; clay loam; slightly hard dry, friable moist, slightly sticky and plastic wet; moderate fine to medium subangular blocks; common medium and many fine pores; frequent small irregular soft and hard nodules; common very fine roots; presence of clay and clay-sesquioxide nodules; clear smooth boundary to

AB 10 - 25 cm: brown (7.5YR5/4)dry, dark brown (7.5YR3/4)moist; clay; slightly hard dry, friable moist, slightly sticky and plasti wet; moderate medium irregular angular blocks; common medium and many fine pores; very frequent medium irregular soft and hard nodules; few very fine roots; presence of clay and clay-sesquioxide nodules; clear smooth boundary to

Bws1 25 - 45 cm: strong brown (7.5YR5/6)dry strong brown (7.5YR4/6)moist; clay; slightly hard dry, friable moist, slightly sticky and plasti wet; moderate fine to medium irregular angular

blocks; many very fine and fine pores; very frequent medium irregular soft and hard nodules; few very fine roots; presence of clay and clay-sesquioxide nodules; gradual smooth boundary to

Bws2 45 - 65 cm: reddish yellow (7.5YR6/6)dry, strong brown (7.5YR5/8)moist; clay; soft dry, very friable moist, slightly sticky and plastic wet; weak to moderate medium subangular blocks; many fine and very fine pores; very frequent medium irregular soft and hard nodules; few medium roots; presence of many clay and sesquioxide nodules; gradual smooth boundary to

Bws3 65 - 110 cm: reddish yellow (7.5YR7/6)dry, reddish yellow (7.5YR6/8)moist; clay; soft dry, very friable moist, slightly sticky and plastic wet; weak to moderate medium subangular blocks; many very fine and fine pores; very frequent medium irregular soft and hard nodules; few coarse and medium roots; presence of many clay and sesquioxide nodules

SOIL CLASSIFICATION: (FAO): Ferric Acrisol Local name: Nduha

Analytical data profile KP 9

Depth (cm)	: 0-20	30-50	80-100
Clay	: 38	50	50
Silt	: 24	23	24
Very fine sand	: 9	1	7
Fine sand	: 16	5	10
Medium sand	: 8	9	5
Coarse sand	: 3	9	2
Very coarse sand	: 2	3	2
Texture class	: CL	C	C
pH H20	: 5.0	4.7	4.8
pH KCl	: 3.9	3.4	3.2
EC mS/cm	: 0.05	0.01	0.01
Organic C %	: 1.51	0.70	0.52
Total N %	: 0.16	0.12	0.05
C/N	: 9	6	10
Available P mg/kg	: 1.92	0.57	0.58
CEC me/100g	: 25.0	10.0	12.6
Exch. Ca me/100g	: 4.3	1.2	3.9
Exch. Mg me/100g	: 4.2	1.0	1.8
Exch. K me/100g	: 0.40	0.08	0.09
Exch. Na me/100g	: 0.07	0.01	0.01
Exch. H me/100g	: 0.06	0.06	0.04
Exch. Al me/100g	: 0.28	2.98	2.90
TEB me/100g	: 9.0	2.3	0.9
Base saturation %	: 36	23	46

Profile : KP10 Soil unit: A3c2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 446079E, 9607682N

Location : Chela village
Elevation : 1190 m asl.

Parent material : colluvium derived from Banded Ironstone.
Landform : footslope, gently undulating with termite mounds.
Slope : 2 - 3%; straight on middle postion.
Surface characteristics : Erosion: moderate sheet erosion. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo woodland. Used for cultivation of rainfed crops (maize, sorghum) and extensive grazing. Influence of past use: ploughing and grazing.
Described by : D.N. Kimaro on 17 October 1996.

Soil: Deep, well drained, strong brown (reddish yellow), friable clay loams (clays) with many clay and sesquioxides nodules increasing with depth.

Ap 0 - 15 cm: dark brown to brown (7.5YR4/4)dry, dark brown (7.5YR3/4)moist; sandy loam; slightly hard dry, friable moist, slightly sticky and slightly plastic wet; weak medium subangular blocks; common medium and many fine and very fine pores; many fine and medium soft and hard rounded sesquioxides nodules; common very fine roots; abrupt smooth boundary to

AB 15 - 30 cm: strong brown (7.5YR4/6)dry, dark brown to brown (7.5YR4/4)moist; clay loam; slightly hard dry, friable moist, slightly sticky and plastic wet; weak to moderate medium subangular blocks; common medium and many fine and vvery fine pores; many fine and medium soft and hard rounded sesquioxides nodules; common very fine roots; clear smooth boundary to

Bws1 30 - 55 cm: strong brown (7.5YR5/8)dry, strong brown (7.5YR4/6)moist; clay loam; slightly hard dry, friable moist, slightly sticky and plastic wet; weak to moderate medium subangular blocks; common medium and many fine and very fine pores; many fine and medium soft and hard rounded sesquioxides nodules; gradual smooth boundary to

Bws2 55 - 80 cm: reddish yellow (7.5YR6/8)dry, strong brown (7.5YR5/8)moist; clay loam; soft dry, very friable moist, slightly sticky and slightly plastic wet; weak to moderate medium angular and subangular blocks; many fine and very fine ppores; many fine and medium soft and hard rounded sesquioxides nodules; gradual smooth boundary to

Bws3 80 - 110 cm: reddish yellow (7.5YR7/8)dry, reddish yellow (7.5YR6/8)moist; clay loam; soft dry, very friable moist, slightly sticky and slightly plastic wet; weak medium subangular blocks; many fine and very fine pores; many fine and very fine ppores; many fine and medium soft and hard rounded sesquioxides nodules; over laterite.

SOIL CLASSIFICATION: (FAO): Ferric Alisol Local name: Nduha

Analytical data profile KP 10

Depth (cm)	: 0-20	30-50	80-100
Clay	: 19	35	38
Silt	: 19	21	24
Very fine sand	: 10	9	7
Fine sand	: 29	21	18
Medium sand	: 15	9	7
Coarse sand	: 5	3	2
Very coarse sand	: 3	2	4
Texture class	: SL	CL	CL

pH H20	: 5.8	5.0	5.3
pH KCl	: 5.1	3.9	3.7
EC mS/cm	: 0.08	0.02	0.01
Organic C %	: 1.24	0.50	0.27
Total N %	: 0.14	0.03	0.02
C/N	: 11	17	14
Available P mg/kg	: 1.75	0.68	0.22
CEC me/100g	: 12.7	13.2	9.4
Exch. Ca me/100g	: 4.3	2.3	1.9
Exch. Mg me/100g	: 2.3	1.9	1.6
Exch. K me/100g	: 0.77	0.14	0.26
Exch. Na me/100g	: 0.02	0.02	0.18
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 7.4	4.4	3.9
Base saturation %	: 58	33	42
Bulk density g/cm3	: 1.3	1.2	1.2
pF 2	: 22.9	26.9	28.3
pF 2.4	: 17.1	20.9	23.3
pF 3	: 10.7	14.8	15.5
pF 4.2	: 8.4	11.8	12.8

Profile : **KP11** Soil unit: C5i1

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/2
Coordinates : 479152E, 9612155N
Location : Malilita village
Elevation : 1145 m asl.

Parent material : alluvium/colluvium derived from materials of unknown origin.
Landform : mbuga plain; flat with termite mounds and low hummocks. Slope : <0.5%; level to slightly concave on bottom position.
Surface characteristics : 4 to 6 cm deep and wide cracks.
Natural drainage class : poorly drained
Soil moisture regime : ustic
Vegetation/land use : woodland (Acacia Nilotica). Used for cultivation of wet land rice and extensive grazing. Influence of past use: grazing.
Described by : D.N. Kimaro on 25 October 1996.

Soil: Very deep, poorly drained, dark grey, sandy clays over clays with CaCO3 concretions increasing with depth.

Ah 0 -20 cm: very dark grey (10YR3/1)moist; sandy clay; very firm moist, very sticky and very plastic wet; very weak very coarse subangular blocks; pressure faces, vvery few very fine pores; common fine roots; clear smooth to

C1 20 - 50 cm: Very dark grey (10YR3/1)moist; sandy clay to clay; very firm moist, very sticky and very plastic wet; weak medium to coarse wedge-shaped blocks; pressure faces; few, fine and medium soft and hard irregular and angular CaCO3 nodules; few very fine roots; diffuse smooth to

C2 50 - 90 cm: dark grey (10YR4/1)moist; sandy clay to clay; very firm moist, very sticky and very plastic wet; weak medium to coarse wedge-shaped blocks; pressure faces; common, fine and medium soft and hard irregular and angular CaCO3 nodules; few very fine roots; gradual smooth to

C3 90 - 150 cm: dark grey (10YR4/1)moist; sandy clay to clay; very firm moist, very sticky and very plastic wet; weak medium to coarse wedge-shaped blocks; pressure faces; many, fine and medium soft and hard irregular and angular CaCO3 nodules; very few very fine roots.

SOIL CLASSIFICATION: (FAO): Eutric Vertisol Local name: Mbuga

Analytical data profile KP 11

Depth (cm)	: 0-20	30-50	80-100
Clay	: 17	36	37
Silt	: 7	9	12
Very fine sand	: 2	2	2
Fine sand	: 9	7	8
Medium sand	: 25	17	19
Coarse sand	: 27	20	18
Very coarse sand	: 13	9	4
Texture class	: SL	SC	SC
pH H20	: 6.0	7.5	7.8
pH KCl	: 4.9	6.3	7.0
EC mS/cm	: 0.10	0.22	0.26
Organic C %	: 1.02	0.56	0.39
Total N %	: 0.08	0.04	0.03
C/N	: 13	14	13
Available P mg/kg	: 3.54	1.99	0.18
CEC me/100g	: 20.5	20.4	24.9
Exch. Ca me/100g	: 10.1	19.8	24.4
Exch. Mg me/100g	: 3.2	4.2	6.4
Exch. K me/100g	: 0.07	0.05	0.06
Exch. Na me/100g	: 0.18	0.20	0.25
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 13.6	24.3	31.1
Base saturation %	: 66	100	100

Profile : KP12 Soil unit: B4g1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 4704E, 96065N
Location : Mwakuzuka village
Elevation : 1162 m asl.

Parent material : colluvium derived from granite.
Landform : plain.
Slope : 1%; complex

Surface characteristics	: Erosion: severe. Deposition: none.
Natural drainage class	: moderately well drained
Soil moisture regime	: ustic
Vegetation/land use	: wooded bushland. Used for cultivation of rainfed crops. Influence of past use: ploughing.
Described by	: D.N. Kimaro on 25 October 1996

Soil: Shallow, moderately well drained, dark brown to brown, mottled, sandy clay loams over very hard cemented sandy layer - Lukele.

Apg 0 - 15 cm: dark brown (7.5YR4/4)moist; sandy loam; brownish mottles; very friable moist, non-sticky non-plastic wet; weak coarse subangular blocks; few medium and many very fine pores; few medium and common fine roots; clear smooth boundary to

Bwg 15 - 40 cm: dark brown (7.5YR4/4)moist; sandy clay loam; brownish mottles; very friable moist, non-sticky non-plastic wet; weak coarse subangular blocks; many very fine and fine pores; few medium and common fine roots; clear smooth boundary to

Cqm 40 - 80 cm: greyish brown (10YR5/2)moist; sandy clay loam; brownish mottles; structureless massive; many very fine pores; presence of cemented layer at about 40 cm depth.

SOIL CLASSIFICATION: (FAO): Dystric Leptosol Local name: Lukele

Analytical data profile KP 12

Depth (cm)	: 0-20	30-50
Clay	: 18	13
Silt	: 9	4
Very fine sand	: 10	27
Fine sand	: 21	24
Medium sand	: 19	18
Coarse sand	: 14	10
Very coarse sand	: 9	4
Texture class	: SL	LS
pH H20	: 4.6	4.6
pH KCl	: 3.6	3.3
EC mS/cm	: 0.01	0.02
Organic C %	: 0.36	0.41
Total N %	: 0.04	0.05
C/N	: 9	8
Available P mg/kg	: 10.2	1.47
CEC me/100g	: 15.9	9.2
Exch. Ca me/100g	: 2.3	1.7
Exch. Mg me/100g	: 1.6	0.8
Exch. K me/100g	: 0.14	0.03
Exch. Na me/100g	: 0.09	0.14
Exch. H (KCl)	: -	-
Exch. Al (KCl)	: -	-
TEB me/100g	: 4.1	2.7
Base saturation %	: 26	29

Profile : **KP13** Soil unit: C4f2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 469816E, 9610806N
Location : Kashishi village
Elevation : 1160 m asl.

Parent material : colluvium derived from granite.
Landform : flat or almost flat plain.
Slope : 1%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well tosomewhat excessively drained
Soil moisture regime : ustic
Vegetation/land use : miombo woodland. Used for rainfed arable cultivation (maize). Influence of past use: ploughing.
Described by : D.N. Kimaro on 25 October 1996

Soil: Very deep, well to somewhat excessively drained, dark brown to brown loamy sand.

Ap 0 - 20 cm: yellowish brown (10yr5/4)moist; loamy sand; loose moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine and fine pores; many very fine roots; clear smooth boundary to

Bw1 20 - 45 cm: dark brown (l10YR4/3)moist; loamy sand; loose moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine and fine pores; frequent medium irregular soft and hard nodules; many very fine and few very coarse roots; gradual smooth boundary to

Bw2 45 - 90 cm: dark yellowish brown (10YR4/4)moist; loamy sand; loose moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine and fine pores; frequent medium irregular soft and hard nodules; common medium and few fine roots; clear smooth boundary to

BC 90 - 150 cm: pale brown (10YR6/3)moist; sand; loose moist, non-sticky non-plastic wet; porous massive; many very fine and fine pores; few fine roots; structureless single grain

SOIL CLASSIFICATION: (FAO): Haplic Arenosol Local name: Luseni

Analytical data profile KP 13

Depth (cm)	: 0-20	30-50	80-100
Clay	: 2	2	2
Silt	: 2	2	3
Very fine sand	: 32	31	32
Fine sand	: 29	28	27
Medium sand	: 21	21	20
Coarse sand	: 11	12	10
Very coarse sand	: 3	4	6
Texture class	: S	S	S
pH H20	: 5.0	4.2	4.8
pH KCl	: 4.1	3.7	3.6
EC mS/cm	: 0.07	0.08	0.04

Organic C %	: 0.39	0.36	0.22
Total N %	: 0.04	0.03	0.03
C/N	: 10	12	7
Available P mg/kg	: 1.5	0.9	0.46
CEC me/100g	: 3.0	2.4	0.9
Exch. Ca me/100g	: 0.5	0.2	0.1
Exch. Mg me/100g	: 0.4	0.1	0.1
Exch. K me/100g	: 0.05	0.04	0.01
Exch. Na me/100g	: 0.12	0.09	0.05
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 1.1	0.4	0.3
Base saturation %	: 36	18	28

Profile : **KP14** Soil unit: B4g1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 465461E, 9610694N
Location : Bulige village
Elevation : 1160 m asl.

Parent material : colluvium derived from granite.
Landform : flat or almost flat plain.
Slope : 1%; straight.
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : moderately well drained
Soil moisture regime : ustic
Vegetation/land use : wooded bushland. Used for Grazing, few rainfed arable farming. Influence of past use: clearing, ploughing, grazing.
Described by : D.N. Kimaro on 25 October 1996

Soil: Shallow, moderately well to imperfectly drained, dark brown to brown, mottled loamy sand over a hard cemeted sandy layer (lukele).

Ahg 0 - 20 cm: greyish brown (10YR5/2)dry, dark greyish brown (10YR4/2)moist; loamy sand; brownish mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine and fine pores; few medium and common fine roots; clear smooth boundary to

Bwg 20 - 40 cm: pale brown (10YR6/3)dry, dark brown (10YR4/3)moist; loamy sand; brownish mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine and fine pores; common medium and few very fine roots; clear smooth boundary to

Cqm 40 - 100 cm: light brownish grey (10YR6/2)dry, brown (10YR5/3)moist; sandy loam; mottles; structureless massive; many pores; extremely hard, sandy loam to sandy clay loam cemeted layer (lukele)

SOIL CLASSIFICATION: (FAO):Dystric Leptosol Local name: Lukele

Analytical data profile KP 14

Depth (cm)	: 0-20	30-50
Clay	: 3	1
Silt	: 2	3
Very fine sand	: 30	31
Fine sand	: 29	29
Medium sand	: 22	21
Coarse sand	: 11	12
Very coarse sand	: 3	3
Texture class	: S	S
pH H20	: 4.7	5.8
pH KCl	: 3.6	3.9
EC mS/cm	: 0.03	0.01
Organic C %	: 0.52	0.15
Total N %	: 0.05	0.02
C/N	: 10	8
Available P mg/kg	: 5.63	2.07
CEC me/100g	: 5.7	0.6
Exch. Ca me/100g	: 0.7	0.2
Exch. Mg me/100g	: 0.5	0.1
Exch. K me/100g	: 0.01	0.01
Exch. Na me/100g	: 0.04	0.10
Exch. H (KCl)	: -	-
Exch. Al (KCl)	: -	-
TEB me/100g	: 1.3	0.4
Base saturation %	: 22	64

Profile : **KP15** Soil unit: B4f5
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 463559E, 9610417N
Location : Bulige village
Elevation : 1175 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%; complex
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well tosomewhat excessively drained
Soil moisture regime : ustic
Vegetation/land use : miombo woodland. Used for Grazing, arable farming, settlements. Influence of past use: ploughing, mud brick making.
Described by : D.N. Kimaro on 29 October 1996

Soil: Shallow, well to somewhat excessively drained, dark brown over yellowish brown, loamy sands; overlying a laterite layer.

Ap 0 - 20 cm: pale brown (10YR6/3)dry, dark brown (10YR4/3)moist; loamy sand; slightly hard dry,

friable moist, non-sticky non-plastic wet; weak medium subangular blocks; few medium and many fine pores; few medium and common fine roots; clear smooth boundary to

Bw 20 - 50 cm: light yellowish brown (10YR6/4)dry, yellowish brown (10YR5/4)moist; sandy loam; slightly hard dry, friable moist,non-sticky non-plastic wet; moderately weak medium subangular blocks; many fine and very fine pores; few medium spherical soft and hard nodules; few medium and common fine roots; over laterite

SOIL CLASSIFICATION: (FAO): Cambic Arenosol Local name: Luseni

Analytical data profile KP 15

Depth (cm)	: 0-20	30-50
Clay	: 4	4
Silt	: 2	3
Very fine sand	: 32	28
Fine sand	: 29	26
Medium sand	: 21	22
Coarse sand	: 10	13
Very coarse sand	: 2	4
Texture class	: S	S
pH H20	: 4.8	4.4
pH KCl	: 3.8	3.5
EC mS/cm	: 0.14	0.05
Organic C %	: 1.09	0.55
Total N %	: 0.10	0.06
C/N	: 11	9
Available P mg/kg	: 36.9	12.15
CEC me/100g	: 6.7	4.8
Exch. Ca me/100g	: 0.6	0.3
Exch. Mg me/100g	: 0.5	0.1
Exch. K me/100g	: 0.50	0.40
Exch. Na me/100g	: 0.04	0.02
Exch. H (KCl)	: -	-
Exch. Al (KCl)	: -	-
TEB me/100g	: 1.6	0.8
Base saturation %	: 25	17

Profile : KP16 Soil unit: B3f3

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 462069E, 9594616N
Location : Nduku village (Bukalage sub-village)
Elevation : 1200 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 4%; straight
Surface characteristics : Outcrops: 15 % Erosion: moderate. Deposition: none.
Natural drainage class : well to somewhat excessively drained

Soil moisture regime : ustic
Vegetation/land use : miombo woodland. Used for rainfed arable farming; maize,cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 29 October 1996

Soil: Very deep, well to somewhat excessively drained, pale brown to light grayish, structureless (single grain) sands.

Ap 0 - 20 cm: brown (10YR5/3)moist; loamy sand; brownish mottles; very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many pores; common fine and very fine roots; gradual smooth boundary to

AC 20 - 45 cm: pale brown (10YR6/3)moist; sand; brownish mottles; loose moist, non-sticky non-plastic wet; weak medium subangular blocks; many pores; few medium spherical soft nodules; few very fine roots; gradual smooth boundary to

C1 45 - 70 cm: very pale brown (10YR7/3)moist; sand; brownish mottles; loose moist, non-sticky non-plastic wet; porous massive; many pores; few very fine roots; structureless single grain; clear smooth boundary to

C2 70 - 110 cm: light grey (10YR7/2)moist; sand; loose moist, non-sticky non-plastic wet; porous massive; many pores; structureless single grain; gradual smooth boundary to

C3 110 - 150 cm: light grey (10YR7/1)moist; sand; loose moist, non-sticky non-plastic wet; porous massive; many pores; structureless single grain

SOIL CLASSIFICATION: (FAO): Haplic Arenosol Local name: Luseni

Analytical data profile KP 16

Depth (cm)	: 0-20	30-50	80-100
Clay	: 2	2	1
Silt	: 4	4	4
Very fine sand	: 34	38	34
Fine sand	: 31	33	32
Medium sand	: 20	17	19
Coarse sand	: 7	5	8
Very coarse sand	: 2	1	2
Texture class	: S	S	S
pH H20	: 7.7	7.0	5.4
pH KCl	: 7.1	6.3	4.2
EC mS/cm	: 0.20	0.08	0.03
Organic C %	: 0.52	0.19	0.15
Total N %	: 0.07	0.03	0.02
C/N	: 7	6	8
Available P mg/kg	: 36.8	29.5	4.1
CEC me/100g	: 3.3	1.5	0.6
Exch. Ca me/100g	: 2.9	0.8	0.1
Exch. Mg me/100g	: 0.8	0.7	0.1
Exch. K me/100g	: 0.40	0.17	0.07
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	0.04
Exch. Al (KCl)	: -	-	0.06

TEB me/100g	: 4.1	1.7	0.3
Base saturation %	: 100	100	49

Profile : **KP17** Soil unit: B3b2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 458015E, 9600700N
Location : Igombe village
Elevation : 1210 m asl.

Parent material : colluvium from granite.
Landform : gently undulating footslope.
Slope : 4%; straight
Surface characteristics : Outcrops: 20 % Erosion: moderate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : miombo woodland. Used for rainfed arable farming; maize,cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 29 October 1996

Soil: Very deep, well drained, dark brown, sandy clay loams.

Ap 0 - 15 cm: strong brown (7.5YR4/6)dry, dark brown (7.5YR3/4)moist; loamy sand; soft dry very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; common medium and many fine pores; common fine and very fine roots; clear smooth boundary to

Bt1 15 - 50 cm: strong brown (7.5YR4/6)dry, dark brown (7.5YR3/4)moist; sandy clay loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules; few fine and very fine roots; gradual smooth boundary to

Bt2 50 - 85 cm: strong brown (7.5YR4/6)dry, dark brown (7.5YR3/4)moist; sandy clay loam; slightly hard dry, friable moist, slightly sticky slightly plastic wet; weak fine to medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules; gradual smooth boundary to

Bt3 85 - 130 cm: dark brown (7.5YR3/4)dry, dark brown (7.5YR3/4)moist; sandy clay loam; soft dry, very friable moist, slightly sticky slightly plastic wet; weak medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules

SOIL CLASSIFICATION: (FAO): Ferric Luvisol Local name: Kikungu

Analytical data profile KP 17

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	9	15
Silt	: 3	4	7
Very fine sand	: 29	27	29
Fine sand	: 26	24	22
Medium sand	: 19	17	13
Coarse sand	: 11	12	9
Very coarse sand	: 7	7	5
Texture class	: LS	SL	SL

pH H20	: 6.0	5.7	5.6
pH KCl	: 5.1	4.3	4.2
EC mS/cm	: 0.05	0.02	0.01
Organic C %	: 0.64	0.49	0.32
Total N %	: 0.07	0.06	0.02
C/N	: 9	8	16
Available P mg/kg	: 3.70	1.91	1.63
CEC me/100g	: 5.3	6.9	7.5
Exch. Ca me/100g	: 2.0	2.0	2.0
Exch. Mg me/100g	: 1.0	1.3	1.7
Exch. K me/100g	: 0.63	0.54	0.40
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 4.0	4.0	4.1
Base saturation %	: 69	56	55

Profile : **KP18** Soil unit: B3b2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 450266E, 96032240N
Location : Ntundu village
Elevation : 1180 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 3%; straight
Surface characteristics : Outcrops: 5 % Erosion: modearate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming; maize, cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 29 October 1996

Soil: Very deep, well drained, yellowish brown to strong brown, sand loams to sand clay loams.

Ap 0 - 25 cm: brown (10YR5/3)dry, very dark greyish brown (10YR3/2)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; few medium and many fine pores; frequent medium irregular soft and hard nodules; common fine and very fine roots; abrupt smooth boundary to

Bw1 25 - 65 cm: yellowish brown (10YR5/4)moist; sandy loam; friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; very frequent medium irregular soft and hard nodules; few very fine roots; clear smooth boundary to

Bw2 65 - 110 cm: strong brown (7.5YR4/6)moist; sandy loam; very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules; few very fine roots; abrupt smooth boundary to

BC 110 - 150 cm: light brown (7.5YR6/4)moist; sandy loam; very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; frequent medium irregular soft nodules; few very fine roots

SOIL CLASSIFICATION: (FAO): Ferric Alisol Local name: Kikungu

Analytical data profile KP 18

Depth (cm)	: 0-20	30-50	80-100
Clay	: 6	10	12
Silt	: 4	5	5
Very fine sand	: 31	36	28
Fine sand	: 33	24	25
Medium sand	: 16	14	16
Coarse sand	: 7	8	10
Very coarse sand	: 3	3	4
Texture class	: LS	SL	SL
pH H20	: 4.3	4.3	4.3
pH KCl	: 3.6	3.4	3.3
EC mS/cm	: 0.08	0.03	0.02
Organic C %	: 0.75	0.54	0.29
Total N %	: 0.07	0.06	0.02
C/N	: 11	9	15
Available P mg/kg	: 5.45	2.03	1.31
CEC me/100g	: 15.7	7.2	8.6
Exch. Ca me/100g	: 1.5	0.5	0.5
Exch. Mg me/100g	: 1.1	0.5	0.5
Exch. K me/100g	: 0.05	0.04	0.52
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: 0.02	0.20	0.06
Exch. Al (KCl)	: 1.00	2.04	2.18
TEB me/100g	: 3.0	1.1	1.5
Base saturation %	: 17	15	18

Profile : KP19 Soil unit: B3b3

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 450712E, 9596338N
Location : Busangi village
Elevation : 1200 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 1%; convex
Surface characteristics : Outcrops: 15 % Erosion: moderate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : few planted trees. Used for rainfed arable farming; maize,cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 29 October 1996

Soil: Very deep, well drained, red, gravelly sandy loams.

Ap 0 - 20 cm: brown (7.5YR4/4)dry, dark brown (7.5YR3/4)moist; sandy loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many fine and very fine pores; few small angular fresh fragments; common very fine roots; abrupt smooth boundary to

Bt1 20 - 55 cm: red (2.5YR4/8)dry, dark red (2.5YR3/6)moist; sandy loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; moderate medium to coarse subangular blocks; many fine and very fine pores; frequent medium angular fresh fragments; frequent medium spherical soft and hard nodules; few fine and very fine roots; gradual smooth boundary to

Bt2 55 - 90 cm: red (2.5YR4/8)dry, red (2.5YR4/6)moist; gravelly sandy loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; very frequent medium angular fresh fragments; few small irregular soft and hard nodules; and few very fine roots; diffuse smooth boundary to

Bt3 90 - 130 cm: red (2.5YR4/8)dry, red (2.5YR4/8)moist; gravelly sandy loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium to coarse subangular blocks; many fine and very fine pores; very frequent medium angular fresh fragments; few small irregular soft and hard nodules; few very fine roots; over laterite

SOIL CLASSIFICATION: (FAO): Cambic Arenosol Local name: Kikungu

Analytical data profile KP 19

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	3	6
Silt	: 4	5	2
Very fine sand	: 32	35	28
Fine sand	: 29	30	26
Medium sand	: 18	17	19
Coarse sand	: 7	7	12
Very coarse sand	: 3	3	7
Texture class	: S	S	S
pH H20	: 6.6	6.0	6.9
pH KCl	: 5.9	5.7	6.0
EC mS/cm	: 0.09	0.29	0.05
Organic C %	: 0.26	0.85	0.13
Total N %	: 0.03	0.09	0.01
C/N	: 9	9	13
Available P mg/kg	: 35.3	35.6	5.7
CEC me/100g	: 6.3	9.3	4.1
Exch. Ca me/100g	: 3.8	4.2	2.6
Exch. Mg me/100g	: 1.2	1.2	1.2
Exch. K me/100g	: 0.54	0.70	0.20
Exch. Na me/100g	: 0.04	0.14	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 5.6	6.2	4.0
Base saturation %	: 89	67	99

Profile : **KP20** Soil unit: B3h1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 424685E, 9617250N
Location : Izumba village
Elevation : 1190 m asl.

Parent material : colluvium/alluvium from granite.
Landform : gently undulating plain.
Slope : 1.5%; concave.
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : imperfectly drained
Soil moisture regime : ustic
Vegetation/land use : shrubs and miombo trees. Used for grazing and pottering. Influence of past use: burning, clearing and felling trees.
Described by : D.N. Kimaro on 30 October 1996

Soil: Deep, imperfectly drained, dark grayish, sandy clay loams to sandy clays.

ACg 0 - 20 cm: dark grey (7.5YR4/0)moist; sandy clay; brownish mottles; firm moist, slightly sticky slightly plastic wet; weak very coarse subangular blocks; common fine and very fine pores; very frequent small angular fresh fragments; common fine and very fine roots; gradual smooth boundary to

Cg1 20 - 50 cm: dark grey (7.5UR4/0)moist; sandy clay loam; brownish mottles; firm moist, slightly sticky slightly plastic wet; structureless massive; common fine and very fine pores; very frequent medium angular fresh fragments; common fine and very fine roots; diffuse smooth boundary to

Cg2 50 - 80 cm: dark grey (7.5YR4/0)moist; sandy clay; brownish mottles; firm moist, slightly sticky slightly plastic wet; structureless massive; few fine and very fine pores; very frequent small angular fresh fragments; few very fine roots; diffuse smooth boundary to

Cg3 80 - 120 cm: dark grey (7.5YR4/0)moist; sandy clay; brownish mottles; firm moist, slightly sticky slightly plastic wet; structureless massive; few fine and very fine pores; very frequent small angular fresh fragments; few very fine roots; over mixed layers of gravel and stones

SOIL CLASSIFICATION: (FAO): Dystric Regosol Local name: Itogoro

Analytical data profile KP 20

Depth (cm)	: 0-20	30-50	80-100
Clay	: 14	19	19
Silt	: 9	5	5
Very fine sand	: 22	21	21
Fine sand	: 21	19	20
Medium sand	: 18	16	17
Coarse sand	: 12	12	12
Very coarse sand	: 4	6	6
Texture class	: LS	SL	SL

pH H20	: 5.1	5.1	5.3
pH KCl	: 3.7	3.4	3.4
EC mS/cm	: 0.06	0.03	0.02
Organic C %	: 1.28	0.98	0.49
Total N %	: 0.08	0.06	0.03
C/N	: 16	16	16
Available P mg/kg	: 2.12	1.41	1.16
CEC me/100g	: 26.8	30.8	23.4
Exch. Ca me/100g	: 5.6	6.5	5.4
Exch. Mg me/100g	: 4.2	5.4	4.5
Exch. K me/100g	: 0.18	0.1	0.12
Exch. Na me/100g	: 0.20	0.3	0.49
Exch. H (KCl)	: 0.08	0.22	0.30
Exch. Al (KCl)	: 0.56	2.06	2.00
TEB me/100g	: 10.2	12.3	10.5
Base saturation %	: 38	40	45

Profile **: KP21** Soil unit: B3f8

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 426375E, 9621102N
Location : Izumba village
Elevation : 1220 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 2%; complex
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming; maize, cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 30 October 1996

Soil: Deep, well to somewhat excessively drained, yelowish brown, sands.

Ap 0 - 15 cm: dark brown (10YR3/3)moist; loamy sand; loose moist, non-sticky non-plastic wet; very weak to single grain, medium subangular blocks; many fine and very fine pores; common fine and very fine roots; clear smooth to

BC 15 - 40 cm: dark yellowish brown (10yr4/4)moist; loamy sand; loose moist, non-sticky non-plastic wet; single grain; many fine and very fine pores; few medium and common fine roots; structureless single grain; gradual smooth boundary to

C1 40 - 85 cm: yellowish brown (10Yr5/4)moist; sand; loose moist, none-sticky non-plastic wet; many fine and very fine pores; few fine and very fine roots; structureless single grain; diffuse smooth boundary to

C2 85 - 110 cm: yellowish brown (10YR5/4)moist; sand; loose moist, non-sticky non-plastic wet; many fine and very fine pores; few fine and very fine roots; structureless single grain; over gravel and stones

SOIL CLASSIFICATION: (FAO): Haplic Arenosol Local name: Luseni

Analytical data profile KP 21

Depth (cm)	: 0-20	30-50	80-100
Clay	: 3	1	2
Silt	: 4	3	3
Very fine sand	: 36	29	29
Fine sand	: 29	27	26
Medium sand	: 16	21	19
Coarse sand	: 8	15	14
Very coarse sand	: 4	4	7
Texture class	: S	S	S
pH H20	: 7.0	6.5	4.8
pH KCl	: 6.4	4.2	3.8
EC mS/cm	: 0.09	0.02	0.01
Organic C %	: 0.54	0.26	0.34
Total N %	: 0.04	0.03	0.02
C/N	: 14	9	17
Available P mg/kg	: 19.4	3.1	1.8
CEC me/100g	: 2.5	1.2	1.8
Exch. Ca me/100g	: 1.9	0.4	0.2
Exch. Mg me/100g	: 0.5	0.2	0.2
Exch. K me/100g	: 0.30	0.27	0.09
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	0.10
Exch. Al (KCl)	: -	-	0.4
TEB me/100g	: 2.7	0.8	0.5
Base saturation %	: 100	75	29

Profile : KP22 Soil unit: B3f3

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 424529E, 9626002N
Location : Ikinda village
Elevation : 1260 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 3%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : moderately well drained
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming; maize,cassava. Influence of past use: ploughing.
Described by : D.N. Kimaro on 30 October 1996

Soil: Very deep, moderately well drained, pale brown sands.

Ap 0 -15 cm: yellowish brown (10YR5/4)moist; loamy sand to sand; loose moist, non-sticky non-plastic wet; very weak medium subangular blocks; many fine and very fine pores; very few very fine roots; gradual smooth to

ACg 15 - 40 cm: light yellowish brown (10YR6/4)moist; loamy sand; brownish mottles; loose moist, non-sticky non-plastic wet; many fine and very fine pores; few medium and very fine roots; structureless single grain; diffuse smooth boundary to

Cg1 40 - 80 cm: pale brown (10YR6/3)moist; sand; brownish mottles; loose moist, non-sticky non-plastic wet; many fine and very fine pores; few fine roots; structureless single grain; diffuse smooth boundary to

Cg2 80 - 140 cm: pale brown (10YR6/3)moist; sand; brownish mottles; loose moist, non-sticky non-plastic wet; many fine and very fine pores; few fine roots; structureless single grain

SOIL CLASSIFICATION: (FAO): Haplic Arenosol Local name: Luseni

Analytical data profile KP 22

Depth (cm)	: 0-20	30-50	80-100
Clay	: 1	2	1
Silt	: 2	3	3
Very fine sand	: 37	37	35
Fine sand	: 32	32	32
Medium sand	: 18	18	19
Coarse sand	: 8	7	8
Very coarse sand	: 2	1	2
Texture class	: S	S	S
pH H20	: 5.0	5.3	5.1
pH KCl	: 4.2	4.2	3.8
EC mS/cm	: 0.04	0.01	0.01
Organic C %	: 0.17	0.15	0.14
Total N %	: 0.02	0.02	0.01
C/N	: 9	8	14
Available P mg/kg	: 2.92	1.26	0.71
CEC me/100g	: 2.1	1.5	0.7
Exch. Ca me/100g	: 0.5	0.5	0.1
Exch. Mg me/100g	: 0.2	0.1	0.1
Exch. K me/100g	: 0.06	0.05	0.04
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: 0.04	0.08	0.02
Exch. Al (KCl)	: 0.10	0.12	0.44
TEB me/100g	: 0.8	0.7	0.3
Base saturation %	: 38	46	35

Profile : KP23 Soil unit: B3e1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 430659E, 9636452N
Location : Buyange village

Elevation : 1250 m asl.
Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 2%; convex
Surface characteristics : Outcrops: 20 % Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained
Soil moisture regime : ustic
Vegetation/land use : few planted trees. Used for rainfed arable farming; maize, beans. Influence of past use: ploughing.
Described by : D.N. Kimaro on 30 October 1996

Soil: Shallow, well to somewhat excessively drained, red, sandy clay loams over laterite.

Ap 0 -15 cm: reddish brown (5YR4/4)moist; sand loam; friable moist, sticky and plastic wet; weak medium subangular blocks; common medium many fine and very fine pores; very few fine medium rounded soft and hard clay nodules; common very fine roots; gradual smooth to

Bt 15 - 50 cm: red (2.5YR4/6)moist; sandy clay loam; weak to moderate medium subangular blocks; common medium and many fine pores; frequent medium spherical soft and hard clay nodules; common fine roots; coarse angular quartz grains; over laterite

SOIL CLASSIFICATION: (FAO): Ferric Luvisol Local name: Lukili

Analytical data profile KP 23

Depth (cm)	: 0-20	30-50
Clay	: 19	24
Silt	: 7	7
Very fine sand	: 33	27
Fine sand	: 22	21
Medium sand	: 11	12
Coarse sand	: 6	6
Very coarse sand	: 2	3
Texture class	: SL	SCL
pH H20	: 6.4	5.9
pH KCl	: 5.4	4.7
EC mS/cm	: 0.13	0.07
Organic C %	: 0.85	0.57
Total N %	: 0.09	0.07
C/N	: 9	8
Available P mg/kg	: 0.72	0.72
CEC me/100g	: 8.4	9.1
Exch. Ca me/100g	: 4.9	4.0
Exch. Mg me/100g	: 1.2	1.6
Exch. K me/100g	: 0.71	0.26
Exch. Na me/100g	: 0.11	0.04
Exch. H (KCl)	: -	-
Exch. Al (KCl)	: -	-
TEB me/100g	: 6.9	5.9
Base saturation %	: 82	65

Profile : **KP24** Soil unit: B3g2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 46/4
Coordinates : 434497E, 9621249N
Elevation : 1210 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 2%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : imperfectly drained
Soil moisture regime : ustic
Vegetation/land use : bushes and miombo trees. Used for grazing. Influence of past use: clearing.
Described by : D.N. Kimaro on 30 October 1996

Soil: Shallow, imperfectly drained, dark grayish, sandy loams to sandy clay loams; over a very hard cemented sandy layer.

ACg 0 - 10 cm: very dark grey (10YR3/1)moist; sandy loam; brownish mottles; friable moist, non-sticky non-plastic wet; weak medium subangular blocks; common fine and very fine pores; common medium and fine roots; clear smooth boundary to

Cg 10 - 30 cm: dark grey (10YR4/1)moist; loamy sand; brownish mottles; very friable moist, non-sticky non-plastic wet; many fine and very fine pores; common medium and fine roots; structureless single grain; over a very hard cemented, mottled sandy layer

SOIL CLASSIFICATION: (FAO): Dystric Leptosol Local name: Lukele

Analytical data profile KP 24

Depth (cm)	: 0-20
Clay	: 2
Silt	: 3
Very fine sand	: 28
Fine sand	: 27
Medium sand	: 22
Coarse sand	: 13
Very coarse sand	: 5
Texture class	: S
pH H20	: 5.1
pH KCl	: 3.6
EC mS/cm	: 0.04
Organic C %	: 0.73
Total N %	: 0.06
C/N	: 12
Available P mg/kg	: 0.88
CEC me/100g	: 7.6
Exch. Ca me/100g	: 1.6
Exch. Mg me/100g	: 0.9
Exch. K me/100g	: 0.04
Exch. Na me/100g	: 0.20
Exch. H (KCl)	: 0.04

Exch. Al (KCl)	: 0.92
TEB me/100g	: 2.7
Base saturation %	: 36

Profile : **KP25** Soil unit: A3d1

Survey project	: Kahama district
Region	: Shinyanga
District	: Kahama
Map sheet no.	: 62/2
Coordinates	: 441912E, 9605609N
Location	: Mhandu village
Elevation	: 1210 m asl.

Parent material	: colluvium from Banded Ironstone.
Landform	: gently undulating footslope (undefined).
Slope	: 5%; straight.
Surface characteristics	: Stones: 15 % Erosion: severe. Deposition: none.
Natural drainage class	: excessively drained
Soil moisture regime	: ustic
Vegetation/land use	: bushes. Used for grazing.
Described by	: D.N. Kimaro on 30 October 1996

Soil: Very shallow, excessively drained, dark brown, sandy loams to sandy clay loams; laterite at or near the surface. Many surface stones and termite mounds of verious sizes.

Ah 0 - 10 cm: brown (7.5YR5/4)dry, dark brown (7.5YR3/4)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; frequent medium angular fresh fragments; few medium irregular soft and hard nodules; common fine roots; over laterite

SOIL CLASSIFICATION: (FAO): Dystric Leptosol Local name: Idalafuma

Analytical data profile KP 25

Depth (cm)	: 0-20
Clay	: 8
Silt	: 11
Very fine sand	: 29
Fine sand	: 26
Medium sand	: 15
Coarse sand	: 7
Very coarse sand	: 4
Texture class	: SL
pH H20	: 5.4
pH KCl	: 4.3
EC mS/cm	: 0.03
Organic C %	: 2.09
Total N %	: 0.14
C/N	: 15
Available P mg/kg	: 1.16
CEC me/100g	: 8.2
Exch. Ca me/100g	: 2.1

Exch. Mg me/100g	: 1.3
Exch. K me/100g	: 0.30
Exch. Na me/100g	: 0.24
Exch. H me/100g	: 0.04
Exch. Al me/100g	: 0.30
TEB me/100g	: 3.9
Base saturation %	: 48

Profile : **KP26** Soil unit: B3b5

Survey project	: Kahama district
Region	: Shinyanga
District	: Kahama
Map sheet no.	: 63/1
Coordinates	: 456083E, 9598142N
Location	: Ngaya village - Bulagaja sub - village
Elevation	: 1180 m asl.

Parent material	: colluvium from granite.
Landform	: flat or almost flat plain.
Slope	: 1%; straight
Surface characteristics	: Erosion: moderate. Deposition: none.
Natural drainage class	: well drained
Soil moisture regime	: ustic
Vegetation/land use	: bushes and miombo trees. Used for rainfed arable farming; maize,cassava. Influence of past use: ploughing.
Described by	: D.N. Kimaro on 1 November 1996

Soil: Deep, well drained, strong brown, very friable sandy clay loams with thick, dark brown, sandy loam topsoils.

Ap 0 - 25 cm: brown (7.5YR5/4)dry, dark brown (7.5YR3/4)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; few medium irregular soft and hard clay nodules; common fine and very fine roots; clear smooth boundary to

Bw1 25 - 55 cm: strong brown (7.5YR5/6)dry, dark brown (7.5YR4/4)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard clay nodules; fine roots; gradual smooth boundary to

Bw2 55 - 75 cm: strong brown (7.5YR5/8)dry, strong brown (7.5YR4/6)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard clay nodules; fine roots; gradual smooth boundary to

BC 75 - 110 cm: light brown (7.5YR6/4)dry, strong brown (7.5YR4/6)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak to moderate medium to coarse subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard clay nodules; over a hard cemented sandy layer (lukele)

SOIL CLASSIFICATION: (FAO): Ferric Acrisol Local name: Kikungu

Analytical data profile KP 26

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	30	32
Silt	: 3	8	9
Very fine sand	: 30	7	7
Fine sand	: 28	21	19
Medium sand	: 18	18	14
Coarse sand	: 9	8	9
Very coarse sand	: 4	8	10
Texture class	: LS	SCL	SCL
pH H20	: 4.4	4.2	4.6
pH KCl	: 3.4	3.3	3.3
EC mS/cm	: 0.06	0.05	0.03
Organic C %	: 0.63	0.49	0.26
Total N %	: 0.07	0.06	0.02
C/N	: 9	8	13
Available P mg/kg	: 2.65	1.16	0.86
CEC me/100g	: 2.2	5.3	2.4
Exch. Ca me/100g	: 0.2	0.3	0.3
Exch. Mg me/100g	: 0.1	0.2	0.1
Exch. K me/100g	: 0.09	0.06	0.04
Exch. Na me/100g	: 0.04	0.07	0.70
Exch. H me/100g	: 0.14	0.02	0.20
Exch. Al me/100g	: 1.20	2.60	2.64
TEB me/100g	: 0.4	0.6	1.1
Base saturation %	: 16	20	26
Bulk density g/cm3	: 1.5	1.3	1.3
pF 2	: 19.0	21.1	24.7
pF 2.4	: 16.2	17.1	21.3
pF 3	: 11.4	12.5	16.3
pF 4.2	: 7.5	11.0	13.5

Profile : **KP27** Soil unit: B4b2

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 462096E, 9607955N
Location : Bulige village; Kizungu sub - village
Elevation : 1174 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%; complex
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well drained
Soil moisture regime : ustic
Vegetation/land use : scatered mimbo trees. Used for rainfed arable farming; maize, grazing. Influence of past use: ploughing.
Described by : D.N. Kimaro on 1 November 1996

Soil: Very deep, well drained, strong brown sandy loams.

Ap 0 - 20 cm: brown (7.5YR5/4)dry, dark brown (7.5YR3/4)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules; very fine roots; clear smooth boundary to

Bw1 20 - 40 cm: brown (7.5YR5/4)dry, dark brown (7.5YR3/4)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak to moderate medium to coarse subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules; very fine roots; gradual smooth boundary to

Bw2 40 - 80 cm: reddish yellow (7.5YR6/6)dry, strong brown (7.5YR4/6)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; moderate medium to coarse subangular blocks; many fine and very fine pores; very frequent medium irregular soft and hard nodules; diffuse smooth boundary to

Bw3 80 - 140 cm: light brown (7.5YR6/4)dry, strong brown (7.5YR5/6)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; moderate medium to coarse subangular blocks; many fine and very fine pores; very frequent medium irregular soft and hard nodules

SOIL CLASSIFICATION: (FAO): Ferric Alisol Local name: Kikungu

Analytical data profile KP 27

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	11	25
Silt	: 3	4	12
Very fine sand	: 27	30	7
Fine sand	: 27	26	16
Medium sand	: 22	18	22
Coarse sand	: 12	9	11
Very coarse sand	: 1	2	7
Texture class	: S	LS	SCL
pH H20	: 4.2	4.3	4.5
pH KCl	: 3.5	3.4	3.4
EC mS/cm	: 0.08	0.03	0.02
Organic C %	: 0.72	0.48	0.33
Total N %	: 0.09	0.07	0.02
C/N	: 8	7	17
Available P mg/kg	: 4.90	1.70	1.11
CEC me/100g	: 13.8	2.1	2.1
Exch. Ca me/100g	: 1.2	0.1	0.2
Exch. Mg me/100g	: 1.1	0.1	0.2
Exch. K me/100g	: 0.29	0.03	0.04
Exch. Na me/100g	: 0.04	0.04	0.02
Exch. H me/100g	: 0.34	0.14	0.24
Exch. Al me/100g	: 1.20	2.70	2.40
TEB me/100g	: 2.6	0.9	0.5
Base saturation %	: 19	13	22

Profile : **KP28** Soil unit: D5i1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 456407E, 9590983N
Location : Igandiga valley
Elevation : 1172 m asl.

Parent material : alluvium.
Landform : flat or almost flat mbuga.
Slope : 0.5%; concave
Surface characteristics : hexagonal cracks Erosion: none or slight. Deposition: none.
Natural drainage class : poorly drained.
Soil moisture regime : ustic
Vegetation/land use : bushes and Acacia trees. Used for wetland rice cultivation and grazing. Influence of past use: ploughing.
Described by : D.N. Kimaro on 1 November 1996

Soil: Very deep, poorly drained, gray to dark gray, cracking heavy clays.

Apg 0 - 10 cm: grey (10YR6/1)dry, dark grey (10YR4/1)moist; sandy clay loam; brownish/orange mottles; extremely hard dry, very firm moist, slightly sticky slightly plastic wet; weak coarse subangular blocks; few medium and common fine pores; clear smooth boundary to

ACg 10 - 35 cm: greyish brown (10YR5/2)dry, dark greyish brown (10YR4/2)moist; sandy clay; brownish/orange mottles; extremely hard dry, very firm moist, sticky plastic wet; weak coarse subangular blocks; few medium and common fine pores; clear smooth boundary to

Cg1 35 - 60 cm: grey (10YR5/1)dry, grey (10YR5/1)moist; clay; brownish/orange mottles; extremely hard dry, very firm moist, sticky very plastic wet; weak very coarse irregular compound prisms; common fine and very fine pores; diffuse smooth boundary to

Cg2 60 - 105 cm: dark grey (10YR4/1)dry, dark grey (10YR4/1)moist; clay; brownish/orange mottles; extremely hard dry, very firm moist, sticky very plastic wet; weak very coarse irregular compound prisms; common fine and very fine pores

SOIL CLASSIFICATION: (FAO): Dystric Vertisol Local name: Mbuga

Analytical data profile KP 28

Depth (cm)	: 0-20	30-50	80-100
Clay	: 22	35	32
Silt	: 9	10	5
Very fine sand	: 5	6	24
Fine sand	: 25	23	21
Medium sand	: 26	18	12
Coarse sand	: 9	6	5
Very coarse sand	: 4	2	1
Texture class	: SCL	SCL	SCL
pH H20	: 5.3	5.4	5.6
pH KCl	: 3.7	3.5	3.7
EC mS/cm	: 0.07	0.05	0.10

Organic C %	: 0.71	0.38	0.29
Total N %	: 0.08	0.05	0.02
C/N	: 9	8	15
Available P mg/kg	: 4.3	6.5	5.7
CEC me/100g	: 17.3	15.3	14.7
Exch. Ca me/100g	: 5.2	5.5	5.6
Exch. Mg me/100g	: 2.7	1.5	2.2
Exch. K me/100g	: 0.06	0.06	0.06
Exch. Na me/100g	: 0.36	0.61	0.20
Exch. H me/100g	: 0.04	0.40	-
Exch. Al me/100g	: 0.46	2,34	-
TEB me/100g	: 8.3	7.3	8.1
Base saturation %	: 48	50	55

Profile : **KP29** Soil unit: B3g2

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 454745E, 9592036N
Location : Busangi village; Nyangota sub - village
Elevation : 1195 m asl.

Parent material : colluvium.
Landform : gently undulating plain.
Slope : 2%; straight
Surface characteristics : Outcrops: 20 % Erosion: moderate. Deposition: none.
Natural drainage class : imperfectly drained. Soil moisture regime: ustic
Vegetation/land use : bushland. Used for grazing land. Influence of past use: ploughing.
Described by : D.N. Kimaro on 1 November 1996

Soil: Very shallow, imperfectly drained, pale brown, sands over cemented sands at shallow depths.

Ap 0 - 10 cm: pale brown (10YR6/3)moist; sand; brownish mottles; loose moist, non-sticky non-plastic wet; porous massive; many fine and very fine pores; very fine roots; over a thick cemented sandy layer; abrupt smooth boundary to

Cmg 10 - 40 cm: light brownish grey (10YR6/2)moist; sand; brownish mottles; lose moist, non-sticky non-plastic wet; many fine and very fine pores; very hard cemented sandy layer; abrupt smooth boundary to

Cg 40 - 100 cm: light grey (10YR7/1)moist; sand; loose moist; non-sticky non-plastic wet; porous massive; loose, structureless single grain sands.

SOIL CLASSIFICATION: (FAO): Dystric Leptosol Local name: Lukele

Analytical data profile KP 29

Depth (cm)	: 0-20	30-50	80-100
Clay	: 2	2	0
Silt	: 6	7	2
Very fine sand	: 8	9	39
Fine sand	: 27	35	35
Medium sand	: 39	35	19

Coarse sand	: 14	10	4
Very coarse sand	: 4	2	1
Texture class	: S	S	S
pH H20	: 5.4	5.2	6.2
pH KCl	: 4.5	4.0	4.8
EC mS/cm	: 0.10	0.04	0.01
Organic C %	: 0.39	0.25	0.17
Total N %	: 0.06	0.03	0.01
C/N	: 7	8	17
Available P mg/kg	: 3.67	2.08	0.87
CEC me/100g	: 2.3	1.1	0.5
Exch. Ca me/100g	: 0.5	0.2	0.2
Exch. Mg me/100g	: 0.3	0.1	0.1
Exch. K me/100g	: 0.07	0.03	0.01
Exch. Na me/100g	: 0.20	0.11	0.04
Exch. H me/100g	: 0.06	0.08	-
Exch. Al me/100g	: 0.00	0.08	-
TEB me/100g	: 0.9	0.4	0.4
Base saturation %	: 46	42	74

Profile : KP30 Soil unit: B3b1

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 454453E, 9592806E
Location : Busangi village; Nyangota sub - village
Elevation : 1200 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 2%; convex
Surface characteristics : Outcrops: 20 % Erosion: moderate. Deposition: none.
Natural drainage class : well drained. Soil moisture regime: ustic
Vegetation/land use : kapok trees. Used for rainfed arable farming; maize,groundnuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 1 November 1996

Soil: Very deep, well drained, red, sandy loams.

Ap 0 - 25 cm: reddish yellow (5YR6/6)dry, yellowish red (5YR4/6)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; few medium irregular soft and hard nodules; many fine and very fine roots; clear smooth boundary to

AB 25 - 55 cm: reddish yellow (5YR6/6)dry, yellowish red (5YR4/6)moist; sandy loam; very soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; few medium irregular soft and hard nodules; few coarse and fine roots; clear smooth boundary to

Bt1 55 - 105 cm: reddish yellow (5YR6/8)dry, red (2.5YR4/8)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; very fine roots; gradual smooth boundary to

Bt2 105 - 140 cm: reddish yellow (5YR6/8)dry, red (2.5YR4/8)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium irregular soft and hard nodules

SOIL CLASSIFICATION: (FAO): Ferric Alisol Local name: Kikungu

Analytical data profile KP 30

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	4	11
Silt	: 10	4	11
Very fine sand	: 11	35	6
Fine sand	: 27	31	14
Medium sand	: 27	18	22
Coarse sand	: 13	6	23
Very coarse sand	: 7	2	13
Texture class	: S	LS	SL
pH H20	: 5.9	5.3	4.9
pH KCl	: 4.5	4.0	4.1
EC mS/cm	: 0.02	0.02	0.30
Organic C %	: 0.18	0.35	0.20
Total N %	: 0.03	0.05	0.01
C/N	: 6	7	20
Available P mg/kg	: 5.6	2.9	1.4
CEC me/100g	: 2.2	2.0	5.4
Exch. Ca me/100g	: 0.9	0.5	1.1
Exch. Mg me/100g	: 0.3	0.3	0.7
Exch. K me/100g	: 0.08	0.11	0.08
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H me/100g	: -	0.09	0.02
Exch. Al me/100g	: -	0.10	0.06
TEB me/100g	: 1.3	0.9	1.9
Base saturation %	: 60	46	35

Profile : KP31 Soil unit: C5i1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 481601E, 9581246N
Location : Mwaluguru village
Elevation : 1180 m asl.

Parent material : alluvium/colluvium from deposists of unknown origin.
Landform : flat or almost flat mbuga.
Slope : 0.5%; concave.
Surface characteristics : hexagonal cracks Erosion: none or slight. Deposition: none.
Natural drainage class : poorly drained.

Soil moisture regime : ustic
Vegetation/land use : bushes and Acacia trees. Used for wetland rice cultivation. Influence of past use: ploughing.
Described by : D.N. Kimaro on 5 November 1996

Soil: Very deep, poorly drained, dark grayish brown, mottled, cracking, heavy sandy clays with calcium carbonate nodules in the deeper subsoils.

Apg 0 - 25 cm: light brownish grey (10YR6/2)dry, dark greyish brown (10YR4/2)moist; sandy clay loam; yellowish brown and reddish brown mottles; slightly hard dry, firm moist, slightly sticky slightly plastic wet; weak medium subangular blocks; many fine and very fine pores; few large spherical hard nodules; common fine roots; yellowish and reddish brown mottles, clay nodules; clear smooth boundary to

Cg1 25 - 60 cm: dark greyish brown (10YR4/2)dry, very dark greyish brown (10YR3/2)moist; sandy clay; reddish brown mottles; very hard dry, very firm moist, sticky plastic wet; moderate medium prisms; many very fine pores; frequent large spherical hard nodules; reddish brown mottles; clay nodules; gradual smooth boundary to

Cg2 60 - 100 cm: dark greyish brown (10YR4/2)dry, dark greyish brown (10YR4/2)moist; sandy clay; reddish brown mottles; very hard dry, very firm moist, sticky plastic wet; moderate medium prisms; common very fine pores; frequent large spherical hard nodules; reddish brownish mottles, clay nodules; clear smooth boundary to

C3 100 - 140 cm: grey (10YR5/1)dry, grey (10YR5/1)moist; sandy clay; very hard dry, very firm moist, sticky plastic wet; structureless massive; few very fine pores; very frequent medium spherical hard nodules; presence of calcium carbonate and clay nodules

SOIL CLASSIFICATION: (FAO): Vertic Cambisol Local name: Mbuga

Analytical data profile KP 31

Depth (cm)	: 0-20	30-50	80-100
Clay	: 11	42	17
Silt	: 10	8	6
Very fine sand	: 6	3	22
Fine sand	: 14	8	20
Medium sand	: 21	12	17
Coarse sand	: 24	19	12
Very coarse sand	: 14	8	6
Texture class	: SL	SC	SL
pH H20	: 5.3	5.4	8.1
pH KCl	: 3.9	3.9	6.9
EC mS/cm	: 0.05	0.10	0.37
Organic C %	: 0.52	0.50	0.39
Total N %	: 0.05	0.06	0.02
C/N	: 10	8	20
Available P mg/kg	: 1.44	8.26	36.8
CEC me/100g	: 11.6	42.6	24.4
Exch. Ca me/100g	: 3.6	14.6	24.6
Exch. Mg me/100g	: 1.2	4.5	6.5
Exch. K me/100g	: 0.03	0.06	0.04
Exch. Na me/100g	: 0.05	0.02	2.3
Exch. H me/100g	: 0.06	0.02	

Exch. Al me/100g	: 0.24	0.82	
TEB me/100g	: 4.9	19.2	33.4
Base saturation %	: 42	45	100

Profile : **KP32** Soil unit: B3f4

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 480717E, 9577974N
Location : Mwaluguru village
Elevation : 1250 m asl.

Parent material : colluvium.
Landform : gently undulating plain.
Slope : 2%; straight
Surface characteristics : Outcrops: 5 % Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming. Influence of past use: ploughing.
Described by : D.N. Kimaro on 5 November 1996

Soil: Deep, well to somewhat excessively drained, red to reddish brown, loamy sands to sandy loams; over laterite.

Ap 0 - 20 cm: brown (7.5YR4/2)dry, dark brown (7.5YR3/2)moist; loamy sand; soft dry, friable moist, non-sticky non-plastic wet; weak to moderate medium to coarse subangular blocks; many fine and very fine pores; few small spherical soft and hard nodules; few very fine roots; presence of sesquioxides and clay nodules; clear smooth boundary to

Bt1 20 - 55 cm: brown (7.5YR4/4)dry, dark brown (7.5YR3.5/4)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; moderate fine to medium subangular blocks; many fine and very fine pores; few medium spherical hard nodules; very fine roots; presence of sesquioxides and clay nodules and coarse quartz grains; gradual smooth boundary to

Bt2 55 - 85 cm: yellowish red (5YR5/6)dry, red (2.5YR4/6)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; moderate fine to medium subangular blocks; many fine and very fine pores; frequent small spherical soft nodules; presence of sesquioxides and clay nodules; clear smooth boundary to

BC 85 - 110 cm: reddish yellow (5YR5.5/6)dry, reddish brown (2.5YR4/4)moist; sandy loam; slightly hard dry, friable moist, slightly sticky non-plastic wet; porous massive; many fine and very fine pores; plinthite mixed with angular quartz fragments and stones over laterite

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 32

Depth (cm)	: 0-20	30-50	80-100
Clay	: 1	9	19
Silt	: 6	5	12
Very fine sand	: 31	29	11
Fine sand	: 27	24	13

Medium sand	: 19	17	13
Coarse sand	: 11	11	15
Very coarse sand	: 5	5	17
Texture class	: S	LS	SL
pH H20	: 6.6	6.5	6.3
pH KCl	: 5.7	4.9	4.6
EC mS/cm	: 0.04	0.02	0.01
Organic C %	: 0.54	0.15	0.32
Total N %	: 0.08	0.02	0.02
C/N	: 7	8	16
Available P mg/kg	: 34.3	11.1	5.8
CEC me/100g	: 5.0	3.6	3.2
Exch. Ca me/100g	: 3.0	2.2	2.0
Exch. Mg me/100g	: 1.0	0.6	0.4
Exch. K me/100g	: 0.40	0.13	0.09
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 4.4	3.0	2.5
Base saturation %	: 88	81	79

Profile : **KP33** Soil unit: C4f4

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 4806E, 95711N
Location : Sungamile village
Elevation : 1190 m asl.

Parent material : colluvium from deposits of unknown origin.
Landform : flat or almost flat plain.
Slope : 1.5%; straight.
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained
Soil moisture regime : ustic.
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming. Influence of past use: ploughing.
Described by : D.N. Kimaro on 7 November 1996

Soil: Deep, well to somewhat excessively drained, dark brown, sandy loams over laterite.

Ap 0 - 15 cm: strong brown (7.5YR4/6)dry, dark brown (7.5YR4/2)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium subangular blocks; many fine and very fine pores; few medium spherical soft and hard nodules; few fine and very fine roots; presence of clay nodules; clear smooth boundary to

Bw1 15 - 45 cm: yellowish red (7.5YR4/5)dry, dark brown (7.5YR4/4)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium spherical soft and hard nodules; very fine roots; presence of clay and iron nodules; gradual smooth boundary to

Bw2 45 - 75 cm: strong brown (7.5YR4/6)dry, dark brown (7.5YR4/4)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium spherical hard nodules; presence of clay and iron nodules; abrupt smooth boundary to

CBc 75 - 125 cm: strong brown (7.5YR5/6)dry, dark brown (7.5YR4/4)moist; very gravelly porous massive; structureless single grain; ironstone gravel over laterite

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 33

Depth (cm)	: 0-20	30-50	80-100
Clay	: 9	15	16
Silt	: 10	11	10
Very fine sand	: 10	13	12
Fine sand	: 26	22	21
Medium sand	: 25	17	18
Coarse sand	: 11	11	10
Very coarse sand	: 9	11	13
Texture class	: LS	SL	SL
pH H20	: 5.6	5.0	4.9
pH KCl	: 4.7	3.8	3.9
EC mS/cm	: 0.06	0.01	0.02
Organic C %	: 0.73	0.27	0.16
Total N %	: 0.07	0.03	0.02
C/N	: 10	9	8
Available P mg/kg	: 4.7	1.8	1.14
CEC me/100g	: 4.8	5.8	5.3
Exch. Ca me/100g	: 1.4	1.3	1.2
Exch. Mg me/100g	: 1.1	0.6	0.4
Exch. K me/100g	: 0.14	0.06	0.06
Exch. Na me/100g	: 0.02	0.06	0.02
Exch. H me/100g	: -	0.08	0.14
Exch. Al me/100g	: -	0.46	0.20
TEB me/100g	: 2.7	2.0	1.7
Base saturation %	: 56	35	32

Profile : KP34 Soil unit: D5i1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 47794E, 95728N
Location : Gembe village
Elevation : 1185 m asl.

Parent material : alluvium.
Landform : flat or almost flat mbuga.
Slope : 0.5%; concave
Surface characteristics : hexagonal cracks Erosion: none or slight. Deposition: none.

Natural drainage class : poorly drained.
Soil moisture regime : ustic
Vegetation/land use : bushes and Acacia trees. Used for wetland rice cultivation. Influence of past use: ploughing.
Described by : D.N. Kimaro on 11 November 1996

Soil: Very deep, poorly drained, dark grayish, mottled, cracking, heavy clays

Ap 0 - 25 cm: dark grey (7.5YR4/0)dry, dark grey (7.5YR4/0)moist; sandy clay; brownish mottles; very hard dry, very firm moist, sticky plastic wet; weak very coarse irregular compound prisms; common fine and very fine pores; very fine roots; brownish mottles; clear smooth boundary to

Cg1 25 - 55 cm: dark grey (7.5YR4/0)moist; clay; brownish mottles; very firm moist, sticky plastic wet; weak very coarse prisms; common fine and very fine pores; few medium spherical soft and hard nodules; brownish mottles; clay and iron nodules; gradual smooth boundary to

Cg2 55 - 80 cm: dark grey (7.5YR4/0)moist; clay; brownish mottles; very firm moist, sticky plastic wet; structureless massive; few fine and very fine pores; few medium spherical soft and hard nodules; brownish mottles; iron and clay nodules; diffuse smooth boundary to

Cg3 80 - 120 cm: dark grey (7.5YR4/0)moist; clay; very firm moist, sticky plastic wet; structureless massive; few fine and very fine pores; few medium spherical soft and hard nodules; iron and clayand calcium carbonate nodules

SOIL CLASSIFICATION: (FAO):Eutric Vertisol Local name: Mbuga

Analytical data profile KP 34

Depth (cm)	: 0-20	30-50	80-100
Clay	: 37	45	46
Silt	: 13	17	19
Very fine sand	: 4	6	6
Fine sand	: 11	10	9
Medium sand	: 14	9	8
Coarse sand	: 11	8	7
Very coarse sand	: 10	5	5
Texture class	: SC	C	C
pH H20	: 6.6	6.1	6.8
pH KCl	: 5.0	4.7	5.4
EC mS/cm	: 0.14	0.08	0.18
Organic C %	: 0.69	0.80	0.52
Total N %	: 0.07	0.05	0.03
C/N	: 10	16	17
Available P mg/kg	: 29.5	16.6	36.2
CEC me/100g	: 27.3	39.4	29.2
Exch. Ca me/100g	: 14.6	16.9	18.0
Exch. Mg me/100g	: 8.0	9.8	9.6
Exch. K me/100g	: 0.62	0.09	0.09
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-

TEB me/100g	: 23.2	26.8	27.7
Base saturation %	: 85	68	95

Profile : **KP35** Soil unit: B3f1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 479553E, 957536N
Location : Mwaluguru village
Elevation : 1197 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1.5%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained.
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming; maize,groundnuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 11 November 1996

Soil: Moderately deep, well to somewhat excessively drained, red, sandy loams over laterite. Coarse quartz and sand grains are present throughout the profile.

Ap 0 - 20 cm: reddish yellow (5YR6/6)dry, yellowish red (5YR5/6)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; few medium spherical soft and hard nodules; few fine and very fine roots; presence of clay nodules; clear smooth boundary to

Bw1 20 - 45 cm: yellowish red (5YR5/6)dry, yellowish red (5YR4/6)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium spherical soft and hard nodules; very fine roots; presence of clay and iron nodules; diffuse smooth boundary to

Bw2 45 - 70 cm: reddish yellow (5YR6/8)dry, red (2.5YR4/8)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; many fine and very fine pores; frequent medium spherical soft and hard nodules; presence of clay and iron nodules; abrupt smooth boundary to

CBc 70 - 135 cm: reddish yellow (5YR6/8)dry, yellowish red (5YR5/8)moist; very gravelly; structureless single grain; ironstone gravel over laterite

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 35

Depth (cm)	: 0-20	30-50	80-100
Clay	: 13	23	8
Silt	: 9	9	10
Very fine sand	: 14	12	12
Fine sand	: 24	19	19
Medium sand	: 21	13	19
Coarse sand	: 12	12	16
Very coarse sand	: 7	12	16
Texture class	: SL	SCL	LS

pH H20	: 5.3	5.0	5.0
pH KCl	: 4.3	3.9	3.9
EC mS/cm	: 0.06	0.02	0.01
Organic C %	: 0.74	0.28	0.21
Total N %	: 0.07	0.02	0.02
C/N	: 11	9	11
Available P mg/kg	: 10.1	3.1	1.6
CEC me/100g	: 5.2	4.1	3.1
Exch. Ca me/100g	: 0.9	0.6	0.5
Exch. Mg me/100g	: 0.5	0.3	0.2
Exch. K me/100g	: 0.97	0.59	0.27
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H me/100g	: 0.04	0.06	0.08
Exch. Al me/100g	: 0.08	0.08	0.34
TEB me/100g	: 2.4	1.5	1.0
Base saturation %	: 46	37	33

Profile : **KP36** Soil unit: D5i1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 482952E, 9584826N
Location : Along river Igundu valley
Elevation : 1150 m asl.

Parent material : alluvium.
Landform : flat or almost flat mbuga.
Slope : 0.5%; concave
Surface characteristics : irregular cracks Erosion: none or slight. Deposition: none.
Natural drainage class : poorly drained.
Soil moisture regime : ustic.
Vegetation/land use : bushes and Acacia trees. Used for grazing, vegetable gardens; tomatoes. Influence of past use: ploughing, grazing.
Described by : D.N. Kimaro on 11 November 1996

Soil: Very deep, poorly drained, black, mottled, cracking, heavy clays; with iron and clay nodules in the subsoils.

Ap 0 - 20 cm: black (5YR2.5/1)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; weak medium to coarse wedge-shaped blocks; few very fine pores; brownish mottles; abrupt smooth boundary to

Cg1 20 - 50 cm: black (7.5YR2/0)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; moderate medium wedge-shaped blocks; few small spherical soft nodules; brownish mottles; iron and clay nodules; gradual smooth boundary to

Cg2 50 - 75 cm: black (2.5Y2/0)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; moderate medium wedge-shaped blocks; few small spherical soft nodules; very fine roots; brownish mottles; iron and clay nodules; diffuse smooth boundary to

Cg3 75 - 120 cm: black (2.5Y2/0)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; moderate medium wedge-shaped blocks; few small spherical soft nodules; very fine roots; brownish mottles; iron and clay nodules

SOIL CLASSIFICATION: (FAO): Eutric Vertisol Local name: Mbuga

Analytical data profile KP 36

Depth (cm)	: 0-20	30-50	80-100
Clay	: 66	83	83
Silt	: 17	7	9
Very fine sand	: 2	1	1
Fine sand	: 3	2	1
Medium sand	: 3	2	2
Coarse sand	: 5	3	3
Very coarse sand	: 4	2	1
Texture class	: C	C	C
pH H20	: 5.1	5.7	5.6
pH KCl	: 4.1	4.6	5.0
EC mS/cm	: 0.30	0.24	0.29
Organic C %	: 2.37	2.46	1.46
Total N %	: 0.35	0.25	0.16
C/N	: 7	10	9
Available P mg/kg	: 21.1	9.5	17.2
CEC me/100g	: 76.6	71.3	54.0
Exch. Ca me/100g	: 22.1	25.3	29.5
Exch. Mg me/100g	: 13.0	16.0	11.0
Exch. K me/100g	: 0.12	0.36	0.26
Exch. Na me/100g	: 0.02	0.43	0.31
Exch. H me/100g	: 0.16	-	-
Exch. Al me/100g	: 0.01	-	-
TEB me/100g	: 35.2	32.1	41.1
Base saturation %	: 46	59	76

Profile **: KP37** Soil unit: B4g2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 493729E, 956839N
Location : Isaka town
Elevation : 1201 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1.5%; convex
Surface characteristics : Outcrops: 2 % Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained.
Soil moisture regime : ustic
Vegetation/land use : planted trees; Cacia sp. Used for rainfed arable farming; cassava,maize. Influence of past use: ploughing.
Described by : D.N. Kimaro on 11 November 1996

Soil: Shallow, imperfectly to moderately well drained, grayish brown, sands, over lukele.

Ap 0 - 25 cm: light brownish grey (10YR6/2)dry, dark greyish brown (10YR4/2)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; few medium and common fine roots; clear smooth boundary to

Cq 25 - 50 cm: light grey (10YR7/1)dry, greyish brown (10YR5/2)moist; loamy sand; brownish mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; porous massive; many fine and very fine pores; few medium roots; weakly cemented layer; diffuse smooth boundary to

Cqm 50 - 140 cm: light grey (10YR7/2)dry, pale brown (10YR6/3)moist; loamy sand; brownish mottles; extremely hard dry, friable moist, non-sticky non-plastic wet; porous massive; many pores; strongly cemented layer

SOIL CLASSIFICATION: (FAO): Eutric Leptosol Local name: Lukele

Analytical data profile KP 37

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	7	8
Silt	: 10	7	8
Very fine sand	: 14	11	8
Fine sand	: 23	22	17
Medium sand	: 22	25	22
Coarse sand	: 18	22	24
Very coarse sand	: 6	6	13
Texture class	: LS	S	S
pH H20	: 6.7	6.6	7.0
pH KCl	: 6.2	5.6	6.0
EC mS/cm	: 0.10	0.05	0.04
Organic C %	: 0.78	0.25	0.13
Total N %	: 0.09	0.03	0.01
C/N	: 9	8	13
Available P mg/kg	: 37.0	22.5	8.1
CEC me/100g	: 5.0	4.5	0.8
Exch. Ca me/100g	: 3.1	2.8	0.3
Exch. Mg me/100g	: 1.0	0.6	0.2
Exch. K me/100g	: 0.50	0.42	0.25
Exch. Na me/100g	: 0.02	0.04	0.09
Exch. H me/100g	: -	-	-
Exch. Al me/100g	: -	-	-
TEB me/100g	: 4.6	3.9	0.8
Base saturation %	: 93	85	100

Profile : **KP38** Soil unit: C4b1
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 487364E, 9575454N
Location : Mwashigini village
Elevation : 1172 m asl.

Parent material : colluvium from deposits of unknown origin.
Landform : flat or almost flat plain.
Slope : 1%; convex.
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well drained.
Soil moisture regime : ustic
Vegetation/land use : miombo trees. Used for rainfed arable farming; cassava, groundnuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 13 November 1996

Soil: Very deep, well drained, red, sandy clay loams

Ap 0 - 15 cm: yellowish red (5YR4/6)dry, dark red (2.5YR2/6)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium subangular blocks; few coarse and many fine pores; few small spherical soft and hard nodules; common very fine roots; presence of iron and clay nodules; clear smooth boundary to

Bw1 15 - 40 cm: yellowish red (5YR5/6)dry, red (2.5YR4/6)moist; sandy clay loam; slightly hard dry, friable moist, slightly sticky non-plastic wet; moderate fine to medium subangular blocks; few coarse and many fine pores; frequent medium spherical soft and hard nodules; very fine roots; cly and iron nodules; gradual smooth boundary to

Bw2 40 - 85 cm: red (2.5YR4/8)dry, red (10R4/8)moist; sandy clay loam; soft dry, very friable moist, slightly sticky slightly plastic wet; moderate fine to medium subangular blocks; many fine and very fine pores; frequent medium spherical soft and hard nodules; clay and iron nodules; diffuse smooth boundary to

Bw3 85 - 135 cm: red 2.5YR4/8)dry, red (10R4/8)moist; sandy clay loam; soft dry, very friable moist, slightly sticky slightly plastic wet; moderate fine to medium subangular blocks; many fine and very fine pores; frequent medium spherical soft and hard nodules; clay and iron nodules

SOIL CLASSIFICATION: (FAO): Ferric Alisol Local name: Kikungu

Analytical data profile KP 38

Depth (cm)	: 0-20	30-50	80-100
Clay	: 14	21	23
Silt	: 11	10	10
Very fine sand	: 9	9	8
Fine sand	: 18	16	15
Medium sand	: 21	17	15
Coarse sand	: 19	18	18
Very coarse sand	: 8	9	11
Texture class	: SL	SCL	SCL

pH H20	: 4.8	4.3	4.3
pH KCl	: 3.8	3.4	3.4
EC mS/cm	: 0.03	0.01	0.03
Organic C %	: 0.93	0.49	0.37
Total N %	: 0.09	0.06	0.03
C/N	: 10	8	12
Available P mg/kg	: 4.54	1.26	0.59
CEC me/100g	: 12.5	6.2	4
Exch. Ca me/100g	: 2.1	0.7	0.4
Exch. Mg me/100g	: 1.4	0.4	0.2
Exch. K me/100g	: 0.07	0.06	0.06
Exch. Na me/100g	: 0.04	0.02	0.02
Exch. H me/100g	: 0.08	0.16	0.14
Exch. Al me/100g	: 0.26	1.48	2.20
TEB me/100g	: 3.6	1.2	0.7
Base saturation %	: 29	19	17
Bulk density g/cm3	: 1.4	1.4	1.4
pF 2	: 18.7	21.1	21.5
pF 2.4	: 14.9	15.3	16.2
pF 3	: 9.5	10.5	11.9
pF 4.2	: 6.5	10.0	9.6

Profile : **KP39** Soil unit: B4g1

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 496432E, 958087N
Location : Jana village
Elevation : 1180 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : imperfectly drained.
Soil moisture regime : ustic
Vegetation/land use : bushes and Acacia trees. Used for rainfed arable farming; cassava,g/nuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 14 November 1996

Soil: Shallow, imperfectly drained, dark brown, mottled, loamy sands over lukele.

Ap 0 - 25 cm: pale brown 10YR6/3)dry, dark greyish brown (10YR4/2)moist; loamy sand; brownish and orange mottles; soft dry, very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; many fine and very fine pores; few small spherical soft and hard nodules; common fine and very fine roots; brownish and orange mottles; c and q nodules; abrupt smooth boundary to

Cg 25 - 40 cm: light grey (10YR7/10DRY, dark brown (10yr4/3)moist; loamy sand; brownish mottles; soft dry, very friable moist, non-sticky non-plastic wet; porous massive; many fine and very fine pores; frequent medium spherical soft and hard nodules; few medium roots;

brownish mottles; c and q nodules; over strongly cemented mottled sandy layer

SOIL CLASSIFICATION: (FAO): Dystric Leptosol Local name: Lukele

Analytical data profile KP 39

Depth (cm)	: 0-20	30-50
Clay	: 6	5
Silt	: 6	7
Very fine sand	: 6	7
Fine sand	: 13	9
Medium sand	: 24	22
Coarse sand	: 32	28
Very coarse sand	: 13	12
Texture class	: S	S
pH H20	: 4.9	5.4
pH KCl	: 3.7	3.7
EC mS/cm	: 0.02	0.02
Organic C %	: 0.81	0.21
Total N %	: 0.05	0.02
C/N	: 16	11
Available P mg/kg	: 4.28	1.71
CEC me/100g	: 4.0	2.0
Exch. Ca me/100g	: 0.6	0.5
Exch. Mg me/100g	: 0.6	0.3
Exch. K me/100g	: 0.10	0.03
Exch. Na me/100g	: 0.10	0.12
Exch. H me/100g	: 0.14	0.10
Exch. Al me/100g	: 0.60	0.22
TEB me/100g	: 1.4	1.0
Base saturation %	: 35	49

Profile : KP40 Soil unit: B4f6

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 498962E, 9580423N
Location : Jana village
Elevation : 1180 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%; convex.
Surface characteristics : Outcrops: 5 % Erosion: moderate. Deposition: none.
Natural drainage class : moderately well drained.
Soil moisture regime : ustic
Vegetation/land use : Acacia trees, Kapok trees. Used for rainfed arable farming; maize, g/nuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 14 November 1996

Soil: Very deep, moderately well drained, yellowish brown to pale brown, mottled, sandy loams over laterite; slightly cemented.

Ap 0 - 20 cm: pale brown (10YR6/3)dry, dark greyish brown (10YR4/2)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium subangular blocks; few medium and many fine pores; frequent medium spherical soft and hard nodules; very fine roots; c and q nodules; clear smooth boundary to

Bw1 20 - 40 cm: pale brown (10YR6/3)dry, dark greyish brown (10YR4/2)moist; sandy loam; brownish mottles; hard dry, friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; few medium and many fine pores; frequent medium spherical soft and hard nodules; very fine roots; brownish mottles c and q nodules; clear smooth boundary to

Bw2 40 - 75 cm: yellowish brown (10YR5/4)moist; sandy loam; brownish and reddish mottles; friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; common medium and many fine pores; very frequent medium spherical soft and hard nodules; brownish and reddish mottles; c and q nodules; gradual smooth boundary to

Bw3 75 - 130 cm: pale brown (10YR6/3)moist; sandy loam; brownish and reddish mottles; very friable moist, non-sticky non-plastic wet; weak medium to coarse subangular blocks; few medium and many fine pores; very frequent medium spherical soft and hard nodules; brownish and reddish mottles; c and q nodules; over laterite

SOIL CLASSIFICATION: (FAO): Haplic Arenosol Local name: Luseni

Analytical data profile KP 40

Depth (cm)	: 0-20	30-50	80-100
Clay	: 6	12	9
Silt	: 11	10	4
Very fine sand	: 11	7	2
Fine sand	: 23	17	4
Medium sand	: 22	21	8
Coarse sand	: 17	21	36
Very coarse sand	: 10	12	37
Texture class	: LS	SL	S
pH H20	: 5.5	5.5	5.3
pH KCl	: 3.7	4.8	3.7
EC mS/cm	: 0.11	0.03	0.02
Organic C %	: 0.76	0.24	0.18
Total N %	: 0.04	0.02	0.02
C/N	: 10	12	9
Available P mg/kg	: 28.1	13.7	2.6
CEC me/100g	: 6.0	6.2	4.8
Exch. Ca me/100g	: 1.6	2.0	1.2
Exch. Mg me/100g	: 1.0	1.1	0.9
Exch. K me/100g	: 0.52	0.24	0.17
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H me/100g	: -	-	0.04
Exch. Al me/100g	: -	-	0.36
TEB me/100g	: 3.1	3.4	2.3
Base saturation %	: 52	54	48

Profile : **KP41** Soil unit: A4c3
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 489271E, 9569269N
Location : Mwakata village
Elevation : 1192 m asl.

Parent material : colluvium from Banded Ironstone.
Landform : plain.
Slope : 1%
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : well drained.
Soil moisture regime : ustic
Vegetation/land use : bushes, miombo regrowth. Used for rainfed arable farming; maize,g/nuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 15 November 1996

Soil: Moderately deep, well drained, red, clay loams to clays, over thick layers of angular gravel, stones and Banded Ironstone rocks

Ap 0 - 12 cm: red (10R4/8)dry, red (10R4/6)moist; clay loam; slightly hard dry, friable moist, slightly sticky slightly plastic wet; weak to moderate fine to medium subangular blocks; few medium and many fine pores; few small spherical soft and hard nodules; common very fine roots; clay nodules; gradual smooth boundary to

Bw1 12 - 40 cm: red (10R4/8)dry, red (10R4/6)moist; clay; soft dry, very friable moist, slightly sticky slightly plastic wet; moderate fine to medium subangular blocks; many very fine pores; few small angular fresh fragments; frequent medium spherical soft and hard nodules; few very fine roots; quartz, claystone gravel; clay nodules; diffuse smooth boundary to

Bw2 40 - 60 cm: red (10R4/8)dry, red (10R4/6)moist; clay; soft dry, very friable moist, slightly sticky slightly plastic wet; moderate fine to medium subangular blocks; many very fine pores; few small angular fresh fragments; frequent medium spherical soft and hard nodules; very fine roots; quartz, claystone gravels; clay nodules over angular gravel,stones,claystonerock

SOIL CLASSIFICATION: (FAO): Ferric Luvisol Local name: Nduha

Analytical data profile KP 41

Depth (cm)	: 0-20	30-50
Clay	: 20	28
Silt	: 16	14
Very fine sand	: 11	15
Fine sand	: 34	21
Medium sand	: 9	11
Coarse sand	: 6	6
Very coarse sand	: 4	5
Texture class	: SCL	SCL
pH H20	: 6.0	5.7
pH KCl	: 4.7	4.8
EC mS/cm	: 0.02	0.02

Organic C %	: 0.76	0.20
Total N %	: 0.05	0.02
C/N	: 15	10
Available P mg/kg	: 0.36	0.05
CEC me/100g	: 10.3	8.3
Exch. Ca me/100g	: 3.9	3.5
Exch. Mg me/100g	: 3.3	1.5
Exch. K me/100g	: 0.10	0.08
Exch. Na me/100g	: 0.04	0.04
Exch. H me/100g	: -	-
Exch. Al me/100g	: -	-
TEB me/100g	: 7.3	5.1
Base saturation %	: 71	62

Profile : **KP42** Soil unit: B4f4
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 48691E, 957126N
Location : Mwakata village
Elevation : 1184 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : moderately well drained.
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming; maize,g/nuts. Influence of past use: ploughing.
Described by : D.N. Kimaro on 15 November 1996

Soil: Deep, moderately well drained, yellowish brown to reddish yellow, loamy sands over laterite.

Ap 0 - 25 cm: pale brown (10YR5/2)dry, dark yellowish brown (10YR3/2)moist; sandy loam; slightly hard dry, friable moist, non-sticky non-plastic wet; weak to moderate fine to medium subangular blocks; few medium and many fine pores; few small spherical soft and hard nodules; few very fine roots; clay nodules; abrupt smooth boundary to

Bw1 25 - 50 cm: pale brown (10YR6/3)dry, dark yellowish brown (10YR4/4)moist; loamy sand; brownish mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; moderate medium subangular blocks; few medium and many fine pores; frequent medium spherical soft and hard nodules; very fine roots; brownish mottles; c and q nodules; slightly compacted; clear smooth boundary to

Bwg2 50 - 75 cm: very pale brown (10YR7/3)dry, yellowish brown (10YR5/4)moist; loamy sand; brownish mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; few medium and many fine pores; very frequent medium spherical soft and hard nodules; brownish mottles; c and q nodules; gradual smooth boundary to

Bwg3 75 - 95 cm: light brown (7.4YR6/4)dry, reddish yellow (7.5YR6/6)moist; loamy sand; brownish mottles; soft dry, very friable moist, non-sticky non-plastic wet; weak medium

subangular blocks; few medium and many fine pores; very frequent medium spherical soft and hard nodules; brownish mottles; c and q nodules; over laterite

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 42

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	10	10
Silt	: 11	16	8
Very fine sand	: 12	16	7
Fine sand	: 20	26	8
Medium sand	: 21	1	20
Coarse sand	: 15	17	22
Very coarse sand	: 13	14	25
Texture class	: LS	SL	LS
pH H20	: 6.1	6.2	5.3
pH KCl	: 5.6	5.2	3.7
EC mS/cm	: 0.05	0.02	0.01
Organic C %	: 0.54	0.25	0.10
Total N %	: 0.04	0.02	0.01
C/N	: 14	13	10
Available P mg/kg	: 16.6	8.5	3.8
CEC me/100g	: 6.2	3.3	2.7
Exch. Ca me/100g	: 3.6	1.7	0.6
Exch. Mg me/100g	: 0.8	0.6	0.3
Exch. K me/100g	: 0.14	0.20	0.23
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H me/100g	: -	-	0.06
Exch. Al me/100g	: -	-	0.48
TEB me/100g	: 4.6	2.5	1.2
Base saturation %	: 74	75	43

Profile **: KP43** Soil unit: B4f8
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 479321E, 9564542N
Location : Bukooba village
Elevation : 1220 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%; straight
Surface characteristics : Erosion: moderate. Deposition: none.
Natural drainage class : somewhat excessively drained.
Soil moisture regime : ustic
Vegetation/land use : regrowth of miombo trees. Used for rainfed arable farming. Influence of past use: ploughing.
Described by : D.N. Kimaro on 15 November 1996

Soil: Moderately deep, well to somewhat excessively drained, dark yellowish brown, loamy sands; over laterite

Ap 0 - 15 cm: very pale brown (10YR7/3)dry, dark yellowish brown (10YR4/4)moist; loamy sand; soft dry, very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; few small spherical soft and hard nodules; common very fine roots; clay nodules; clear smooth boundary to

Bw1 15 - 35 cm: light yellowish brown (10YR6/4)dry, dark yellowish brown (10YR6/4)moist; loamy sand; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium subangular blocks; few medium and many fine pores; very frequent medium spherical soft and hard nodules; common very fine roots; c and q nodules; gradual smooth boundary to

Bwg2 35 - 60 cm: light yellowish brown (10YR6/4)dry, dark yellowish brown (10YR6/4)moist; sandy loam; brownish mottles; soft dry, very friable moist, non-sticky non-plastic wet; weak to moderate medium subangular blocks; few medium and many fine pores; very frequent medium spherical soft and hard nodules; c and q nodules; abrupt smooth boundary to

CBcs 60 - 120 cm: yellowish brown (10YR5/8)dry, strong brown (7.5YR5/6)moist; very gravelly; plinthite (ironstone gravel mixed with few fresh quartz gravels.

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 43

Depth (cm)	: 0-20	30-50
Clay	: 10	13
Silt	: 26	3
Very fine sand	: 12	17
Fine sand	: 17	23
Medium sand	: 14	19
Coarse sand	: 9	12
Very coarse sand	: 9	12
Texture class	: SL	LS
pH H20	: 5.1	5.9
pH KCl	: 5.0	5.1
EC mS/cm	: 0.01	0.02
Organic C %	: 0.66	0.22
Total N %	: 0.05	0.02
C/N	: 13	11
Available P mg/kg	: 1.83	2.68
CEC me/100g	: 2.2	1.9
Exch. Ca me/100g	: 0.5	0.7
Exch. Mg me/100g	: 0.2	0.4
Exch. K me/100g	: 0.06	0.10
Exch. Na me/100g	: 0.02	0.02
Exch. H me/100g	: 0.04	-
Exch. Al me/100g	: 0.30	-
TEB me/100g	: 0.8	1.2
Base saturation %	: 35	66

Profile : **KP44** Soil unit: B4b2
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/4
Coordinates : 474655E, 956401N
Location : Mpera villge
Elevation : 1130 m asl.

Parent material : colluvium from granite.
Landform : flat or almost flat plain.
Slope : 1%; straight
Surface characteristics : Erosion: severe. Deposition: none.
Natural drainage class : well drained.
Soil moisture regime : ustic
Vegetation/land use : bushes; miombo trees. Used for forest reserve; grazing. Influence of past use: clearing.
Described by : D.N. Kimaro on 15 November 1996

Soil: Very deep, well drained, yellowish brown, sandy loams to sandy clay loams.

Ah 0 - 15 cm: pale brown (10YR6/3)dry, dark brown (10YR4/3)moist; sandy loam; soft dry, very friable moist, non-sticky non-plastic wet; weak to moderate fine to medium subangular blocks; few medium and many fine pores; few small spherical soft and hard nodules; few fine roots; c and q nodules; clear smooth boundary to

Bw1 15 - 35 cm: yellowish brown (10YR5/4)dry, yellowish brown (10YR5/6)moist; sandy loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak to moderate fine to medium subangular blocks; few medium and many fine pores; frequent medium spherical soft and hard nodules; few medium and fine roots; c and q nodules; gradual smooth boundary to

Bw2 35 - 75 cm: yellowish brown (10YR5/6)dry, yellowish brown (10YR5/8)moist; sandy clay loam; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak to moderate fine to medium subangular blocks; many fine and very fine pores; very frequent medium spherical soft and hard nodules; few medium and fine roots; c and q nodules; diffuse smooth boundary to

Bw3 75 - 130 cm: brownish yellow (10YR6/6)dry, yellowish brown (10YR5/8)moist; sandy clay loam; soft dry, very friable moist, slightly sticky slightly plastic wet; weak to moderate fine to medium subangular blocks; many fine and very fine pores; very frequent medium spherical soft and hard nodules; few fine roots; c and q nodules

SOIL CLASSIFICATION: (FAO):Ferric Acrisol Local name: Kikungu

Analytical data profile KP 44

Depth (cm)	: 0-20	30-50	80-100
Clay	: 12	22	26
Silt	: 8	10	12
Very fine sand	: 11	10	12
Fine sand	: 18	13	13
Medium sand	: 24	9	8
Coarse sand	: 12	14	14
Very coarse sand	: 15	22	15
Texture class	: LS	SCL	SCL

pH H20	: 4.7	4.9	5.5
pH KCl	: 3.9	3.7	4.3
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.39	0.25	2.16
Total N %	: 0.03	0.02	0.22
C/N	: 13	13	10
Available P mg/kg	: 4.49	1.32	0.90
CEC me/100g	: 2.1	3.6	2.9
Exch. Ca me/100g	: 0.2	0.7	1.0
Exch. Mg me/100g	: 0.2	0.5	0.5
Exch. K me/100g	: 0.11	0.11	0.03
Exch. Na me/100g	: 0.02	0.07	0.04
Exch. H me/100g	: 0.06	0.04	-
Exch. Al me/100g	: 0.38	0.70	-
TEB me/100g	: 0.5	1.4	1.6
Base saturation %	: 26	38	54

Profile : **KP45** Soil unit: A2e2

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinate : 445952E, 9608410N
Location : Chela village near Chela spring
Elevation : 1220 m asl.

Parent material : colluvium from Banded Ironstone.
Landform : undulating footslope (undefined).
Slope : 8%; straight.
Surface characteristics : Stones: 5 % Erosion: severe. Deposition: none.
Natural drainage class : well drained.
Soil moisture regime : ustic
Vegetation/land use : miombo trees. Used for rainfed arable farming. Influence of past use: plughing, grazing.
Described by : D.N. Kimaro on 22 November 1996

Soil: Shallow, well to somewhat excessively drained, yellowish brown, gravelly clays; over laterite.

Ap 0 - 20 cm: yellowish brown (10YR5/4)dry, dark brown (10YR3/3)moist; clay loam; slightly hard dry, very friable moist, slightly sticky slightly plastic wet; moderate fine to medium subangular blocks; many fine and very fine pores; frequent medium spherical hard nodules; few fine and very fine roots; clay and iron nodules; abrupt smooth boundary to

Bw 20 - 45 cm: brownish yellow (10YR6/8)dry, yellowish brown (10YR5/8)moist; gravelly clay; soft dry, very friable moist, moderately strong fine to medium subangular blocks; many fine and very fine pores; very frequent small spherical hard nodules; few fine roots; clay and iron nodules; over laterite

SOIL CLASSIFICATION: (FAO): Ferric Acrisol Local name: Lukili

Analytical data profile KP 45

Depth (cm)	: 0-20	30-50
Clay	: 19	23
Silt	: 16	19
Very fine sand	: 14	12
Fine sand	: 27	21
Medium sand	: 12	12
Coarse sand	: 6	5
Very coarse sand	: 6	8
Texture class	: SL	SCL
pH H20	: 5.3	5.5
pH KCl	: 4.3	4.9
EC mS/cm	: 0.02	0.01
Organic C %	: 0.15	1.59
Total N %	: 0.02	0.13
C/N	: 8	12
Available P mg/kg	: 0.62	0.12
CEC me/100g	: 7.0	0.7
Exch. Ca me/100g	: 2.3	0.3
Exch. Mg me/100g	: 0.5	0.2
Exch. K me/100g	: 0.06	0.03
Exch. Na me/100g	: 0.07	0.02
Exch. H me/100g	: 0.02	-
Exch. Al me/100g	: 0.20	-
TEB me/100g	: 2.9	0.6
Base saturation %	: 42	85

Profile : **KP46** Soil unit: A1a1

Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/1
Coordinates : 446333E, 9609162N
Location : Chela village at the spring
Elevation : 1300 m asl.

Parent material : metamorphic rocks Banded Ironstone.
Landform : hilly erosional hill.
Slope : 25%; straight.
Surface characteristics : Outcrops: 80 % Stones: 90 % Erosion: severe. Deposition: none.
Natural drainage class : excessively drained.
Soil moisture regime : ustic
Vegetation/land use : miombo forest. Used for Grazing, fuel wood. Influence of past use: clearing.
Described by : D.N. Kimaro on 22 November 1996

Soil: Very shallow, excessively drained, dark brown, gravelly loams. (Rockland)

Ah 0 - 15 cm: brown (7.5YR4/4)dry, dark brown (7.5YR3/4)moist; very gravelly clay loam; slightly hard dry, very friable moist, slightly sticky slightly plastic wet; moderate medium subangular blocks; many pores; many fine and very fine roots; many angular rock fragments; over Banded Ironstone rock

SOIL CLASSIFICATION: (FAO): Eutric Leptosol Local name: Luguru

Analytical data profile KP 46

Depth (cm)	: 0-20
Clay	: 16
Silt	: 36
Very fine sand	: 6
Fine sand	: 16
Medium sand	: 7
Coarse sand	: 7
Very coarse sand	: 12
Texture class	: L
pH H20	: 5.8
pH KCl	: 4.5
EC mS/cm	: 0.16
Organic C %	: 0.78
Total N %	: 0.06
C/N	: 13
Available P mg/kg	: 6.95
CEC me/100g	: 32.2
Exch. Ca me/100g	: 15.2
Exch. Mg me/100g	: 4.2
Exch. K me/100g	: 0.83
Exch. Na me/100g	: 0.04
Exch. H me/100g	: -
Exch. Al me/100g	: -
TEB me/100g	: 20.3
Base saturation %	: 63

Profile : KP47 Soil unit: D5i2

Survey project	: Kahama district
Region	: Shinyanga
District	: Kahama
Map sheet no.	: 63/1
Coordinates	: 4555E, 96195N
Location	: Jomu village
Elevation	: 1205 m asl.
Parent material	: alluvium from Banded Ironstone.
Landform	: flat or almost flat mbuga.
Slope	: 0.5%; concave.
Surface characteristics	: hexagonal cracks Erosion: none or slight. Deposition: none.
Natural drainage class	: imperfectly drained.
Soil moisture regime	: ustic
Vegetation/land use	: Acacia sp, miombo trees. Used for rainfed arable farming; maize,chickpeas. Influence of past use: ploughing.
Described by	: D.N. Kimaro on 22 November 1996

Soil: Very deep, imperfectly drained, very dark gray, mottled, cracking heavy clays; with iron and manganese nodules throught the profile.

Ap 0 - 20 cm: very dark grey (10YR3/1)dry, very dark grey (10YR3/1)moist; clay; extremely hard dry, very firm moist, very sticky very plastic wet; weak coarse subangular blocks; common fine pores; few small spherical hard nodules; very fine roots; iron and manganese nodules; clear smooth boundary to

Cg1 20 - 45 cm: very dark grey (7.5YR3/0)dry, very dark grey (7.5YR3/0)moist; clay; brownish mottles; extremely hard dry, very firm moist, very sticky very plastic wet; weak medium to coarse wedge-shaped blocks; common very fine pores; frequent small spherical hard nodules; brownish mottles; iron and manganese nodules; diffuse smooth boundary to

Cg2 45 - 85 cm: very dark grey (10YR3/1)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; weak very coarse wedge-shaped blocks; very frequent small spherical hard nodules; brownish mottles; iron and manganes nodules; diffuse smooth boundary to

Cg3 85 - 120 cm: very dark grey (10YR3/1)moist; clay; brownish mottles; very firm moist, very sticky very plastic wet; weak very coarse wedge-shaped blocks; very frequent small spherical hard nodules; brownish mottles; iron and manganese nodules

SOIL CLASSIFICATION: (FAO): Eutric Vertisol Local name: Mbuga

Analytical data profile KP 47

Depth (cm)	: 0-20	30-50	80-100
Clay	: 47	50	52
Silt	: 20	21	20
Very fine sand	: 6	6	5
Fine sand	: 10	9	13
Medium sand	: 8	6	1
Coarse sand	: 6	5	5
Very coarse sand	: 3	3	4
Texture class	: C	C	C
pH H20	: 5.9	5.9	6.3
pH KCl	:4.5	4.5	5.0
EC mS/cm	: 0.08	0.06	0.13
Organic C %	: 2.20	1.05	0.55
Total N %	: 0.20	0.09	0.04
C/N	: 11	12	14
Available P mg/kg	: 2.93	3.77	2.62
CEC me/100g	: 63.1	61.6	5.4
Exch. Ca me/100g	: 26.4	28.2	30.6
Exch. Mg me/100g	: 10.1	8.6	10.6
Exch. K me/100g	: 2.56	2.26	2.56
Exch. Na me/100g	: 0.04	0.34	0.04
TEB me/100g	: 39.1	39.4	43.8
Base saturation %	: 62	64	79
Bulk density g/cm3	: 1.2	1.6	1.5
pF 2	: 41.3	52.4	52.2
pF 2.4	: 38.0	41.4	43.4
pF 3	: 36.2	41.2	41.4
pF 4.2	: 32.7	40.8	40.3

Profile : **KP48** Soil unit: B3f3
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 63/3
Coordinates : 4510E, 95738N
Location : Wigehe village
Elevation : 1220 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 3%; straight
Surface characteristics : Erosion: moderately severe. Deposition: none.
Natural drainage class : somewhat excessively drained.
Soil moisture regime : ustic
Vegetation/land use : planted trees. Used for rainfed arable farming. Influence of past use: ploughing.
Described by : D.N. Kimaro on 25 November 1996

Soil: Very deep, moderately well to somewhat excessively drained, pale brown to light gray, loamy sands.

Ap 0 - 20 cm: light brownish grey (10YR6/2)dry, dark greyish brown (10YR4/2)moist; sand; yellowish brown mottles; soft dry, loose moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; many very fine roots; yellowish brown mottles; gradual smooth boundary to

Bw 20 - 40 cm: pale grey (7.5YR6/2)dry, brown (7.5YR5/2)moist; loamy sand; yellowish brown mottles; soft dry, loose moist; non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; few medium and many fine roots; yellowish brown mottles; gradual smooth boundary to

C1 40 - 80 cm: light grey (10YR7/1)dry, pale brown (10YR6/3)moist; loamy sand; yellowish brown mottles; loose dry, loose moist; non-sticky non-plastic wet; many fine and very fine pores; very fine roots; yellowish brown mottles; structureless single grain; diffuse smooth boundary to

C2 80 - 130 cm: light grey (10YR7/1)dry, light grey (10YR7/2)moist; loamy sand; loose dry, loose moist, non-sticky non-plastic wet; many fine and very fine pores; structureless single grain.

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 48

Depth (cm)	: 0-20	30-50	80-100
Clay	: 3	5	2
Silt	: 8	14	12
Very fine sand	: 7	13	8
Fine sand	: 27	35	27
Medium sand	: 30	12	31
Coarse sand	: 20	17	17
Very coarse sand	: 5	4	3
Texture class	: S	LS	LS
pH H20	: 6.0	5.8	5.7
pH KCl	: 5.1	4.4	4.5
EC mS/cm	: 0.04	0.02	0.01

Organic C %	: 0.36	0.25	0.14
Total N %	: 0.03	0.02	0.01
C/N	: 12	13	14
Available P mg/kg	: 6.36	1.82	1.41
CEC me/100g	: 2.5	2.0	1.3
Exch. Ca me/100g	: 1.0	0.7	0.4
Exch. Mg me/100g	: 0.4	0.3	0.3
Exch. K me/100g	: 0.23	0.14	0.03
Exch. Na me/100g	: 0.02	0.02	0.02
TEB me/100g	: 1.7	1.2	0.6
Base saturation %	: 65	62	58

Profile : **KP49** Soil unit: B3f7
Survey project : Kahama district
Region : Shinyanga
District : Kahama
Map sheet no. : 61/1
Coordinate : 45622E, 958906N
Location : Bubilimbi village
Elevation : 1185 m asl.

Parent material : colluvium from granite.
Landform : gently undulating plain.
Slope : 2%; straight
Surface characteristics : Outcrops: 2 % Erosion: moderately severe. Deposition: none.
Natural drainage class : somewhat excessively drained.
Soil moisture regime : ustic
Vegetation/land use : bushes and Acacia trees. Used for grazing. Influence of past use: grazing.
Described by : D.N. Kimaro on 26 November 1996

Soil: Shallow, moderately well to somewhat excessively drained, pale brown, loamy sands; over laterite

Apg 0 - 15 cm: pale brown (10YR6/3)dry, greyish brown (10YR5/2)moist; loamy sand; brownish mottles; soft dry,very friable moist, non-sticky non-plastic wet; weak medium subangular blocks; many fine and very fine pores; many very fine roots; brownish mottles; clear smooth boundary to

Bwg 15 - 35 cm: light grey (10YR7/2)dry, pale brown (10YR6/3)moist; loamy sand; yellowish brown mottles; slightly hard dry, very friable moist, non-sticky non-plastic wet; weak fine to medium subangular blocks; many very fine pores; few very fine roots; yellowish brown mottles; over laterite

SOIL CLASSIFICATION: (FAO): Luvic Arenosol Local name: Luseni

Analytical data profile KP 49

Depth (cm)	: 0-20	30-50
Clay	: 4	9
Silt	: 5	8
Very fine sand	: 6	9
Fine sand	: 33	9
Medium sand	: 35	41
Coarse sand	: 10	16

Very coarse sand	: 7	8
Texture class	: S	LS
pH H20	: 4.8	4.7
pH KCl	: 3.8	3.6
EC mS/cm	: 0.03	0.02
Organic C %	: 0.23	0.23
Total N %	: 0.02	0.02
C/N	: 12	12
Available P mg/kg	: 2.53	1.37
CEC me/100g	: 2.1	2.8
Exch. Ca me/100g	: 0.3	0.4
Exch. Mg me/100g	: 0.2	0.1
Exch. K me/100g	: 0.06	0.03
Exch. Na me/100g	: 0.04	0.20
Exch. H me/100g	: 0.02	0.07
Exch. Al me/100g	: 1.00	0.80
TEB me/100g	: 0.6	0.7
Base saturation %	: 29	26

Profile no. **: KP 50**

Profile no. **: KP 51** Map unit: B 32 (Soil unit: B3f2)

Sheet/Grid	: 78/1		
Coord	: UTM 4139E9531N		
Elevation	: 1140 m		
Author(s)	: F.M. Banzi		
Date described	: 09/10/96		
Survey Area	: Mweli Div., Kahama District	Location	: Lusonga Village
Soil name (local)	: Luseni		
Classification FAO	: Haplic Arenosols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Land form	: Gently und. Plain	Microrelief	: Cultivation ridges
Slope form	: Straight	Slope % : 2	
Slope position	: Middle		
Parent Mater.	: Colluvium derived from Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Brachestegia, Combretum, Albizia spp.)		
Land use	: Rainfed cultivation (maize, g.nuts) Human inf.		: Cultivation

Ap1 0 - 10 cm: Dark brown (10YR 3/3, moist) sand; very weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many fine and very fine pores; many very fine and fine roots; gradual smooth boundary;

Ap2	10 - 30 cm:	Yellowish brown (10YR 5/4, moist) sand; very weak, very fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many fine and very fine pores; many very fine and fine and common medium roots; gradual smooth boundary;
AC	30 - 60 cm:	Light yellowish brown (10YR 6/4, moist) sand; very weak, very fine sub angular blocky structure; very friable when moist, non sticky and non plastic when wet; many fine and very fine pores; common medium and coarse roots; diffuse weavy boundary;
CA	60 - 100 cm:	Pale brown (10YR 6/3, moist) sand; structureless single grain: loose, non sticky and non plastic when wet; common fine and medium pores; few medium and coarse roots; diffuse smooth boundary;
C	100 - 155 cm:	Very pale brown (10YR 7/4, moist) sand; structureles single grain; loose, non sticky and non plastic when wet; common fine and medium pores; very few coarse roots.

Analytical data profile KP 51

Depth (cm)	: 0-20	30-50	80-100
Clay	: 4	3	3
Silt	: 6	9	8
Very fine sand	: 21	5	10
Fine sand	: 31	16	29
Medium sand	: 28	37	32
Coarse sand	: 9	24	16
Very coarse sand	: 1	6	2
Texture class	: S	S	S
pH H20	: 4.5	4.6	5.2
pH KCl	: 3.8	3.9	4.0
EC mS/cm	: 0.06	0.02	0.01
Organic C %	: 0.16	0.13	0.15
Total N %	: 0.02	0.01	0.01
C/N	: 8	13	15
Available P mg/kg	: 6.16	3.05	1.42
CEC me/100g	: 2.8	1.2	0.7
Exch. Ca me/100g	: 0.2	0.1	0.1
Exch. Mg me/100g	: 0.1	0.1	0.1
Exch. K me/100g	: 0.07	0.09	0.07
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 0.39	0.31	0.29
Base saturation %	: 18	11	16

Profile no. **: KP 52** Map unit: B 22 (soil unit B3b1)
Sheet/Grid : 78/1
Coord : UTM 4141E9534N
Elevation : 1210 m
Author(s) : F.M. Banzi
Date described : 09/10/96
Survey Area : Mweli Div., Kahama District, Location : Nhwagi Village

Soil name (local)	: Kikungu		
Classification FAO	: Haplic Acrisol		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Land form	: Gently und. Plain	Microrelief	: Cultivation ridges
Slope form	: Convex	Slope % : 5	
Slope position	: Upper		
Parent Mater.	: Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Brachestegia, Combretum, Albizia spp.)		
Land use	: Rainfed cultiv. (maize, tobacco, cassava).	Human inf.	: Cultivation

Ap 0 - 15 cm: Dark brown (7.5YR 4/4, dry, and 7.5YR 3/4, moist) sandy loam ; moderate, medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

BA 15 - 50 cm: Yellowish red (7.5YR 5/6, dry, and 7.5YR 4/6, moist) sandy loam ; moderate, medium and coarse subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many very fine, fine and medium pores; many fine and medium roots; gradual smooth boundary;

Bt1 50 - 125 cm: Red (2.5YR 5/8, dry, and 2.5YR 5/6, moist) sandy loam to sand clay loam ; moderately weak, medium angular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common distinct thin clay cutans; common fine, medium and coarse pores; very few, fine, partially weathered angular quartz minerals; very few medium and coarse roots; gradual diffuse boundary;

BC 125 - 180 cm: Red (2.5YR 5/8, dry, and 2.5YR 4/8, moist) sandy clay loam ; weak, medium and coarse angular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; common fine, partially weathered angular quartz minerals; very few coarse roots.

Analytical data profile KP 52

Depth (cm)	: 0-20	30-50	80-100
Clay	: 12	18	29
Silt	: 11	9	9
Very fine sand	: 7	8	8
Fine sand	: 28	17	13
Medium sand	: 18	18	12
Coarse sand	: 17	15	13
Very coarse sand	: 7	15	16
Texture class	: SL	SL	SCL
pH H20	: 5.9	4.8	5.0
pH KCl	: 5.3	3.8	3.8
EC mS/cm	: 0.18	0.05	0.02
Organic C %	: 1.69	0.35	0.55
Total N %	: 0.12	0.03	0.04
C/N	: 14	12	14

Available P mg/kg	: 60.1	3.35	0.4
CEC me/100g	: 10.3	2.6	2.4
Exch. Ca me/100g	: 3.7	0.2	0.2
Exch. Mg me/100g	: 2.3	0.2	0.3
Exch. K me/100g	: 0.68	0.33	0.29
Exch. Na me/100g	: 0.04	0.02	0.04
Exch. H (KCl)	: -	0.04	0.06
Exch. Al (KCl)	: -	0.44	0.76
TEB me/100g	: 6.72	0.75	0.83
Base saturation %	: 65	29	35

Profile no. **: KP 53** Map unit: D 52 (soil unit: D4i1)
Sheet/Grid : 78/3
Coord : UTM 4135E9529N
Elevation : 1110 m
Authors(s) : F.M. Banzi
Date described : 09/10/96
Survey Area : Mweli Div., Kahama District, Location : Kasenga r. mbuga

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Mbuga Microrelief : Rice bunds
Slope form : Concave Slope % : 0 - 1
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Slight (1 - 3cm wide)
Drainage : Poor
Erosion : Nil
Flooding : Once/yr (Feb-May)
Vegetation : Miombo woodland (Brachestegia, Combretum, Albizia spp.)
Land use : Wetland cultivation (Paddy rice) Human inf. : Cultivation
Remarks : few (0.5 -2cm) CaCo3 nodules were observed localized on the soil surface.

Ap 0 - 20/35cm Dark grey (10YR 4/1, moist) clay loam; many coarse distinct clear, dark reddish brown (5YR 3/4) mottles; moderate, medium subangular blocky structure; friable when moist, sticky and slightly plastic when wet; common fine and medium pores; common fine and medium roots; clear weavy boundary;

Bg1 20/35 - 60cm Dark greyish brown (10YR 4/2, dry, and 10YR 4/2, moist) sandy clay loam; common fine faint diffuse, strong brown (7.5YR 4/6) mottles; weak, medium and coarse prismatic structure; slightly hard when dry, firm when moist, sticky and plastic when wet; common medium and coarse pores; very few coarse roots; gradual smooth boundary;

Bg2 60 - 110cm Dark greyish brown (10YR 4/2, dry, and 10YR 4/2, moist) sandy clay loam; common, fine faint diffuse, strong brown (7.5YR 4/6) mottles; weak, coarse angular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; very few, medium and coarse pores; hardly any roots.

Analytical data profile KP 53

Depth (cm)	: 0-20	30-50	80-100
Clay	: 34	27	30
Silt	: 32	19	16
Very fine sand	: 7	6	7
Fine sand	: 14	22	16
Medium sand	: 8	15	19
Coarse sand	: 4	9	10
Very coarse sand	: 1	2	2
Texture class	: CL	SCL	SCL
pH H20	: 4.5	4.4	5.2
pH KCl	: 3.6	3.4	4.5
EC mS/cm	: 0.07	0.02	0.06
Organic C %	: 1.44	0.69	0.31
Total N %	: 0.18	0.07	0.03
C/N	: 8	10	10
Available P mg/kg	: 0.63	0.86	0.94
CEC me/100g	: 8.3	12.2	14.5
Exch. Ca me/100g	: 1.3	4.7	8.3
Exch. Mg me/100g	: 0.5	1.0	2.2
Exch. K me/100g	: 0.09	0.10	0.07
Exch. Na me/100g	: 0.11	0.20	0.33
Exch. H (KCl)	: 0.10	0.08	-
Exch. Al (KCl)	: 0.62	0.54	-
TEB me/100g	: 2.00	6.00	10.9
Base saturation %	: 24	49	75

Profile no.	**: KP 54**	Map unit: D 52 (soil unit: D4i1)	
Sheet/Grid	: 78/4		
Coord	: UTM 4287E9529N		
Elevation	: 1125 m		
Author(s)	: F.M. Banzi		
Date described	: 10/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Bulyalya mbuga
Soil name (local)	: Mbuga		
Classification FAO	: Calcic Gleysols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Land form	: Mbuga	Microrelief	: Ricebunds
Slope form	: Concave	Slope %	: 0.5 - 1
Slope position	: Bottom		
Parent Mater.	: Alluvium		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Slight (1 - 3cm wide)		
Drainage	: Poor		
Erosion	: Nil		
Flooding	: Once/yr (Feb-May)		
Vegetation	: Miombo woodland (Brachestegia, Combretum, Albizia spp.)		
Land use	: Wetland cultivation (Paddy rice)	Human inf.	: Cultivation

Ap	0 - 15cm	Very dark greyish brown (10YR 4/2, moist, and 10YR 3/2, moist) sandy clay loam; common fine distinct clear, yellowish red (5YR 5/6) mottles; moderate, medium subangular blocky structure; friable when moist, sticky and slightly plastic when wet; many fine and medium and common coarse pores; common very fine, fine and medium roots; clear smooth boundary;
Bg1	15 - 50/55cm	Brownish yellow (10YR 6/6, dry, and 10YR 6/6, moist) sandy clay loam to clay; many medium distinct clear, reddish yellow (5YR 6/6) mottles; moderate, medium and coarse prismatic structure; hard when dry, firm when moist, sticky and plastic when wet; few pressure faces; common, fine and medium pores; few medium and coarse roots; gradual weavy boundary;
BCk	50/55 - 100cm	Light brown (7.5YR 6/4, dry, and 7.5YR 6/4, moist) clay; common fine diffuse faint, reddish yellow (5YR 7/6) mottles; weak, coarse angular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; prominent intersecting pressure faces; few, fine medium pores; common, medium and coarse, hard, elongated CaCO3 nodules; hardly any roots.

Analytical data profile KP 54

Depth (cm)	: 0-20	30-50	80-100
Clay	: 21	56	55
Silt	: 9	8	11
Very fine sand	: 11	5	5
Fine sand	: 30	14	12
Medium sand	: 21	11	11
Coarse sand	: 7	5	5
Very coarse sand	: 1	1	1
Texture class	: SCL	C	C
pH H20	: 5.6	5.8	7.5
pH KCl	: 4.3	4.2	6.3
EC mS/cm	: 0.04	0.03	0.16
Organic C %	: 1.62	0.89	0.27
Total N %	: 0.21	0.07	0.02
C/N	: 8	13	14
Available P mg/kg	: 1.04	0.05	0.31
CEC me/100g	: 13.5	19.7	18.8
Exch. Ca me/100g	: 5.3	9.4	16.3
Exch. Mg me/100g	: 2.3	3.9	5.6
Exch. K me/100g	: 0.11	0.10	0.10
Exch. Na me/100g	: 0.09	0.22	0.42
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 7.80	16.62	22.42
Base saturation %	: 58	69	100

Profile no. : **KP 55** Map unit: B 32 (soil unit B3f2)
Sheet/Grid : 78/2
Coord : UTM 4199E9536N
Elevation : 1220 m
Author(s) : F.M. Banzi
Date described : 10/10/96

Survey Area	: Mweli Div., Kahama District,	Location	: Ikwenuku (Ushetu)
Soil name (local)	: Luseni		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	: Cultivation ridges
Slope form	: Straight	Slope % : 2	
Slope position	: Upper		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2.5mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (splash and rill)		
Flooding	: Never		
Vegetation	: Miombo woodland (Brachestegia, Combretum, Albizia spp.)		
Land use	: Rainfed cropping (maize, g.nuts, cassava)	Human inf.	: Cultivation

Ap	0 - 20cm	Brown (7.5YR 5/3, moist) loamy sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; common very fine, fine and medium roots; clear smooth boundary;
BA	20 - 40cm	Brown (7.5YR 5/4, moist) loamy sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; common fine and medium roots; gradual smooth boundary;
Bw1	40 - 60cm	Light brown (7.5YR 6/3, moist) loamy sand; weak, fine and medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; many very fine and fine, and common medium pores; few fine and medium, and very few coarse roots; gradual smooth boundary;
Bw2	60 - 110cm	Reddish yellow (7.5YR 7/6, dry, and 7.5YR 6/6, moist) loamy sand to sandy loam; weak, fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine, medium and coarse pores; few medium roots; diffuse smooth boundary;
BC	110 - 180cm	Reddish yellow (7.5YR 7/8, dry, and 7.5YR 6/8, moist) sandy loam; very weak, fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common medium and coarse pores; very few, very fine, slghtly weathered, angular, quartz fragments; very few coarse roots.

Analytical data profile KP 55

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	10	17
Silt	: 6	8	9
Very fine sand	: 10	7	8
Fine sand	: 22	19	16
Medium sand	: 25	23	21
Coarse sand	: 24	26	23
Very coarse sand	: 5	7	6
Texture class	: LS	LS	SL
pH H20	: 6.2	5.2	5.2
pH KCl	: 4.9	4.2	4.1
EC mS/cm	: 0.02	0.04	0.06

Organic C %	: 0.30	0.19	0.12
Total N %	: 0.03	0.02	0.01
C/N	: 10	10	12
Available P mg/kg	: 4.56	2.43	0.95
CEC me/100g	: 1.43	1.56	2.46
Exch. Ca me/100g	: 0.6	0.3	0.5
Exch. Mg me/100g	: 0.3	0.2	0.3
Exch. K me/100g	: 0.11	0.15	0.14
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	0.02	0.04
Exch. Al (KCl) : -	0.10	0.16	
TEB me/100g	: 1.03	0.67	0.96
Base saturation %	: 72	43	39
Bulk density g/cm3	: 1.8	1.6	1.6
pF 2	: 11.5	12.7	18.4
pF 2.4	: 9.8	8.9	12.1
pF 3	: 4.1	4.3	5.7
pF 4.2	: 2.6	4.3	5.6

Profile no. **: KP 56** Map unit: B 31 (soil unit: B3b4)
Sheet/Grid : 78/1
Coord : UTM 4141E9544N
Elevation : 1240 m
Author(s) : F.M. Banzi
Date described : 11/10/96
Survey Area : Mweli Div., Kahama District, Location : Kidana Village

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief :
Slope form : Convex Slope % : 3 - 4
Slope position : Top
Parent Mater. : Granite
Sealing : Slight (about 3mm)
Rock Outcrops : Very few (about 3%) Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland (Pterocopsis, Combretum, Vitex spp.)
Land use : Rainfed cultiv. (maize, tobacco, cassava) Human inf. : Cultivation

Ap 0 - 15cm Brown (7.5YR 4/4, moist) loamy sand; weak, fine and medium subangular blocky structure; friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; common very fine and fine roots; clear smooth boundary;

BA 15 - 35cm Strong brown (7.5YR 4/6, moist) loamy sand; weak, fine and medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; many very fine, fine and medium pores; very few, fine and medium, fresh, subrounded quartz fragments; common fine and medium roots; gradual smooth boundary.

Bt1 35 - 75cm Yellowish red (5YR 5/6, dry, and 5YR 4/6, moist) sandy loam; moderate, fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine, medium and coarse pores; few, fine and medium, fresh, subrounded quartz fragments; few, fine and medium roots; gradual smooth boundary;

BCs 75 - 110cm Yellowish red (5YR 5/8, dry, and 5YR 4/6, moist) gravely sandy loam; structure less, single grain; loose, sticky and slightly plastic when wet; common medium and coarse pores; abundant, medium and coarse, hard, irregular, iron and manganese concretions.

Analytical data profile KP 56

Depth (cm)	: 0-20	30-50	80-100
Clay	: 9	14	15
Silt	: 10	12	11
Very fine sand	: 10	9	7
Fine sand	: 27	21	13
Medium sand	: 24	21	18
Coarse sand	: 14	17	19
Very coarse sand	: 6	6	17
Texture class	: LS	SL	SL
pH H20	: 5.1	5.3	5.6
pH KCl	: 4.3	4.1	4.2
EC mS/cm	: 0.02	0.02	0.01
Organic C %	: 0.37	0.21	0.13
Total N %	: 0.03	0.02	0.01
C/N	: 12	11	13
Available P mg/kg	: 3.28	0.75	1.55
CEC me/100g	: 2.8	1.1	1.5
Exch. Ca me/100g	: 0.5	0.3	0.3
Exch. Mg me/100g	: 0.4	0.3	0.2
Exch. K me/100g	: 0.14	0.17	0.30
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: 0.02	0.02	-
Exch. Al (KCl)	: 0.06	0.20	-
TEB me/100g	: 1.06	0.79	0.82
Base saturation %	: 38	46	55

Profile no. **: KP 57** Map unit: B 22 (soil unit: B3b4)
Sheet/Grid : 78/1
Coord : UTM 4103E9538N
Elevation : 1235 m
Author(s) : F.M. Banzi
Date described : 11/10/96
Survey Area : Mweli Div., Kahama District, Location : Mhuge P/school

Soil name (local) : Kikungu
Classification FAO : Haplic Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Gently und. Plain Microrelief : Few termite mounds
Slope form : Convex Slope % : 3

Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Nil		
Rock Outcrops	: Very few (about 3%)	Stones	: Few (7%)
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Pterocopsis, Brachestegia, Albizia spp.)		
Land use	: Rainfed cultiv. (maize, tobacco, cotton)	Human inf.	: Cultivation

Ap	0 - 10cm	Dark brown (7.5YR 4/4, dry, and 7.5YR 3/4, moist) sandy loam; moderate, medium and coarse subangular blocky structure; hard when dry, friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;
BA	10 - 30cm	Yellowish red (5YR 5/6, dry, and 5YR 4/6, moist) sandy loam to sandy clay loam; moderate, fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few fine clay cutans; many fine, medium and coarse pores; common fine and medium roots; gradual smooth boundary;
Bt1	30 - 60cm	Red (2.5YR 4/8, dry, and 2.5YR 4/6, moist) sandy clay loam; weak, medium and coarse angular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common, distinct, clay cutans; common fine, and medium pores; very few, fine and medium, partialy weathered, angular quartz fragments; few medium roots; gradual smooth boundary.
BC	60 - 100cm	Red (2.5YR 4/6, moist) gravely sand clay loam; very weak, very fine, sbangular blocky structure; soft, sticky and slightly plastic when wet; common fine, and medium pores; abundant, medium and coarse, partialy weathered, angular and subrounded quartz fragments; few medium and coarse roots.

Analytical data profile KP 57

Depth (cm)	: 0-20	30-50	80-100
Clay	: 10	20	27
Silt	: 13	12	13
Very fine sand	: 10	7	6
Fine sand	: 32	21	16
Medium sand	: 20	18	14
Coarse sand	: 10	16	16
Very coarse sand	: 5	6	8
Texture class	: SL	SCL	SCL
pH H20	: 5.9	5.3	5.1
pH KCl	: 4.6	4.0	3.9
EC mS/cm	: 0.03	0.02	0.02
Organic C %	: 0.44	0.29	0.14
Total N %	: 0.04	0.03	0.01
C/N	: 11	10	14
Available P mg/kg	: 1.11	0.33	2.67
CEC me/100g	: 2.4	2.5	1.9
Exch. Ca me/100g	: 0.9	0.6	0.3
Exch. Mg me/100g	: 0.4	0.3	0.1

Exch. K me/100g	: 0.27	0.30	0.21
Exch. Na me/100g	: 0.04	0.02	0.04
Exch. H (KCl)	: -	0.06	0.06
Exch. Al (KCl)	: -	0.36	0.52
TEB me/100g	: 1.61	1.22	0.65
Base saturation %	: 67	49	35

Profile no. : **KP 58** Map unit: B 32 (soil unit B3f2)
Sheet/Grid : 78/1
Coord : UTM 4046E9535N
Elevation : 1170 m
Author(s) : F.M. Banzi
Date described : 11/10/96
Survey Area : Mweli Div., Kahama District, Location : Kangeme P/school

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Gently und. Plain Microrelief : Few termite mounds
Slope form : Convex Slope % : 2
Slope position : Top
Parent Mater. : Colluvium der. fr. Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Somewhat excessive
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland (cleared)
Land use : Settlement, cultivation (maize, g.nuts) Human inf. : Deforestation

Ap 0 - 30 cm: Brown (7.5YR 4/4, moist) loamy sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

AC 30 - 60 cm: Strong brown (7.5YR 5/6, moist) loamy sand; very weak, fine and medium subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; gradual smooth boundary;

CA1 60 - 110 cm: Reddish yellow (7.5YR 6/8, moist) loamy sand; very weak, fine and medium subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; diffuse smooth boundary;

C1 110 - 190 cm: Reddish yellow (7.5YR 7/8, moist) loamy sand; very weak, medium and coarse subangular blocky and angular blocky structure; friable when moist, non sticky and non plastic when wet; common fine and medium pores; few medium and coarse roots.

Analytical data profile KP 58

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	4	5
Silt	: 12	12	13
Very fine sand	: 11	11	16
Fine sand	: 26	25	26
Medium sand	: 24	26	23
Coarse sand	: 16	19	14
Very coarse sand	: 6	3	3
Texture class	: LS	LS	LS
pH H20	: 6.6	6.3	5.5
pH KCl	: 5.9	5.3	4.3
EC mS/cm	: 0.03	0.03	0.02
Organic C %	: 0.35	0.37	0.15
Total N %	: 0.03	0.03	0.01
C/N	: 12	12	15
Available P mg/kg	: 2.32	2.32	1.65
CEC me/100g	: 2.6	2.1	1.4
Exch. Ca me/100g	: 1.7	1.2	0.3
Exch. Mg me/100g	: 0.5	0.3	0.3
Exch. K me/100g	: 0.14	0.08	0.10
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 2.36	1.62	0.72
Base saturation %	: 92	76	53

Profile no. **: KP 59** Map unit: B 32 (soil unit B3f3)
Sheet/Grid : 78/3
Coord : UTM 4020E9526N
Elevation : 1150m
Author(s) : F.M. Banzi
Date described : 12/10/96
Survey Area : Mweli Div., Kahama District, Location: Ushetu-Ubagwe For.Res.

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Gently und. Plain Microrelief : Few termite mounds
Slope form : Straight Slope % : 2.5
Slope position : Lower
Parent Mater. : Colluvium der. fr. Granite
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Somewhat excessive
Erosion : Slight (sheet)
Flooding : Never
Vegetation : Miombo woodland (Brachestegia, Pterocarpus, Pericopsis, spp)

Land use : Lumbering (timber), Honey collection) Human inf. : Deforestation

Ah 0 - 15cm Greyish brown (10YR 5/2, moist) loamy sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; common fine, medium and coarse roots; clear smooth boundary;

Ah2 15 - 40cm Yellowish brown (10YR 5/4, moist) loamy sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; common medium and coarse roots; gradual smooth boundary;

AC 40 - 95cm Pale brown (10YR 6/3, dry and 10YR 6/3, moist) loamy sand; very weak, very fine subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common very fine, fine and medium pores; few medium and coarse roots; diffuse smooth boundary;

C 95 - 150cm Light greyish brown (10YR 7/2, dry and 10YR 6/2, moist) sand; structureless single grain; loose, non sticky and non plastic when wet; common fine and medium pores; very few medium roots.

Analytical data profile KP 59

Depth (cm)	: 0-20	30-50	80-100
Clay	: 6	6	4
Silt	: 9	7	7
Very fine sand	: 10	10	11
Fine sand	: 19	30	28
Medium sand	: 25	36	35
Coarse sand	: 21	11	14
Very coarse sand	: 10	0	1
Texture class	: LS	LS	S
pH H20	: 5.2	5.2	5.5
pH KCl	: 4.2	4.0	3.9
EC mS/cm	: 0.03	0.02	0.01
Organic C %	: 0.23	0.11	0.10
Total N %	: 0.02	0.01	0.01
C/N	: 12	11	10
Available P mg/kg	: 2.02	1.29	0.43
CEC me/100g	: 6.4	2.2	1.9
Exch. Ca me/100g	: 1.8	0.5	0.5
Exch. Mg me/100g	: 0.5	0.2	0.2
Exch. K me/100g	: 0.18	0.18	0.15
Exch. Na me/100g	: 0.02	0.04	0.04
Exch. H (KCl)	: 0.05	0.04	-
Exch. Al (KCl)	: 0.07	0.02	-
TEB me/100g	: 2.5	0.92	0.89
Base saturation %	: 39	41	48

Profile no.	**: KP 60**	Map unit: B 32 (soil unit: B3b4)	
Sheet/Grid	: 78/1		
Coord	: UTM 4030E9534N		
Elevation	: 1185 m		
Author(s)	: F.M. Banzi		
Date described	: 12/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Ilomelo (Ulowa 6)
Soil name (local)	: Kikungu		
Classification FAO	: Ferric Acrisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	: Few termite mounds
Slope form	: Convex	Slope % : 3	
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Slight (2mm)		
Rock Outcrops	: Few (about 5-7%)	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Vitex, Brachestegia, Tamarindus spp.)		
Land use	: Rainfed cultiv. (maize, tobacco, g.nuts)	Human inf.	: Cultivation

Ap	0 - 15cm	Brown (7.5YR 4/4, moist) sandy loam; moderate, medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; many very fine, fine, and medium pores; many very fine and fine roots; clear smooth boundary;
Bt1	15 - 40cm	Strong brown (7.5YR 5/8, moist) sandy clay loam; moderate, medium subangular blocky structure; friable when moist, sticky and slightly plastic when wet; few fine clay cutans; many very fine, fine and medium pores; very few fine partialy weathered subrounded quartz fragments; common fine and medium roots; gradual smooth boundary;
Bt2	40 - 110cm	Yellowish red (5YR 5/8, moist) sand clay loam; moderate, medium angular blocky and subangula blocky structure; friable when moist, sticky and slightly plastic when wet; common distinct clay cutans; common fine, medium and coarse pores; few fine and medium partially weathered angular and subrounded quartz fragments; few medium and coarse roots; clear smooth boundary;
BC	110 - 130cm	Yellowish red (5YR 5/8, moist) very gravely sand clay loam; structureless, single grain; loose, slightly sticky and non plastic when wet; common fine, and medium pores; common medium and coarse, partially weathered, angular quartz fragments; common, medium and coarse, hard, iron and manganese concretions.

Analytical data profile KP 60

Depth (cm)	: 0-20	30-50	80-100
Clay	: 14	22	28
Silt	: 10	10	11
Very fine sand	: 10	12	15
Fine sand	: 24	18	18
Medium sand	: 19	15	12
Coarse sand	: 14	15	10
Very coarse sand	: 9	8	6
Texture class	: SL	SCL	SCL

pH H20	: 5.8	5.1	5.0
pH KCl	: 4.6	4.0	4.0
EC mS/cm	: 0.04	0.03	0.02
Organic C %	: 0.39	0.14	0.11
Total N %	: 0.04	0.01	0.01
C/N	: 10	14	11
Available P mg/kg	: 3.46	1.45	0.61
CEC me/100g	: 3.6	3.8	6.3
Exch. Ca me/100g	: 1.2	0.5	1.5
Exch. Mg me/100g	: 0.7	0.6	0.4
Exch. K me/100g	: 0.35	0.21	0.14
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H (KCl)	: -	0.08	0.06
Exch. Al (KCl)	: -	0.40	0.26
TEB me/100g	: 2.27	1.33	2.08
Base saturation %	: 63	35	33
Bulk density g/cm3	: 1.7	1.6	1.5
pF 2	: 19.8	19.7	21.6
pF 2.4	: 15.2	16.2	18.4
pF 3	: 8.3	11.0	11.1
pF 4.2	: 6.4	8.8	9.5

Profile no.	**: KP 61**	Map unit: B 32 (soil unit: B3b4)	
Sheet/Grid	: 78/1		
Coord	: UTM 3935E9552N		
Elevation	: 1197 m		
Author(s)	: F.M. Banzi		
Date described	: 14/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Ubagwe
Soil name (local)	: Kikungu		
Classification FAO	: Haplic Acrisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	:
Slope form	: Convex	Slope %	: 2.5
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Nil		
Rock Outcrops	: Few (about 5%)	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Pterocarpus, Brachestegia, Strychnos spp.)		
Land use	: Abandoned settlement	Human inf.	: Forest clearing

Ap 0 - 15cm Yellowish red (7.5YR 5/6, moist) sandy loam; moderate, fine and medium subangular blocky structure; friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bt1	15 - 40cm	Yellowish red (5YR 5/8, moist) sandy loam; moderate, fine and medium subangular blocky structure; friable when moist, sticky and slightly plastic when wet; few fine clay cutans; many fine and medium pores; common fine and medium roots; gradual smooth boundary;
Bt2	40 - 80cm	Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sandy loam; weak, fine and medium angular blocky and subangula blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common, fine, clay cutans; common fine and medium pores; very few fine partialy weathered, angular quartz fragments; few medium and coarse roots; diffuse smooth boundary;
BC	80 - 140cm	Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sandy loam; weak, medium, angular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine, and medium pores; common finne partialy weathered, angular quartz fragments; few coarse roots;
C1	140 - 150cm	Red (2.5YR 5/8, dry and 2.5YR 4/8, moist) very gravelly sandy loam (by augering).

Analytical data profile KP 61

Depth (cm)	: 0-20	30-50	80-100
Clay	: 13	17	19
Silt	: 10	9	9
Very fine sand	: 20	13	23
Fine sand	: 28	28	25
Medium sand	: 15	16	13
Coarse sand	: 11	12	8
Very coarse sand	: 3	5	3
Texture class	: SL	SL	SL
pH H20	: 5.7	5.5	5.6
pH KCl	: 4.4	4.1	4.4
EC mS/cm	: 0.03	0.03	0.01
Organic C %	: 0.39	0.34	0.13
Total N %	: 0.04	0.03	0.01
C/N	: 10	11	13
Available P mg/kg	: 1.62	3.12	0.35
CEC me/100g	: 4.0	9.6	9.0
Exch. Ca me/100g	: 0.9	1.7	0.5
Exch. Mg me/100g	: 0.8	0.5	0.1
Exch. K me/100g	: 0.44	0.28	0.19
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 2.16	2.50	0.81
Base saturation %	: 54	52	56

Profile no. **: KP 62** Map unit: B 32 (soil unit: B3f2)
Sheet/Grid : 78/1
Coord : UTM 3930E9549N
Elevation : 1200m
Authors : F.M. Banzi
Date described : 14/10/96

Survey Area	: Mweli Div., Kahama District,	Location	: Ubagwe
Soil name (local)	: Luseni		
Classification FAO	: Haplic Arenosols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	: Few termite mounds
Slope form	: Straight	Slope % : 2	
Slope position	: middle		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Brachestegia, Pterocarpus, Strychnos, spp)		
Land use	: Lumbering (timber), Honey collection). Human inf.:		Deforestation

Ah	0 - 15cm	Brown (7.5YR 5/4, dry and 7.5YR 4/4, moist) loamy sand; moderate, fine subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;
AB	15 - 50cm	Strong brown (7.5YR 6/6, dry and 7.5YR 5/6, moist) loamy sand; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; common fine, medium and coarse roots; gradual smooth boundary;
Bw1	50 - 100cm	Strong brown (7.5YR 6/8, dry and 7.5YR 5/8, moist) loamy sand to sandy loam; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and non plastic when wet; common very fine, fine and medium pores; common fine and medium roots; diffuse smooth boundary;
Bw2	100 - 140cm	Reddish yellow (7.5YR 7/6, dry and 7.5YR 6/6, moist) loamy sand to sandy loam; very weak, fine and medium subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common very fine, fine and medium pores; few medium roots.
BC	140 - 170cm	Reddish yellow (7.5YR 7/6, dry and 7.5YR 6/6, moist) very coarse loamy sand (by augering).

Analytical data profile KP 62

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	7	11
Silt	: 7	5	7
Very fine sand	: 13	9	13
Fine sand	: 23	22	21
Medium sand	: 26	32	23
Coarse sand	: 19	18	19
Very coarse sand	: 5	7	6
Texture class	: LS	LS	LS
pH H20	: 5.6	5.8	6.3
pH KCl	: 4.2	4.4	5.6
EC mS/cm	: 0.01	0.01	0.01

Organic C %	: 0.22	0.27	0.15
Total N %	: 0.02	0.02	0.01
C/N	: 11	14	15
Available P mg/kg	: 1.75	1.18	1.17
CEC me/100g	: 1.1	2.2	2.3
Exch. Ca me/100g	: 0.3	0.9	1.4
Exch. Mg me/100g	: 0.2	0.3	0.4
Exch. K me/100g	: 0.08	0.15	0.12
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 0.60	1.37	1.94
Base saturation %	: 54	63	79

Profile no. **: KP 63** Map unit: B 32 (soil unit: B3f2)
Sheet/Grid : 62/3
Coord : UTM 3902E9571N
Elevation : 1360m
Author(s) : F.M. Banzi
Date described : 16/10/96
Survey Area : Mweli Div., Kahama District, Location : Usumbwa For. res.

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief :
Slope form : Straight Slope % : 2
Slope position : Middle
Parent Mater. : Colluvium der. fr. Granite
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Somewhat excessive
Erosion : Slight (sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Lumbering (timber), Honey collection). Human inf. : Deforestation

Ah 0 - 6 cm: Very dark greyish brown (10YR 4/2, dry and 10YR 3/2, moist) loamy sand; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

Ah2 6 - 45 cm: Dark greyish brown (10YR 5/3, dry and 10YR 4/2, moist) loamy sand; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many fine and medium roots; clear smooth boundary;

AC 45 - 80 cm: Brown (10YR 6/3, dry and 10YR 5/3, moist) loamy sand to sand; very weak, medium and coarse subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common very fine and medium pores; common fine and medium roots; clear smooth boundary.

C 80 - 120 cm: Very pale brown (10YR 7/4, moist) sand; very weak, structureless, single grain; loose when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; few fine and medium roots.

Analytical data profile KP 63

Depth (cm)	: 0-20	30-50	80-100
Clay	: 6	5	4
Silt	: 7	7	9
Very fine sand	: 6	5	11
Fine sand	: 26	18	29
Medium sand	: 31	31	34
Coarse sand	: 21	28	11
Very coarse sand	: 3	6	2
Texture class	: LS	LS	S
pH H20	: 5.7	5.4	5.2
pH KCl	: 4.7	4.0	4.0
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.54	0.16	0.13
Total N %	: 0.03	0.02	0.01
C/N	: 18	8	13
Available P mg/kg	: 2.02	1.18	0.95
CEC me/100g	: 3.7	3.4	1.2
Exch. Ca me/100g	: 1.4	1.1	0.3
Exch. Mg me/100g	: 0.5	0.4	0.1
Exch. K me/100g	: 0.10	0.11	0.06
Exch. Na me/100g	: 0.04	0.02	0.02
Exch. H (KCl)	: -	0.02	0.04
Exch. Al (KCl)	: -	0.18	0.18
TEB me/100g	: 2.04	1.63	0.48
Base saturation %	: 55	45	41

Profile no. **: KP 64** Map unit: B 32 (soil unit: B3f2)
Sheet/Grid : 62/3
Coord : UTM 3887E9569N
Elevation : 1355m
Author(s) : F.M. Banzi
Date described : 16/10/96
Survey Area : Mweli Div., Kahama District, Location: Usumbwa For. res.

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief :
Slope form : Straight Slope % : 2
Slope position : Middle
Parent Mater. : Colluvium der. fr. Granite
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Somewhat excessive

Erosion : Slight (sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Lumbering (timber), Honey collection). Human inf. : Deforestation

Ah 0 - 10 cm: Very dark greyish brown (10YR 4/2, dry and 10YR 3/2, moist) sand; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

Ah2 10 - 35 cm: Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) sand; very weak, fine and medium subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine, fine and medium roots; gradual smooth boundary;

AC 35 - 65 cm: Brown (10YR 6/3, dry and 10YR 5/3, moist) sand; very weak, fine subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; common fine and medium roots; gradual smooth boundary;

C1 65 - 120 cm: Pale brown (10YR 7/3, dry and 10YR 6/3, moist) sand; structureless, single grain; loose, non sticky and non plastic when wet; common fine and medium pores; very few medium roots.

Analytical data profile KP 64

Depth (cm)	: 0-20	30-50	80-100
Clay	: 3	3	3
Silt	: 6	8	9
Very fine sand	: 6	8	9
Fine sand	: 14	15	17
Medium sand	: 21	18	22
Coarse sand	: 33	32	27
Very coarse sand	: 17	16	13
Texture class	: S	S	S
pH H20	: 5.7	6.0	6.1
pH KCl	: 4.9	4.8	4.7
EC mS/cm	: 0.03	0.02	0.01
Organic C %	: 0.75	0.32	0.24
Total N %	: 0.05	0.03	0.02
C/N	: 15	11	12
Available P mg/kg	: 2.04	1.03	1.34
CEC me/100g	: 2.7	1.1	0.4
Exch. Ca me/100g	: 0.9	0.3	0.1
Exch. Mg me/100g	: 0.5	0.3	0.1
Exch. K me/100g	: 0.07	0.10	0.06
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 1.49	0.72	0.28
Base saturation %	: 56	66	69

Profile no.	**: KP 65**		Map unit: B 32 (B3f2)
Sheet/Grid	: 62/3		
Coord	: UTM 3945E9570N		
Elevation	: 1371m		
Author(s)	: F.M. Banzi		
Date described	: 16/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Isanga village
Soil name (local)	: Luseni		
Classification FAO	: Haplic Arenosols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	:
Slope form	: Straight	Slope %	: 2
Slope position	: Middle		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Lumbering (timber), Honey collection).	Human inf.	: Deforestation

Ah 0 - 10 cm: Dark brown (10YR 4/3, dry and 10YR 3/3, moist) loamy sand to sand; weak, fine subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

Ah2 10 - 45 cm: Dark yellowish brown (10YR 5/4, dry and 10YR 4/4, moist) loamy sand; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and medium roots; gradual smooth boundary;

AC 45 - 110 cm: Yellowish brown (10YR 6/4, dry and 10YR 5/4, moist) loamy sand to sand; very weak, fine and medium subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; common medium and coarse roots; gradual smooth boundary;

C 110 - 155 cm: Very pale brown (10YR 8/3, moist) sand; structureless, single grain; loose, non sticky and non plastic when wet; common fine and medium pores; very few medium roots.

Analytical data profile KP 65

Depth (cm)	: 0-20	30-50	80-100
Clay	: 3	8	5
Silt	: 8	8	8
Very fine sand	: 12	12	7
Fine sand	: 32	30	23
Medium sand	: 29	26	31
Coarse sand	: 13	14	22
Very coarse sand	: 3	2	4
Texture class	: S	LS	LS

pH H20	: 5.4	4.8	4.7
pH KCl	: 4.3	3.9	3.9
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.28	0.39	0.24
Total N %	: 0.04	0.03	0.02
C/N	: 7	13	12
Available P mg/kg	: 0.89	0.83	1.38
CEC me/100g	: 2.5	1.0	1.2
Exch. Ca me/100g	: 0.6	0.1	0.1
Exch. Mg me/100g	: 0.4	0.1	0.1
Exch. K me/100g	: 0.13	0.04	0.03
Exch. Na me/100g	: 0.04	0.02	0.04
Exch. H (KCl)	: 0.04	0.06	0.04
Exch. Al (KCl)	: 0.06	0.26	0.24
TEB me/100g	: 1.17	0.26	0.27
Base saturation %	: 46	25	23

Profile no. **: KP 66** Map unit: B 32 (soil unit B3b1)
Sheet/Grid : 62/3
Coord : UTM 4005E9570N
Elevation : 1311 m
Author(s) : F.M. Banzi
Date described : 16/10/96
Survey Area : Mweli Div., Kahama District, Location : Nyamtengera vill

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief : Few termite mounds
Slope form : Convex Slope % : 2
Slope position : Top
Parent Mater. : Granite
Rock Outcrops : Nil Stones : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland (Pterocarpus, Brachestegia, Strychnos spp.)
Land use : Rainfed cropping (maize, cassava etc). Human inf. : Forest clearing

Ap 0 - 15 cm: Brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; strong, medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine, fine, and medium pores; many very fine and fine roots; clear smooth boundary;

BA 15 - 30 cm: Brown (7.5YR 4/4, moist) loamy sand to sandy loam; strong, medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; few fine clay cutans; many very fine, fine and medium pores; common very fine and fine roots; gradual smooth boundary;

Bt1 30 - 70 cm: Yellowish red (5YR 4/6, moist) sandy loam; moderate, medium angular blocky structure; friable when moist, sticky and slightly plastic when wet; common, distinct, clay cutans; common fine and medium pores; few, medium roots; diffuse smooth boundary;

Bt2 70 - 120 cm: Reddish yellowish (5YR 6/8, moist) sand clay loam; moderate, medium angular blocky structure; firm when moist, sticky and slightly plastic when wet; many, distinct, clay cutans; common fine and medium pores; few fine partially weathered angular quartz fragments; very few fine and medium hard irregular iron and manganese concretions; very few, medium roots; gradual smooth boundary;

BCs 120 - 150 cm: Reddish yellowish (5YR 6/8, moist) sand clay loam; moderate, medium angular blocky structure; firm when moist, sticky and slightly plastic when wet; common fine and medium pores; few fine partially weathered angular quartz fragments; common medium hard irregular iron and manganese concretions; very few, medium roots;

Cs > 150 cm: Lateritic gravel.

Analytical data profile KP 66

Depth (cm)	: 0-20	30-50	80-100
Clay	: 10	18	25
Silt	: 9	8	9
Very fine sand	: 14	11	12
Fine sand	: 30	26	22
Medium sand	: 24	23	19
Coarse sand	: 11	12	11
Very coarse sand	: 2	2	2
Texture class	: LS	SL	SCL
pH H20	: 6.5	6.8	5.3
pH KCl	: 5.7	5.4	4.1
EC mS/cm	: 0.07	0.02	0.03
Organic C %	: 0.14	0.13	0.70
Total N %	: 0.01	0.01	0.05
C/N	: 14	13	14
Available P mg/kg	: 4.21	1.15	0.46
CEC me/100g	: 3.9	3.9	6.0
Exch. Ca me/100g	: 2.2	2.4	3.6
Exch. Mg me/100g	: 0.8	1.0	1.0
Exch. K me/100g	: 0.33	0.24	0.23
Exch. Na me/100g	: 0.04	0.02	0.04
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 3.37	3.66	4.87
Base saturation %	: 86	95	81

Profile no. **: KP 67** Map unit: B 32 (soil unit: B3b1)
Sheet/Grid : 62/3
Coord : UTM 4121E9563N
Elevation : 1290 m
Autho(s) : F.M. Banzi
Date described : 16/10/96

Survey Area	: Mweli Div., Kahama District,	Location	: Nyamatutu vill
Soil name (local)	: Kikungu		
Classification FAO	: Ferric Acrisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	: Few termite mounds
Slope form	: Convex	Slope % : 3.5	
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Few (about 5%)	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Vitex, Brachestegia, Strychnos spp.)		
Land use	: Rainfed cropping (maize, cotton, g.nuts).	Human inf.	: Forest clearing

Ap 0 - 15 cm: Dark reddish brown (5YR 4/4, dry and 5YR 3/4, moist) sandy clay loam; strong, medium subangular blocky structure; hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

BA 15 - 50 cm: Yellowish red (5YR 5/8, dry and 5YR 4/6, moist) sand clay loam to sandy clay; strong, medium subangular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; few distinct clay cutans; common fine, medium and coarse pores; common fine, medium and coarse roots; gradual smooth boundary;

Bt1 50 - 110 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sand clay; moderate, medium angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; common distinct clay cutans; common fine and medium pores; very few fine fresh angular quartz fragments; very few fine hard subrounded iron and manganese concretions; few, medium and coarse roots; diffuse smooth boundary;

BC 110 - 155 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sand clay; moderate, medium angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; common distinct clay cutans; common fine and medium pores; common medium partially weathered angular quartz fragments; few fine and medium hard subrounded iron and manganese concretions.

Analytical data profile KP 67

Depth (cm)	: 0-20	30-50	80-100
Clay	: 25	35	42
Silt	: 10	10	4
Very fine sand	: 9	9	11
Fine sand	: 22	16	16
Medium sand	: 16	13	13
Coarse sand	: 11	10	9
Very coarse sand	: 7	7	5
Texture class	: SCL	SC	SC
pH H20	: 6.5	6.6	6.6
pH KCl	: 5.3	5.0	5.6
EC mS/cm	: 0.06	0.05	0.02

Organic C %	: 0.22	0.35	0.14
Total N %	: 0.03	0.04	0.01
C/N	: 7	9	14
Available P mg/kg	: 2.96	0.45	0.22
CEC me/100g	: 6.4	8.7	10.0
Exch. Ca me/100g	: 3.7	5.6	5.8
Exch. Mg me/100g	: 0.9	1.8	2.3
Exch. K me/100g	: 0.73	0.23	0.34
Exch. Na me/100g	: 0.04	0.04	0.04
Exch. H (KCl)	: -	-	0.04
Exch. Al (KCl)	: -	-	0.34
TEB me/100g	: 5.37	7.67	8.48
Base saturation %	: 84	88	85

Profile no. **: KP 68** Map unit: B 32 (soil unit: B3b1)

Sheet/Grid	: 62/3		
Coord	: UTM 4052E9559N		
Elevation	: 1170 m		
Author(s)	: F.M. Banzi		
Date described	: 17/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Kalo vill
Soil name (local)	: Kikungu		
Classification FAO	: Haplic Acrisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	: Few termite mounds
Slope form	: Convex	Slope % : 2	
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Few (about 5%)	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Pterocarpus, Brachestegia, Burkea spp.)		
Land use	: Rainfed cropping (maize, cotton, tobacco). Human inf.		: Deforestation

Ap 0 - 15 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; moderate, fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

BA 15 - 35 cm: Brown (7.5YR 4/4, moist) loamy sand to sandy loam; moderate, fine and medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; very few, fine, clay cutans; many fine and medium pores; many fine and medium; clear smooth boundary;

Bt1 35 - 80 cm: Yellowish red (5YR 4/6, moist) sand clay loam; moderately weak, medium and coarse angular blocky structure; firm when moist, sticky and slightly plastic when wet; common patchy clay cutans; common fine and medium pores; common coarse roots; gradual smooth boundary;

Bt2 80 - 180 cm: Yellowish red (5YR 5/8, moist) sandy clay loam; weak, fine subangular blocky structure; very friable when moist, sticky and slightly plastic when wet; common distinct clay cutans; common fine and medium pores; very few fine partially weathered angular quartz fragments; very few fine hard rounded iron and manganese concretions; few coarse roots; diffuse smooth boundary;

Bcs 180 - 200 cm: Yellowish red (5YR 5/8, moist) very gravelly sandy loam to sandy clay loam; structureless, single grain; loose, sticky and slightly plastic when wet; many medium and coarse, hard, rounded, iron and manganese concretions mixed with quartz fragments.

Analytical data profile KP 68

Depth (cm)	: 0-20	30-50	80-100
Clay	: 8	22	17
Silt	: 10	10	9
Very fine sand	: 16	12	9
Fine sand	: 26	17	16
Medium sand	: 19	18	18
Coarse sand	: 11	19	21
Very coarse sand	: 10	2	10
Texture class	: LS	SCL	SL
pH H20	: 8.5	7.9	6.1
pH KCl	: 7.9	6.6	4.3
EC mS/cm	: 0.08	0.07	0.03
Organic C %	: 0.41	0.22	0.09
Total N %	: 0.04	0.02	0.01
C/N	: 10	11	9
Available P mg/kg	: 2.36	6.05	0.43
CEC me/100g	: 6.6	5.5	8.9
Exch. Ca me/100g	: 7.8	5.0	4.4
Exch. Mg me/100g	: 2.0	1.4	1.3
Exch. K me/100g	: 0.25	1.02	0.43
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 10.1	7.46	6.15
Base saturation %	: 100	100	69

Profile no. **: KP 69** Map unit: B 32 (soil unit: B3f2)
Sheet/Grid : 62/3
Coord : UTM 4062E9559N
Elevation : 1157m
Author(s) : F.M. Banzi
Date described : 17/10/96
Survey Area : Mweli Div., Kahama District, Location : Kalo vill

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols
Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief : Few termite mounnds

Slope form	: Straight	Slope % : 1.5	
Slope position	: Lower		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Timber, Firewood, Honey collection,	Human inf.	: Deforestation

Ah 0 - 10 cm: Dark greyish brown (10YR 4/2, moist) sand; weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

AC 10 - 35 cm: Greyish brown (10YR 5/2, moist) sand; very weak, fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; gradual smooth boundary;

C1 35 - 100 cm: Yellowish brown (10YR 5/4, moist) sand; structureless, single grain; loose, non sticky and non plastic when wet; common very fine, fine and medium pores; common medium and coarse roots; gradual smooth boundary;

C2 65 - 150 cm: Very pale brown (10YR 7/4, moist) sand; structureless, single grain; loose, non sticky and non plastic when wet; common fine and medium pores; very few medium roots.

Analytical data profile KP 69

Depth (cm)	: 0-20	30-50	80-100
Clay	: 2	2	2
Silt	: 7	10	8
Very fine sand	: 16	13	13
Fine sand	: 15	26	24
Medium sand	: 25	23	23
Coarse sand	: 24	17	21
Very coarse sand	: 11	9	9
Texture class	: S	S	S
pH H20	: 5.1	5.1	5.4
pH KCl	: 4.2	4.1	4.2
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.08	0.07	0.07
Total N %	: 0.01	0.01	0.01
C/N	: 8	7	7
Available P mg/kg	: 3.93	1.33	0.99
CEC me/100g	: 1.5	0.8	0.6
Exch. Ca me/100g	: 0.4	0.1	0.1
Exch. Mg me/100g	: 0.1	0.1	0.1
Exch. K me/100g	: 0.05	0.04	0.07
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: 0.04	0.05	0.04
Exch. Al (KCl)	: 0.18	0.17	0.08

TEB me/100g	: 0.57	0.28	0.29
Base saturation %	: 38	36	45

Profile no. **: KP 70** Map unit: D 52 (soil unit D5i1)
Sheet/Grid : 62/3
Coord : UTM 4287E9529N
Elevation : 1148m
Author(s) : F.M. Banzi
Date described : 17/10/96
Survey Area : Mweli Div., Kahama District, Location : Kalo vill

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief : Rice bunds
Slope form : Concave Slope % : 0.5 - 1
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Slight (1 - 2cm wide)
Drainage : Poor
Erosion : Nil
Flooding : Once/yr (Mar-May)
Vegetation : Wooded grassland
Land use : Wetland cultivation (Paddy rice). Human inf.: Cultivation

Ap 0 - 15 cm: Very dark greyish brown (10YR 3/2, moist) sandy loam; common fine distinct clear brownish yellow (10YR 6/8) mottles; moderate, medium angular blocky structure; firm when moist, sticky and slightly plastic when wet; common fine and medium pores; common fine and medium roots; clear smooth boundary;

Bg1 15 - 40 cm: Dark greyish brown (10YR 4/2, moist) sandy clay loam; common medium distinct, clear dark reddish brown (5YR 3/2) mottles; moderate medium angular blocky structure; friable when moist, sticky and plastic when wet; common, fine and medium pores; few medium and coarse roots; gradual weavy boundary;

Bg2 40 - 70 cm: Greyish brown (10YR 5/2, moist) sandy clay loam; common, medium, distinct, faint reddish brown (5YR 5/4) mottles; weak, medium angular blocky structure; friable when moist, sticky and plastic when wet; few pressure faces; common medium pores; few medium roots; gradual smooth boundary;

Bg3 70 - 140 cm: Grey (10YR 5/1, moist) sandy clay loam; many, medium, distinct, faint reddish (2.5YR 4/6) mottles; weak, medium and coarse angular wedge structure; friable when moist, sticky and plastic when wet; very few medium pores; very few medium roots.

Analytical data profile KP 70

Depth (cm)	: 0-20	30-50	80-100
Clay	: 18	20	33
Silt	: 12	9	13
Very fine sand	: 6	5	7
Fine sand	: 22	22	18
Medium sand	: 23	26	19
Coarse sand	: 14	15	9

Very coarse sand	: 5	3	1
Texture class	: SL	SCL	SCL
pH H20	: 5.4	5.0	5.4
pH KCl	: 4.0	3.3	3.1
EC mS/cm	: 0.03	0.02	0.02
Organic C %	: 0.61	0.33	0.75
Total N %	: 0.05	0.03	0.04
C/N	: 12	11	19
Available P mg/kg	: 1.03	0.71	0.36
CEC me/100g	: 19.2	13.1	6.0
Exch. Ca me/100g	: 6.4	3.4	1.8
Exch. Mg me/100g	: 3.2	2.0	1.1
Exch. K me/100g	: 0.08	0.07	0.08
Exch. Na me/100g	: 0.13	0.17	0.15
Exch. H (KCl)	: 0.04	0.10	-
Exch. Al (KCl)	: 0.20	1.80	-
TEB me/100g	: 9.81	5.64	3.13
Base saturation %	: 51	43	52

Profile no. **: KP 71** Map unit: A 32 (soil unit A3c3)
Sheet/Grid : 62/3
Coord : UTM 4070E9570N
Elevation : 1304m
Author(s) : F.M. Banzi
Date described : 17/10/96
Survey Area : Mweli Div., Kahama District, Location: Nyamtengera vill

Soil name (local) : Nduha
Classification FAO : Ferric Alisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief : Few termite mounds
Slope form : Convex Slope % : 2.5
Slope position : Top
Parent Mater. : Banded Ironstone
Sealing : Slight (about 3mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland (Pterocarpus, Brachestegia, Albizia spp.)
Land use : Rainfed cropping (maize, cassava) Human inf. : Deforestation

Ap 0 - 15 cm: Dark reddish brown (2.5YR 3/3, dry and 2.5YR 2.5/3, moist) sandy clay loam; strong, medium granular and subangular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; many very fine and fine pores; many very fine, fine and medium roots; gradual smooth boundary;

Bt1 15 - 40 cm: Dark red (2.5YR 4/6, dry and 2.5YR 3/6, moist) sandy clay loam to clay; moderate, medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; common distinct clay cutans; common fine and medium pores;

common fine and medium roots; gradual smooth boundary;

Bt2 40 - 120 cm: Dark red (2.5YR 4/6, dry and 2.5YR 3/6, moist) clay; moderate, medium angular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; abundant, patchy, clay cutans; common fine and medium pores; few medium hard irregular iron concretions; common fine and medium roots;

BC 120 - 150cm Dark red (2.5YR 3/6, moist) gravelly clay; sticky and slightly plastic when wet; many medium and coarse hard rounded iron and manganese concretions (by augering).

Analytical data profile KP 71

Depth (cm)	: 0-20	30-50	80-100
Clay	: 30	52	54
Silt	: 10	10	11
Very fine sand	: 10	9	11
Fine sand	: 24	13	12
Medium sand	: 16	8	7
Coarse sand	: 7	5	4
Very coarse sand	: 3	3	1
Texture class	: SCL	C	C
pH H20	: 5.4	5.0	5.1
pH KCl	: 4.3	4.0	4.0
EC mS/cm	: 0.05	0.01	0.01
Organic C %	: 1.44	0.22	0.17
Total N %	: 0.10	0.02	0.01
C/N	: 14	11	17
Available P mg/kg	: 4.09	0.39	0.05
CEC me/100g	: 9.9	13.1	13.5
Exch. Ca me/100g	: 2.3	3.4	3.9
Exch. Mg me/100g	: 1.9	1.2	1.4
Exch. K me/100g	: 0.62	0.09	0.09
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: 0.03	0.04	0.04
Exch. Al (KCl)	: 0.08	0.70	0.60
TEB me/100g	: 4.88	4.71	5.41
Base saturation %	: 49	36	40

Profile no. **: KP 72** Map unit: B 22 (soil unit: B3b1)
Sheet/Grid : 78/2
Coord : UTM 4282E9550N
Elevation : 1263m
Author(s) : F.M. Banzi
Date described : 18/10/96
Survey Area : Mweli Div., Kahama District, Location : Ngokolo vill

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief :
Slope form : Convex Slope % : 3 - 4

Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Moderate (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland (Vitex, Brachestegia, Strychnos spp.)		
Land use	: Rainfed cropping (maize, cotton, tobacco).	Human inf.	: cultivation

Ap 0 - 15 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) sandy loam; strong, fine and medium subangular blocky structure; hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine and few medium pores; common very fine and fine roots; clear smooth boundary;

Bt1 15 - 40 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) sandy loam; moderate, medium subangular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; few distinct clay cutans; many very fine and fine and few medium pores; common fine roots; gradual smooth boundary;

Bt2 40 - 95 cm: Strong brown (7.5YR 6/8, dry and 7.5YR 5/8, moist) sandy clay loam; weak, fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; common distinct clay cutans; common fine and medium pores; very few medium roots; diffuse smooth boundary.

BC 95 - 150 cm: Strong brown (7.5YR 6/8, dry and 7.5YR 5/8, moist) gravelly sandy clay loam; weak, fine and medium angular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; few distinct clay cutans; common fine and medium pores; common fine and medium partially weathered angular quartz fragments mixed with iron and manganese concretions.

Analytical data profile KP 72

Depth (cm)	: 0-20	30-50	80-100
Clay	: 10	20	20
Silt	: 10	11	13
Very fine sand	: 16	12	16
Fine sand	: 30	21	24
Medium sand	: 22	20	16
Coarse sand	: 9	12	8
Very coarse sand	: 3	4	3
Texture class	: SL	SCL	SCL
pH H20	: 6.0	4.8	5.4
pH KCl	: 5.0	4.2	4.2
EC mS/cm	: 0.15	0.13	0.01
Organic C %	: 0.13	0.12	0.07
Total N %	: 0.02	0.01	0.01
C/N	: 7	12	7
Available P mg/kg	: 4.51	0.39	0.05
CEC me/100g	: 2.5	1.0	3.9
Exch. Ca me/100g	: 0.4	0.1	1.2
Exch. Mg me/100g	: 0.3	0.1	0.4
Exch. K me/100g	: 0.97	0.03	0.12

Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: -	0.03	0.03
Exch. Al (KCl)	: -	0.29	0.20
TEB me/100g	: 1.69	0.27	1.74
Base saturation %	: 68	29	45

Profile no. : **KP 73** Map unit: D 52 (soil unit: D5i1)
Sheet/Grid : 78/2
Coord : UTM 4200E9554N
Elevation : 1130m
Author(s) : F.M. Banzi
Date described : 18/10/96
Survey Area : Mweli Div., Kahama District, Location : Upper ng'embe

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief : Rice bunds
Slope form : Concave Slope % : 0.5 - 1
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Slight (1 - 4cm wide)
Drainage : Poor
Erosion : Nil
Flooding : Once/yr (Mar-May)
Vegetation : Wooded grassland (Combretum, Brachestegia, Acacia spp.)
Land use : Wetland cultivation (Paddy rice). Human inf. : Cultivation

Ap 0 - 10 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sand clay loam; very few medium faint diffuse, yellowish brown (10YR 6/4) mottles; strong medium subangular blocky structure; very firm when moist, sticky and slightly plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

Bg1 10 - 60 cm: Brown (10YR 4/3, dry and 10YR 4/3, moist) clay; many fine distinct clear yellowish red (5YR 4/6) mottles; moderate medium prismatic structure; very firm when moist, sticky and plastic when wet; few pressure faces; common fine and medium pores; many medium and coarse roots; gradual smooth boundary;

Bg2 60 - 110 cm: Greyish brown (10YR 5/2, moist) clay; many medium prominent sharp reddish (2.5YR 4/6) mottles; weak medium and coarse angular wedge structure; extremely firm when moist, very sticky and very plastic when wet; common intersecting pressure faces; very few medium pores; very few medium roots; gradual smooth boundary;

Bg3 110 - 145 cm: Grey (10YR 5/1, moist) clay; very few very fine faint clear reddish (2.5YR 4/6) mottles; very weak coarse angular wedge structure; extremely firm when moist, very sticky and very plastic when wet; few intersecting pressure faces; very few medium pores.

Analytical data profile KP 73

Depth (cm)	: 0-20	30-50	80-100
Clay	: 21	42	43
Silt	: 11	19	15
Very fine sand	: 7	8	6
Fine sand	: 24	16	16
Medium sand	: 25	10	14
Coarse sand	: 10	4	7
Very coarse sand	: 2	1	1
Texture class	: SCL	C	C
pH H20	: 5.0	5.5	5.2
pH KCl	: 3.9	3.4	3.7
EC mS/cm	: 0.07	0.04	0.25
Organic C %	: 0.54	0.09	0.23
Total N %	: 0.04	0.01	0.03
C/N	: 14	9	8
Available P mg/kg	: 1.71	0.84	0.20
CEC me/100g	: 27.0	10.1	9.6
Exch. Ca me/100g	: 6.4	4.6	3.1
Exch. Mg me/100g	: 2.4	0.7	0.7
Exch. K me/100g	: 0.15	0.09	0.08
Exch. Na me/100g	: 0.23	0.24	0.24
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 9.18	5.63	4.12
Base saturation %	: 34	56	43

Profile no. **: KP 74** Map unit: A 32 (soil unit A3c3)
Sheet/Grid : 78/2
Coord : UTM 4190E9555N
Elevation : 1180m
Author(s) : F.M. Banzi
Date described : 18/10/96
Survey Area : Mweli Div., Kahama District. Location : Nyankondo vill

Soil name (local) : Nduha
Classification FAO : Haplic Alisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief :
Slope form : Straight Slope % : 3
Slope position : Lower
Parent Mater. : Banded Ironstone
Sealing : Slight (about 3mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland (Pterocarpus, Brachestegia, Albizia spp.)
Land use : Rainfed cropping (maize, cotton, tobacco). Human inf. : Deforestation

Ap 0 - 15 cm: Dark reddish brown (5YR 4/4, dry and 5YR 3/4, moist) sandy clay loam; strong fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; many very fine, fine and medium pores; many very fine, fine and medium roots; gradual smooth boundary;

Bt1 15 - 45 cm: Yellowish red (5YR 4/6, dry and 5YR 4/4, moist) sandy clay loam; weak medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; few distinct clay cutans; common fine and medium pores; many fine and medium roots; diffuse smooth boundary;

BC 45 - 75 cm: Yellowish red (5YR 5/6, dry and 5YR 4/6, moist) sandy clay loam; weak medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; many distinct clay cutans; common fine and medium pores; common fine and medium partially weathered subrounded quartz fragments; common fine and medium roots; gradual smooth boundary;

C1 75 - 100 cm: Yellowish red (5YR 4/6, moist) gravelly sandy clay loam; very weak very fine subangular blcky; soft, sticky and slightly plastic when wet; common medium and coarse pores; many fine and medium and coarse, partially weathered subrounded quartz fragments; few medium and coarse roots.

Analytical data profile KP 74

Depth (cm)	: 0-20	30-50	80-100
Clay	: 22	30	28
Silt	: 11	10	11
Very fine sand	: 9	10	9
Fine sand	: 21	18	14
Medium sand	: 21	16	16
Coarse sand	: 12	11	11
Very coarse sand	: 4	5	11
Texture class	: SCL	SCL	SCL
pH H20	: 5.6	5.4	5.4
pH KCl	: 4.5	4.0	4.1
EC mS/cm	: 0.03	0.09	0.01
Organic C %	: 0.56	0.23	0.22
Total N %	: 0.08	0.02	0.02
C/N	: 7	11	11
Available P mg/kg	: 0.79	0.15	0.15
CEC me/100g	: 5.5	7.5	7.2
Exch. Ca me/100g	: 1.8	2.0	2.6
Exch. Mg me/100g	: 0.9	1.6	0.6
Exch. K me/100g	: 0.11	0.06	0.08
Exch. Na me/100g	: 0.04	0.02	0.04
Exch. H (KCl)	: -	0.04	0.08
Exch. Al (KCl)	: -	0.58	0.28
TEB me/100g	: 2.85	3.68	3.3
Base saturation %	: 52	49	46

Profile no.	**: KP 75**	Map unit: B 22 (soil unit B3b1)	
Sheet/Grid	: 78/2		
Coord	: UTM 4130E9558N		
Elevation	:		
Author(s)	: F.M. Banzi		
Date described	: 19/10/96		
Survey Area	: Mweli Div., Kahama District,	Location	: Bulungwa vill
Soil name (local)	: Kikungu		
Classification FAO	: Ferric Alisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. Plain	Microrelief	:
Slope form	: Convex	Slope % : 4	
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Moderate (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, cotton, g.nuts).	Human inf.	: Cultivation

Ap 0 - 15 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) sandy loam; strong medium subangular blocky structure; hard when dry, friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;

Bt1 15 - 40 cm: Strong brown (5YR 5/6, dry and 5YR 4/6, moist) sandy clay loam; moderate medium subangular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; common distinct clay cutans; many very fine and fine and common medium pores; common fine roots; gradual smooth boundary;

BCs 40 - 125 cm: Strong brown (5YR 6/8, dry and 5YR 5/8, moist) gravelly sandy clay; moderate medium angular blocky and subangular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; common distinct clay cutans; common fine and medium pores; common fine fresh angular quartz fragments; few fine hard subrounded iron and manganese concretions; few fine and medium roots; diffuse smooth boundary;

Cs 125 - 195cm Strong brown (5YR 6/8, dry and 5YR 5/8, moist) very gravelly sandy clay; weak fine and medium angular blocky structure; slightly hard when dry, very friable when moist, sticky and plastic when wet; common fine and medium pores; common fine fresh angular quartz fragments mixed with iron and manganese concretions.

Analytical data profile KP 75

Depth (cm)	: 0-20	30-50	80-100
Clay	: 16	36	35
Silt	: 12	13	14
Very fine sand	: 15	11	12
Fine sand	: 25	15	18
Medium sand	: 16	11	10
Coarse sand	: 10	9	7
Very coarse sand	: 6	5	4

Texture class	: SL	SC	SC
pH H20	: 5.2	5.6	4.9
pH KCl	: 3.9	4.4	3.9
EC mS/cm	: 0.05	0.02	0.03
Organic C %	: 0.78	0.31	0.08
Total N %	: 0.07	0.02	0.01
C/N	: 11	16	8
Available P mg/kg	: 8.40	1.04	0.60
CEC me/100g	: 4.0	9.0	8.6
Exch. Ca me/100g	: 0.8	2.3	1.6
Exch. Mg me/100g	: 0.5	2.2	1.2
Exch. K me/100g	: 0.31	0.35	0.24
Exch. Na me/100g	: 0.04	0.09	0.07
Exch. H (KCl)	: 0.04	-	0.04
Exch. Al (KCl)	: 0.32	-	0.70
TEB me/100g	: 1.65	4.94	3.11
Base saturation %	: 41	55	36

Profile no. : **KP 76** Map unit: D 52 (soil unit: D4i1)
Sheet/Grid : 78/2
Coord : UTM 4209E9564N
Elevation :
Author(s) : F.M. Banzi
Date described : 19/10/96
Survey Area : Dakama Div., Kahama District, Location : Mtoni river

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief :
Slope form : Concave Slope % : 1
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Slight (1 - 4cm wide)
Drainage : Poor
Erosion : Nil
Flooding : Once/yr (Mar-May)
Vegetation : Miombo woodland (Combretum, Brachestegia, Acacia spp.)
Land use : Grazing. Human inf. : Cultivation

Ap 0 - 15/20 cm: Very dark grey (10YR 3/1, dry and 10YR 3/1, moist) sandy clay loam; few fine faint diffuse yellowish brown (10YR 6/4) mottles; strong medium subangular blocky structure; very hard when dry, very firm when moist, sticky and slightly plastic when wet; common fine and medium pores; many fine roots; clear weavy boundary;

Bg1 15/20 - 75 cm: Very dark greyish brown (10YR 3/2, dry and 10YR 3/2, moist) clay; few very fine faint diffuse dark yellowish brown (5YR 3/4) mottles; strong medium prismatic structure;

very hard when dry, very firm when moist, sticky and plastic when wet; few pressure faces; common few medium and coarse pores; common fine and medium roots; gradual smooth boundary;

Bg2 75 - 120 cm: Dark grey (10YR 4/1, moist) clay; many very fine faint diffuse dark yellowish brown (5YR 3/4) mottles; weak medium and coarse angular blocky structure; firm when moist, very sticky and very plastic when wet; common intersecting pressure faces; very few medium pores.

Analytical data profile KP 76

Depth (cm)	: 0-20	30-50	80-100
Clay	: 26	49	45
Silt	: 11	11	12
Very fine sand	: 10	6	5
Fine sand	: 29	15	17
Medium sand	: 16	12	14
Coarse sand	: 6	5	6
Very coarse sand	: 2	2	1
Texture class	: SCL	C	C
pH H20	: 5.6	5.7	5.8
pH KCl	: 4.1	3.9	4.0
EC mS/cm	: 0.03	0.02	0.03
Organic C %	: 0.79	0.47	0.29
Total N %	: 0.05	0.03	0.03
C/N	: 14	16	10
Available P mg/kg	: 1.13	0.56	0.18
CEC me/100g	: 6.6	12.4	11.3
Exch. Ca me/100g	: 2.1	6.2	4.8
Exch. Mg me/100g	: 1.0	1.6	1.7
Exch. K me/100g	: 0.12	0.11	0.08
Exch. Na me/100g	: 0.19	0.30	0.42
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 3.41	8.21	7.10
Base saturation %	: 52	66	62

Profile no. **: KP 77** Map unit: B 32 (soil unit: B3f6)
Sheet/Grid : 62/4
Coord : UTM 4251E9570N
Elevation : 1170m
Author(s) : F.M. Banzi
Date described : 28/10/96
Survey Area : Dakama Div., Kahama District, Location : Busonzo vill

Soil name (local) : Luseni
Classification FAO : Gleyic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. Plain Microrelief : Few termite mounds
Slope form : Straight Slope % : 1.5
Slope position : Lower

Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (splash & sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (cotton, g.nuts, maize).	Human inf.	: Cultivation

Ap 0 - 15 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) loamy sand; very few, very fine faint clear yellowish red (5YR 5/8) mottles; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine and fine and few medium pores; common very fine and fine roots; clear smooth boundary;

Bw1 15 - 30 cm: Yellowish brown (10YR 5/6, moist) loamy sand; few very fine faint clear strong brown (7.5YR 5/8) mottles; weak fine and medium angular blocky structure; friable when moist, slghtly sticky and non plastic when wet; many very fine and fine pores; common fine and medium roots; gradual smooth boundary;

Bw2 30 - 100 cm: Light yellowish brown (10YR 6/4, moist) sandy loam; many medium prominent sharp reddish brown (5YR 5/4) mottles; very weak medium and coarse angular blocky structure; friable when moist, sticky and non plastic when wet; common fine and medium pores; very few medium roots; clear smooth boundary;

BCs 100 - 130 cm: Light gray (10YR 7/1, moist) gravelly loamy sand; very weak medium and coarse angular blocky structure; very friable when moist, slightly sticky and non plastic when wet; few medium pores; common medium and coarse hard irregular iron and manganese concretions.

Cms > - 130 cm: Laterite.

Analytical data profile KP 77

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	13	8
Silt	: 9	10	9
Very fine sand	: 10	9	9
Fine sand	: 32	26	26
Medium sand	: 30	28	28
Coarse sand	:10	12	12
Very coarse sand	: 2	2	8
Texture class	: LS	SL	LS
pH H20	: 5.1	5.0	5.5
pH KCl	: 3.8	3.5	4.4
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.23	0.11	0.26
Total N %	: 0.02	0.01	0.02
C/N	: 12	11	13
Available P mg/kg	: 1.43	0.21	1.01
CEC me/100g	: 2.8	3.2	2.1
Exch. Ca me/100g	: 0.6	0.6	0.6
Exch. Mg me/100g	: 0.3	0.3	0.2

Exch. K me/100g	: 0.04	0.04	0.01
Exch. Na me/100g	: 0.07	0.09	0.09
Exch. H (KCl)	: 0.06	0.12	0.04
Exch. Al (KCl)	: 0.46	1.90	0.65
TEB me/100g	: 1.11	1.13	0.90
Base saturation %	: 36	32	43

Profile no. **: KP 78** Map unit: B 32 (soil unit: B4f2)
Sheet/Grid : 62/4
Coord : UTM 4305E9568N
Elevation :
Author(s) : F.M. Banzi
Date described : 28/10/96
Survey Area : Dakama Div., Kahama District, Location : Imalange/Mpunze

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Undulating Plain Microrelief :
Slope form : Straight Slope % : 5 - 6
Slope position : Middle
Parent Mater. : Colluvium der. fr. Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Drainage : Somewhat excessive
Erosion : Moderate (sheet & gully)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (cotton, g.nuts, maize). Human inf. : Cultivation

Ap 0 - 25 cm: Brown (10YR 4/3, dry and 10YR 4/3, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; gradual smooth boundary;

AB 25 - 50 cm: Dark yellowish brown (10YR 5/4, 10YR 4/4, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium and very few coarse pores; common very fine, fine and medium roots; gradual smooth boundary;

Bw1 50 - 110 cm: Brownish yellow (10YR 6/8, dry and 10YR 6/6, moist) loamy sand; very weak fine and medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; common very fine fine and medium pores; very few medium roots; clear smooth boundary;

BC 110 - 180 cm: Brownish yellow (10YR 7/8, dry and 10YR 6/8, moist) loamy sand; very weak fine and medium angular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; common fine and medium pores; few fine fresh angular quartz fragments.

Cms > 180 cm: Laterite.

Analytical data profile KP 78

Depth (cm)	: 0-20	30-50	80-100
Clay	: 4	5	6
Silt	: 11	10	8
Very fine sand	: 13	12	9
Fine sand	: 25	23	20
Medium sand	: 25	27	26
Coarse sand	: 18	19	23
Very coarse sand	: 4	4	8
Texture class	: LS	LS	LS
pH H20	: 5.9	6.1	5.6
pH KCl	: 5.3	4.9	4.5
EC mS/cm	: 0.05	0.01	0.02
Organic C %	: 0.65	0.45	0.38
Total N %	: 0.04	0.03	0.03
C/N	: 16	15	13
Available P mg/kg	: 7.76	2.28	0.90
CEC me/100g	: 1.0	1.6	2.0
Exch. Ca me/100g	: 0.2	0.7	0.7
Exch. Mg me/100g	: 0.2	0.2	0.3
Exch. K me/100g	: 0.22	0.10	0.05
Exch. Na me/100g	: 0.02	0.04	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 0.64	1.04	1.07
Base saturation %	: 72	55	56

Profile no.	**: KP 79**	Map unit: B 23 (soil unit: B4b2)	
Sheet/Grid	: 62/4		
Coord	: UTM 4360E9564N		
Elevation	:		
Author(s)	: F.M. Banzi		
Date described	: 28/10/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Bulima
Soil name (local)	: Kikungu		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Undulating Plain	Microrelief	:
Slope form	: Straight	Slope % : 6	
Slope position	: Upper		
Parent Mater.	: Granite		
Sealing	: Slight (about 3mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Moderate (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, cotton, g.nuts).	Human inf.	: cultivation

Ap	0 - 20 cm:	Dark brown (10YR 4/3, dry and 10YR 3/3, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;
BA	20 - 50 cm:	Dark yellowish brown (5YR 5/4, dry and 10YR 4/4, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine, fine and medium pores; common very fine and fine roots; gradual smooth boundary;
Bw1	50 - 130 cm:	Yellowish brown (10YR 6/6, dry and 10YR 5/6, moist) sandy loam; weak medium and coarse angular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine, medium and coarse pores; common coarse roots; diffuse smooth boundary;
BC	130 - 220 cm:	Brownish yellow (10YR 7/6, dry and 10YR 6/6, moist) sandy loam to sandy clay loam; very weak medium angular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; few fine fresh angular quartz fragments; very few coarse roots.

Analytical data profile KP 79

Depth (cm)	: 0-20	30-50	80-100
Clay	: 4	7	8
Silt	: 10	11	12
Very fine sand	: 10	10	11
Fine sand	: 25	18	20
Medium sand	: 25	23	23
Coarse sand	: 22	24	22
Very coarse sand	: 4	7	4
Texture class	: LS	LS	SL
pH H20	: 5.7	5.9	5.4
pH KCl	: 5.1	4.4	4.1
EC mS/cm	: 0.07	0.01	0.01
Organic C %	: 0.78	0.47	0.35
Total N %	: 0.06	0.03	0.02
C/N	: 13	15	18
Available P mg/kg	: 2.64	1.13	0.95
CEC me/100g	: 0.9	1.8	1.6
Exch. Ca me/100g	: 0.2	0.7	0.5
Exch. Mg me/100g	: 0.1	0.4	0.1
Exch. K me/100g	: 0.18	0.11	0.12
Exch. Na me/100g	: 0.04	0.02	0.02
Exch. H (KCl)	: -	-	0.03
Exch. Al (KCl)	: -	-	0.19
TEB me/100g	: 0.52	1.23	0.74
Base saturation %	: 56	68	45

Profile no. **: KP 80** Map unit: B 23 (soil unit: B4f2)
Sheet/Grid : 62/4
Coord : UTM 4410E9560N
Elevation :

Author(s)	: F.M. Banzi		
Date described	: 28/10/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Igunda
Soil name (local)	: Luseni		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Undulating Plain	Microrelief	: v.few termite mounds
Slope form	: Straight	Slope %	: 5 - 6
Slope position	: Middle		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 3mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewhat excessive		
Erosion	: Slight (splash & sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (cotton, g.nuts, maize).	Human inf.	: Cultivation

Ap 0 - 20 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; gradual smooth boundary;

AB 20 - 45 cm: Brown (7.5YR 4/4, moist) loamy sand; weak fine and medium subangular blocky structure; friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and medium roots; gradual smooth boundary;

Bw1 45 - 80 cm: Strong brown (7.5YR 5/6, moist) loamy sand; weak medium subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; many very fine, fine and medium pores; common fine and medium roots; gradual smooth boundary;

Bw2 80 - 120 cm: Strong brown (5YR 5/8, moist) sandy loam; weak medium angular blocky structure; friable when moist, sticky and non plastic when wet; common very fine, fine and medium pores; very few fine and medium fresh angular quartz fragments; few fine roots; diffuse smooth boundary;

BCs 120 - 180 cm: Strong brown (5YR 5/8, moist) sandy loam; very weak fine and medium angular blocky structure; very friable when moist, sticky and non plastic when wet; common very fine, fine and medium pores; very few medium fresh angular quartz fragments mixed with iron and manganese concretions; very few, medium and coarse roots; clear smooth boundary;

Cs > - 180 cm: Gravel (about 90 % gravel) (subrounded; medium, coarse and stones sized quartz mixed with medium and coarse iron and manganese concretions).

Analytical data profile KP 80

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	9	10
Silt	: 11	9	10
Very fine sand	: 13	11	11
Fine sand	: 24	19	21
Medium sand	: 22	21	22
Coarse sand	: 20	23	20

Very coarse sand	: 5	8	6
Texture class	: LS	LS	SL
pH H20	: 6.0	5.0	5.5
pH KCl	: 5.1	4.0	4.0
EC mS/cm	: 0.04	0.02	0.02
Organic C %	: 0.52	0.49	0.34
Total N %	: 0.03	0.04	0.04
C/N	: 17	12	9
Available P mg/kg	: 6.77	4.41	1.50
CEC me/100g	: 2.6	1.3	2.5
Exch. Ca me/100g	: 1.0	0.2	0.9
Exch. Mg me/100g	: 0.5	0.1	0.3
Exch. K me/100g	: 0.18	0.15	0.08
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	0.02	0.04
Exch. Al (KCl)	: -	0.10	0.14
TEB me/100g	: 1.70	0.47	1.30
Base saturation %	: 66	37	52

Profile no.	**: KP 81**	Map unit: D 52 (soil unit: D4i1)	
Sheet/Grid	: 78/2		
Coord	: UTM 4299E9538N		
Elevation	: 1460m ?		
Author(s)	: F.M. Banzi		
Date described	: 29/10/96		
Survey Area	: Dakama Div., Kahama District.	Location	: Bukwimba
Soil name (local)	: Mbuga		
Classification FAO	: Dystric Gleysols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Mbuga	Microrelief	:
Slope form	: Concave	Slope %	: 1
Parent Mater.	: Alluvium		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Slight (1 - 2cm wide)		
Drainage	: Poor		
Erosion	: Nil		
Flooding	: Once/yr (Mar-Jun)		
Vegetation	: Miombo woodland (Combretum, Brachestegia, Acacia spp.)		
Land use	: Wetland cultivation (paddy rice).	Human inf.	: Cultivation

Ap 0 - 12 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sandy clay loam; very few fine faint clear brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common fine and medium pores; common very fine and fine roots; clear smooth boundary;

Bg1 12 - 35 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) sandy clay loam; many fine distinct clear brown (5YR 4/4) mottles; moderate medium subangular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common very fine, fine and medium pores; common fine and medium roots; gradual smooth boundary;

Bg2 35 - 115 cm: Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) clay; common medium distinct sharp yellowish red (2.5YR 4/6) mottles; moderate medium and coarse prismatic structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few fine and medium pores; few coarse roots; gradual smooth boundary;

Bg3 115 - 180 cm: Grey (10YR 6/1, dry and 10YR 5/1, moist) clay; few medium distinct clear brownish yellow (10YR 6/8) mottles; weak medium and coarse angular wedge structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few fine and medium pores.

Analytical data profile KP 81

Depth (cm)	: 0-20	30-50	80-100
Clay	: 22	44	54
Silt	: 13	12	14
Very fine sand	: 13	7	10
Fine sand	: 35	13	11
Medium sand	: 14	18	7
Coarse sand	: 2	5	3
Very coarse sand	: 1	1	1
Texture class	: SCL	C	C
pH H20	: 5.5	5.4	5.3
pH KCl	: 4.0	3.7	4.3
EC mS/cm	: 0.03	0.02	0.01
Organic C %	: 0.71	0.39	0.59
Total N %	: 0.07	0.04	0.04
C/N	: 10	10	15
Available P mg/kg	: 0.73	0.12	0.07
CEC me/100g	: 5.6	11.0	13.5
Exch. Ca me/100g	: 2.2	3.6	3.6
Exch. Mg me/100g	: 0.3	1.1	2.1
Exch. K me/100g	: 0.08	0.14	0.14
Exch. Na me/100g	: 0.14	0.20	0.25
Exch. H (KCl)	: -	0.04	0.02
Exch. Al (KCl)	: -	1.08	2.80
TEB me/100g	: 2.72	5.04	6.09
Base saturation %	: 49	46	45

Profile no. **: KP 82** Map unit: D 52 (soil unit: D4i1)
Sheet/Grid : 62/4
Coord : UTM 4417E9573N
Elevation : 1232m ?
Author(s) : F.M. Banzi
Date described : 31/10/96
Survey Area : Dakama Div., Kahama District. Location : Ifukili

Soil name (local)	: Mbuga		
Classification FAO	: Calcic Gleysols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Mbuga	Microrelief	:
Slope form	: Concave	Slope %	: 1
Slope position	: Bottom		
Parent Mater.	: Alluvium		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Slight (1 - 3m wide)		
Drainage	: Poor		
Erosion	: Nil		
Flooding	: Once/yr (Mar-Jun)		
Vegetation	: Miombo woodland (Combretum, Acacia spp.)		
Land use	: Wetland cultivation (paddy rice),	Human inf.	- : Cultivation

Ap 0 - 10 cm: Black (10YR 3/1, dry and 10YR 2/1, moist) clay; few fine distinct clear reddish yellow (7.5YR 6/8) mottles; moderate fine subangular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; many fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bg1 10 - 25 cm: Brown (10YR 5/3, dry and 10YR 5/3, moist) clay; many medium prominent clear dark reddish brown (5YR 3/4) mottles; moderate medium subangular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; common medium pores; common medium roots; gradual smooth boundary;

Bckg2 25 - 80 cm: Greyish brown (10YR 5/2, dry and 10YR 5/2, moist) clay; common medium faint distinct brown (7.5YR 5/4) mottles; weak coarse prismatic structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few medium and coarse pores; common medium and coarse hard irregular $CaCO_3$ nodules; very few medium roots; gradual smooth boundary;

BCkg 80 - 110 cm: Light brownish grey (10YR 6/2, dry and 10YR 6/2, moist) clay; common fine faint distinct brown (7.5YR 5/4) mottles; very weak coarse angular wedge structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; very few medium pores; few medium and coarse hard irregular $CaCO_3$ nodules.

Analytical data profile KP 82

Depth (cm)	: 0-20	30-50	80-100
Clay	: 55	60	61
Silt	: 7	6	8
Very fine sand	: 11	1	2
Fine sand	: 8	6	7
Medium sand	: 12	12	11
Coarse sand	: 4	11	9
Very coarse sand	: 3	4	2
Texture class	: C	C	C
pH H20	: 5.4	6.3	6.8
pH KCl	: 3.9	4.5	5.2
EC mS/cm	: 0.08	0.05	0.11
Organic C %	: 2.11	0.59	0.34
Total N %	: 0.18	0.04	0.03
C/N	: 12	15	11

Available P mg/kg	: 0.22	Tr	0.08
CEC me/100g	: 13.8	15.0	15.0
Exch. Ca me/100g	: 4.5	6.5	6.9
Exch. Mg me/100g	: 1.7	4.3	6.2
Exch. K me/100g	: 0.12	0.08	0.75
Exch. Na me/100g	: 0.30	0.40	0.56
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 6.62	11.3	14.4
Base saturation %	: 48	75	96

Profile no. **: KP 83** Map unit: B22 (soil unit: B2f1)

Sheet/Grid	: 62/4		
Coord	: UTM 4426E9568N		
Elevation	: 1216m		
Author(s)	: F.M. Banzi		
Date described	: 31/10/96		
Survey Area	: Dakama Div., Kahama District.	Location	: Kigungumuli vill
Soil name (local)	: Luseni		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Interfluve	Microrelief	: Cultivation ridges
Slope form	: Convex	Slope %	: 2
Slope position	: Upper		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, g.nuts, cotton).	Human inf.	: Cultivation

Ap 0 - 20 cm: Brown (7.5YR 5/3, dry and 7.5YR 4/3, moist) loamy sand; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

AB 20 - 50 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) loamy sand; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and medium roots; gradual smooth boundary;

Bw1 50 - 100 cm: Yellowish red (5YR 5/8, dry and 5YR 5/6, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine and medium pores; common medium coarse roots; gradual smooth boundary;

Bws 100 - 150 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) loamy sand; weak fine and medium subangular blocky structure; hard when dry, friable when moist, non sticky and non plastic when wet; common fine and medium pores; common fine fresh angular quartz

fragments mixed with medium hard subrounded iron and manganese concretions;

BCs 150 - 200 cm: Lateritic gravel (semi consolidated).

Analytical data profile KP 83

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	7	9
Silt	: 11	9	10
Very fine sand	: 16	12	12
Fine sand	: 26	22	22
Medium sand	: 23	24	23
Coarse sand	: 15	20	18
Very coarse sand	: 4	6	6
Texture class	: LS	LS	LS
pH H20	: 6.3	6.1	5.9
pH KCl	: 5.0	4.7	4.4
EC mS/cm	: 0.02	0.02	0.01
Organic C %	: 0.49	0.44	0.33
Total N %	: 0.04	0.04	0.03
C/N	: 12	11	11
Available P mg/kg	: 2.08	1.30	1.32
CEC me/100g	: 1.0	1.8	2.4
Exch. Ca me/100g	: 0.3	0.6	0.9
Exch. Mg me/100g	: 0.2	0.5	0.5
Exch. K me/100g	: 0.08	0.15	0.15
Exch. Na me/100g	: 0.21	0.04	0.02
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 0.79	1.29	1.57
Base saturation %	: 79	72	65

Profile no. : **KP 84** Map unit: B 22 (soil unit: B4b1)
Sheet/Grid :
Coord : UTM 4430E9543N
Elevation : 1196m
Author(s) : F.M. Banzi
Date described : 01/11/96
Survey Area : Dakama Div., Kahama District. Location : Mapamba P/School

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Undulating Plain Microrelief :
Slope form : Straight Slope % : 6 - 7
Slope position : Upper
Parent Mater. : Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well

Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, cotton, g.nuts). Human inf. : Cultivation

Ap 0 - 15 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

AB 15 - 45 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) loamy sand to sandy loam; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common very fine, fine and medium pores; many fine and medium and few coarse roots; gradual smooth boundary;

Bt1 45 - 110 cm: Yellowish red (5YR 5/8, dry and 5YR 4/6, moist) sandy loam; moderate medium subangular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; few fine and medium roots; diffuse smooth boundary;

Bt2 110 - 160 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sandy loam; weak fine and medium angular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; very few fine partially weathered angular quartz fragments; very few medium and coarse roots; diffuse smooth boundary;

BCs 160 - 190 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sandy loam; weak fine and medium angular blocky structure; slightly hard when dry, very friable when moist, sticky and slightly plastic when wet; common fine and medium pores; Common fine and medium partially weathered angular quartz fragments mixed with fine and medium soft irregular iron and manganese concretions.

Analytical data profile KP 84

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	14	14
Silt	: 13	13	11
Very fine sand	: 14	14	11
Fine sand	: 25	24	21
Medium sand	: 24	21	24
Coarse sand	: 13	12	16
Very coarse sand	: 4	2	3
Texture class	: LS	SL	SL
pH H20	: 6.2	6.0	5.7
pH KCl	: 5.3	4.4	4.4
EC mS/cm	: 0.05	0.02	0.01
Organic C %	: 0.55	0.31	0.40
Total N %	: 0.03	0.02	0.03
C/N	: 18	16	13
Available P mg/kg	: 2.00	1.92	0.50
CEC me/100g	: 4.2	2.0	2.1
Exch. Ca me/100g	: 1.7	0.6	0.8
Exch. Mg me/100g	: 0.9	0.4	0.2
Exch. K me/100g	: 0.40	0.25	0.15

Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 3.02	1.27	1.19
Base saturation %	: 72	64	58

Profile no. : **KP 85** Map unit: B 23 (soil unit: B3b5)
Sheet/Grid : 79/1
Coord : UTM 4497E9546N
Author(s) : F.M. Banzi
Date described : 01/11/96
Survey Area : Dakama Div., Kahama District, Location : Sofi East vill

Soil name (local) : Kikungu
Classification FAO : Dystric Cambisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Interfluve Microrelief :
Slope form : Straight Slope % : 2 - 3
Slope position : Upper
Parent Mater. : Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, cotton, g.nuts). Human inf. : Cultivation

Ap 0 - 20 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many fine and medium pores; many very fine and fine roots; clear smooth boundary;

AB 20 - 45 cm: Brown (7.5YR 6/4, dry and 7.5YR 5/4, moist) loamy sand; moderate medium subangular blocky structure; hard when dry, friable when moist, slightly sticky and non plastic when wet; many fine and medium pores; common, fine and medium roots; gradual smooth boundary;

Bws 45 - 85/95 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) gravelly sandy loam; weak fine and medium angular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; few fine and medium partially weathered angular quartz fragments; common fine and medium hard irregular iron and manganese concretions; common medium and coarse roots;

BCs 95 - 150 cm: Lateritic gravel (unconsolidated).

Analytical data profile KP 85

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	6	11
Silt	: 10	11	9
Very fine sand	: 13	14	10
Fine sand	: 28	32	24

Medium sand	: 29	24	28
Coarse sand	: 13	11	16
Very coarse sand	: 2	2	2
Texture class	: LS	LS	SL
pH H20	: 6.9	6.6	6.7
pH KCl	: 6.1	5.3	5.9
EC mS/cm	: 0.07	0.02	0.02
Organic C %	: 0.69	0.19	0.15
Total N %	: 0.04	0.02	0.02
C/N	: 17	10	8
Available P mg/kg	: 3.70	1.22	1.07
CEC me/100g	: 7.1	1.7	3.2
Exch. Ca me/100g	: 3.1	0.8	2.1
Exch. Mg me/100g	: 1.4	0.5	0.6
Exch. K me/100g	: 0.33	0.22	0.17
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H (KCl)	: -	-	0.07
Exch. Al (KCl)	: -	-	0.24
TEB me/100g	: 4.85	1.54	2.91
Base saturation %	: 68	89	92

Profile no. **: KP 86** Map unit: B 32 (soil unit B3f3)

Sheet/Grid	: 79/1		
Coord	: UTM 4426E9568N		
Elevation	:		
Author(s)	: F.M. Banzi		
Date described	: 2/11/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Iboja/Italike
Soil name (local)	: Luseni		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. plain	Microrelief	:
Slope form	: Straight	Slope %	: 2
Slope position	: Lower		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewh. excessive		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	:		
Land use	: Rainfed cropping (maize, g.nuts, cassava).	Human inf.	: Cultivation

Ap 0 - 20 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) loamy sand; weak medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; gradual smooth boundary;

BA 20 - 45 cm: Yellowish brown (10YR 5/4, dry and 10YR 4/4, moist) loamy sand; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common very fine, fine and medium pores; common fine and medium roots; clear smooth boundary;

Bw1 45 - 80 cm: Light yellowish brown (10YR 6/4, moist) sandy loam; weak medium angular and subangular blocky structure; friable when moist, non sticky and non plastic when wet; common fine and medium pores; few medium; gradual smooth boundary;

Bw2 80 - 125 cm: Very pale brown (10YR 7/4, moist) sandy loam; weak coarse angular blocky structure; friable when moist, sticky and non plastic when wet; common fine and medium pores; few medium roots; gradual smooth boundary;

Bw3 125 - 160 cm: Light yellowish brown (10YR 6/4, moist) sandy loam to sandy clay loam; very weak coarse angular blocky structure; friable when moist, sticky and slightly plastic when wet; few fine and medium pores; very few medium roots; gradual smooth boundary;

BC 160 - 190 cm: Brownish grey (10YR 6/2, moist) sand clay loam; very weak coarse angular blocky structure; firm when moist, sticky and slightly plastic when wet; few fine and medium pores; few, fine, partially weathered subrounded quartz fragments.

Analytical data profile KP 86

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	7	8
Silt	: 19	16	20
Very fine sand	: 22	20	23
Fine sand	: 25	26	25
Medium sand	: 18	19	16
Coarse sand	: 9	10	7
Very coarse sand	: 2	2	1
Texture class	: LS	SL	SL
pH H20	: 5.4	5.6	6.0
pH KCl	: 4.0	4.0	4.6
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.43	0.09	0.13
Total N %	: 0.05	0.01	0.01
C/N	: 9	9	13
Available P mg/kg	: 1.88	0.63	0.21
CEC me/100g	: 5.6	3.83	3.59
Exch. Ca me/100g	: 1.7	1.3	1.2
Exch. Mg me/100g	: 0.7	0.8	1.2
Exch. K me/100g	: 0.10	0.08	0.06
Exch. Na me/100g	: 0.02	0.04	0.23
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 2.52	2.22	2.69
Base saturation %	: 45	58	75

Bulk density g/cm3	: 1.5	1.7	1.7
pF 2	: 14.7	20.4	20.6
pF 2.4	: 13.8	13.4	19.4
pF 3	: 4.2	4.4	8.9
pF 4.2	: 3.7	4.2	8.1

Profile no. **: KP 87** Map unit: B 33 (soil unit B3b5)
Sheet/Grid : 79/1
Coord : UTM 4667E9535N
Elevation :
Author(s) : F.M. Banzi
Date described : 05/11/96
Survey Area : Dakama Div., Kahama District, Location : Isunuka

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Land form : Gently und. plain Microrelief :
Slope form : Convex Slope % : 2
Slope position : Top
Parent Mater. : Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Very few (5%) Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, cotton, g.nuts). Human inf. : Cultivation

Ap 0 - 20 cm: Dark brown (7.5YR 3/4, moist) sandy loam; moderate fine subangular blocky structure; friable when moist, slightly sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bt1 20 - 45 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) sandy loam; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; few fine clay cutans; many fine and medium pores; common fine medium and coarse roots; gradual smooth boundary;

Bt2 45 - 80 cm: Yellowish red (5YR 5/6, dry and 5YR 4/6, moist) sandy clay loam; weak medium angular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; few fine and medium partially weathered angular quartz fragments; few medium and coarse roots;

BCs 80 - 100 cm: Reddish yellow (5YR 6/8, dry and 5YR 5/8, moist) gravelly sandy clay loam; very weak fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; common medium and coarse partially weathered angular quartz fragments; few medium hard irregular iron and manganese concretions;

C > 100 cm: Lateritic gravel (unconsolidated).

Analytical data profile KP 87

Depth (cm)	: 0-20	30-50	80-100
Clay	: 11	18	24
Silt	: 9	10	12
Very fine sand	: 10	8	13
Fine sand	: 23	21	19
Medium sand	: 24	14	15
Coarse sand	: 17	21	12
Very coarse sand	: 6	5	5
Texture class	: SL	SL	SCL
pH H20	: 5.4	5.2	4.8
pH KCl	: 4.5	4.1	4.0
EC mS/cm	: 0.07	0.02	0.02
Organic C %	: 0.53	0.26	0.19
Total N %	: 0.04	0.03	0.02
C/N	: 13	9	10
Available P mg/kg	: 7.20	3.51	0.61
CEC me/100g	: 3.7	2.6	7.1
Exch. Ca me/100g	: 1.0	0.6	2.0
Exch. Mg me/100g	: 0.5	0.3	0.6
Exch. K me/100g	: 0.40	0.18	0.08
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: 0.04	0.06	0.04
Exch. Al (KCl)	: 0.00	0.24	0.40
TEB me/100g	: 1.92	1.10	2.70
Base saturation %	: 52	43	38

Profile no.	**: KP 88**	Map unit: B 31 (soil unit: B3f2)	
Sheet/Grid	: 79/1		
Coord	: UTM 4607E9540N		
Elevation	:		
Author(s)	: F.M. Banzi		
Date described	: 5/11/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Itumbili vill
Soil name (local)	: Luseni		
Classification FAO	: Eutric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Land form	: Gently und. plain	Microrelief	:
Slope form	: Straight	Slope %	: 1.5
Slope position	: Middle		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 3mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewh. excessive		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	:		
Land use	: Rainfed cropping (maize, g.nuts, cotton).	Human inf.	: Cultivation

Ap	0 - 15 cm:	Dark brown (10YR 3/3, moist) loamy sand; moderate, medium subangular blocky structure; friable when moist, non sticky and non plastic when wet; many very fine and fine pores; many very fine and fine roots; clear smooth boundary;
BA	15 - 35 cm:	Dark yellowish brown (10YR 5/4, dry and 10YR 4/4, moist) loamy sand; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine and medium pores; common fine and medium roots; clear smooth boundary;
Bw1	35 - 80 cm:	Strong brown (7.5YR 6/6, dry and 7.5YR 5/6, moist) loamy sand; moderate medium angular blocky structure; hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine and medium pores; few medium and coarse roots; gradual smooth boundary;
Bw2	80 - 130 cm:	Reddish yellow (7.5YR 7/8, dry and 7.5YR 6/8, moist) sandy loam; weak medium angular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common fine and medium pores; very few fine angular partially weathered quartz fragments; few medium and coarse roots; gradual smooth boundary;
Bw3	130 - 155 cm:	Reddish yellow (7.5YR 7/6, moist) sandy loam; weak fine angular blocky structure; friable when moist, slightly sticky and slightly plastic when wet; few fine and medium pores; few fine angular partially weathered quartz fragments;
Cms	> 155 cm:	Laterite (strongly cemented).

Analytical data profile KP 88

Depth (cm)	: 0-20	30-50	80-100
Clay	: 7	5	10
Silt	: 11	0	16
Very fine sand	: 19	5	14
Fine sand	: 29	9	24
Medium sand	: 20	7	20
Coarse sand	: 12	4	14
Very coarse sand	: 2	70	2
Texture class	: LS	S	SL
pH H20	: 6.2	5.7	6.4
pH KCl	: 5.1	4.3	4.9
EC mS/cm	: 0.04	0.01	0.02
Organic C %	: 0.46	0.24	0.18
Total N %	: 0.03	0.02	0.01
C/N	: 15	12	18
Available P mg/kg	: 2.77	1.47	0.80
CEC me/100g	: 4.0	2.5	3.7
Exch. Ca me/100g	: 2.2	0.9	1.6
Exch. Mg me/100g	: 0.6	0.4	1.3
Exch. K me/100g	: 0.19	0.08	0.10
Exch. Na me/100g	: 0.02	0.04	0.04
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 3.01	1.42	3.04
Base saturation %	: 76	58	82

Profile no.	**: KP 89**	Map unit: B 34 (soil unit: B3f3)	
Sheet/Grid	: 79/1		
Coord	: UTM 4618E9544N		
Elevation	:		
Author(s)	: F.M. Banzi		
Date described	: 5/11/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Ishila
Soil name (local)	: Luseni		
Classification FAO	: Dystric Cambisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gently und. plain	Microrelief	:
Slope form	: Straight	Slope %	: 2
Slope position	: Lower		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewh. excessive		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping, Light grazing.	Human inf.	: Grazing

Ap 0 - 20 cm: Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) loamy sand; weak fine subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and medium roots; clear smooth boundary;

AB 20 - 45 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) loamy sand; weak fine subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; common fine, medium and coarse roots; gradual smooth boundary;

Bw1 45 - 115 cm: Yellowish brown (10YR 6/4, dry and 10YR 5/4, moist) loamy sand to sandy loam; weak medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; very few fine partially weathered quartz fragments; few, medium and coarse roots; gradual smooth boundary;

BCs 115 - 150 cm: Light yellowish brown (10YR 7/4, dry and 10YR 6/4, moist) sandy loam; very weak medium angular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; few fine and medium pores; very few fine partially weathered quartz fragments; few fine hard irregular iron and manganese concretions.

Cms > 150 cm: Laterite (strongly cemented).

Analytical data profile KP 89

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	7	11
Silt	: 9	13	13
Very fine sand	: 13	11	10
Fine sand	: 23	23	17
Medium sand	: 25	24	24

Coarse sand	: 20	18	23
Very coarse sand	: 5	4	2
Texture class	: LS	LS	SL
pH H20	: 5.5	5.0	4.5
pH KCl	: 4.3	3.7	3.4
EC mS/cm	: 0.02	0.01	0.02
Organic C %	: 0.40	0.95	0.19
Total N %	: 0.05	0.10	0.02
C/N	: 8	10	10
Available P mg/kg	: 1.80	1.12	0.77
CEC me/100g	: 3.3	2.4	4.2
Exch. Ca me/100g	: 1.1	0.4	0.5
Exch. Mg me/100g	: 0.5	0.3	0.4
Exch. K me/100g	: 0.15	0.15	0.12
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H (KCl)	: -	0.06	0.10
Exch. Al (KCl)	: -	0.64	1.20
TEB me/100g	: 1.77	0.87	1.06
Base saturation %	: 54	36	25

Profile no. **: KP 90** Map unit: B 33 (soil unit B2g2)
Sheet/Grid : 79/1
Coord : UTM 4557E9550N
Elevation :
Author(s) : F.M. Banzi
Date described : 06/11/96
Survey Area : Dakama Div., Kahama District, Location: Busenda vill

Soil name (local) : Lukele
Classification FAO : Cambic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. plain Microrelief :
Slope form : Straight Slope % : 1.5
Slope position : Lower
Parent Mater. : Colluvium derived from granite
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Light grazing. Human inf. :

Ah 0 - 20 cm: Dark greyish brown (10YR 5/3, dry and 10YR 4/2, moist) loamy sand; weak medium subangular blocky structure; hard when dry, friable when moist, non sticky and non plastic when wet; common fine, medium and coarse pores; common fine and medium roots; clear smooth boundary;

ABm 20 - 65 cm: Brown (10YR 6/3, dry and 10YR 5/3, moist) loamy sand; very weak coarse angular blocky structure; hard when dry, firm when moist, slightly sticky and non plastic when wet; common medium and coarse pores; few medium and coarse roots; gradual smooth

boundary;

BC 65 - 80 cm: Pale brown (10YR 7/3, dry and 10YR 6/3, moist) coarse loamy sand; very weak fine angular blocky structure; hard when dry, friable when moist, slightly sticky and non plastic when wet; common fine and medium pores; very few coarse roots; clear smooth boundary;

Ccm 80 - 110 cm: Strongly cemented layer (extremely hard).

Analytical data profile KP 90

Depth (cm)	: 0-20	30-50
Clay	: 8	9
Silt	: 10	11
Very fine sand	: 11	9
Fine sand	: 25	30
Medium sand	: 26	24
Coarse sand	: 17	15
Very coarse sand	: 3	2
Texture class	: LS	LS
pH H20	: 4.7	5.0
pH KCl	: 3.7	3.5
EC mS/cm	: 0.05	0.01
Organic C %	: 0.49	0.21
Total N %	: 0.03	0.02
C/N	: 16	11
Available P mg/kg	: 3.04	1.15
CEC me/100g	: 5.7	2.6
Exch. Ca me/100g	: 0.7	0.5
Exch. Mg me/100g	: 0.7	0.4
Exch. K me/100g	: 0.17	0.06
Exch. Na me/100g	: 0.09	0.04
Exch. H (KCl)	: 0.10	0.00
Exch. Al (KCl)	: 0.50	0.98
TEB me/100g	: 1.66	1.00
Base saturation %	: 29	38

Profile no. **: KP 91** Map unit: A 41 (soil unit: A2c3)
Sheet/Grid : 63/3
Coord : UTM 4647E9557N
Elevation : 1300m ?
Author(s) : F.M. Banzi
Date described : 7/11/96
Survey Area : Dakama Div., Kahama District. Location : Iyenze vill

Soil name (local) : Nduha
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Interfluve Microrelief :
Slope form : Convex Slope % : 1.5
Slope position : Top

Parent Mater.	: Banded Ironstone		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, cassava, g.nuts).	Human inf.	:

Ap 0 - 10 cm: Dark brown (10YR 4/3, dry and 10YR 3/3, moist) clay; strong medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

BA 10 - 20 cm: Brown (7.5YR 4/4, dry and 7.5YR 4/3, moist) clay; strong medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine, medium and coarse pores; common fine, medium and coarse roots; gradual smooth boundary;

Bt1 20 - 50 cm: Strong brown (7.5YR 6/8, dry and 7.5YR 5/8, moist) clay; strong fine and medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; common fine clay cutans; common medium and coarse pores; common fine and medium roots; gradual smooth boundary;

Bt2 50 - 95 cm: Yellowish brown (10YR 6/8, dry and 10YR 5/8, moist) clay; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; few fine clay cutans; common medium and coarse pores; few medium and coarse roots; gradual smooth boundary;

BCs 95 - 110 cm: Brownish yellow (10YR 6/8, dry and 10YR 6/6, moist) gravely clay; weak fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few medium and coarse pores; many fine and medium hard subrounded iron and manganese concretions; clear smooth boundary;

Cs > 110 cm: Lateritic gravel (unconsolidated).

Analytical data profile KP 91

Depth (cm)	: 0-20	30-50	80-100
Clay	: 42	54	52
Silt	: 14	13	16
Very fine sand	: 7	6	7
Fine sand	: 19	13	10
Medium sand	: 11	8	8
Coarse sand	: 5	4	4
Very coarse sand	: 2	2	3
Texture class	: C	C	C
pH H20	: 5.3	5.0	4.9
pH KCl	: 4.1	3.5	3.5
EC mS/cm	: 0.03	0.01	0.01
Organic C %	: 1.53	0.53	0.38
Total N %	: 0.12	0.04	0.03
C/N	: 13	13	13
Available P mg/kg	: 0.36	Tr	Tr

CEC me/100g	: 9.5	9.2	8.6
Exch. Ca me/100g	: 2.7	2.5	1.6
Exch. Mg me/100g	: 1.3	0.8	1.3
Exch. K me/100g	: 0.22	0.07	0.07
Exch. Na me/100g	: 0.04	0.04	0.04
Exch. H (KCl)	: 0.04	0.10	0.02
Exch. Al (KCl)	: 0.32	2.20	2.50
TEB me/100g	: 4.26	3.41	3.01
Base saturation %	: 45	37	35
Bulk density g/cm3	: 1.4	1.5	1.5
pF 2	: 37.6	43.6	44.7
pF 2.4	: 30.9	33.8	31.2
pF 3	: 29.5	31.5	29.8
pF 4.2	: 19.2	20.2	21.9

Profile no. **: KP 92** Map unit: D 52 (soil unit D5i2)
Sheet/Grid : 79/1
Coord : UTM 4687E9551N
Elevation : 1157m
Author(s) : F.M. Banzi
Date described : 7/11/96
Survey Area : Dakama Div., Kahama District, Location : Mwashilingo

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief : Gilgai relief
Slope form : Concave Slope % : 0.5
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Moderate (1 - 5cm wide)
Drainage : Poor
Erosion : Nil
Flooding : Once/yr (Jan-May)
Vegetation : Miombo woodland (Combretum, Acacia spp.)
Land use : Wetland cultivation (paddy rice). Human inf. : Cultivation

Ap 0 - 20 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sandy clay loam; common fine distinct clear yellowish red (5YR 5/8) mottles; strong fine and medium subangular blocky structure; very hard when dry, firm when moist, sticky and slightly plastic when wet; common fine and medium pores; many very fine, fine and medium roots; clear smooth boundary;

Bg1 20 - 40 cm: Very dark greyish brown (10YR 4/2, dry and 10YR 3/2, moist) sandy clay loam; few fine faint distinct reddish yellow (5YR 5/8) mottles; moderate, fine and medium subangular blocky structure; very hard when dry, very firm when moist, sticky and slightly plastic when wet; common fine and medium pores; common medium and coarse roots; gradual smooth boundary;

Bg2 40 - 85 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) clay loam; very few fine faint distinct yellowish red (7.5YR 4/6) mottles; weak coarse prismatic structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; few medium pores; few medium roots; clear smooth boundary;

Bck1 85 - 120cm Reddish brown (2.5YR 5/3, dry and 2.5YR 4/3, moist) clay; weak coarse angular blocky structure; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; few medium pores; few fine hard subrounded calcium carbonate ($CaCO_3$) nodules; gradual smooth boundary;

BCck2 120 - 150cm Reddish brown (2.5YR 5/4, dry and 2.5YR 4/4, moist) clay; weak coarse angular blocky structure; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; few medium pores; many fine and medium hard subrounded $CaCO_3$ nodules mixed with iron and manganese concretions.

Analytical data profile KP 92

Depth (cm)	: 0-20	30-50	80-100
Clay	: 34	39	49
Silt	: 18	17	9
Very fine sand	: 8	7	6
Fine sand	: 13	11	13
Medium sand	: 7	10	10
Coarse sand	: 10	9	8
Very coarse sand	: 10	7	5
Texture class	: SCL	CL	C
pH H20	: 6.3	7.6	8.6
pH KCl	: 4.8	5.9	7.1
EC mS/cm	: 0.09	0.02	0.05
Organic C %	: 0.87	0.64	0.53
Total N %	: 0.08	0.04	0.05
C/N	: 11	16	11
Available P mg/kg	: 0.07	0.23	0.88
CEC me/100g	: 22.8	15.2	22.4
Exch. Ca me/100g	: 9.3	9.9	19.1
Exch. Mg me/100g	: 8.0	8.0	13.5
Exch. K me/100g	: 0.15	0.12	0.10
Exch. Na me/100g	: 0.54	0.97	1.80
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 18.0	19.0	34.5
Base saturation %	: 79	100	100

Profile no. : **KP 93** Map unit: A 41 (soil unit: A3c1)
Sheet/Grid : 79/1
Coord : UTM 4674E9553N
Elevation : 1230m ?
Author(s) : F.M. Banzi
Date described : 7/11/96
Survey Area : Dakama Div., Kahama District, Location : Mwashilingo

Soil name (local)	: Nduha		
Classification FAO	: Haplic Alisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Interfluve	Microrelief	:
Slope form	: Straight	Slope %	: 1.5
Slope position	: Lower		
Parent Mater.	: Banded Ironstone		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, g.nuts, millet).	Human inf.	:

Ap 0 - 15 cm: Strong brown (7.5YR 5/6, dry and 7.5YR 4/6, moist) clay loam; strong fine granular structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bw1 15 - 40 cm: Yellowish red (5YR 5/6, dry and 5YR 4/6, moist) clay loam to clay; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; many fine and medium pores; common fine, medium and coarse roots; diffuse smooth boundary;

Bw2 40 - 90 cm: Yellowish red (5YR 5/8, dry and 5YR 5/6, moist) clay; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine, medium and coarse pores; few fine, medium and coarse roots; gradual smooth boundary;

Bw3 90 - 115 cm: Reddish yellow (5YR 7/8, dry and 5YR 6/8, moist) clay; weak fine and medium angular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine and medium pores; very few fine and medium soft irregular iron and manganese concretions; few fine, medium and coarse roots.

BCs 115 - 175 cm: Reddish yellow (5YR 7/8, dry and 5YR 6/8, moist) gravelly clay; common fine and medium soft irregular iron and manganese concretions. (by augering).

Analytical data profile KP 93

Depth (cm)	: 0-20	30-50	80-100
Clay	: 39	41	39
Silt	: 16	14	16
Very fine sand	: 8	8	9
Fine sand	: 14	15	16
Medium sand	: 12	12	10
Coarse sand	: 7	6	6
Very coarse sand	: 4	4	4
Texture class	: CL	C	CL
pH H20	: 4.6	4.9	4.7
pH KCl	: 3.6	3.6	3.5
EC mS/cm	: 0.04	0.01	0.01

Organic C %	: 1.34	0.59	0.49
Total N %	: 0.11	0.04	0.03
C/N	: 12	15	16
Available P mg/kg	: 4.26	0.24	Tr
CEC me/100g	: 19.6	10.3	19.6
Exch. Ca me/100g	: 3.5	2.2	4.1
Exch. Mg me/100g	: 1.1	1.3	1.3
Exch. K me/100g	: 0.26	0.07	0.06
Exch. Na me/100g	: 0.04	0.04	0.02
Exch. H (KCl)	: 0.04	0.10	0.08
Exch. Al (KCl)	: 1.80	1.84	1.22
TEB me/100g	: 4.90	3.61	5.48
Base saturation %	: 25	35	28

Profile no. **: KP 94** Map unit: A 41 (soil unit: A3c3)

Sheet/Grid : 79/1
Coord : UTM 4595E9558N
Elevation : 1156m ?
Author(s) : F.M. Banzi
Date described : 8/11/96
Survey Area : Dakama Div., Kahama District, Location : Utowambogo

Soil name (local) : Nduha
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Interfluve Microrelief : Few termite mounds
Slope form : Convex Slope % : 2
Slope position : Top
Parent Mater. : Banded Ironstone
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, g.nuts, cassava). Human inf. :

Ap 0 - 10 cm: Dark reddish brown (5YR 4/4, dry and 5YR 3/4, moist) sand clay loam; strong fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

BA 10 - 35 cm: Yellowish red (5YR 5/8, dry and 5YR 4/6, moist) sandy clay loam; moderate medium subangular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; common fine clay cutans; common fine and medium pores; common fine and medium roots; diffuse smooth boundary;

BCs 35 - 80 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) gravelly sandy clay; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; common fine and medium hard irregular iron and manganese concretions mixed with quartz fragments; few medium and coarse roots;

Cs > 80 cm: Lateritic gravel (unconsolidated).

Analytical data profile KP 94

Depth (cm)	: 0-20	30-50
Clay	: 29	35
Silt	: 11	14
Very fine sand	: 9	13
Fine sand	: 19	17
Medium sand	: 18	11
Coarse sand	: 9	6
Very coarse sand	: 5	4
Texture class	: SCL	SC
pH H20	: 6.2	6.2
pH KCl	: 5.3	4.9
EC mS/cm	: 0.04	0.02
Organic C %	: 1.04	0.31
Total N %	: 0.06	0.03
C/N	: 17	10
Available P mg/kg	: 0.88	0.16
CEC me/100g	: 8.6	6.2
Exch. Ca me/100g	: 4.7	2.7
Exch. Mg me/100g	: 1.7	1.8
Exch. K me/100g	: 0.15	0.06
Exch. Na me/100g	: 0.02	0.02
Exch. H (KCl)	: -	-
Exch. Al (KCl)	: -	-
TEB me/100g	: 6.57	4.58
Base saturation %	: 76	74

Profile no. : **KP 95** Map unit: B 34 (soil unit: B2f2)

Sheet/Grid :
Coord : UTM 4600E9562N
Elevation : 1207m
Author(s) : F.M. Banzi
Date described : 8/11/96
Survey Area : Dakama Div., Kahama District, Location : Kawe vill

Soil name (local) : Luseni
Classification FAO : Haplic Arenosols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Interfluve Microrelief : Few termite mounds
Slope form : Straight Slope % : 1.5
Slope position : middle
Parent Mater. : Colluvium der. fr. Granite
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Somewh. excessive
Erosion : Slight (splash and sheet)
Flooding : Never

Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, g.nuts). Human inf. :

Ap 0 - 20 cm: Brown (10YR 5/3, dry and 10YR 4/3, moist) loamy sand; weak fine subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and fine roots; clear smooth boundary;

BA 20 - 45 cm: Dark yellowish brown (10YR 5/4, dry and 10YR 4/4, moist) loamy sand; weak fine subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium, and few coarse pores; many fine and medium roots; gradual smooth boundary;

Bw1 45 - 100 cm: Yellowish brown (10YR 6/6, dry and 10YR 5/6, moist) loamy sand; very weak fine subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and non plastic when wet; common fine medium and coarse pores; common fine, medium and coarse roots; diffuse smooth boundary;

Bw2 100 - 170 cm: Brownish yellow (10YR 7/6, dry and 10YR 6/8, moist) loamy sand; very weak fine subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and non plastic when wet; common fine and medium pores; few fine partially weathered angular quartz fragments; very few medium and coarse roots; gradual smooth boundary;

BC 170 - 190 cm: Very pale brown (10YR 7/4, moist) loamy sand to sand; very weak fine subangular blocky structure; very friable when moist, non sticky and non plastic when wet; common fine and medium pores; common fine partially weathered angular quartz fragments.

Analytical data profile KP 95

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	6	10
Silt	: 8	8	7
Very fine sand	: 9	7	4
Fine sand	: 17	20	17
Medium sand	: 26	28	39
Coarse sand	: 24	23	18
Very coarse sand	: 11	8	5
Texture class	: LS	LS	LS
pH H20	: 5.7	5.3	4.8
pH KCl	: 4.9	4.2	3.8
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.57	0.28	0.24
Total N %	: 0.03	0.04	0.03
C/N	: 19	7	8
Available P mg/kg	: 2.54	0.76	0.73
CEC me/100g	: 2.96	2.98	1.84
Exch. Ca me/100g	: 1.0	0.9	0.4
Exch. Mg me/100g	: 0.5	0.3	0.1
Exch. K me/100g	: 0.14	0.06	0.05
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	0.02	0.06

Exch. Al (KCl)	: -	0.10	0.36
TEB me/100g	: 1.66	1.28	0.57
Base saturation %	: 56	43	31

Profile no. **: KP 96** Map unit: A 42 (soil unit: A4c3)
Sheet/Grid : 62/3
Coord : UTM 4595E9558N
Elevation :
Author(s) : F.M. Banzi
Date described : 12/11/96
Survey Area : Mweli Div., Kahama District, Location: Idahina

Soil name (local) : Nduha
Classification FAO : Dystric Cambisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Interfluv Microrelief : many termite mounds
Slope form : Straight Slope % : 2
Slope position : Upper
Parent Mater. : Banded Ironstone
Sealing : Slight (about 2mm)
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Well
Erosion : Slight (splash and sheet)
Flooding : Never
Vegetation : Miombo woodland
Land use : Rainfed cropping (maize, g.nuts, cotton). Human inf. :

Ap 0 - 20 cm: Dark reddish brown (5YR 4/4, dry and 5YR 3/4, moist) clay; strong fine granular structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; many very fine, fine and medium pores; many very fine, fine and medium roots; clear smooth boundary;

AB 20 - 50 cm: Reddish brown (5YR 4/6, dry and 5YR 4/4, moist) clay; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; few fine and medium roots; diffuse smooth boundary;

Bws 50 - 100 cm: Yellowish red (5YR 5/8, dry and 5YR 4/6, moist) gravelly clay; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; few fine hard irregular iron and manganese concretions; few medium and coarse roots;

Cs > 100cm Lateritic gravel (unconsolidated).

Analytical data profile KP 96

Depth (cm)	: 0-20	30-50	80-100
Clay	: 44	49	53
Silt	: 13	15	14
Very fine sand	: 9	10	10
Fine sand	: 17	14	13
Medium sand	: 11	8	7
Coarse sand	: 4	3	2

Very coarse sand	: 2	1	1
Texture class	: C	C	C
pH H20	: 5.3	4.8	4.7
pH KCl	: 4.6	3.9	4.0
EC mS/cm	: 0.01	0.01	0.01
Organic C %	: 1.80	0.75	0.65
Total N %	: 0.12	0.06	0.06
C/N	: 15	12	11
Available P mg/kg	: 1.40	0.13	0.37
CEC me/100g	: 13.0	12.8	13.3
Exch. Ca me/100g	: 4.0	3.4	2.6
Exch. Mg me/100g	: 1.7	1.4	1.2
Exch. K me/100g	: 0.26	0.05	0.05
Exch. Na me/100g	: 0.04	0.02	0.02
Exch. H (KCl)	: 0.04	0.04	0.06
Exch. Al (KCl)	: 0.01	1.00	0.88
TEB me/100g	: 6.0	4.87	3.87
Base saturation %	: 46	38	29

Profile no.	**: KP 97**	Map unit: D 52 (soil unit: D5i1)	
Sheet/Grid	: 62/3		
Coord	: UTM 4070E9580N		
Elevation	: 1140m		
Author(s)	: F.M. Banzi		
Date described	: 12/11/96		
Survey Area	: Mweli Div., Kahama District,	Location	:Mwabomba/Budoda
Soil name (local)	: Mbuga		
Classification FAO	: Dystric Gleysols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Mbuga	Microrelief	:
Slope form	: Concave	Slope % : 0.5	
Slope position	: Bottom		
Parent Mater.	: Alluvium		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Moderate (1 - 3cm wide)		
Drainage	: Poor		
Erosion	: Nil		
Flooding	: Once/yr (Jan-May)		
Vegetation	: Acacia wooded grassland		
Land use	: Wetland cultivation (paddy rice).	Human inf.	: Cultivation

Ap 0 - 10 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sandy clay loam; many fine faint clear reddish yellow (7.5YR 7/8) mottles; moderate fine subangular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common fine and medium pores; many very fine, fine and medium roots; clear smooth boundary;

Bg1 10 - 25 cm: Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) sandy clay loam; common fine faint distinct dark brown (7.5YR 3/4) mottles; moderate fine and medium subangular blocky structure; hard when dry, firm when moist, sticky and slightly plastic

when wet; common fine and medium pores; common fine and medium roots; gradual smooth boundary;

Bg2 25 - 60 cm: Dark yellowish brown (10YR 5/4, dry and 10YR 4/4, moist) clay; common fine faint distinct dark brown (7.5YR 3/4) mottles; weak medium and coarse prismatic structure; Very hard when dry, firm when moist, sticky and plastic when wet; few fine and medium pores; common medium and coarse roots; clear smooth boundary;

Bg3 60 - 100 cm: Dark grey (10YR 5/1, dry and 10YR 4/1, moist) clay; very weak coarse angular blocky structure; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; few pressure faces; very few medium pores; gradual smooth boundary;

BCck 100 - 120 cm: Grey brown (10YR 5/2, dry and 10YR 5/2, moist) clay; very weak coarse angular blocky structure; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; very few medium pores; many medium and coarse hard subrounded calcium carbonate ($CaCO_3$) nodules.

Analytical data profile KP 97

Depth (cm)	: 0-20	30-50	80-100
Clay	: 34	57	59
Silt	: 7	1	9
Very fine sand	: 5	4	4
Fine sand	: 22	16	12
Medium sand	: 21	16	11
Coarse sand	: 9	5	4
Very coarse sand	: 2	1	1
Texture class	: SCL	C	C
pH H20	: 5.6	5.9	7.8
pH KCl	: 4.1	4.0	6.3
EC mS/cm	: 0.03	0.02	0.03
Organic C %	: 1.65	0.87	0.44
Total N %	: 0.14	0.07	0.03
C/N	: 12	12	15
Available P mg/kg	: 0.50	0.07	0.98
CEC me/100g	: 22.5	22.8	24.3
Exch. Ca me/100g	: 7.4	8.2	18.3
Exch. Mg me/100g	: 4.8	6.0	12.4
Exch. K me/100g	: 0.15	0.11	0.24
Exch. Na me/100g	: 0.27	0.48	0.42
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 12.6	14.8	31.4
Base saturation %	: 56	65	100

Profile no. **: KP 98** Map unit: B 23 (soil unit: B3f9)
Sheet/Grid : 62/4
Coord : UTM 4236E9579N
Elevation : 1180m
Author(s) : F.M. Banzi
Date described : 14/11/96
Survey Area : Dakama Div., Kahama District, Location : Kipangu vill

Soil name (local)	: Luseni		
Classification FAO	: Haplic Arenosols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Hilly	Microrelief	: Termite mounds
Slope form	: Straight	Slope %	: 3.5
Slope position	: Lower		
Parent Mater.	: Colluvium der. fr. Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Somewh. excessive		
Erosion	: Moderate (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, g.nuts).	Human inf.	:
Remarks	: Common high termite mounds		

Ah	0 - 10 cm:	Very dark greyish brown (10YR 3/2, dry and 10YR 2/2, moist) loamy sand; weak fine subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;
AC	10 - 30 cm:	Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) loamy sand; weak, fine subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many fine and medium roots; gradual smooth boundary;
2C	30 - 60 cm:	Greyish brown (10YR 6/2, dry and 10YR 5/2, moist) sand; very weak medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; many fine and medium pores; common medium and coarse roots; diffuse smooth boundary;
3C1	60 - 90 cm:	Very pale brown (10YR 7/3, dry and 10YR 6/3, moist) loamy sand to sand; very weak medium subangular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; few medium and coarse roots; diffuse smooth boundary;
3C2	90 - 140 cm:	Light grey (10YR 8/2, dry and 10YR7/2, moist) loamy sand to sand; very weak fine subangular blocky structure; soft when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; very few fine partially weathered angular quartz fragments; very few medium and coarse roots;
4Cms	> 140 cm:	Strongly cemented layer (cementing agent-silica).

Analytical data profile KP 98

Depth (cm)	: 0-20	30-50	80-100
Clay	: 4	2	2
Silt	: 14	11	17
Very fine sand	: 13	7	12
Fine sand	: 22	19	22
Medium sand	: 27	31	26
Coarse sand	: 18	26	18
Very coarse sand	: 2	4	3
Texture class	: LS	S	LS

pH H20	: 6.2	5.6	6.4
pH KCl	: 5.4	4.2	4.8
EC mS/cm	: 0.03	0.01	0.01
Organic C %	: 1.15	0.39	0.23
Total N %	: 0.12	0.03	0.02
C/N	: 10	13	12
Available P mg/kg	: 18.6	1.55	0.21
CEC me/100g	: 9.7	1.28	0.51
Exch. Ca me/100g	: 3.8	0.4	0.2
Exch. Mg me/100g	: 3.1	0.2	0.1
Exch. K me/100g	: 0.34	0.05	0.08
Exch. Na me/100g	: 0.02	0.02	0.04
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 7.26	0.67	0.42
Base saturation %	: 75	55	82

Profile no.	**: KP 99**	Map unit: D 52 (soil unit: D4i1)	
Sheet/Grid	: 62/4		
Coord	: UTM 4241E9580N		
Elevation	: 1158m		
Author(s)	: F.M. Banzi		
Date described	: 14/11/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Kigosi r. mbuga
Soil name (local)	: Mbuga		
Classification FAO	: Calcic Gleysols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Mbuga	Microrelief	:
Slope form	: Concave	Slope %	: 0.5 - 1%
Slope position	: Bottom		
Parent Mater.	: Alluvium		
Sealing	: Nil		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Slight (2 - 3cm wide)		
Drainage	: Poor		
Erosion	: Nil		
Flooding	: Once/yr (Mar-Jun)		
Vegetation	: Acacia wooded grassland		
Land use	: Wetland cultivation (paddy rice).	Human inf.	: Cultivation

Ap1 0 - 10 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sandy clay loam; very few fine distinct clear yellowish red (5YR 5/8) mottles; moderate medium and coarse subangular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; many fine and medium pores; many very fine, fine and medium roots; clear smooth boundary;

Bg1 10 - 25 cm: Brown (10YR 4/3, moist) sandy clay loam; many fine distinct clear yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common fine and medium pores; many fine and medium roots; gradual smooth boundary;

Bg2 25 - 65 cm: Greyish brown (10YR 5/2, moist) clay; few fine faint diffuse brown (7.5YR 5/4) mottles; weak coarse prismatic structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; very few fine and medium pores; few medium roots; diffuse smooth boundary;

BCck 65 - 110 cm: Grey (10YR 5/1, moist) clay; weak coarse prismatic structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few fine and medium pores; common medium and coarse hard irregular calcium carbonate ($CaCO_3$) nodules.

Analytical data profile KP 99

Depth (cm)	: 0-20	30-50	80-100
Clay	: 24	57	54
Silt	: 6	5	7
Very fine sand	: 4	3	3
Fine sand	: 14	7	9
Medium sand	: 25	13	15
Coarse sand	: 21	13	11
Very coarse sand	: 6	2	1
Texture class	: SCL	C	C
pH H20	: 5.6	5.8	7.4
pH KCl	: 4.2	4.0	5.8
EC mS/cm	: 0.04	0.04	0.03
Organic C %	: 1.31	0.73	0.42
Total N %	: 0.07	0.06	0.04
C/N	: 18	12	11
Available P mg/kg	: 1.69	1.91	1.65
CEC me/100g	: 19.3	12.21	13.7
Exch. Ca me/100g	: 6.2	5.4	7.9
Exch. Mg me/100g	: 3.1	2.2	7.5
Exch. K me/100g	: 0.11	0.15	0.12
Exch. Na me/100g	: 0.24	0.31	0.24
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 9.65	8.06	14.7
Base saturation %	: 50	66	100

Profile no. : **KP 100** Map unit: B 22 (soil unit: B4b1)
Sheet/Grid : 62/4
Coord : UTM 4295E9574N
Elevation : 1320m
Author(s) : F.M. Banzi
Date described : 14/11/96
Survey Area : Dakama Div., Kahama District, Location : Butende

Soil name (local) : Kikungu
Classification FAO : Ferric Acrisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Hilly Microrelief :
Slope form : Convex Slope % : 6
Slope position : Top

Parent Mater.	: Granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stoniness	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, cotton, g.nuts).	Human inf.	: Cultivation

Ap 0 - 20 cm: Dark reddish brown (5YR 4/3, dry and 5YR 3/3, moist) sandy loam; moderate fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bt1 20 - 60 cm: Yellowish red (5YR 5/6, dry and 5YR 4/6, moist) sand clay loam; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few fine clay cutans; many fine and medium pores; common fine, medium and coarse roots; gradual smooth boundary;

Bt2 60 - 125 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) sandy clay loam to sandy clay; moderate fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common fine clay cutans; common fine and medium pores; few fine and medium partially weathered angular quartz fragments; few medium and coarse roots; diffuse smooth boundary;

BCs 125 - 140 cm: Yellowish red (5YR 6/8, dry and 5YR 5/8, moist) gravelly sand clay; weak fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; common fine and medium partially weathered angular quartz fragments; very few fine hard irregular iron and manganese concretions.

Analytical data profile KP 100

Depth (cm)	: 0-20	30-50	80-100
Clay	: 12	31	37
Silt	: 10	9	10
Very fine sand	: 15	12	11
Fine sand	: 30	20	16
Medium sand	: 23	15	13
Coarse sand	: 8	9	8
Very coarse sand	: 2	4	5
Texture class	: SL	SCL	SC
pH H20	: 6.1	4.9	4.6
pH KCl	: 5.3	3.9	3.8
EC mS/cm	: 0.08	0.03	0.04
Organic C %	: 0.92	0.39	0.21
Total N %	: 0.06	0.05	0.02
C/N	: 15	8	11
Available P mg/kg	: 5.13	0.88	0.15
CEC me/100g	: 6.5	5.0	2.8
Exch. Ca me/100g	: 2.8	1.8	0.2
Exch. Mg me/100g	: 1.3	0.9	0.2
Exch. K me/100g	: 0.45	0.05	0.20

Exch. Na me/100g	: 0.03	0.04	0.04
Exch. H (KCl)	: -	0.05	0.06
Exch. Al (KCl)	: -	0.75	0.88
TEB me/100g	: 4.58	2.79	0.64
Base saturation %	: 70	58	23

Profile no. **: KP 101** Map unit: D51 (soil unit: D4i1)
Sheet/Grid : 63/3
Coord : UTM 4624E9562N
Elevation : 1220m
Author(s) : F.M. Banzi
Date described : 15/11/96
Survey Area : Dakama Div., Kahama District, Location : Ishiki-mbuga

Soil name (local) : Mbuga
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief :
Slope form : Straight/concave Slope % : 0.5 - 1%
Slope position : Bottom
Parent Mater. : Colluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Nil
Drainage : Poor
Erosion : Nil
Flooding : Infrequent
Vegetation : Miombo woodland
Land use : Wetland cultivation (paddy rice). Human inf. : Cultivation

Ap 0 - 20 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) sandy loam; common medium distinct clear yellowish bown (10YR 3/1) mottles; weak medium subangular blocky structure; hard when dry, firm when moist, slightly sticky and non plastic when wet; common fine and medium pores; common fine and medium roots; gradual smooth boundary;

Bg1 20 - 50 cm: Dark greyish brown (10YR 5/2, dry and 10YR 4/2, moist) sandy loam; very few, fine, faint, diffuse, reddish yellow (5YR 4/4) mottles; weak coarse angular blocky structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; common fine and medium pores; few fine and medium roots; diffuse smooth boundary;

Bg2 50 - 100 cm: Dark greyish brown (10YR 4/2, moist) sandy to sandy clay loam; common medium distinct clear reddish brown (2.5YR 4/4) mottles; very weak coarse angular blocky structure; firm when moist, sticky and slightly plastic when wet; common fine and medium pores; diffuse smooth boundary;

Bg3 100 - 140 cm: Greyish brown (10YR 5/2, moist) sandy loam; many medium prominent clear reddish brown (2.5YR 4/4) mottles; very weak coarse angular blocky structure; firm when moist, sticky and slightly plastic when wet; few fine and medium pores; diffuse smooth boundary;

Bcs 140 - 160 cm: Grey (10YR 5/1, moist) sandy loam; common medium faint clear yellowish red (5YR 5/6) mottles; very weak coarse angular blocky structure; firm when moist, sticky and slightly plastic when wet; few fine and medium pores; few fine soft irregular manganese concretions.

Analytical data profile KP 101

Depth (cm)	: 0-20	30-50	80-100
Clay	: 13	19	16
Silt	: 8	8	7
Very fine sand	: 8	6	4
Fine sand	: 21	15	14
Medium sand	: 29	25	26
Coarse sand	: 17	20	23
Very coarse sand	: 4	7	10
Texture class	: SL	SL	SL
pH H20	: 5.7	5.7	5.9
pH KCl	: 4.7	4.0	4.1
EC mS/cm	: 0.06	0.01	0.01
Organic C %	: 0.65	0.45	0.18
Total N %	: 0.05	0.03	0.02
C/N	: 13	15	9
Available P mg/kg	: 1.79	0.19	2.74
CEC me/100g	: 17.0	22.6	13.5
Exch. Ca me/100g	: 6.6	6.5	6.8
Exch. Mg me/100g	: 4.0	6.5	1.5
Exch. K me/100g	: 0.05	0.05	0.01
Exch. Na me/100g	: 0.04	0.04	0.07
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 10.7	13.1	8.4
Base saturation %	: 63	58	62

Profile no. : **KP 102** Map unit: D 51 (soil unit: D5i2)
Sheet/Grid : 63/3
Coord : UTM 4659E9564N
Elevation : 1210m
Author(s) : F.M. Banzi
Date described : 16/11/96
Survey Area : Dakama Div., Kahama District, Location : Iyenze/Bumbiti

Soil name (local) : Mbuga
Classification FAO : Eutric Vertisols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Mbuga Microrelief :
Slope form : Concave Slope % : 0 - 0.5%
Slope position : Bottom
Parent Mater. : Alluvium
Sealing : Nil
Rock Outcrops : Nil Stones : Nil
Cracking : Wide (3 - 8cm wide)

Drainage : Imperfect
Erosion : Nil
Flooding : Once/yr (Jan-May)
Vegetation : Accacia wooded grassland
Land use : Grazing, cultivation Human inf. : Cultivation

Ah 0 - 10 cm: Black (10YR 3/1, dry and 10YR 2/1, moist) clay; strong fine and medium subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; common fine and medium pores; many very fine, fine and medium roots; clear smooth boundary;

Bw1 10 - 40 cm: Black (10YR 2/1, dry and 10YR 2/1, moist) clay; moderate medium and coarse angular blocky structure; extremely hard when dry, very firm when moist, sticky and plastic when wet; prominent intersecting slickensides; common medium and coarse pores; common medium and few coarse roots; gradual smooth boundary;

Bw2 40 - 110 cm: Black (10YR 3/1, dry and 10YR 2/1, moist) clay; weak coarse angular wedge structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; prominent intersecting slickensides; few medium and coarse pores; very few medium roots.

Analytical data profile KP 102

Depth (cm)	: 0-20	30-50	80-100
Clay	: 55	58	62
Silt	: 22	26	24
Very fine sand	: 4	3	3
Fine sand	: 7	5	5
Medium sand	: 7	4	4
Coarse sand	: 4	3	2
Very coarse sand	: 1	1	0
Texture class	: C	C	C
pH H20	: 6.3	6.3	7.3
pH KCl	: 5.1	4.7	5.6
EC mS/cm	: 0.11	0.04	0.09
Organic C %	: 1.32	1.03	0.97
Total N %	: 0.09	0.07	0.05
C/N	: 15	15	15
Available P mg/kg	: 4.48	4.60	5.67
CEC me/100g	: 58.0	68.1	52.1
Exch. Ca me/100g	: 26.0	29.2	31.4
Exch. Mg me/100g	: 18.7	22.0	30.1
Exch. K me/100g	: 0.25	0.05	0.07
Exch. Na me/100g	: 0.28	0.54	0.58
Exch. H (KCl)	: -	-	-
Exch. Al (KCl)	: -	-	-
TEB me/100g	: 45.2	51.8	62.1
Base saturation %	: 78	76	100

Profile no. **: KP 103** Map unit: B 22 (soil unit: B3a2)
Sheet/Grid : 79/1
Coord : UTM 4480E9555N

Elevation	: 1330m		
Author(s)	: F.M. Banzi		
Date described	: 19/11/96		
Survey Area	: Dakama Div., Kahama District.	Location	: Iboja
Soil name (local)	: Luguru		
Classification FAO	: Eutric Leptosols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Plain (top)	Microrelief	:
Slope form	: Convex	Slope %	: 5%
Slope position	: Top		
Parent Mater.	: Granite		
Sealing	: Nil		
Rock Outcrops	: Many (85 - 90 %)	Stones	: Common (15%)
Cracking	: Nil		
Drainage	: Somewh. excessive		
Erosion	: Moderate (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Fire wood collection.	Human inf.	:

Ah 0 - 8/10 cm: Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) sandy loam; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and non plastic when wet; many very fine, fine and medium pores; common fine medium and coarse fresh and partially weathered angular quartz and granite fragments; many very fine, fine and medium roots; clear weavy boundary;

BA 8/10 - 20 cm: Brown (7.5YR 5/4, dry and 7.5YR 4/4, moist) gravelly sandy loam; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many very fine, fine and medium pores; common fine, medium and coarse fresh and partially weathered angular quartz and granite fragments; common fine, medium and coarse roots.

C > 20 cm: Bedrock/ Boulder.

Analytical data profile KP 103

Depth (cm)	: 0-20
Clay	: 12
Silt	: 12
Very fine sand	: 13
Fine sand	: 28
Medium sand	: 19
Coarse sand	: 12
Very coarse sand	: 4
Texture class	: SL
pH H20	: 6.3
pH KCl	: 5.2
EC mS/cm	: 0.04
Organic C %	: 1.01
Total N %	: 0.10
C/N	: 10
Available P mg/kg	: 6.30

CEC me/100g	: 7.31
Exch. Ca me/100g	: 2.2
Exch. Mg me/100g	: 2.1
Exch. K me/100g	: 0.43
Exch. Na me/100g	: 0.02
Exch. H (KCl)	: -
Exch. Al (KCl)	: -
TEB me/100g	: 4.75
Base saturation %	: 65

Profile no.	**: KP 104**	Map unit: B 22 (soil unit: B3b1)	
Sheet/Grid	: 63/3		
Coord	: UTM 4499E9562N		
Elevation	: 1270m		
Author(s)	: F.M. Banzi		
Date described	: 20/11/96		
Survey Area	: Dakama Div., Kahama District,	Location	: Shininga
Soil name (local)	: Kikungu		
Classification FAO	: Haplic Acrisols		
Soil Climate	: Ustic (smr), Isohyperthermic (str)		
Landform	: Gent. und. plain	Microrelief	:
Slope form	: Straight	Slope %	: 4
Slope position	: Upper		
Parent Mater.	: Colluvium derived from granite		
Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stoniness	: Nil
Cracking	: Nil		
Drainage	: Well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Rainfed cropping (maize, cotton, g.nuts).	Human inf.	: Cultivation

Ap	0 - 20 cm:	Dark brown (7.5YR 4/3, dry and 7.5YR 3/3, moist) loamy sand; weak to moderate fine subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many, very fine, fine and medium pores; many very fine and fine roots; gradual smooth boundary;
AB	20 - 40 cm:	Dark brown (7.5YR 4/4, dry and 7.5YR 3/4, moist) sandy loam; moderate medium subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and non plastic when wet; many fine and medium pores; common very fine, fine and medium; gradual smooth boundary;
Bt1	40 - 90 cm:	Reddish brown (5YR 5/4, dry and 5YR 4/4, moist) sandy loam; moderate fine and medium sub angular blocky structure; hard when dry, friable when moist, sticky and slightly plastic when wet; common fine clay cutans; common fine and medium pores; few medium and coarse roots; gradual smooth boundary;
Bt2	90 - 160 cm:	Yellowish red (5YR 5/8, dry and 5YR 6/8, moist) sandy loam to sandy clay loam; weak medium subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; few fine clay cutans; common fine and medium pores; few fine partially weathered angular quartz and granite fragments; few coarse roots, diffuse smooth boundary;

Bcs 160 - 200 cm: Yellowish red (5YR 5/8, dry and 5YR 6/8, moist) gravelly sandy loam to sandy clay loam; weak fine subangular blocky structure; slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common fine and medium pores; common fine partially weathered angular quartz fragments; few fine and medium soft irregular iron concretions.

Analytical data profile KP 104

Depth (cm)	: 0-20	30-50	80-100
Clay	: 9	12	19
Silt	: 9	11	11
Very fine sand	: 13	11	11
Fine sand	: 27	24	21
Medium sand	: 24	22	21
Coarse sand	: 14	15	13
Very coarse sand	: 4	5	4
Texture class	: LS	SL	SL
pH H20	: 6.0	5.3	5.3
pH KCl	: 5.3	4.2	4.1
EC mS/cm	: 0.07	0.03	0.02
Organic C %	: 0.52	0.24	0.17
Total N %	: 0.03	0.02	0.01
C/N	: 17	12	17
Available P mg/kg	: 5.12	2.06	1.40
CEC me/100g	: 4.4	3.9	3.2
Exch. Ca me/100g	: 1.7	1.0	0.8
Exch. Mg me/100g	: 0.8	0.6	0.5
Exch. K me/100g	: 0.34	0.26	0.14
Exch. Na me/100g	: 0.02	0.02	0.02
Exch. H (KCl)	: -	0.04	0.05
Exch. Al (KCl)	: -	0.10	0.25
TEB me/100g	: 2.86	1.88	1.46
Base saturation %	: 65	48	45

Profile no. **: KP 105** Map unit: B 41 (soil unit: B3g2)
Sheet/Grid : 78/4
Coord : UTM 4334E9525N
Elevation :
Author(s) : F.M. Banzi
Date described : 22/11/96
Survey Area : Mweli Div., Kahama District, Location : Sunga/Kashishi r.

Soil name (local) : Lukele (Luseni)
Classification FAO : Dystric Gleysols

Soil Climate : Ustic (smr), Isohyperthermic (str)
Landform : Gently und. plain Microrelief :
Slope form : Straight Slope % : 1 - 1.5%
Slope position : Lower
Parent Mater. : Colluvium derived from granite

Sealing	: Slight (about 2mm)		
Rock Outcrops	: Nil	Stones	: Nil
Cracking	: Nil		
Drainage	: Mod. well		
Erosion	: Slight (splash and sheet)		
Flooding	: Never		
Vegetation	: Miombo woodland		
Land use	: Light grazing.	Human inf.	:

Ah 0 - 10 cm: Very dark grey (10YR 4/1, dry and 10YR 3/1, moist) loamy sand; weak fine and medium subangular blocky structure; slightly hard when dry, friable when moist, non sticky and non plastic when wet; many very fine, fine and medium pores; many very fine and fine roots; clear smooth boundary;

Bg1 10 - 30 cm: Brown (10YR 6/3, dry and 10YR 5/3, moist) loamy sand; abundant coarse prominent sharp reddish (2.5YR 4/6) mottles; weak medium subangular blocky structure; hard when dry, friable when moist, non sticky and non plastic when wet; common fine and medium pores; many fine and medium roots; gradual smooth boundary;

Bg2 30 - 110 cm: Greyish brown (10YR 6/2, dry and 10YR 5/2, moist) sandy loam; few medium distinct clear reddish (2.5YR 4/6) mottles; very weak coarse angular blocky structure; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common fine and medium pores; common medium and coarse roots; gradual smooth boundary;

Bg3 110 - 125 cm: Light brownish grey (10YR 7/2, dry and 10YR 6/2, moist) sandy loam; very few fine distinct clear reddish yellow (7.5YR 6/6) mottles; very weak coarse angular blocky structure; slightly hard when dry, very friable when moist, non sticky and non plastic when wet; common fine and medium pores; very few coarse roots.

Analytical data profile KP 105

Depth (cm)	: 0-20	30-50	80-100
Clay	: 5	14	17
Silt	: 9	7	7
Very fine sand	: 15	8	9
Fine sand	: 30	18	19
Medium sand	: 25	24	24
Coarse sand	: 13	24	20
Very coarse sand	: 3	5	4
Texture class	: LS	SL	SL
pH H20	: 5.7	4.9	5.8
pH KCl	: 4.7	3.6	3.5
EC mS/cm	: 0.02	0.01	0.01
Organic C %	: 0.54	0.25	0.13
Total N %	: 0.04	0.03	0.02
C/N	: 14	8	7
Available P mg/kg	: 2.47	0.59	0.25
CEC me/100g	: 5.0	7.4	2.5
Exch. Ca me/100g	: 1.7	1.1	0.7
Exch. Mg me/100g	: 0.9	0.8	0.7
Exch. K me/100g	: 0.16	0.13	0.08
Exch. Na me/100g	: 0.02	0.04	0.03
Exch. H (KCl)	: -	0.04	-
Exch. Al (KCl)	: -	1.36	-

TEB me/100g	: 1.78	2.07	1.51
Base saturation %	: 56	28	61
Bulk density g/cm3	: 1.5	1.8	1.7
pF 2	: 18.7	30.8	20.8
pF 2.4	: 17.9	16.2	19.0
pF 3	: 12.8	13.9	17.7
pF 4.2	: 3.4	8.7	11.1

ANNEX: IV.3: ANALYTICAL DATA OF COMPOSITE SAMPLES

Sample no.	Text.	pH	Org.C	Tot.N	C/N	Av. P	CEC	Ca	Mg	K	Na	Al	H	BS
		H2O	%	%		mg/kg		me/100g						%
KC1	CL	5.6	0.96	0.07	14	2.33	10.9	3.4	2.0	0.66	0.04	-	-	56
KC2	SL	5.3	0.38	0.03	13	3.72	3.0	0.8	0.4	0.12	0.02	-	0.03	45
KC3	SL	5.8	0.53	0.04	13	0.38	4.8	2.2	0.5	0.04	0.21	-	-	62
KC4	SL	7.4	0.38	0.03	13	14.96	8.0	4.8	1.6	0.33	0.12	-	-	100
KC5	SCL	5.1	0.62	0.04	16	24.55	10.7	2.3	1.5	0.24	0.04	0.19	0.03	38
KC6	SCL	5.4	0.32	0.03	11	1.21	15.4	4.4	2.4	0.07	0.51	1.00	0.06	48
KC7	SL	6.1	0.44	0.03	15	33.24	5.1	2.9	0.9	0.50	0.02	-	-	74
KC8	SL	5.3	0.44	0.03	15	8.04	3.4	1.1	0.4	0.12	0.02	0.04	0.11	48
KC9	SCL	4.9	0.59	0.04	15	32.95	16.5	2.8	1.8	0.58	0.09	0.18	0.02	32
KC10	SCL	5.6	0.89	0.05	18	4.26	15.4	5.4	2.9	0.11	0.23	-	-	56
KC11	C	5.9	0.57	0.05	11	2.09	27.1	15.7	10.4	0.09	0.21	-	-	65
KC12	SCL	7.4	1.58	0.12	13	33.54	16.1	14.0	3.2	0.96	0.30	-	-	100
KC13	C	5.6	2.19	0.31	7	12.90	61.5	19.4	11.7	0.65	0.22	-	-	52
KC14	SL	5.8	0.42	0.04	11	24.34	6.4	2.2	1.4	0.25	0.04	-	-	61
KC15	SCL	4.8	0.55	0.05	11	7.04	14.9	1.9	1.2	0.58	0.04	0.26	0.04	25
KC16	SL	5.7	0.49	0.05	10	12.10	6.8	2.3	1.0	0.68	0.04	-	-	59
KC17	SL	6.1	0.47	0.05	9	21.69	5.6	2.7	1.0	0.34	0.02	-	-	72
KC18	SL	6.6	0.28	0.03	9	7.75	3.8	2.2	0.9	0.25	0.02	-	-	88
KC19	SCL	5.1	0.55	0.04	14	6.45	6.0	1.5	0.6	0.09	0.02	0.30	0.02	37
KC20	SL	4.6	0.65	0.07	9	26.73	11.1	1.6	1.0	0.14	0.03	0.65	0.05	25
KC21	SL	6.3	0.76	0.05	15	6.23	7.3	3.9	1.4	0.08	0.12	-	-	75
KC22	C	6.1	1.11	0.09	12	4.01	38.6	29.1	8.1	0.40	0.27	-	-	75
KC23	SCL	5.7	0.98	0.07	14	0.98	10.1	3.5	2.3	0.05	0.02	-	-	58
KC24	C	6.3	1.74	0.10	17	0.47	28.9	11.7	9.8	0.04	0.07	-	-	76
KC25	SCL	5.0	0.82	0.04	21	1.70	4.0	0.9	0.4	0.14	0.02	0.25	0.05	37
KC26	SL	5.2	0.60	0.05	12	4.14	4.8	1.4	0.6	0.04	0.02	-	0.02	43
KC27	SCL	5.7	0.14	0.01	14	16.50	6.7	2.5	1.1	0.54	0.04	-	-	62
KC28	SCL	5.6	0.87	0.06	15	1.60	16.4	6.5	2.1	0.08	0.17	-	-	54
KC29	SC	5.3	1.06	0.10	11	0.46	23.7	7.3	3.2	0.14	0.27	0.20	0.04	46
KC30	SL	5.9	0.38	0.03	13	6.70	2.3	0.9	0.4	0.13	0.04	-	-	65
KC31	SL	6.2	0.44	0.03	15	7.13	3.3	1.8	0.5	0.22	0.02	-	-	76
KC32	SL	5.8	0.72	0.07	10	14.22	3.9	1.6	0.5	0.19	0.04	-	-	60
KC33	SL	6.0	0.78	0.06	13	4.42	1.9	0.8	0.4	0.08	0.02	-	-	69
KC34	LS	6.0	0.85	0.07	12	5.99	3.9	1.7	0.7	0.18	0.02	-	-	66
KC35	SL	6.3	0.77	0.06	13	3.51	5.3	2.9	0.8	0.23	0.02	-	-	75
KC36	SL	6.3	0.98	0.08	12	5.76	4.0	2.1	0.8	0.21	0.02	-	-	78
KC37	SCL	5.4	1.42	0.12	12	2.94	7.9	1.8	1.3	0.51	0.04	0.19	0.03	46
KC38	SCL	5.2	1.47	0.11	13	2.10	24.1	6.7	3.1	0.29	0.29	0.15	0.04	43
KC39	SCL	5.7	1.26	0.10	13	7.93	14.1	5.1	2.4	0.64	0.04	-	-	58
KC40	SL	5.5	0.59	0.04	15	6.40	3.7	1.2	0.6	0.14	0.04	-	-	53

ANALYTICAL DATA OF COMPOSITE SAMPLES (CONT'D)

Sample no.	Text.	pH	Org.C	Tot.N	C/N	Av. P	CEC	Ca	Mg	K	Na	Al	H	BS
		H2O	%	%		mg/kg		me/100g						%
KC41	SL	5.8	0.47	0.04	12	3.71	3.1	1.3	0.5	0.15	0.02	-	-	64
KC42	SL	6.3	0.59	0.04	15	4.38	4.2	2.2	0.7	0.27	0.02	-	-	76
KC43	SL	6.3	1.63	0.16	10	5.08	11.3	5.9	2.2	0.58	0.10	-	-	78
KC44	SCL	5.6	1.16	0.12	10	3.50	9.7	2.5	2.5	0.31	0.04	-	-	55
KC45	SCL	6.6	1.98	0.18	11	5.39	11.2	6.4	2.7	0.64	0.24	-	-	89
KC46	SL	6.2	0.89	0.06	15	32.6	5.5	2.8	1.1	0.23	0.04	-	-	76
KC47	SCL	6.3	0.10	0.01	10	8.95	6.0	2.7	1.2	0.80	0.02	-	-	79
KC48	SL	6.1	1.50	0.12	13	9.82	6.4	3.1	1.3	0.15	0.02	-	-	72
KC49	LS	5.5	0.56	0.04	14	25.37	4.4	1.4	0.7	0.16	0.02	-	-	52
KC50	SCL	5.2	1.12	0.11	10	3.84	10.2	2.2	1.9	0.25	0.03	0.08	0.02	43
KC51	SL	5.2	0.55	0.05	11	2.22	7.5	1.8	0.9	0.13	0.09	0.08	0.02	39
KC52	SL	7.0	0.56	0.04	14	29.98	4.0	3.2	0.8	0.34	0.02	-	-	100
KC53	SC	4.7	1.17	0.12	10	5.17	22.6	2.2	3.1	0.31	0.03	0.60	0.04	25

ANNNEX V: LISTINGS OF MAPPING UNITS AND THEIR EXTENT (BY DISTRICT, DIVISION AND WARD)

Map 1 Topography

Extent of Divisions and Wards

DIVISION	WARDNAME	AREA IN HA	Perc. of Division	Perc. of District
Dakama	Chambo	23162,2	11,0%	2,7%
Dakama	Chona	19250,7	9,2%	2,3%
Dakama	Idahina	35601,3	16,9%	4,2%
Dakama	Igwamanoni	20994,4	10,0%	2,5%
Dakama	Kilago	30296,0	14,4%	3,6%
Dakama	Kinamapula	11206,3	5,3%	1,3%
Dakama	Kisuke	27442,4	13,0%	3,2%
Dakama	Mpunze	17190,6	8,2%	2,0%
Dakama	Nyandekwa	11905,9	5,7%	1,4%
Dakama	Ukune	13242,4	6,3%	1,6%
	Total Kahama Division:	**210292,2**		**24,8%**
Isagehe	Isagehe	21026,9	19,7%	2,5%
Isagehe	Isaka	12567,2	11,8%	1,5%
Isagehe	Isaka-jana	24357,7	22,8%	2,9%
Isagehe	Kinaga	35857,5	33,6%	4,2%
Isagehe	Mwalugulu	12927,3	12,1%	1,5%
	Total Isagehe Division:	**106736,6**		**12,6%**
Kahama	Kahama	3778,6	12,6%	0,4%
Kahama	Malunga	4200,0	14,0%	0,5%
Kahama	Mhongolo	4801,6	16,0%	0,6%
Kahama	Mwendakulima	6718,1	22,4%	0,8%
Kahama	Nyahogo	2681,8	8,9%	0,3%
Kahama	Zongomera	7873,0	26,2%	0,9%
	Total Kahama Division:	**30053,2**		**3,5%**
Msalala	Bugarama	22516,0	9,5%	2,7%
Msalala	Bulige	36541,7	15,5%	4,3%
Msalala	Busangi	22489,3	9,5%	2,7%
Msalala	Chela	21217,3	9,0%	2,5%
Msalala	Lunguya	33586,6	14,2%	4,0%
Msalala	Ngaya	15886,0	6,7%	1,9%
Msalala	Ngogwa	40805,4	17,3%	4,8%
Msalala	Ntobo	9729,2	4,1%	1,1%
Msalala	Segese	33260,3	14,1%	3,9%
	Total Msalala Division:	**236031,9**		**27,8%**
Mweli	Bulungwa	159588,0	60,3%	18,8%
Mweli	Ulowa	55682,6	21,0%	6,6%
Mweli	Ushetu	29875,8	11,3%	3,5%
Mweli	Uyogo	19434,1	7,3%	2,3%
	Total Mweli Division:	**264580,4**		**31,2%**

Map 2 Agro-climate

Extent of mapping units (by Ward)

DIVISION	WARDNAME	RAINZONE	AREA IN HA	Perc. Of Division	Perc. Of District	TOTALS	AREA IN HA
Dakama	Chambo	900-1000	23162,2	11,0%	2,7%		
Dakama	Chona	900-1000	19250,7	9,2%	2,3%		
Dakama	Idahina	900-1000	3108,0	1,5%	0,4%		
Dakama	Idahina	>1000	4523,4	2,2%	0,5%		
Dakama	Igwamanoni	900-1000	20994,4	10,0%	2,5%		
Dakama	Kilago	900-1000	30296,0	14,4%	3,6%		
Dakama	Kinamapula	900-1000	11206,3	5,3%	1,3%		
Dakama	Kisuke	900-1000	27442,4	13,0%	3,2%		
Dakama	Mpunze	900-1000	45160,5	21,5%	5,3%		
Dakama	Nyandekwa	900-1000	11905,9	5,7%	1,4%		
Dakama	Ukune	900-1000	13242,4	6,3%	1,6%		
						900-1000	205768,8
	Total Dakama Division:		**210292,2**		**24,8%**	>1000	4523,4
Isagehe	Isagehe	800-900	8807,3	4,2%	1,0%		
Isagehe	Isagehe	900-1000	12219,6	5,8%	1,4%		
Isagehe	Isaka	800-900	9177,2	4,4%	1,1%		
Isagehe	Isaka	<800	3390,0	1,6%	0,4%		
Isagehe	Isaka-Jana	<800	24357,7	11,6%	2,9%		
Isagehe	Kinaga	800-900	9071,1	4,3%	1,1%		
Isagehe	Kinaga	<800	26786,4	12,7%	3,2%		
Isagehe	Mwalugulu	800-900	9680,1	4,6%	1,1%		
Isagehe	Mwalugulu	900-1000	0,2	0,0%	0,0%		
Isagehe	Mwalugulu	<800	3247,1	1,5%	0,4%	<800	57781,2
						800-900	36735,7
	Total Isagehe Division:		**106736,6048**		**12,6%**	900-1000	12219,8
Kahama	Kahama	900-1000	3778,6	1,8%	0,4%		
Kahama	Malunga	800-900	1258,8	0,6%	0,1%		
Kahama	Malunga	900-1000	2941,2	1,4%	0,3%		
Kahama	Mhongolo	800-900	3234,4	1,5%	0,4%		
Kahama	Mhongolo	900-1000	1567,2	0,7%	0,2%		
Kahama	Mwendakulima	800-900	1845,1	0,9%	0,2%		
Kahama	Mwendakulima	900-1000	4873,0	2,3%	0,6%		
Kahama	Nyahogo	900-1000	2681,8	1,3%	0,3%		
Kahama	Zongomera	900-1000	7873,0	3,7%	0,9%		
						800-900	6338,2
	Total Kahama Division:		**30053,2**		**3,5%**	900-1000	23714,9
Msalala	Bugarama	800-900	22516,0	10,7%	2,7%		
Msalala	Bulige	800-900	16190,5	7,7%	1,9%		
Msalala	Bulige	<800	20351,2	9,7%	2,4%		
Msalala	Busangi	800-900	21358,8	10,2%	2,5%		
Msalala	Busangi	<800	1130,2	0,5%	0,1%		
Msalala	Chela	800-900	21217,3	10,1%	2,5%		
Msalala	Lunguya	800-900	31849,9	15,1%	3,8%		
Msalala	Lunguya	900-1000	1736,7	0,8%	0,2%		
Msalala	Ngaya	800-900	337,9	0,2%	0,0%		
Msalala	Ngaya	<800	15548,5	7,4%	1,8%		
Msalala	Ngogwa	800-900	1833,3	0,9%	0,2%		
Msalala	Ngogwa	900-1000	38972,1	18,5%	4,6%		
Msalala	Ntobo	800-900	7186,4	3,4%	0,8%		
Msalala	Ntobo	900-1000	2542,8	1,2%	0,3%		
Msalala	Segese	800-900	20912,6	9,9%	2,5%		
Msalala	Segese	900-1000	12347,7	5,9%	1,5%	<800	37029,9
						800-900	143402,7
	Total Msalala Division:		**236031,9**		**27,8%**	900-1000	55599,3
Mweli	Bulungwa	900-1000	32566,9	15,5%	3,8%		
Mweli	Bulungwa	>1000	127021,0	60,4%	15,0%		
Mweli	Ulowa	900-1000	8123,2	3,9%	1,0%		
Mweli	Ulowa	>1000	47559,4	22,6%	5,6%		
Mweli	Ushetu	900-1000	29389,0	14,0%	3,5%		
Mweli	Ushetu	>1000	486,8	0,2%	0,1%		
Mweli	Uyogo	900-1000	19434,1	9,2%	2,3%		
						900-1000	89513,2
	Total Mweli Division:		**264580,4**		**31,2%**	>1000	175067,2
			847694,3				
	Total District	<800	94811,0	11,2%			
		800-900	186476,6	22,0%			
		900-1000	386816,1	45,6%			
		>1000	179590,6	21,2%			

Map 3 Hydrology

Extent of Catchments (by Ward)

Division	Wardname	Catchment	Area in ha	Perc. Of Division	Perc. Of District
Dakama	Chambo	Mtoni	23162,2	11,0%	2,7%
Dakama	Chona	Mtoni	19250,7	9,2%	2,3%
Dakama	Idahina	Kigozi-s	22951,2	10,9%	2,7%
Dakama	Idahina	Mtoni	12652,5	6,0%	1,5%
Dakama	Igwamanoni	Kigozi-s	14775,0	7,0%	1,7%
Dakama	Igwamanoni	Mtoni	6219,4	3,0%	0,7%
Dakama	Kilago	Isanga	65,9	0,0%	0,0%
Dakama	Kilago	Kigozi-s	22111,9	10,5%	2,6%
Dakama	Kilago	Mtoni	8118,2	3,9%	1,0%
Dakama	Kinamapula	Mtoni	11206,3	5,3%	1,3%
Dakama	Kisuke	Mtoni	27442,4	13,0%	3,2%
Dakama	Mpunze	Kigozi-s	3852,8	1,8%	0,5%
Dakama	Mpunze	Mtoni	13335,4	6,3%	1,6%
Dakama	Nyandekwa	Kigozi-s	11905,9	5,7%	1,4%
Dakama	Ukune	Kigozi-s	5819,1	2,8%	0,7%
Dakama	Ukune	Mtoni	7423,3	3,5%	0,9%
		Total Dakama Division:	**210292,2**		**24,8%**
Isagehe	Isagehe	Isanga	20206,2	18,9%	2,4%
Isagehe	Isagehe	Kigozi-s	820,7	0,8%	0,1%
Isagehe	Isaka	Isanga	6342,9	5,9%	0,7%
Isagehe	Isaka	Manonga	6224,3	5,8%	0,7%
Isagehe	Isaka-jana	Isanga	21345,6	20,0%	2,5%
Isagehe	Isaka-jana	Manonga	3012,1	2,8%	0,4%
Isagehe	Kinaga	Isanga	35857,5	33,6%	4,2%
Isagehe	Mwalugulu	Isanga	12927,3	12,1%	1,5%
		Total Isagehe Division:	**106736,6**		**12,6%**
Kahama	Kahama	Isanga	1224,1	4,1%	0,1%
Kahama	Kahama	Kigozi-s	2554,6	8,5%	0,3%
Kahama	Malunga	Isanga	1416,4	4,7%	0,2%
Kahama	Malunga	Kigozi-s	2783,5	9,3%	0,3%
Kahama	Mhongolo	Isanga	4801,6	16,0%	0,6%
Kahama	Mwendakulima	Isanga	5196,6	17,3%	0,6%
Kahama	Mwendakulima	Kigozi-s	1521,4	5,1%	0,2%
Kahama	Nyahogo	Isanga	370,3	1,2%	0,0%
Kahama	Nyahogo	Kigozi-s	2311,5	7,7%	0,3%
Kahama	Zongomera	Kigozi-s	7873,0	26,2%	0,9%
		Total Kahama Division:	**30053,2**		**3,5%**
Msalala	Bugarama	Kadongke	22516,0	9,5%	2,7%
Msalala	Bulige	Isanga	36541,7	15,5%	4,3%
Msalala	Busangi	Isanga	21306,3	9,0%	2,5%
Msalala	Busangi	Kigozi-s	1183,1	0,5%	0,1%
Msalala	Chela	Isanga	13334,7	5,6%	1,6%
Msalala	Chela	Kadongke	6882,9	2,9%	0,8%
Msalala	Chela	Kigozi	999,8	0,4%	0,1%
Msalala	Lunguya	Kadongke	26885,8	11,4%	3,2%
Msalala	Lunguya	Kigozi	6700,8	2,8%	0,8%
Msalala	Ngaya	Isanga	15886,0	6,7%	1,9%
Msalala	Ngogwa	Isanga	415,4	0,2%	0,0%
Msalala	Ngogwa	Kigozi-s	40390,1	17,1%	4,8%

Msalala	Ntobo	Isanga	5910,8	2,5%	0,7%
Msalala	Ntobo	Kigozi	328,2	0,1%	0,0%
Msalala	Ntobo	Kigozi-s	3490,2	1,5%	0,4%
Msalala	Segese	Isanga	1300,8	0,6%	0,2%
Msalala	Segese	Kadongke	3610,3	1,5%	0,4%
Msalala	Segese	Kigozi	28349,2	12,0%	3,3%
		Total Msalala Division:	**236031,9**		**27,8%**
Mweli	Bulungwa	Kigozi-s	93665,4	35,4%	11,0%
Mweli	Bulungwa	Mtoni	65922,6	24,9%	7,8%
Mweli	Ulowa	Mtoni	55682,6	21,0%	6,6%
Mweli	Ushetu	Mtoni	29875,8	11,3%	3,5%
Mweli	Uyogo	Mtoni	19434,1	7,3%	2,3%
		Total Mweli Division:	**264580,5**		**31,2%**
			847694,3		

Map 4 Land Resources

Extent of geological mapping units.

Division	Ward	Geology	Area in ha	Perc. of Division	Perc. of District
Dakama	Idahina	BI/C	7756	3,7	0,9
Dakama	Mpunze	BI/C	138	0,1	0,0
Dakama	Kilago	BI/C	4807	2,3	0,6
Dakama	Idahina	BI/C	8878	4,2	1,0
Dakama	Igwamanoni	BI/C	47	0,0	0,0
Total BI/C in Dakama			**21626 ha**	**10,3 %**	**2,6 %**
Dakama	Igwamanoni	G	2284	1,1	0,3
Dakama	Kilago	G	393	0,2	0,0
Dakama	Nyandekwa	G	2	0,0	0,0
Dakama	Igwamanoni	G	327	0,2	0,0
Dakama	Kilago	G	432	0,2	0,1
Dakama	Nyandekwa	G	103	0,0	0,0
Dakama	Chambo	G	1596	0,8	0,2
Dakama	Chona	G	1816	0,9	0,2
Dakama	Idahina	G	153	0,1	0,0
Dakama	Igwamanoni	G	378	0,2	0,0
Dakama	Kilago	G	850	0,4	0,1
Dakama	Kinamapula	G	1357	0,6	0,2
Dakama	Kisuke	G	3046	1,4	0,4
Dakama	Mpunze	G	2052	1,0	0,2
Dakama	Nyandekwa	G	1041	0,5	0,1
Dakama	Ukune	G	2265	1,1	0,3
Dakama	Idahina	G	93	0,0	0,0
Dakama	Igwamanoni	G	6631	3,2	0,8
Dakama	Mpunze	G	2049	1,0	0,2
Dakama	Nyandekwa	G	15	0,0	0,0
Dakama	Chambo	G	3376	1,6	0,4
Dakama	Chona	G	441	0,2	0,1
Dakama	Kisuke	G	2683	1,3	0,3
Dakama	Ukune	G	1987	0,9	0,2
Dakama	Chambo	G	1586	0,8	0,2
Dakama	Chona	G	12934	6,2	1,5
Dakama	Idahina	G	12550	6,0	1,5
Dakama	Igwamanoni	G	7137	3,4	0,8
Dakama	Kilago	G	6515	3,1	0,8
Dakama	Kinamapula	G	7031	3,3	0,8
Dakama	Kisuke	G	12038	5,7	1,4
Dakama	Mpunze	G	8717	4,1	1,0
Dakama	Nyandekwa	G	5988	2,8	0,7
Dakama	Ukune	G	6848	3,3	0,8
Dakama	Chambo	G	9819	4,7	1,2
Dakama	Kisuke	G	629	0,3	0,1
Dakama	Kilago	G	6091	2,9	0,7
Dakama	Idahina	G	3274	1,6	0,4
Dakama	Igwamanoni	G	919	0,4	0,1
Dakama	Kilago	G	350	0,2	0,0
Dakama	Kilago	G	1310	0,6	0,2
Total G in Dakama			**139106 ha**	**66,1 %**	**16,4 %**
Dakama	Kilago	A/C	872	0,4	0,1
Total A/C in Dakama			**872 ha**	**0,4 %**	**0,1 %**
Dakama	Kilago	A	1597	0,8	0,2
Dakama	Chambo	A	6786	3,2	0,8
Dakama	Chona	A	4059	1,9	0,5
Dakama	Idahina	A	2899	1,4	0,3
Dakama	Igwamanoni	A	3272	1,6	0,4

Dakama	Kilago	A	7080	3,4	0,8
Dakama	Kinamapula	A	2819	1,3	0,3
Dakama	Kisuke	A	9046	4,3	1,1
Dakama	Mpunze	A	4231	2,0	0,5
Dakama	Nyandekwa	A	4758	2,3	0,6
Dakama	Ukune	A	2143	1,0	0,3
Total A in Dakama			**48690 ha**	**23,2 %**	**5,7 %**
Isagehe	Isaka	BI/C	671	0,6	0,1
Total BI/C in Isagehe			**671 ha**	**0,6 %**	**0,1 %**
Isagehe	Kinaga	G	70	0,1	0,0
Isagehe	Kinaga	G	186	0,2	0,0
Isagehe	Mwalugulu	G	977	0,9	0,1
Isagehe	Kinaga	G	8231	7,7	1,0
Isagehe	Kinaga	G	1216	1,1	0,1
Isagehe	Isagehe	G	67	0,1	0,0
Isagehe	Isaka	G	3	0,0	0,0
Isagehe	Kinaga	G	1558	1,5	0,2
Isagehe	Mwalugulu	G	3065	2,9	0,4
Isagehe	Isagehe	G	10192	9,5	1,2
Isagehe	Kinaga	G	4674	4,4	0,6
Isagehe	Mwalugulu	G	3084	2,9	0,4
Isagehe	Isaka	G	375	0,4	0,0
Isagehe	Isaka	G	8531	8,0	1,0
Isagehe	Isaka-jana	G	8371	7,8	1,0
Isagehe	Mwalugulu	G	827	0,8	0,1
Total G in Isagehe			**51427 ha**	**48,2 %**	**6,1 %**
Isagehe	Isagehe	A/C	307	0,3	0,0
Isagehe	Isaka	A/C	244	0,2	0,0
Isagehe	Kinaga	A/C	2426	2,3	0,3
Isagehe	Mwalugulu	A/C	904	0,8	0,1
Isagehe	Isagehe	A/C	4824	4,5	0,6
Isagehe	Kinaga	A/C	577	0,5	0,1
Isagehe	Isagehe	A/C	616	0,6	0,1
Isagehe	Isaka	A/C	1643	1,5	0,2
Isagehe	Isaka-jana	A/C	12764	12,0	1,5
Isagehe	Kinaga	A/C	12998	12,2	1,5
Isagehe	Mwalugulu	A/C	2923	2,7	0,3
Total A/C in Isagehe			**40226 ha**	**37,7 %**	**4,7 %**
Isagehe	Isagehe	A	1141	1,1	0,1
Isagehe	Isagehe	A	3881	3,6	0,5
Isagehe	Isaka	A	1098	1,0	0,1
Isagehe	Isaka-jana	A	3223	3,0	0,4
Isagehe	Kinaga	A	3921	3,7	0,5
Isagehe	Mwalugulu	A	1149	1,1	0,1
Total A in Isagehe			**14413 ha**	**13,5 %**	**1,7 %**
Kahama	Kahama	G	503	1,7	0,1
Kahama	Malunga	G	5	0,0	0,0
Kahama	Nyahogo	G	403	1,3	0,0
Kahama	Zongomera	G	677	2,3	0,1
Kahama	Kahama	G	3275	10,9	0,4
Kahama	Malunga	G	2514	8,4	0,3
Kahama	Mhongolo	G	3046	10,1	0,4
Kahama	Mwendakulima	G	1052	3,5	0,1
Kahama	Nyahogo	G	2279	7,6	0,3
Kahama	Zongomera	G	5274	17,5	0,6
Kahama	Zongomera	G	4	0,0	0,0
Kahama	Malunga	G	732	2,4	0,1
Kahama	Mhongolo	G	876	2,9	0,1

Kahama	Malunga	G	262	0,9	0,0
Total G in Kahama			**20902 ha**	**69,6 %**	**2,5 %**
Kahama	Mwendakulima	A/C	3330	11,1	0,4
Kahama	Mhongolo	A/C	363	1,2	0,0
Kahama	Mwendakulima	A/C	1152	3,8	0,1
TotalA/C in Kahama			**4845 ha**	**16,1 %**	**0,6 %**
Kahama	Malunga	A	686	2,3	0,1
Kahama	Mhongolo	A	517	1,7	0,1
Kahama	Mwendakulima	A	1184	3,9	0,1
Kahama	Zongomera	A	1919	6,4	0,2
Total A in Kahama			**4306 ha**	**14,3 %**	**0,5 %**
Msalala	Chela	BI	4486	1,9	0,5
Msalala	Ntobo	BI	165	0,1	0,0
Msalala	Segese	BI	1361	0,6	0,2
Total BI in Msalala			**6012 ha**	**2,5 %**	**0,7 %**
Msalala	Bulige	BI/C	659	0,3	0,1
Msalala	Busangi	BI/C	331	0,1	0,0
Msalala	Chela	BI/C	8474	3,6	1,0
Msalala	Ntobo	BI/C	138	0,1	0,0
Msalala	Segese	BI/C	1839	0,8	0,2
Msalala	Bulige	BI/C	1871	0,8	0,2
Msalala	Chela	BI/C	1389	0,6	0,2
Msalala	Bugarama	BI/C	1998	0,8	0,2
Msalala	Chela	BI/C	2040	0,9	0,2
Msalala	Lunguya	BI/C	4837	2,0	0,6
Msalala	Ntobo	BI/C	2718	1,2	0,3
Msalala	Segese	BI/C	10451	4,4	1,2
Msalala	Bugarama	BI/C	2013	0,9	0,2
Msalala	Segese	BI/C	2941	1,2	0,3
Total BI/C in Msalala			**41699 ha**	**17,7 %**	**4,9 %**
Msalala	Busangi	G	138	0,1	0,0
Msalala	Ngaya	G	1125	0,5	0,1
Msalala	Ngogwa	G	11318	4,8	1,3
Msalala	Ntobo	G	104	0,0	0,0
Msalala	Busangi	G	34	0,0	0,0
Msalala	Ngogwa	G	14437	6,1	1,7
Msalala	Ntobo	G	142	0,1	0,0
Msalala	Ngogwa	G	2469	1,0	0,3
Msalala	Bugarama	G	7739	3,3	0,9
Msalala	Lunguya	G	3	0,0	0,0
Msalala	Busangi	G	236	0,1	0,0
Msalala	Chela	G	332	0,1	0,0
Msalala	Lunguya	G	840	0,4	0,1
Msalala	Ntobo	G	5	0,0	0,0
Msalala	Segese	G	20	0,0	0,0
Msalala	Lunguya	G	8332	3,5	1,0
Msalala	Ngogwa	G	940	0,4	0,1
Msalala	Segese	G	455	0,2	0,1
Msalala	Busangi	G	3004	1,3	0,4
Msalala	Lunguya	G	1215	0,5	0,1
Msalala	Ngogwa	G	3	0,0	0,0
Msalala	Ntobo	G	2164	0,9	0,3
Msalala	Segese	G	1920	0,8	0,2
Msalala	Busangi	G	8275	3,5	1,0
Msalala	Ngaya	G	6073	2,6	0,7
Msalala	Ngogwa	G	1475	0,6	0,2
Msalala	Bugarama	G	4260	1,8	0,5
Msalala	Lunguya	G	6769	2,9	0,8
Msalala	Segese	G	4114	1,7	0,5

Msalala	Bulige	G	2896	1,2	0,3
Msalala	Busangi	G	1920	0,8	0,2
Msalala	Ngaya	G	3268	1,4	0,4
Total G in Msalala			**96025 ha**	**40,7 %**	**11,3 %**
Msalala	Bulige	A/C	6755	2,9	0,8
Msalala	Ngaya	A/C	766	0,3	0,1
Msalala	Bulige	A/C	18187	7,7	2,1
Msalala	Ngaya	A/C	3225	1,4	0,4
Total A/C in Msalala			**28933 ha**	**12,3 %**	**3,4 %**
Msalala	Bugarama	A	1330	0,6	0,2
Msalala	Bulige	A	357	0,2	0,0
Msalala	Chela	A	3992	1,7	0,5
Msalala	Lunguya	A	4076	1,7	0,5
Msalala	Ntobo	A	240	0,1	0,0
Msalala	Segese	A	6812	2,9	0,8
Msalala	Bugarama	A	5176	2,2	0,6
Msalala	Bulige	A	5817	2,5	0,7
Msalala	Busangi	A	8553	3,6	1,0
Msalala	Chela	A	504	0,2	0,1
Msalala	Lunguya	A	7514	3,2	0,9
Msalala	Ngaya	A	1428	0,6	0,2
Msalala	Ngogwa	A	10163	4,3	1,2
Msalala	Ntobo	A	4055	1,7	0,5
Msalala	Segese	A	3346	1,4	0,4
Total A in Msalala			**63363 ha**	**26,8 %**	**7,5 %**
Mweli	Bulungwa	BI/C	90	0,0	0,0
Total BI/C in Mweli			**90 ha**	**0,0 %**	**0.0 %**
Mweli	Bulungwa	G	394	0,1	0,0
Mweli	Bulungwa	G	2558	1,0	0,3
Mweli	Ulowa	G	884	0,3	0,1
Mweli	Ushetu	G	1977	0,7	0,2
Mweli	Uyogo	G	850	0,3	0,1
Mweli	Bulungwa	G	907	0,3	0,1
Mweli	Uyogo	G	268	0,1	0,0
Mweli	Bulungwa	G	144849	54,7	17,1
Mweli	Ulowa	G	41278	15,6	4,9
Mweli	Ushetu	G	15133	5,7	1,8
Mweli	Uyogo	G	4378	1,7	0,5
Mweli	Ushetu	G	931	0,4	0,1
Mweli	Uyogo	G	4310	1,6	0,5
Mweli	Ushetu	G	3706	1,4	0,4
Mweli	Uyogo	G	808	0,3	0,1
Total G in Mweli			**223231 ha**	**84,4 %**	**26,3 %**
Mweli	Bulungwa	A	10790	4,1	1,3
Mweli	Ulowa	A	13520	5,1	1,6
Mweli	Ushetu	A	8130	3,1	1,0
Mweli	Uyogo	A	8819	3,3	1,0
Total A in Mweli			**41259 ha**	**15,6 %**	**4,9 %**

Map 4 Land Resources

Extent of physiographic mapping units

Division	Ward	Physiography	Area in ha	Perc. of Division	Perc. of District
Dakama	Igwamanoni	Hilly land	2284	1,1	0,3
Dakama	Kilago	Hilly land	393	0,2	0,0
Dakama	Nyandekwa	Hilly land	2	0,0	0,0
Total Hilly land in Dakama			**2679 ha**	**1,3 %**	**0,3 %**
Dakama	Igwamanoni	Undulating plains	327	0,2	0,0
Dakama	Kilago	Undulating plains	432	0,2	0,1
Dakama	Nyandekwa	Undulating plains	103	0,0	0,0
Dakama	Chambo	Undulating plains	1596	0,8	0,2
Dakama	Chona	Undulating plains	1816	0,9	0,2
Dakama	Idahina	Undulating plains	153	0,1	0,0
Dakama	Igwamanoni	Undulating plains	378	0,2	0,0
Dakama	Kilago	Undulating plains	850	0,4	0,1
Dakama	Kinamapula	Undulating plains	1357	0,6	0,2
Dakama	Kisuke	Undulating plains	3046	1,4	0,4
Dakama	Mpunze	Undulating plains	2052	1,0	0,2
Dakama	Nyandekwa	Undulating plains	1041	0,5	0,1
Dakama	Ukune	Undulating plains	2265	1,1	0,3
Dakama	Idahina	Undulating plains	93	0,0	0,0
Dakama	Igwamanoni	Undulating plains	6631	3,2	0,8
Dakama	Mpunze	Undulating plains	2049	1,0	0,2
Dakama	Nyandekwa	Undulating plains	15	0,0	0,0
Total undulating plains in Dakama			**24204 ha**	**11,5 %**	**2,9 %**
Dakama	Idahina	Gently undulating plains	7756	3,7	0,9
Dakama	Mpunze	Gently undulating plains	138	0,1	0,0
Dakama	Chambo	Gently undulating plains	3376	1,6	0,4
Dakama	Chona	Gently undulating plains	441	0,2	0,1
Dakama	Kisuke	Gently undulating plains	2683	1,3	0,3
Dakama	Ukune	Gently undulating plains	1987	0,9	0,2
Dakama	Chambo	Gently undulating plains	1586	0,8	0,2
Dakama	Chona	Gently undulating plains	12934	6,2	1,5
Dakama	Idahina	Gently undulating plains	12550	6,0	1,5
Dakama	Igwamanoni	Gently undulating plains	7137	3,4	0,8
Dakama	Kilago	Gently undulating plains	6515	3,1	0,8
Dakama	Kinamapula	Gently undulating plains	7031	3,3	0,8
Dakama	Kisuke	Gently undulating plains	12038	5,7	1,4
Dakama	Mpunze	Gently undulating plains	8717	4,1	1,0
Dakama	Nyandekwa	Gently undulating plains	5988	2,8	0,7
Dakama	Ukune	Gently undulating plains	6848	3,3	0,8
Dakama	Chambo	Gently undulating plains	9819	4,7	1,2
Dakama	Kisuke	Gently undulating plains	629	0,3	0,1
Dakama	Kilago	Gently undulating plains	6091	2,9	0,7
Total gently undulating plains in Dakama			**106370 ha**	**50,6 %**	**12,5 %**
Dakama	Kilago	Almost flat plains	4807	2,3	0,6
Dakama	Idahina	Almost flat plains	8878	4,2	1,0
Dakama	Igwamanoni	Almost flat plains	47	0,0	0,0
Dakama	Idahina	Almost flat plains	3274	1,6	0,4
Dakama	Igwamanoni	Almost flat plains	919	0,4	0,1
Dakama	Kilago	Almost flat plains	350	0,2	0,0
Dakama	Kilago	Almost flat plains	1310	0,6	0,2
Dakama	Kilago	Almost flat plains	872	0,4	0,1
Total almost flat plains in Dakama			**20457 ha**	**9,7 %**	**2,4 %**

Dakama	Kilago	Flat and wide valleys (Mbugas)	1597	0,8	0,2
Dakama	Chambo	Flat and wide valleys (Mbugas)	6786	3,2	0,8
Dakama	Chona	Flat and wide valleys (Mbugas)	4059	1,9	0,5
Dakama	Idahina	Flat and wide valleys (Mbugas)	2899	1,4	0,3
Dakama	Igwamanoni	Flat and wide valleys (Mbugas)	3272	1,6	0,4
Dakama	Kilago	Flat and wide valleys (Mbugas)	7080	3,4	0,8
Dakama	Kinamapula	Flat and wide valleys (Mbugas)	2819	1,3	0,3
Dakama	Kisuke	Flat and wide valleys (Mbugas)	9046	4,3	1,1
Dakama	Mpunze	Flat and wide valleys (Mbugas)	4231	2,0	0,5
Dakama	Nyandekwa	Flat and wide valleys (Mbugas)	4758	2,3	0,6
Dakama	Ukune	Flat and wide valleys (Mbugas)	2143	1,0	0,3
Total flat and wide valleys (Mbugas) in Dakama			**48690 ha**	**23,2 %**	**5,7 %**
Isagehe	Kinaga	Hilly land	70	0,1	0,0
Total hilly lands in Isagehe			**70 ha**	**0,0 %**	**0,0 %**
Isagehe	Kinaga	Undulating plains	186	0,2	0,0
Total undulating plains in Isagehe			**186 ha**	**0,1 %**	**0,0 %**
Isagehe	Mwalugulu	Gently undulating plains	977	0,9	0,1
Isagehe	Kinaga	Gently undulating plains	8231	7,7	1,0
Isagehe	Kinaga	Gently undulating plains	1216	1,1	0,1
Total gently undulating plains in Isagehe			**10424 ha**	**9,8 %**	**1,2 %**
Isagehe	Isaka	Almost flat plains	671	0,6	0,1
Isagehe	Isagehe	Almost flat plains	67	0,1	0,0
Isagehe	Isaka	Almost flat plains	3	0,0	0,0
Isagehe	Kinaga	Almost flat plains	1558	1,5	0,2
Isagehe	Mwalugulu	Almost flat plains	3065	2,9	0,4
Isagehe	Isagehe	Almost flat plains	10192	9,5	1,2
Isagehe	Kinaga	Almost flat plains	4674	4,4	0,6
Isagehe	Mwalugulu	Almost flat plains	3084	2,9	0,4
Isagehe	Isaka	Almost flat plains	375	0,4	0,0
Isagehe	Isaka	Almost flat plains	8531	8,0	1,0
Isagehe	Isaka-jana	Almost flat plains	8371	7,8	1,0
Isagehe	Mwalugulu	Almost flat plains	827	0,8	0,1
Isagehe	Isagehe	Almost flat plains	307	0,3	0,0
Isagehe	Isaka	Almost flat plains	244	0,2	0,0
Isagehe	Kinaga	Almost flat plains	2426	2,3	0,3
Isagehe	Mwalugulu	Almost flat plains	904	0,8	0,1
Isagehe	Isagehe	Almost flat plains	4824	4,5	0,6
Isagehe	Kinaga	Almost flat plains	577	0,5	0,1
Total almost flat plains in Isagehe			**50700 ha**	**47,5 %**	**6,0 %**
Isagehe	Isagehe	Flat and very wide bottomlands	616	0,6	0,1
Isagehe	Isaka	Flat and very wide bottomlands	1643	1,5	0,2
Isagehe	Isaka-jana	Flat and very wide bottomlands	12764	12,0	1,5
Isagehe	Kinaga	Flat and very wide bottomlands	12998	12,2	1,5
Isagehe	Mwalugulu	Flat and very wide bottomlands	2923	2,7	0,3
Total flat and very wide bottomlands in Isagehe			**30944 ha**	**29,0 %**	**3,7 %**
Isagehe	Isagehe	Flat and wide valleys (Mbugas)	1141	1,1	0,1
Isagehe	Isagehe	Flat and wide valleys (Mbugas)	3881	3,6	0,5
Isagehe	Isaka	Flat and wide valleys (Mbugas)	1098	1,0	0,1
Isagehe	Isaka-jana	Flat and wide valleys (Mbugas)	3223	3,0	0,4
Isagehe	Kinaga	Flat and wide valleys (Mbugas)	3921	3,7	0,5
Isagehe	Mwalugulu	Flat and wide valleys (Mbugas)	1149	1,1	0,1
Total flat and wide valleys (Mbugas) in Isagehe			**14413 ha**	**13,5 %**	**1,7 %**

Kahama	Kahama	Hilly land	503	1,7	0,1
Kahama	Malunga	Hilly land	5	0,0	0,0
Kahama	Nyahogo	Hilly land	403	1,3	0,0
Kahama	Zongomera	Hilly land	677	2,3	0,1
Total hilly land in Kahama			**1588 ha**	**5,3 %**	**0,2 %**
Kahama	Kahama	Undulating plains	3275	10,9	0,4
Kahama	Malunga	Undulating plains	2514	8,4	0,3
Kahama	Mhongolo	Undulating plains	3046	10,1	0,4
Kahama	Mwendakulima	Undulating plains	1052	3,5	0,1
Kahama	Nyahogo	Undulating plains	2279	7,6	0,3
Kahama	Zongomera	Undulating plains	5274	17,5	0,6
Total undulating plains in Kahama			**17440 ha**	**58,0 %**	**2,1 %**
Kahama	Zongomera	Gently undulating plains	4	0,0	0,0
Kahama	Malunga	Gently undulating plains	732	2,4	0,1
Kahama	Mhongolo	Gently undulating plains	876	2,9	0,1
Kahama	Malunga	Gently undulating plains	262	0,9	0,0
Total gently undulating plains in Kahama			**1874 ha**	**6,2 %**	**0,2 %**
Kahama	Mwendakulima	Almost flat plains	3330	11,1	0,4
Total almost flat plains in Kahama			**3330 ha**	**1,6 %**	**0,4 %**
Kahama	Mhongolo	Flat and very wide bottomlands	363	1,2	0,0
Kahama	Mwendakulima	Flat and very wide bottomlands	1152	3,8	0,1
Total flat and wide bottomlands in Kahama			**1515 ha**	**5,0 %**	**0,2 %**
Kahama	Malunga	Flat and wide valleys (Mbugas)	686	2,3	0,1
Kahama	Mhongolo	Flat and wide valleys (Mbugas)	517	1,7	0,1
Kahama	Mwendakulima	Flat and wide valleys (Mbugas)	1184	3,9	0,1
Kahama	Zongomera	Flat and wide valleys (Mbugas)	1919	6,4	0,2
Total flat and wide valleys (Mbugas) in Kahama			**4306 ha**	**14,3 %**	**0,5 %**
Msalala	Chela	Hilly land	4486	1,9	0,5
Msalala	Ntobo	Hilly land	165	0,1	0,0
Msalala	Segese	Hilly land	1361	0,6	0,2
Msalala	Busangi	Hilly land	138	0,1	0,0
Msalala	Ngaya	Hilly land	1125	0,5	0,1
Msalala	Ngogwa	Hilly land	11318	4,8	1,3
Msalala	Ntobo	Hilly land	104	0,0	0,0
Total hilly land in Msalala			**18697 ha**	**7,9 %**	**2,2 %**
Msalala	Bulige	Undulating plains	659	0,3	0,1
Msalala	Busangi	Undulating plains	331	0,1	0,0
Msalala	Chela	Undulating plains	8474	3,6	1,0
Msalala	Ntobo	Undulating plains	138	0,1	0,0
Msalala	Segese	Undulating plains	1839	0,8	0,2
Msalala	Busangi	Undulating plains	34	0,0	0,0
Msalala	Ngogwa	Undulating plains	14437	6,1	1,7
Msalala	Ntobo	Undulating plains	142	0,1	0,0
Msalala	Ngogwa	Undulating plains	2469	1,0	0,3
Total undulating plains in Msalala			**28523 ha**	**12,1 %**	**3,4 %**
Msalala	Bulige	Gently undulating plains	1871	0,8	0,2
Msalala	Chela	Gently undulating plains	1389	0,6	0,2
Msalala	Bugarama	Gently undulating plains	7739	3,3	0,9
Msalala	Lunguya	Gently undulating plains	3	0,0	0,0
Msalala	Busangi	Gently undulating plains	236	0,1	0,0
Msalala	Chela	Gently undulating plains	332	0,1	0,0
Msalala	Lunguya	Gently undulating plains	840	0,4	0,1
Msalala	Ntobo	Gently undulating plains	5	0,0	0,0

Msalala	Segese	Gently undulating plains	20	0,0	0,0
Msalala	Lunguya	Gently undulating plains	8332	3,5	1,0
Msalala	Ngogwa	Gently undulating plains	940	0,4	0,1
Msalala	Segese	Gently undulating plains	455	0,2	0,1
Msalala	Busangi	Gently undulating plains	3004	1,3	0,4
Msalala	Lunguya	Gently undulating plains	1215	0,5	0,1
Msalala	Ngogwa	Gently undulating plains	3	0,0	0,0
Msalala	Ntobo	Gently undulating plains	2164	0,9	0,3
Msalala	Segese	Gently undulating plains	1920	0,8	0,2
Msalala	Busangi	Gently undulating plains	8275	3,5	1,0
Msalala	Ngaya	Gently undulating plains	6073	2,6	0,7
Msalala	Ngogwa	Gently undulating plains	1475	0,6	0,2
Total gently undulating plains in Msalala			**46291 ha**	**19,6 %**	**5,5 %**
Msalala	Bugarama	Almost flat plains	1998	0,8	0,2
Msalala	Bugarama	Almost flat plains	1998	0,8	0,2
Msalala	Chela	Almost flat plains	2040	0,9	0,2
Msalala	Lunguya	Almost flat plains	4837	2,0	0,6
Msalala	Ntobo	Almost flat plains	2718	1,2	0,3
Msalala	Segese	Almost flat plains	10451	4,4	1,2
Msalala	Bugarama	Almost flat plains	2013	0,9	0,2
Msalala	Segese	Almost flat plains	2941	1,2	0,3
Msalala	Bugarama	Almost flat plains	4260	1,8	0,5
Msalala	Lunguya	Almost flat plains	6769	2,9	0,8
Msalala	Segese	Almost flat plains	4114	1,7	0,5
Msalala	Bulige	Almost flat plains	2896	1,2	0,3
Msalala	Busangi	Almost flat plains	1920	0,8	0,2
Msalala	Ngaya	Almost flat plains	3268	1,4	0,4
Msalala	Bulige	Almost flat plains	6755	2,9	0,8
Msalala	Ngaya	Almost flat plains	766	0,3	0,1
Total almost flat plains in Msalala			**59744 ha**	**25,3 %**	**7,0 %**
Msalala	Bulige	Flat and very wide bottomlands	18187	7,7	2,1
Msalala	Ngaya	Flat and very wide bottomlands	3225	1,4	0,4
Total flat and very wide bottomlands in Msalala			**21412 ha**	**9,1 %**	**2,5 %**
Msalala	Bugarama	Flat and wide valleys (Mbugas)	1330	0,6	0,2
Msalala	Bulige	Flat and wide valleys (Mbugas)	357	0,2	0,0
Msalala	Chela	Flat and wide valleys (Mbugas)	3992	1,7	0,5
Msalala	Lunguya	Flat and wide valleys (Mbugas)	4076	1,7	0,5
Msalala	Ntobo	Flat and wide valleys (Mbugas)	240	0,1	0,0
Msalala	Segese	Flat and wide valleys (Mbugas)	6812	2,9	0,8
Msalala	Bugarama	Flat and wide valleys (Mbugas)	5176	2,2	0,6
Msalala	Bulige	Flat and wide valleys (Mbugas)	5817	2,5	0,7
Msalala	Busangi	Flat and wide valleys (Mbugas)	8553	3,6	1,0
Msalala	Chela	Flat and wide valleys (Mbugas)	504	0,2	0,1
Msalala	Lunguya	Flat and wide valleys (Mbugas)	7514	3,2	0,9
Msalala	Ngaya	Flat and wide valleys (Mbugas)	1428	0,6	0,2
Msalala	Ngogwa	Flat and wide valleys (Mbugas)	10163	4,3	1,2
Msalala	Ntobo	Flat and wide valleys (Mbugas)	4055	1,7	0,5
Msalala	Segese	Flat and wide valleys (Mbugas)	3346	1,4	0,4
Total flat and wide valleys in Msalala			**63363 ha**	**26,8 %**	**7,5 %**
Mweli	Bulungwa	Hilly land	394	0,1	0,0
Total hilly land in Mweli			**394 ha**	**0,2 %**	**0,0 %**
Mweli	Bulungwa	Undulating plains	2558	1,0	0,3
Mweli	Ulowa	Undulating plains	884	0,3	0,1
Mweli	Ushetu	Undulating plains	1977	0,7	0,2
Mweli	Uyogo	Undulating plains	850	0,3	0,1
Mweli	Bulungwa	Undulating plains	907	0,3	0,1
Total undulating plains in Mweli			**7176 ha**	**2,7 %**	**0,8 %**

Mweli	Uyogo	Gently undulating plains	268	0,1	0,0
Mweli	Bulungwa	Gently undulating plains	144849	54,7	17,1
Mweli	Ulowa	Gently undulating plains	41278	15,6	4,9
Mweli	Ushetu	Gently undulating plains	15133	5,7	1,8
Mweli	Uyogo	Gently undulating plains	4378	1,7	0,5
Mweli	Ushetu	Gently undulating plains	931	0,4	0,1
Mweli	Bulungwa	Gently undulating plains	90	0,0	0,0
Mweli	Uyogo	Gently undulating plains	4310	1,6	0,5
Total gently undulating plains in Mweli			**211237 ha**	**79,8 %**	**24,9 %**
Mweli	Ushetu	Almost flat plains	3706	1,4	0,4
Mweli	Uyogo	Almost flat plains	808	0,3	0,1
Total almost flat plains in Mweli			**4514 ha**	**1,7 %**	**0,5 %**
Mweli	Bulungwa	Flat and wide valleys (Mbugas)	10790	4,1	1,3
Mweli	Ulowa	Flat and wide valleys (Mbugas)	13520	5,1	1,6
Mweli	Ushetu	Flat and wide valleys (Mbugas)	8130	3,1	1,0
Mweli	Uyogo	Flat and wide valleys (Mbugas)	8819	3,3	1,0
Total flat and wide vallyes (Mbugas) in Mweli			**41259 ha**	**15,6 %**	**4,9 %**

Map 4 Land resources

Extent of soil mapping units (by Ward)

Division	Wardname	Soilcode	Area in ha	Perc. of Division	Perc. of District
Dakama	Chambo	B22	1595,9	0,8%	0,2%
Dakama	Chambo	B31	3375,6	1,6%	0,4%
Dakama	Chambo	B32	1585,6	0,8%	0,2%
Dakama	Chambo	B33	9819,4	4,7%	1,2%
Dakama	Chambo	D52	6785,6	3,2%	0,8%
Dakama	Chona	B22	1816,2	0,9%	0,2%
Dakama	Chona	B31	441,2	0,2%	0,1%
Dakama	Chona	B32	12934,3	6,2%	1,5%
Dakama	Chona	D52	4058,9	1,9%	0,5%
Dakama	Idahina	A32	7756,3	3,7%	0,9%
Dakama	Idahina	A42	8878,2	4,2%	1,0%
Dakama	Idahina	B22	152,8	0,1%	0,0%
Dakama	Idahina	B23	92,8	0,0%	0,0%
Dakama	Idahina	B32	12550,4	6,0%	1,5%
Dakama	Idahina	B41	3274,1	1,6%	0,4%
Dakama	Idahina	D52	2899,1	1,4%	0,3%
Dakama	Igwamanoni	A42	47,2	0,0%	0,0%
Dakama	Igwamanoni	B11	2284,1	1,1%	0,3%
Dakama	Igwamanoni	B21	326,7	0,2%	0,0%
Dakama	Igwamanoni	B22	378,1	0,2%	0,0%
Dakama	Igwamanoni	B23	6630,8	3,2%	0,8%
Dakama	Igwamanoni	B32	7136,9	3,4%	0,8%
Dakama	Igwamanoni	B41	918,9	0,4%	0,1%
Dakama	Igwamanoni	D52	3271,6	1,6%	0,4%
Dakama	Kilago	A41	4807,2	2,3%	0,6%
Dakama	Kilago	B11	393,0	0,2%	0,0%
Dakama	Kilago	B21	431,8	0,2%	0,1%
Dakama	Kilago	B22	849,5	0,4%	0,1%
Dakama	Kilago	B32	6514,7	3,1%	0,8%
Dakama	Kilago	B34	6090,5	2,9%	0,7%
Dakama	Kilago	B42	350,3	0,2%	0,0%
Dakama	Kilago	B44	1309,7	0,6%	0,2%
Dakama	Kilago	C42	872,5	0,4%	0,1%
Dakama	Kilago	D51	1596,6	0,8%	0,2%
Dakama	Kilago	D52	7079,7	3,4%	0,8%
Dakama	Kinamapula	B22	1357,0	0,6%	0,2%
Dakama	Kinamapula	B32	7030,4	3,3%	0,8%
Dakama	Kinamapula	D52	2819,3	1,3%	0,3%
Dakama	Kisuke	B22	3046,4	1,4%	0,4%
Dakama	Kisuke	B31	2682,9	1,3%	0,3%
Dakama	Kisuke	B32	12037,9	5,7%	1,4%
Dakama	Kisuke	B33	628,9	0,3%	0,1%
Dakama	Kisuke	D52	9046,1	4,3%	1,1%
Dakama	Mpunze	A32	137,5	0,1%	0,0%
Dakama	Mpunze	B22	2052,1	1,0%	0,2%
Dakama	Mpunze	B23	2049,6	1,0%	0,2%
Dakama	Mpunze	B32	8716,9	4,1%	1,0%
Dakama	Mpunze	D52	4231,0	2,0%	0,5%
Dakama	Nyandekwa	B11	2,2	0,0%	0,0%
Dakama	Nyandekwa	B21	103,3	0,0%	0,0%
Dakama	Nyandekwa	B22	1040,6	0,5%	0,1%
Dakama	Nyandekwa	B23	14,7	0,0%	0,0%
Dakama	Nyandekwa	B32	5987,6	2,8%	0,7%
Dakama	Nyandekwa	D52	4758,3	2,3%	0,6%
Dakama	Ukune	B22	2265,1	1,1%	0,3%
Dakama	Ukune	B31	1986,6	0,9%	0,2%
Dakama	Ukune	B32	6848,1	3,3%	0,8%
Dakama	Ukune	D52	2142,7	1,0%	0,3%
	Total Dakama Division:		**210291,7**		**24,8%**

Isagehe	Isagehe	B41	66,7	0,1%	0,0%
Isagehe	Isagehe	B42	10192,0	9,5%	1,2%
Isagehe	Isagehe	C41	306,8	0,3%	0,0%
Isagehe	Isagehe	C42	4823,9	4,5%	0,6%
Isagehe	Isagehe	C51	615,5	0,6%	0,1%
Isagehe	Isagehe	D51	1140,9	1,1%	0,1%
Isagehe	Isagehe	D52	3880,9	3,6%	0,5%
Isagehe	Isaka	A41	671,4	0,6%	0,1%
Isagehe	Isaka	B41	2,6	0,0%	0,0%
Isagehe	Isaka	B43	375,2	0,4%	0,0%
Isagehe	Isaka	B44	8531,4	8,0%	1,0%
Isagehe	Isaka	C41	244,2	0,2%	0,0%
Isagehe	Isaka	C51	1643,5	1,5%	0,2%
Isagehe	Isaka	D52	1097,9	1,0%	0,1%
Isagehe	Isaka-Jana	B44	8370,6	7,8%	1,0%
Isagehe	Isaka-Jana	C51	12764,1	12,0%	1,5%
Isagehe	Isaka-Jana	D52	3223,0	3,0%	0,4%
Isagehe	Kinaga	B11	70,3	0,1%	0,0%
Isagehe	Kinaga	B21	186,5	0,2%	0,0%
Isagehe	Kinaga	B34	8231,1	7,7%	1,0%
Isagehe	Kinaga	B35	1216,5	1,1%	0,1%
Isagehe	Kinaga	B41	1557,5	1,5%	0,2%
Isagehe	Kinaga	B42	4673,5	4,4%	0,6%
Isagehe	Kinaga	C41	2426,2	2,3%	0,3%
Isagehe	Kinaga	C42	576,9	0,5%	0,1%
Isagehe	Kinaga	C51	12998,4	12,2%	1,5%
Isagehe	Kinaga	D52	3920,5	3,7%	0,5%
Isagehe	Mwalugulu	B32	976,5	0,9%	0,1%
Isagehe	Mwalugulu	B41	3065,3	2,9%	0,4%
Isagehe	Mwalugulu	B42	3083,6	2,9%	0,4%
Isagehe	Mwalugulu	B44	826,8	0,8%	0,1%
Isagehe	Mwalugulu	C41	904,1	0,8%	0,1%
Isagehe	Mwalugulu	C51	2922,9	2,7%	0,3%
Isagehe	Mwalugulu	D52	1149,0	1,1%	0,1%
		Total Isagehe Division:	**106736,5**		**12,6%**
Kahama	Kahama	B11	503,5	1,7%	0,1%
Kahama	Kahama	B21	3275,2	10,9%	0,4%
Kahama	Malunga	B11	5,0	0,0%	0,0%
Kahama	Malunga	B21	2514,4	8,4%	0,3%
Kahama	Malunga	B34	732,2	2,4%	0,1%
Kahama	Malunga	B35	262,4	0,9%	0,0%
Kahama	Malunga	D52	686,0	2,3%	0,1%
Kahama	Mhongolo	B21	3046,3	10,1%	0,4%
Kahama	Mhongolo	B34	875,8	2,9%	0,1%
Kahama	Mhongolo	C51	362,6	1,2%	0,0%
Kahama	Mhongolo	D52	516,9	1,7%	0,1%
Kahama	Mwendakulima	B21	1052,0	3,5%	0,1%
Kahama	Mwendakulima	C42	3330,1	11,1%	0,4%
Kahama	Mwendakulima	C51	1151,8	3,8%	0,1%
Kahama	Mwendakulima	D52	1184,2	3,9%	0,1%
Kahama	Nyahogo	B11	403,0	1,3%	0,0%
Kahama	Nyahogo	B21	2278,6	7,6%	0,3%
Kahama	Zongomera	B11	676,8	2,3%	0,1%
Kahama	Zongomera	B21	5273,7	17,5%	0,6%
Kahama	Zongomera	B32	3,9	0,0%	0,0%
Kahama	Zongomera	D52	1918,9	6,4%	0,2%
		Total Kahama Division:	**30053,2**		**3,5%**
Msalala	Bugarama	A41	1997,7	0,8%	0,2%
Msalala	Bugarama	A42	2012,9	0,9%	0,2%
Msalala	Bugarama	B31	7739,3	3,3%	0,9%
Msalala	Bugarama	B41	4260,0	1,8%	0,5%

Msalala	Bugarama	D51	1330,3	0,6%	0,2%
Msalala	Bugarama	D52	5175,9	2,2%	0,6%
Msalala	Bulige	A21	659,5	0,3%	0,1%
Msalala	Bulige	A31	1871,2	0,8%	0,2%
Msalala	Bulige	B42	2895,7	1,2%	0,3%
Msalala	Bulige	C41	6755,1	2,9%	0,8%
Msalala	Bulige	C51	18187,3	7,7%	2,1%
Msalala	Bulige	D51	356,6	0,2%	0,0%
Msalala	Bulige	D52	5816,4	2,5%	0,7%
Msalala	Busangi	A21	330,5	0,1%	0,0%
Msalala	Busangi	B11	137,6	0,1%	0,0%
Msalala	Busangi	B21	33,9	0,0%	0,0%
Msalala	Busangi	B32	235,7	0,1%	0,0%
Msalala	Busangi	B34	3003,6	1,3%	0,4%
Msalala	Busangi	B35	8274,7	3,5%	1,0%
Msalala	Busangi	B42	1920,5	0,8%	0,2%
Msalala	Busangi	D52	8552,8	3,6%	1,0%
Msalala	Chela	A11	4485,9	1,9%	0,5%
Msalala	Chela	A21	8474,1	3,6%	1,0%
Msalala	Chela	A31	1389,3	0,6%	0,2%
Msalala	Chela	A41	2040,0	0,9%	0,2%
Msalala	Chela	B32	332,1	0,1%	0,0%
Msalala	Chela	D51	3991,4	1,7%	0,5%
Msalala	Chela	D52	504,4	0,2%	0,1%
Msalala	Lunguya	A41	4837,3	2,0%	0,6%
Msalala	Lunguya	B31	3,2	0,0%	0,0%
Msalala	Lunguya	B32	839,9	0,4%	0,1%
Msalala	Lunguya	B33	8332,3	3,5%	1,0%
Msalala	Lunguya	B34	1215,4	0,5%	0,1%
Msalala	Lunguya	B41	6769,0	2,9%	0,8%
Msalala	Lunguya	D51	4077,0	1,7%	0,5%
Msalala	Lunguya	D52	7513,6	3,2%	0,9%
Msalala	Ngaya	B11	1125,4	0,5%	0,1%
Msalala	Ngaya	B35	6073,3	2,6%	0,7%
Msalala	Ngaya	B42	3268,0	1,4%	0,4%
Msalala	Ngaya	C41	766,3	0,3%	0,1%
Msalala	Ngaya	C51	3225,4	1,4%	0,4%
Msalala	Ngaya	D52	1427,6	0,6%	0,2%
Msalala	Ngogwa	B11	11317,7	4,8%	1,3%
Msalala	Ngogwa	B21	14437,1	6,1%	1,7%
Msalala	Ngogwa	B23	2468,7	1,0%	0,3%
Msalala	Ngogwa	B33	940,0	0,4%	0,1%
Msalala	Ngogwa	B34	3,3	0,0%	0,0%
Msalala	Ngogwa	B35	1475,4	0,6%	0,2%
Msalala	Ngogwa	D52	10163,4	4,3%	1,2%
Msalala	Ntobo	A11	164,7	0,1%	0,0%
Msalala	Ntobo	A21	137,7	0,1%	0,0%
Msalala	Ntobo	A41	2717,6	1,2%	0,3%
Msalala	Ntobo	B11	104,4	0,0%	0,0%
Msalala	Ntobo	B21	141,9	0,1%	0,0%
Msalala	Ntobo	B32	4,8	0,0%	0,0%
Msalala	Ntobo	B34	2163,8	0,9%	0,3%
Msalala	Ntobo	D51	239,7	0,1%	0,0%
Msalala	Ntobo	D52	4055,2	1,7%	0,5%
Msalala	Segese	A11	1361,2	0,6%	0,2%
Msalala	Segese	A21	1839,0	0,8%	0,2%
Msalala	Segese	A41	10450,6	4,4%	1,2%
Msalala	Segese	A42	2941,3	1,2%	0,3%
Msalala	Segese	B32	19,7	0,0%	0,0%
Msalala	Segese	B33	454,9	0,2%	0,1%
Msalala	Segese	B34	1920,2	0,8%	0,2%
Msalala	Segese	B41	4113,6	1,7%	0,5%
Msalala	Segese	D51	6812,0	2,9%	0,8%
Msalala	Segese	D52	3346,4	1,4%	0,4%
	Total Msalala Division:		**236032,2**		**27,8%**

Mweli	Bulungwa	A32	90,4	0,0%	0,0%
Mweli	Bulungwa	B11	394,2	0,1%	0,0%
Mweli	Bulungwa	B22	2558,4	1,0%	0,3%
Mweli	Bulungwa	B23	906,3	0,3%	0,1%
Mweli	Bulungwa	B32	144849,0	54,7%	17,1%
Mweli	Bulungwa	D52	10790,3	4,1%	1,3%
Mweli	Ulowa	B22	883,9	0,3%	0,1%
Mweli	Ulowa	B32	41278,0	15,6%	4,9%
Mweli	Ulowa	D52	13520,3	5,1%	1,6%
Mweli	Ushetu	B22	1976,8	0,7%	0,2%
Mweli	Ushetu	B32	15132,6	5,7%	1,8%
Mweli	Ushetu	B33	930,6	0,4%	0,1%
Mweli	Ushetu	B41	3705,7	1,4%	0,4%
Mweli	Ushetu	D52	8129,8	3,1%	1,0%
Mweli	Uyogo	B22	850,4	0,3%	0,1%
Mweli	Uyogo	B31	268,3	0,1%	0,0%
Mweli	Uyogo	B32	4377,9	1,7%	0,5%
Mweli	Uyogo	B33	4310,4	1,6%	0,5%
Mweli	Uyogo	B41	808,3	0,3%	0,1%
Mweli	Uyogo	D52	8819,0	3,3%	1,0%
		Total Mweli Division:	**264580,7**		**31,2%**
			847694,3		

Map 5 Land-use (1996)

Extent of mapping units (by Ward)

Division	Wardname	Landuse unit	Area in ha	Perc. of Division	Perc. Of District
Dakama	Chambo	?	1,2	0,001%	0,000%
Dakama	Chambo	A	3638,0	1,730%	0,429%
Dakama	Chambo	A/D1	11144,3	5,299%	1,315%
Dakama	Chambo	A/D2	2878,1	1,369%	0,340%
Dakama	Chambo	D2/A	1125,9	0,535%	0,133%
Dakama	Chambo	D3/B	4376,3	2,081%	0,516%
Dakama	Chona	?	4,4	0,002%	0,001%
Dakama	Chona	A	9955,0	4,734%	1,174%
Dakama	Chona	A/D2	5170,4	2,459%	0,610%
Dakama	Chona	B/D3	217,0	0,103%	0,026%
Dakama	Chona	D2/A	415,5	0,198%	0,049%
Dakama	Chona	D3/B	3487,7	1,658%	0,411%
Dakama	Idahina	A	2064,9	0,982%	0,244%
Dakama	Idahina	A/C	6668,6	3,171%	0,787%
Dakama	Idahina	A/C/L	12400,9	5,897%	1,463%
Dakama	Idahina	A/D1	7187,0	3,418%	0,848%
Dakama	Idahina	C	779,7	0,371%	0,092%
Dakama	Idahina	C/A	2999,1	1,426%	0,354%
Dakama	Idahina	D3	460,6	0,219%	0,054%
Dakama	Idahina	D3/B	3040,5	1,446%	0,359%
Dakama	Igwamanoni	?	8,5	0,004%	0,001%
Dakama	Igwamanoni	A	8519,5	4,051%	1,005%
Dakama	Igwamanoni	A/C/L	125,7	0,060%	0,015%
Dakama	Igwamanoni	A/D1	1923,1	0,914%	0,227%
Dakama	Igwamanoni	A/D2	6937,4	3,299%	0,818%
Dakama	Igwamanoni	A/E	979,7	0,466%	0,116%
Dakama	Igwamanoni	D3	474,7	0,226%	0,056%
Dakama	Igwamanoni	D3/B	2026,3	0,964%	0,239%
Dakama	Kilago	A	7044,9	3,350%	0,831%
Dakama	Kilago	A/D1	2774,0	1,319%	0,327%
Dakama	Kilago	A/D2	10446,4	4,968%	1,232%
Dakama	Kilago	B	485,5	0,231%	0,057%
Dakama	Kilago	C	1091,7	0,519%	0,129%
Dakama	Kilago	D2	368,0	0,175%	0,043%
Dakama	Kilago	D2/A	1712,9	0,815%	0,202%
Dakama	Kilago	D3/A*	882,2	0,419%	0,104%
Dakama	Kilago	D3/B	5490,5	2,611%	0,648%
Dakama	Kinamapula	A/D1	1401,8	0,667%	0,165%
Dakama	Kinamapula	A/D2	7833,3	3,725%	0,924%
Dakama	Kinamapula	D1/A	393,5	0,187%	0,046%
Dakama	Kinamapula	D3/B	1577,5	0,750%	0,186%
Dakama	Kisuke	A	3213,9	1,528%	0,379%
Dakama	Kisuke	A/D1	2212,2	1,052%	0,261%
Dakama	Kisuke	A/D2	14480,3	6,886%	1,708%
Dakama	Kisuke	B/D3	713,3	0,339%	0,084%
Dakama	Kisuke	D2	249,1	0,118%	0,029%
Dakama	Kisuke	D2/A	1869,3	0,889%	0,221%
Dakama	Kisuke	D3/B	4704,6	2,237%	0,555%
Dakama	Mpunze	?	2,1	0,001%	0,000%
Dakama	Mpunze	A	206,7	0,098%	0,024%
Dakama	Mpunze	A/C	0,0	0,000%	0,000%
Dakama	Mpunze	A/C/L	219,1	0,104%	0,026%
Dakama	Mpunze	A/D1	492,0	0,234%	0,058%
Dakama	Mpunze	A/D2	11332,4	5,389%	1,337%
Dakama	Mpunze	A/E	758,9	0,361%	0,090%
Dakama	Mpunze	B	156,2	0,074%	0,018%
Dakama	Mpunze	C	1043,8	0,496%	0,123%

Dakama	Mpunze	C/A	0,0	0,000%	0,000%
Dakama	Mpunze	D1/A	496,2	0,236%	0,059%
Dakama	Mpunze	D3	808,7	0,385%	0,095%
Dakama	Mpunze	D3/B	1674,4	0,796%	0,198%
Dakama	Nyandekwa	A	4823,4	2,294%	0,569%
Dakama	Nyandekwa	A/D2	4137,7	1,968%	0,488%
Dakama	Nyandekwa	A/E	77,4	0,037%	0,009%
Dakama	Nyandekwa	D3/B	2867,5	1,364%	0,338%
Dakama	Ukune	A	2795,3	1,329%	0,330%
Dakama	Ukune	A/D2	9354,7	4,448%	1,104%
Dakama	Ukune	B/D3	385,3	0,183%	0,045%
Dakama	Ukune	D3/B	707,0	0,336%	0,083%
		Total Dakama Division:	**210293,7**		**24,808%**
Isagehe	Isagehe	A	10956,2	10,265%	1,292%
Isagehe	Isagehe	A/B/E	2529,9	2,370%	0,298%
Isagehe	Isagehe	A/D2	1904,1	1,784%	0,225%
Isagehe	Isagehe	A/D3	620,0	0,581%	0,073%
Isagehe	Isagehe	A/E	11,2	0,011%	0,001%
Isagehe	Isagehe	B	1230,0	1,152%	0,145%
Isagehe	Isagehe	B/A/E	2034,7	1,906%	0,240%
Isagehe	Isagehe	B/D3	754,0	0,706%	0,089%
Isagehe	Isagehe	D3/A*	986,8	0,925%	0,116%
Isagehe	Isaka	A/B/E	10659,7	9,987%	1,257%
Isagehe	Isaka	B	320,8	0,301%	0,038%
Isagehe	Isaka	B/A/E	1337,9	1,253%	0,158%
Isagehe	Isaka	B/D3	209,1	0,196%	0,025%
Isagehe	Isaka	D3/B	39,7	0,037%	0,005%
Isagehe	Isaka-jana	A	2445,1	2,291%	0,288%
Isagehe	Isaka-jana	A/B/E	5457,5	5,113%	0,644%
Isagehe	Isaka-jana	B	94,0	0,088%	0,011%
Isagehe	Isaka-jana	B/A/E	14121,4	13,230%	1,666%
Isagehe	Isaka-jana	D3/B	2239,6	2,098%	0,264%
Isagehe	Kinaga	A	7006,3	6,564%	0,827%
Isagehe	Kinaga	A/D2	7879,0	7,382%	0,929%
Isagehe	Kinaga	A/D3	351,2	0,329%	0,041%
Isagehe	Kinaga	A/E	9211,3	8,630%	1,087%
Isagehe	Kinaga	B	387,6	0,363%	0,046%
Isagehe	Kinaga	B/A/E	9389,8	8,797%	1,108%
Isagehe	Kinaga	D3	747,4	0,700%	0,088%
Isagehe	Kinaga	D3/B	884,9	0,829%	0,104%
Isagehe	Mwalugulu	A	972,9	0,912%	0,115%
Isagehe	Mwalugulu	A/B/E	7165,0	6,713%	0,845%
Isagehe	Mwalugulu	B	346,9	0,325%	0,041%
Isagehe	Mwalugulu	B/A/E	3448,3	3,231%	0,407%
Isagehe	Mwalugulu	B/D3	131,3	0,123%	0,015%
Isagehe	Mwalugulu	E	863,0	0,809%	0,102%
		Total Isagehe Division:	**106736,6**		**12,591%**
Kahama	Kahama	A	1586,9	5,280%	0,187%
Kahama	Kahama	A/D2	2191,8	7,293%	0,259%
Kahama	Malunga	A	1615,1	5,374%	0,191%
Kahama	Malunga	A/D2	2486,9	8,275%	0,293%
Kahama	Malunga	B/D3	98,0	0,326%	0,012%
Kahama	Mhongolo	A	1182,5	3,935%	0,139%
Kahama	Mhongolo	A/D2	2538,9	8,448%	0,300%
Kahama	Mhongolo	A/E	645,0	2,146%	0,076%
Kahama	Mhongolo	D3/B	435,1	1,448%	0,051%
Kahama	Mwendakulima	A	3647,0	12,135%	0,430%
Kahama	Mwendakulima	A/D2	1400,4	4,660%	0,165%
Kahama	Mwendakulima	A/D3	145,2	0,483%	0,017%
Kahama	Mwendakulima	A/E	572,7	1,906%	0,068%
Kahama	Mwendakulima	B/A/E	130,9	0,436%	0,015%
Kahama	Mwendakulima	B/D3	465,6	1,549%	0,055%

Kahama	Mwendakulima	D3/B	356,1	1,185%	0,042%
Kahama	Nyahogo	A	1752,9	5,833%	0,207%
Kahama	Nyahogo	A/D2	928,9	3,091%	0,110%
Kahama	Zongomera	A	4614,4	15,354%	0,544%
Kahama	Zongomera	A/D2	1722,0	5,730%	0,203%
Kahama	Zongomera	B/D3	387,6	1,290%	0,046%
Kahama	Zongomera	D3/B	1149,2	3,824%	0,136%
	Total Kahama Division:		**30053,3**		**3,545%**
Msalala	Bugarama	A	12122,1	5,136%	1,430%
Msalala	Bugarama	A*	862,2	0,365%	0,102%
Msalala	Bugarama	A/D2	450,1	0,191%	0,053%
Msalala	Bugarama	A/E	191,0	0,081%	0,023%
Msalala	Bugarama	A/L	3540,5	1,500%	0,418%
Msalala	Bugarama	D3	4280,9	1,814%	0,505%
Msalala	Bugarama	D3/B	584,3	0,248%	0,069%
Msalala	Bugarama	E/L	484,4	0,205%	0,057%
Msalala	Bulige	A	4636,1	1,964%	0,547%
Msalala	Bulige	A*	176,8	0,075%	0,021%
Msalala	Bulige	A/E	1216,6	0,515%	0,144%
Msalala	Bulige	A/L	3274,1	1,387%	0,386%
Msalala	Bulige	B	3809,6	1,614%	0,449%
Msalala	Bulige	B/A/E	6790,6	2,877%	0,801%
Msalala	Bulige	B/D3	11926,8	5,053%	1,407%
Msalala	Bulige	D3/B	4711,5	1,996%	0,556%
Msalala	Busangi	A	2415,7	1,023%	0,285%
Msalala	Busangi	A/D2	9851,9	4,174%	1,162%
Msalala	Busangi	A/E	1036,0	0,439%	0,122%
Msalala	Busangi	A/L	527,0	0,223%	0,062%
Msalala	Busangi	B	253,0	0,107%	0,030%
Msalala	Busangi	B/D3	775,6	0,329%	0,091%
Msalala	Busangi	D3/B	3723,4	1,577%	0,439%
Msalala	Busangi	D3/E	1875,6	0,795%	0,221%
Msalala	Busangi	E/A	2031,2	0,861%	0,240%
Msalala	Chela	A*	3657,1	1,549%	0,431%
Msalala	Chela	A/D2	358,0	0,152%	0,042%
Msalala	Chela	A/L	12116,7	5,134%	1,429%
Msalala	Chela	C	4844,9	2,053%	0,572%
Msalala	Chela	D3/B	240,6	0,102%	0,028%
Msalala	Lunguya	?	1,0	0,000%	0,000%
Msalala	Lunguya	A	10928,8	4,630%	1,289%
Msalala	Lunguya	A*	3159,0	1,338%	0,373%
Msalala	Lunguya	A/D2	2509,1	1,063%	0,296%
Msalala	Lunguya	A/L	4725,9	2,002%	0,558%
Msalala	Lunguya	D3	4639,1	1,965%	0,547%
Msalala	Lunguya	D3/B	1797,7	0,762%	0,212%
Msalala	Lunguya	E/A	5826,4	2,469%	0,687%
Msalala	Ngaya	A	4526,2	1,918%	0,534%
Msalala	Ngaya	A/D2	4880,7	2,068%	0,576%
Msalala	Ngaya	A/E	3260,5	1,381%	0,385%
Msalala	Ngaya	B	824,6	0,349%	0,097%
Msalala	Ngaya	B/A/E	907,3	0,384%	0,107%
Msalala	Ngaya	B/D3	261,7	0,111%	0,031%
Msalala	Ngaya	E/A	1224,6	0,519%	0,144%
Msalala	Ngogwa	A	10374,7	4,395%	1,224%
Msalala	Ngogwa	A/D1	2084,6	0,883%	0,246%
Msalala	Ngogwa	A/D2	5336,4	2,261%	0,630%
Msalala	Ngogwa	A/E	3047,0	1,291%	0,359%
Msalala	Ngogwa	B/D3	851,6	0,361%	0,100%
Msalala	Ngogwa	C	14285,9	6,053%	1,685%
Msalala	Ngogwa	D3/B	4824,0	2,044%	0,569%
Msalala	Ntobo	A	1954,3	0,828%	0,231%
Msalala	Ntobo	A*	305,0	0,129%	0,036%
Msalala	Ntobo	A/D2	3675,5	1,557%	0,434%
Msalala	Ntobo	A/L	1100,8	0,466%	0,130%

Msalala	Ntobo	C	151,4	0,064%	0,018%
Msalala	Ntobo	D3/B	2541,6	1,077%	0,300%
Msalala	Segese	A	5351,3	2,267%	0,631%
Msalala	Segese	A*	7131,3	3,021%	0,841%
Msalala	Segese	A/D2	7239,2	3,067%	0,854%
Msalala	Segese	A/L	7985,1	3,383%	0,942%
Msalala	Segese	B	787,2	0,334%	0,093%
Msalala	Segese	C	930,1	0,394%	0,110%
Msalala	Segese	D2	845,8	0,358%	0,100%
Msalala	Segese	D3	593,1	0,251%	0,070%
Msalala	Segese	D3/B	180,9	0,077%	0,021%
Msalala	Segese	E/A	2217,0	0,939%	0,262%
		Total Msalala Division:	**236030,6**		**27,844%**
					0,000%
Mwell	Bulungwa	A	3830,5	1,448%	0,452%
Mwell	Bulungwa	A/C	10713,2	4,049%	1,264%
Mweli	Bulungwa	A/C/L	1271,6	0,481%	0,150%
Mweli	Bulungwa	A/D1	18750,2	7,087%	2,212%
Mweli	Bulungwa	C	94396,1	35,678%	11,136%
Mweli	Bulungwa	C/A	23738,0	8,972%	2,800%
Mweli	Bulungwa	D3	659,8	0,249%	0,078%
Mweli	Bulungwa	D3/B	6229,5	2,354%	0,735%
Mwell	Ulowa	?	13,8	0,005%	0,002%
Mweli	Ulowa	A	7552,3	2,854%	0,891%
Mweli	Ulowa	A/C	310,3	0,117%	0,037%
Mweli	Ulowa	A/D1	9369,8	3,541%	1,105%
Mweli	Ulowa	A/D2	1094,0	0,413%	0,129%
Mweli	Ulowa	C	24631,7	9,310%	2,906%
Mweli	Ulowa	C/A	51,4	0,019%	0,006%
Mweli	Ulowa	D1/A	1567,1	0,592%	0,185%
Mweli	Ulowa	D3	3442,3	1,301%	0,406%
Mweli	Ulowa	D3/B	7650,3	2,891%	0,902%
Mweli	Ushetu	?	9,1	0,003%	0,001%
Mweli	Ushetu	A	5128,6	1,938%	0,605%
Mweli	Ushetu	A/D1	10267,1	3,881%	1,211%
Mweli	Ushetu	A/D2	1932,3	0,730%	0,228%
Mweli	Ushetu	D1/A	7979,1	3,016%	0,941%
Mweli	Ushetu	D3/B	4558,7	1,723%	0,538%
Mweli	Uyogo	?	2,8	0,001%	0,000%
Mweli	Uyogo	A	1240,0	0,469%	0,146%
Mweli	Uyogo	A/D1	678,2	0,256%	0,080%
Mweli	Uyogo	A/D2	10570,9	3,995%	1,247%
Mweli	Uyogo	D1/A	1113,6	0,421%	0,131%
Mweli	Uyogo	D2/A	1466,9	0,554%	0,173%
Mweli	Uyogo	D3/B	4361,5	1,648%	0,515%
		Total Mweli Division:	**264580,4**		**31,212%**
			847694,6		

Map 6 Major Land-systems and Agro-ecological zones

Extent of mapping units (by Ward)

Division	Wardname	Mapping unit	Area in ha	Perc. Of Division	Perc. of District
Dakama	Chambo	KPLc	6785,6	3,23%	0,800%
Dakama	Chambo	KPMc	16376,5	7,79%	1,932%
Dakama	Chona	KPLc	4058,9	1,93%	0,479%
Dakama	Chona	KPMc	15192,1	7,22%	1,792%
Dakama	Idahina	CHP	16634,5	7,91%	1,962%
Dakama	Idahina	KPMc	14530,1	6,91%	1,714%
Dakama	Idahina	KPMs	4439,1	2,11%	0,524%
Dakama	Igwamanoni	CHP	47,2	0,02%	0,006%
Dakama	Igwamanoni	KPLc	3271,6	1,56%	0,386%
Dakama	Igwamanoni	KPMc	17675,6	8,41%	2,085%
Dakama	Kilago	CHP	4807,2	2,29%	0,567%
Dakama	Kilago	CM	429,9	0,20%	0,051%
Dakama	Kilago	IPLs	911,6	0,43%	0,108%
Dakama	Kilago	IPMs	872,5	0,41%	0,103%
Dakama	Kilago	KPLc	7334,4	3,49%	0,865%
Dakama	Kilago	KPMc	15939,6	7,58%	1,880%
Dakama	Kinamapula	KPLc	2819,3	1,34%	0,333%
Dakama	Kinamapula	KPMc	8387,4	3,99%	0,989%
Dakama	Kisuke	KPLc	9046,0	4,30%	1,067%
Dakama	Kisuke	KPMc	18396,0	8,75%	2,170%
Dakama	Mpunze	CHP	137,5	0,07%	0,016%
Dakama	Mpunze	KPLc	7130,1	3,39%	0,841%
Dakama	Mpunze	KPMc	9919,6	4,72%	1,170%
Dakama	Nyandekwa	KPLc	4758,2	2,26%	0,561%
Dakama	Nyandekwa	KPMc	7148,5	3,40%	0,843%
Dakama	Ukune	KPLc	2142,6	1,02%	0,253%
Dakama	Ukune	KPMc	11100,4	5,28%	1,309%
	Total Dakama Division:		**210292,0**		**24,808%**

Mapping unit	Area in ha	Perc. of Division
CHP	21626,4	10,3%
CM	429,9	0,2%
IPLs	911,6	0,4%
IPMs	872,5	0,4%
KPLc	47346,8	22,5%
KPMc	134665,8	64,0%
KPMs	4439,1	2,1%

Isagehe	Isagehe	CM	1025,0	0,96%	0,121%
Isagehe	Isagehe	IPLs	3268,9	3,06%	0,386%
Isagehe	Isagehe	IPMs	5439,5	5,10%	0,642%
Isagehe	Isagehe	KPLc	727,8	0,68%	0,086%
Isagehe	Isagehe	KPMc	10565,6	9,90%	1,246%
Isagehe	Isaka	CHP	671,4	0,63%	0,079%
Isagehe	Isaka	IsLs	523,5	0,49%	0,062%
Isagehe	Isaka	IsPs	1765,8	1,65%	0,208%
Isagehe	Isaka	KPLc	392,8	0,37%	0,046%
Isagehe	Isaka	KPLe	181,5	0,17%	0,021%
Isagehe	Isaka	KPMc	7800,5	7,31%	0,920%
Isagehe	Isaka	KPLe	1230,6	1,15%	0,145%
Isagehe	Isaka-jana	IsLs	3135,2	2,94%	0,370%
Isagehe	Isaka-jana	IsPs	11522,8	10,80%	1,359%
Isagehe	Isaka-jana	KPLe	87,8	0,08%	0,010%
Isagehe	Isaka-jana	KPLe	9611,8	9,01%	1,134%
Isagehe	Kinaga	IPLs	32,5	0,03%	0,004%
Isagehe	Kinaga	IPMn	1093,8	1,02%	0,129%
Isagehe	Kinaga	IPMs	1752,1	1,64%	0,207%
Isagehe	Kinaga	IsLs	1579,5	1,48%	0,186%
Isagehe	Kinaga	IsPs	12964,9	12,15%	1,529%
Isagehe	Kinaga	KPLc	946,5	0,89%	0,112%
Isagehe	Kinaga	KPLe	1362,2	1,28%	0,161%
Isagehe	Kinaga	KPMc	6396,7	5,99%	0,755%
Isagehe	Kinaga	KPLe	9729,5	9,12%	1,148%
Isagehe	Mwalugulu	IPLs	0,5	0,00%	0,000%
Isagehe	Mwalugulu	IsLs	129,8	0,12%	0,015%
Isagehe	Mwalugulu	IsPs	3145,1	2,95%	0,371%
Isagehe	Mwalugulu	KPLc	1018,6	0,95%	0,120%
Isagehe	Mwalugulu	KPMc	8634,3	8,09%	1,019%
	Total Isagehe Division:		**106736,6**		**12,591%**

Mapping unit	Area in ha	Perc. of Division
CHP	671,4	0,6%
CM	1025,0	1,0%
IPLs	3302,0	3,1%
IPMn	1093,8	1,0%
IPMs	7191,6	6,7%
IsLs	5368,1	5,0%
IsPs	29398,6	27,5%
KPLc	3085,8	2,9%
KPLe	22203,4	20,8%
KPMc	33397,0	31,3%

Kahama	Kahama	KPMc	3778,6	12,57%	0,446%
Kahama	Malunga	KPLc	686,0	2,28%	0,081%
Kahama	Malunga	KPMc	3514,0	11,69%	0,415%
Kahama	Mhongolo	IPMs	362,6	1,21%	0,043%
Kahama	Mhongolo	KPLc	516,9	1,72%	0,061%
Kahama	Mhongolo	KPMc	3922,1	13,05%	0,463%
Kahama	Mwendakulima	IPLs	945,0	3,14%	0,111%
Kahama	Mwendakulima	IPMs	4482,0	14,91%	0,529%
Kahama	Mwendakulima	KPLc	239,2	0,80%	0,028%
Kahama	Mwendakulima	KPMc	1052,0	3,50%	0,124%
Kahama	Nyahogo	KPMc	2681,8	8,92%	0,316%
Kahama	Zongomera	KPLc	1918,9	6,39%	0,226%
Kahama	Zongomera	KPMc	5954,1	19,81%	0,702%
	Total Kahama Division:		**30053,2**		**3,545%**

Mapping unit	Area in ha	Perc. of Division
IPLs	945,0	3,1%
IPMs	4844,5	16,1%
KPLc	3361,0	11,2%
KPMc	20902,7	69,6%

Msalala	Bugarama	CHP	4073,4	1,73%	0,481%
Msalala	Bugarama	CM	723,6	0,31%	0,085%
Msalala	Bugarama	KPLc	5758,2	2,44%	0,679%
Msalala	Bugarama	KPMc	11960,8	5,07%	1,411%

Msalala	Bulige	CHP	2569,8	1,09%	0,303%
Msalala	Bulige	CM	356,6	0,15%	0,042%
Msalala	Bulige	IPMn	6275,1	2,66%	0,740%
Msalala	Bulige	IsLn	2952,1	1,25%	0,348%
Msalala	Bulige	IsLs	1572,4	0,67%	0,185%
Msalala	Bulige	IsPn	8389,2	3,55%	0,990%
Msalala	Bulige	IsPs	9784,2	4,15%	1,154%
Msalala	Bulige	KPLc	808,8	0,34%	0,095%
Msalala	Bulige	KPLe	443,6	0,19%	0,052%
Msalala	Bulige	KPMc	1114,0	0,47%	0,131%
Msalala	Bulige	KPLe	2275,9	0,96%	0,268%
Msalala	Busangi	CHP	330,5	0,14%	0,039%
Msalala	Busangi	KPLc	8119,1	3,44%	0,958%
Msalala	Busangi	KPLe	433,5	0,18%	0,051%
Msalala	Busangi	KPMc	12909,3	5,47%	1,523%
Msalala	Busangi	KPLe	696,7	0,30%	0,082%
Msalala	Chela	CHP	16388,4	6,94%	1,933%
Msalala	Chela	CM	3991,4	1,69%	0,471%
Msalala	Chela	KPLc	504,4	0,21%	0,060%
Msalala	Chela	KPMc	332,1	0,14%	0,039%
Msalala	Lunguya	CHP	4879,3	2,07%	0,576%
Msalala	Lunguya	CM	3269,9	1,39%	0,386%
Msalala	Lunguya	KPLc	8320,7	3,53%	0,982%
Msalala	Lunguya	KPMc	17117,7	7,25%	2,019%
Msalala	Ngaya	IPMn	23,1	0,01%	0,003%
Msalala	Ngaya	IsLs	4,2	0,00%	0,000%
Msalala	Ngaya	IsPs	3968,6	1,68%	0,468%
Msalala	Ngaya	KPLc	100,1	0,04%	0,012%
Msalala	Ngaya	KPLe	1323,6	0,56%	0,156%
Msalala	Ngaya	KPMc	237,8	0,10%	0,028%
Msalala	Ngaya	KPLe	10228,9	4,33%	1,207%
Msalala	Ngogwa	KPLc	10163,0	4,31%	1,199%
Msalala	Ngogwa	KPMc	30642,7	12,98%	3,615%
Msalala	Ntobo	CHP	3020,0	1,28%	0,356%
Msalala	Ntobo	CM	63,2	0,03%	0,007%
Msalala	Ntobo	KPLc	4231,7	1,79%	0,499%
Msalala	Ntobo	KPMc	2414,8	1,02%	0,285%
Msalala	Segese	CHP	16609,2	7,04%	1,959%
Msalala	Segese	CM	7911,0	3,35%	0,933%
Msalala	Segese	KPLc	2250,6	0,95%	0,265%
Msalala	Segese	KPMc	6489,0	2,75%	0,765%
		Total Msalala Division:	**236032,1**		**27,844%**

Mapping unit	Area in ha	Perc. of Division
CHP	47870,6	20,3%
CM	16315,6	6,9%
IPMn	6298,2	2,7%
IsLn	2952,1	1,3%
IsLs	1576,5	0,7%
IsPn	8389,2	3,6%
IsPs	13752,9	5,8%
KPLc	40256,6	17,1%
KPLe	15402,2	6,5%
KPMc	83218,3	35,3%

Mweli	Bulungwa	CHP	90,4	0,03%	0,011%
Mweli	Bulungwa	KPLc	8135,8	3,07%	0,960%
Mweli	Bulungwa	KPLs	2654,5	1,00%	0,313%
Mweli	Bulungwa	KPMc	24340,7	9,20%	2,871%
Mweli	Bulungwa	KPMs	124365,9	47,00%	14,671%
Mweli	Ulowa	KPLc	1641,1	0,62%	0,194%
Mweli	Ulowa	KPLs	11878,9	4,49%	1,401%
Mweli	Ulowa	KPMc	6482,5	2,45%	0,765%
Mweli	Ulowa	KPMs	35681,1	13,49%	4,209%
Mweli	Ushetu	KPLc	7946,3	3,00%	0,937%
Mweli	Ushetu	KPLs	183,5	0,07%	0,022%
Mweli	Ushetu	KPMc	21442,4	8,10%	2,529%
Mweli	Ushetu	KPMs	303,2	0,11%	0,036%
Mweli	Uyogo	KPLc	8818,8	3,33%	1,040%
Mweli	Uyogo	KPMc	10615,3	4,01%	1,252%
		Total Mweli Division:	**264580,4**		**31,212%**
			847694,3		

Mapping unit	Area in ha	Perc. of Division
CHP	90,4	0,0%
KPLc	26542,0	10,0%
KPLs	14717,0	5,6%
KPMc	62880,9	23,8%
KPMs	160350,2	60,6%

Map 7 Farming system zones

Extent of mapping units (by Ward)

Division	Wardname	Farming-type	Area in ha	Perc. of Division	Perc. of District
Dakama	Chambo	Co	19522,2	9,283%	2,303%
Dakama	Chambo	R	3640,0	1,731%	0,429%
Dakama	Chona	Co	18838,1	8,958%	2,222%
Dakama	Chona	M	280,1	0,133%	0,033%
Dakama	Chona	R	131,8	0,063%	0,016%
Dakama	Idahina	2	4,9	0,002%	0,001%
Dakama	Idahina	Co	34571,7	16,440%	4,078%
Dakama	Idahina	T	1026,6	0,488%	0,121%
Dakama	Igwamanoni	2	169,4	0,081%	0,020%
Dakama	Igwamanoni	Co	20825,0	9,903%	2,457%
Dakama	Kilago	2	1072,6	0,510%	0,127%
Dakama	Kilago	Co	7875,3	3,745%	0,929%
Dakama	Kilago	M	15888,2	7,555%	1,874%
Dakama	Kilago	MC	580,2	0,276%	0,068%
Dakama	Kilago	R	4880,4	2,321%	0,576%
Dakama	Kinamapula	Co	8682,9	4,129%	1,024%
Dakama	Kinamapula	T	2523,4	1,200%	0,298%
Dakama	Kisuke	Co	13203,1	6,278%	1,558%
Dakama	Kisuke	T	14239,3	6,771%	1,680%
Dakama	Mpunze	2	2054,2	0,977%	0,242%
Dakama	Mpunze	Co	14435,3	6,864%	1,703%
Dakama	Mpunze	R	697,7	0,332%	0,082%
Dakama	Nyandekwa	Co	8700,5	4,137%	1,026%
Dakama	Nyandekwa	R	3205,3	1,524%	0,378%
Dakama	Ukune	Co	13242,4	6,297%	1,562%
		Total Dakama Division:	**210290,7**		**24,807%**
Isagehe	Isagehe	M	17229,6	16,142%	2,033%
Isagehe	Isagehe	MC	1448,7	1,357%	0,171%
Isagehe	Isagehe	R	2348,7	2,200%	0,277%
Isagehe	Isaka	M	10316,2	9,665%	1,217%
Isagehe	Isaka	R	2251,0	2,109%	0,266%
Isagehe	Isaka-jana	M	5388,1	5,048%	0,636%
Isagehe	Isaka-jana	R	18969,6	17,772%	2,238%
Isagehe	Kinaga	Co	7178,2	6,725%	0,847%
Isagehe	Kinaga	M	1876,5	1,758%	0,221%
Isagehe	Kinaga	R	26802,7	25,111%	3,162%
Isagehe	Mwalugulu	2	860,9	0,807%	0,102%
Isagehe	Mwalugulu	M	10300,2	9,650%	1,215%
Isagehe	Mwalugulu	R	1766,2	1,655%	0,208%
		Total Isagehe Division:	**106736,7**		**12,591%**
Kahama	Kahama	Co	3778,6	12,573%	0,446%
Kahama	Malunga	Co	4136,2	13,763%	0,488%
Kahama	Malunga	R	63,8	0,212%	0,008%
Kahama	Mhongolo	Co	2803,7	9,329%	0,331%
Kahama	Mhongolo	M	523,0	1,740%	0,062%
Kahama	Mhongolo	R	1474,6	4,907%	0,174%
Kahama	Mwendakulima	Co	609,5	2,028%	0,072%
Kahama	Mwendakulima	M	4138,7	13,771%	0,488%
Kahama	Mwendakulima	R	1969,9	6,555%	0,232%
Kahama	Nyahogo	Co	2641,1	8,788%	0,312%
Kahama	Nyahogo	M	17,9	0,060%	0,002%

Kahama	Nyahogo	R	22,8	0,076%	0,003%
Kahama	Zongomera	Co	5539,5	18,432%	0,653%
Kahama	Zongomera	R	2334,1	7,766%	0,275%
		Total Kahama Division:	**30053,5**		**3,545%**
Msalala	Bugarama	Co	21528,0	9,121%	2,540%
Msalala	Bugarama	MC	988,0	0,419%	0,117%
Msalala	Bulige	Co	6485,7	2,748%	0,765%
Msalala	Bulige	M	6200,4	2,627%	0,731%
Msalala	Bulige	MC	140,8	0,060%	0,017%
Msalala	Bulige	R	23714,9	10,047%	2,798%
Msalala	Busangi	Co	12354,2	5,234%	1,457%
Msalala	Busangi	R	10135,5	4,294%	1,196%
Msalala	Chela	1	4087,3	1,732%	0,482%
Msalala	Chela	Co	11172,7	4,734%	1,318%
Msalala	Chela	MC	3062,6	1,298%	0,361%
Msalala	Chela	R	2894,8	1,226%	0,341%
Msalala	Lunguya	Co	28324,8	12,000%	3,341%
Msalala	Lunguya	MC	2821,3	1,195%	0,333%
Msalala	Lunguya	R	2440,5	1,034%	0,288%
Msalala	Ngaya	Co	9832,1	4,166%	1,160%
Msalala	Ngaya	R	6053,8	2,565%	0,714%
Msalala	Ngogwa	2	14003,2	5,933%	1,652%
Msalala	Ngogwa	Co	18023,4	7,636%	2,126%
Msalala	Ngogwa	R	8778,9	3,719%	1,036%
Msalala	Ntobo	?	48,8	0,021%	0,006%
Msalala	Ntobo	1	125,8	0,053%	0,015%
Msalala	Ntobo	Co	6905,9	2,926%	0,815%
Msalala	Ntobo	MC	117,4	0,050%	0,014%
Msalala	Ntobo	R	2531,2	1,072%	0,299%
Msalala	Segese	1	1251,1	0,530%	0,148%
Msalala	Segese	Co	24380,1	10,329%	2,876%
Msalala	Segese	MC	4476,2	1,896%	0,528%
Msalala	Segese	R	3152,9	1,336%	0,372%
		Total Msalala Division:	**236032,1**		**27,844%**
Mweli	Bulungwa	2	132,8	0,050%	0,016%
Mweli	Bulungwa	3	90018,6	34,023%	10,619%
Mweli	Bulungwa	Co	4358,3	1,647%	0,514%
Mweli	Bulungwa	T	65078,5	24,597%	7,677%
Mweli	Ulowa	2	28527,3	10,782%	3,365%
Mweli	Ulowa	Co	41,7	0,016%	0,005%
Mweli	Ulowa	R	158,1	0,060%	0,019%
Mweli	Ulowa	T	26955,9	10,188%	3,180%
Mweli	Ushetu	Co	13519,3	5,110%	1,595%
Mweli	Ushetu	R	8778,4	3,318%	1,036%
Mweli	Ushetu	T	7577,7	2,864%	0,894%
Mweli	Uyogo	Co	12378,0	4,678%	1,460%
Mweli	Uyogo	R	5878,6	2,222%	0,693%
Mweli	Uyogo	T	1177,3	0,445%	0,139%
		Total Mweli Division:	**264580,6**		**31,212%**
			847694,2		

Fig. 3 Land use (1974)

Extent of mapping units (by Ward)

Division	Wardname	Landuse unit	Area in ha	Perc. of Division	Perc. of District
Dakama	Chambo	Ca	18015,5	8,6%	2,1%
Dakama	Chambo	Um	5146,7	2,4%	0,6%
Dakama	Chona	Ca	15658,6	7,4%	1,8%
Dakama	Chona	Um	3591,9	1,7%	0,4%
Dakama	Idahina	Ro	5765,3	2,7%	0,7%
Dakama	Idahina	Um	787,6	0,4%	0,1%
Dakama	Idahina	Uu	29050,8	13,8%	3,4%
Dakama	Igwamanoni	Ro	6823,6	3,2%	0,8%
Dakama	Igwamanoni	Um	2516,2	1,2%	0,3%
Dakama	Igwamanoni	Uu	11654,6	5,5%	1,4%
Dakama	Kilago	Ca	14546,9	6,9%	1,7%
Dakama	Kilago	Ro	1681,0	0,8%	0,2%
Dakama	Kilago	Um	10252,6	4,9%	1,2%
Dakama	Kilago	Uu	3815,8	1,8%	0,5%
Dakama	Kinamapula	Ca	5875,5	2,8%	0,7%
Dakama	Kinamapula	Ro	2817,3	1,3%	0,3%
Dakama	Kinamapula	Uu	2513,5	1,2%	0,3%
Dakama	Kisuke	Ca	19409,6	9,2%	2,3%
Dakama	Kisuke	Ro	1435,4	0,7%	0,2%
Dakama	Kisuke	Um	5587,2	2,7%	0,7%
Dakama	Kisuke	Uu	1010,3	0,5%	0,1%
Dakama	Mpunze	Ca	7708,9	3,7%	0,9%
Dakama	Mpunze	Ro	4476,0	2,1%	0,5%
Dakama	Mpunze	Um	660,0	0,3%	0,1%
Dakama	Mpunze	Uu	4343,3	2,1%	0,5%
Dakama	Nyandekwa	Ca	6840,0	3,3%	0,8%
Dakama	Nyandekwa	Ro	1964,0	0,9%	0,2%
Dakama	Nyandekwa	Um	2495,2	1,2%	0,3%
Dakama	Nyandekwa	Uu	606,4	0,3%	0,1%
Dakama	Ukune	Ca	7185,8	3,4%	0,8%
Dakama	Ukune	Ro	3651,5	1,7%	0,4%
Dakama	Ukune	Um	2405,5	1,1%	0,3%
	Total of Dakama Division:		**210292,6**		**24,8%**
Isagehe	Isagehe	Ca	11301,7	10,6%	1,3%
Isagehe	Isagehe	Um	5851,5	5,5%	0,7%
Isagehe	Isagehe	Uu	3873,4	3,6%	0,5%
Isagehe	Isaka	Ca	3212,6	3,0%	0,4%
Isagehe	Isaka	Ro	489,7	0,5%	0,1%
Isagehe	Isaka	Um	1625,6	1,5%	0,2%
Isagehe	Isaka	Uu	7239,3	6,8%	0,9%
Isagehe	Isaka-jana	Ca	239,9	0,2%	0,0%
Isagehe	Isaka-jana	Um	10660,4	10,0%	1,3%
Isagehe	Isaka-jana	Uu	13457,4	12,6%	1,6%
Isagehe	Kinaga	Ca	13288,7	12,5%	1,6%
Isagehe	Kinaga	Ro	1223,0	1,1%	0,1%
Isagehe	Kinaga	Um	4908,0	4,6%	0,6%
Isagehe	Kinaga	Uu	16438,0	15,4%	1,9%
Isagehe	Mwalugulu	Ca	7013,1	6,6%	0,8%
Isagehe	Mwalugulu	Um	1682,9	1,6%	0,2%
Isagehe	Mwalugulu	Uu	4231,6	4,0%	0,5%
	Total of Isagehe Division:		**106736,7**		**12,6%**
Kahama	Kahama	Ca	1212,4	4,0%	0,1%

Kahama	Kahama	Ro	1804,0	6,0%	0,2%
Kahama	Kahama	Uu	762,3	2,5%	0,1%
Kahama	Malunga	Ca	3337,1	11,1%	0,4%
Kahama	Malunga	Ro	495,5	1,6%	0,1%
Kahama	Malunga	Uu	367,5	1,2%	0,0%
Kahama	Mhongolo	Ca	3341,4	11,1%	0,4%
Kahama	Mhongolo	Ro	137,7	0,5%	0,0%
Kahama	Mhongolo	Um	138,1	0,5%	0,0%
Kahama	Mhongolo	Uu	1184,4	3,9%	0,1%
Kahama	Mwendakulima	Ca	3965,6	13,2%	0,5%
Kahama	Mwendakulima	Um	871,4	2,9%	0,1%
Kahama	Mwendakulima	Uu	1880,9	6,3%	0,2%
Kahama	Nyahogo	Ca	1572,0	5,2%	0,2%
Kahama	Nyahogo	Ro	833,7	2,8%	0,1%
Kahama	Nyahogo	Uu	276,2	0,9%	0,0%
Kahama	Zongomera	Ca	2906,7	9,7%	0,3%
Kahama	Zongomera	Ro	1367,5	4,6%	0,2%
Kahama	Zongomera	Um	1640,6	5,5%	0,2%
Kahama	Zongomera	Uu	1957,9	6,5%	0,2%
	Total of Kahama Division:		**30052,8**		**3,5%**
Msalala	Bugarama	Ca	8460,7	3,6%	1,0%
Msalala	Bugarama	Ro	965,2	0,4%	0,1%
Msalala	Bugarama	Um	1934,3	0,8%	0,2%
Msalala	Bugarama	Uu	11155,8	4,7%	1,3%
Msalala	Bulige	Ca	8202,4	3,5%	1,0%
Msalala	Bulige	Ro	206,5	0,1%	0,0%
Msalala	Bulige	Um	12611,8	5,3%	1,5%
Msalala	Bulige	Uu	15521,1	6,6%	1,8%
Msalala	Busangi	Ca	10008,2	4,2%	1,2%
Msalala	Busangi	Ro	1975,5	0,8%	0,2%
Msalala	Busangi	Um	4873,4	2,1%	0,6%
Msalala	Busangi	Uu	5632,8	2,4%	0,7%
Msalala	Chela	Ca	4120,8	1,7%	0,5%
Msalala	Chela	Ro	5778,6	2,4%	0,7%
Msalala	Chela	Um	3515,7	1,5%	0,4%
Msalala	Chela	Uu	7802,3	3,3%	0,9%
Msalala	Lunguya	Ca	8997,5	3,8%	1,1%
Msalala	Lunguya	Ro	1068,2	0,5%	0,1%
Msalala	Lunguya	Um	7012,8	3,0%	0,8%
Msalala	Lunguya	Uu	16508,1	7,0%	1,9%
Msalala	Ngaya	Ca	8725,8	3,7%	1,0%
Msalala	Ngaya	Ro	2262,0	1,0%	0,3%
Msalala	Ngaya	Um	2019,3	0,9%	0,2%
Msalala	Ngaya	Uu	2878,8	1,2%	0,3%
Msalala	Ngogwa	Ca	7223,5	3,1%	0,9%
Msalala	Ngogwa	Ro	9813,1	4,2%	1,2%
Msalala	Ngogwa	Um	8735,0	3,7%	1,0%
Msalala	Ngogwa	Uu	15033,9	6,4%	1,8%
Msalala	Ntobo	Ca	1964,7	0,8%	0,2%
Msalala	Ntobo	Ro	985,4	0,4%	0,1%
Msalala	Ntobo	Um	1406,8	0,6%	0,2%
Msalala	Ntobo	Uu	5372,2	2,3%	0,6%
Msalala	Segese	Ca	4245,1	1,8%	0,5%
Msalala	Segese	Ro	1264,1	0,5%	0,1%
Msalala	Segese	Um	9704,8	4,1%	1,1%
Msalala	Segese	Uu	18045,8	7,6%	2,1%
	Total of Msalala Division:		**236031,9**		**27,8%**
Mweli	Bulungwa	Ca	11228,5	4,2%	1,3%
Mweli	Bulungwa	Ro	6799,9	2,6%	0,8%
Mweli	Bulungwa	Um	32032,6	12,1%	3,8%
Mweli	Bulungwa	Uu	109527,4	41,4%	12,9%
Mwell	Ulowa	Ca	7456,8	2,8%	0,9%

Mweli	Ulowa	Ro	2265,3	0,9%	0,3%
Mweli	Ulowa	Um	18328,4	6,9%	2,2%
Mweli	Ulowa	Uu	27631,4	10,4%	3,3%
Mweli	Ushetu	Ca	20593,1	7,8%	2,4%
Mweli	Ushetu	Ro	1869,4	0,7%	0,2%
Mweli	Ushetu	Um	1647,7	0,6%	0,2%
Mweli	Ushetu	Uu	5766,2	2,2%	0,7%
Mweli	Uyogo	Ca	10776,4	4,1%	1,3%
Mwell	Uyogo	Ro	994,2	0,4%	0,1%
Mweli	Uyogo	Um	5363,6	2,0%	0,6%
Mweli	Uyogo	Uu	2299,6	0,9%	0,3%
		Total of Mweli Division:	**264580,3**		**31,2%**
			847694,3		

ANNEX VI: CROP AND TREE SPECIES ENVIRONMENTAL REQUIREMENTS (SOURCE: FAO ECOCROP1 V1.1, 1996)

The data list used by ECOCROP I is as follows:

(This database do not consider different varieties within a species but only the species as a hole, also different crop environmental requirements at different stages of growth are disregarded, the values are to be read as the overall environmental requirements of the species. Note that for some of the factors listed below there may be considerable varietal variability within a species).

2.1 **Common name (code: NAME)**

This is the most commonly used name for the species. In English where this have been found, else a common name from the region where the plant is grown. In some cases synonyms will be found under Memo.

2.2 **Family name (code: FAMNAME)**

This is the name of the botanical family in which the species belong.

2.3 **Scientific name (code: SCIENTNAME)**

This is the scientific name for the species. In some cases scientific synonyms are given under Memo.

2.4 **Record number (code: CODE)**

This is the record code number, only used for technical identification of the record or plant fill.

2.5 **Uses (code: USES)**

This is a classification of uses, specially adopted for this database. The classification uses the following classes:

Food (code F)

Cereal	(code Fc)
Vegetables and melon	(code Fv)
Pulses	(code Fp)
Root crops	(code Fr)
Tuber	(code Ft)
Fruit	(code Ff)
Nuts	(code Fn)
Honey flora	(code Fh)
Seed and grain	(code Fs)

Energy (code E)

Fuel	(code Ef)
Charcoal	(code Ec)
Firewood	(code Ef)

Industrial (code I)

Oil seeds	(code Io)
Fibre	(code If)
Wax & fat	(code Iw)
Gum & starch	(code Ig)
Insecticide	(code Ii)
Medical	(code Ie)
Miscellaneous	(code Im)
Sweetener	(code Is)
Timber	(code It)
Paper	(code Ip)
Dye and tanning	(code Id)
Rubber & isoprenoid Resin	(code Ir)

Spices (code S)

Beverage (code B)

Cereal	(code Bc)
Fruit	(code Bf)
Leaves	(code Bl)

Fodder (code O)

Pasture	(code Oa)
Pulses	(code Op)
Fodder and feed grain	(code Of)
Vegetable	(code Ov)

Control (code C)

Erosion control	(code Ce)
Shade and shelter	(code Cs)
Windbreaks	(code Cw)
Dune stabilisation	(code Cd)
Firebreak	(code Cf)
Green manure	(code Cg)
Soil improvement	(code Ci)
Living fence	(code Cl)
Nitrogen fixing	(code Cn)
Ornamental	(code Co)

2.6 Climate (code: CLIMATE)

The climate classification used is based on Köppen's classification as modified by Trewartha. (An Introduction To Climate, by Glenn T.Trewartha, McGraw-Hill Kogakusha Ltd, Tokyo, fourth edition, 1968.) A broad climate classification is included in the database to divide plant species into groups from the point of view of adaptability. The classification uses the following classes:

A : Tropical climate
Ar : Tropical Wet
Aw : Tropical Wet-and-Dry
B : Dry climates
Bs : Steppe and Semiarid
Bw : Desert and Arid
C : Subtropical climate
Cf : Subtropical Humid
Cs : Subtropical Dry Summer
Cw : Subtropical dry winter
D : Temperate climate
Dc : Temperate Continental
Df : Temperate with humid winters

Do : Temperate Oceanic
Dw : Temperate with dry winters
E : Boreal

2.7 Minimum length of growth cycle (code: GMIN)

For annual species the number of days from planting to the first harvest can be obtained or in other words the minimum number of days the field will be occupied in order to obtain the first possible harvest. For perennials the minimum number of days required from beginning of growth in the spring, or with the onset of the rains, until commencement of dormancy with the following cold or dry season. In the case of annuals there is often considerable variation between varieties in this respect. (Note that durations of growth cycle is often considerable affected by temperature and other factors, so the figure given here should be taken only as a rough guide).

2.8 Killing temperature (code: KTMP)

The temperature, in degrees Centigrade, below which the species, under average conditions, will be damaged or killed. For annual species this refers to the growing period. For perennials it refers to any part of the year. In some cases there is additional information under Memo.

2.9 Minimum growing temperature (code: TMIN)

This is the temperature, in degrees Centigrade, below which the crop, under average conditions, will cease to grow or develop.

2.10 Minimum optimal temperature (code: TOPMN)

The minimum most suitable temperature requirement, in degrees Centigrade, for practical production and growth under average conditions.

2.11 Maximum optimal temperature (code: TOPMX)

The maximum most suitable temperature requirement, in degrees Centigrade, for practical production and growth under average conditions.

2.12 Maximum growing temperature (code: TMAX)

The ambient temperature at which the plant, under normal conditions, will cease to grow, and above which short or long-term damage may occur.

2.13 Minimum annual rainfall (code: RMIN)

The annual amount of rainfall in millimetres (mm) below which it becomes impractical to grow the species under average conditions without some supplemental irrigation.

2.14 Minimum optimal annual rainfall (code: ROPMN)

Under average growing conditions the minimum annual rainfall requirement for optimal growth and yield.

2.15 Maximum optimal annual rainfall (code: ROPMX)

Under average growing conditions the maximal annual rainfall requirement for optimal growth and yield.

2.16 Maximum annual rainfall (code: RMAX)

The amount of annual rainfall above which it becomes impractical to grow the species or crop under average soil and topographical conditions.

2.17 Light (code: LIG)

Optimal light or shade requirements for practical production. The database uses the following five classes:

1. Very bright.
2. Clear skies.
3. Cloudy skies.
4. Light shade.
5. Heavy shade.

Code	Text	Range
1	Very bright	1 & 1 2,1 3,1 4
2	Clear skies	2 - 1 2,1 3,1 4,2 3,2 4,2 5
3	Cloudy skies	3 - 1 3,1 4,2 3,2 4,2 5,3 4,3 5
4	Light shade	4 - 1 4,2 4,2 5,3 4,3 5,4 5
5	Heavy shade	5 - 2 5,3 5,4 5

Range of codes and search in the Light field.

The ranges define the codes that the software will search for in the database, if you enter a given code. E.g. you enter the code 1 in the light rubric, in the "select environment for the site screen", meaning that there is very bright sunshine at the location in which you are interested. The software then searches for species that are coded 1, meaning that they can grow in full sunlight, and plants that are coded 1 2, 1 3, or 1 4 meaning that they can grow in a range of light from bright sunlight and in the last case down to light shade.

2.18 Light requirements range (code: LIGR)

Range of light or shade requirements for practical production. The database uses the same classes and search as under LIG.

2.19 Photo period sensitivity (code: PHO)

Day length requirements are shown as follows:

L = Long day (more than 14 hours)
S = Short day (less than 12 hours)
N = Day neutral (12-14 hours, or not photo period sensitive)

Actual day lengths are given where known.

Code	Text	Range
L	Long day	L & N,S L,N L
S	Short day	S - N,S L,S N
N	Day neutral	N - L,S,S L,S N,N L

Range of codes an search in the Photo period field.

For an explanation of the ranges see under 2.17 (Light).

2.20 Optimal soil texture (code: TEXT)

Soil texture which is optimal satisfactory for practical production:

L = Light (sand and loamy sand).
M = Medium (sandy loam, loam, sandy clay loam, silt loam, clay loam, and silty clay loam).
H = Heavy (sandy clay, silty clay, and clay).
W = Wide (suits a wide range of soil textures).
O = High organic content in the soil.

Code	Text		Ranges
H	Heavy texture	H	M H,W
M	Medium texture	M	L M,M H,W
L	Light texture	L	L M,W
W	Wide texture	W	L,M,H,L M,M H
O	Organic soils	O	O

Range of codes and search in the Texture field.

For an explanation of the ranges see under 2.17 (Light).

2.21 Soil texture range (code: TEXTR)

Range of soil texture satisfactory for practical production, codes used under this field are the same as under TEXT except O: Organic soils.

2.22 Optimal soil depth (code: DEP)

The minimum soil depth for optimal satisfactory growth. The soil depth is defined as the thickness of the soil above a layer which is impermeable to roots or percolating water.

S = Shallow (20 - 50 cm).
M = Moderate (50 - 150 cm).
D = Deep (more than 150 cm).

Code	Text		Ranges
S	Shallow	S	S M
M	Medium	M	S,S M,M D
D	Deep	D	S,M,S M,M D

Range of codes and search in the Soil depth field.

For an explanation of the ranges see under 2.17 (Light).

2.23 **Soil depth range (code: DEPR)**

The minimum soil depth for satisfactory growth. Codes used under this field are the same as under DEP.

2.24 **Optimal soil drainage (code: DRA)**

Indicates optimal soil moisture conditions under which the plant can be grown successfully.

I = Poorly drained (rooting zone saturated for considerable periods during the growing season)
W = Well drained (adequate moisture availability)
E = Excessively drained (dry to moderately dry soil for considerable periods during the growing season).

Code	Text	Ranges
I	Poorly	I I W,I E
W	Well	W I W,W E,I E
E	Excessive	E W E,I E

Range of codes and search in the Soil drainage field.

For an explanation of the ranges see under .17 (Light).

2.25 **Soil drainage range (code: DRAR)**

The range of soil moisture conditions under which the plant can be grown successfully. Codes used under this field are the same as under DRA.

2.26 **Minimum soil pH (code: PHMIN)**

Minimum soil pH (measured in water), for practical growth and production of the species.

2.27 **Minimum optimal soil pH (code: PHOPMN)**

Minimum soil pH for optimal growth and yield.

2.28 **Maximum optimal soil pH (code: PHOPMX)**

Maximum soil pH for optimal growth and yield.

2.29 **Maximum soil pH (code: PHMAX)**

Maximum soil pH for successful growth and production.

2.30 **Optimum salinity (code: SAL)**

Highest salinity level tolerated without a major yield reduction.

Electrical conductivity (EC), in dS/m (= mmhos/cm).

L = Low (less than 4).
M = Medium (4 - 10).
H = High (more than 10).

Code	Text		Ranges
L	Low	L	M,H,L M,M H
M	Medium	M	H,L M,M H
H	High	H	M H

Range of codes and search in the Salinity field.

For an explanation of the ranges see under 2.17 (Light).

2.31 Soil salinity range (code: SALR)

Highest salinity level by which it is still practically possible to grow the species. Codes used under this field are the same as under SAL.

2.32 Optimum fertility level (code: FER)

The minimum soil fertility level optimal satisfactory growth.

H = High (the soils should have a high level of fertility for successful production).
M = Moderate (soils require a moderate level of fertility).
L = Low (can be successfully grown on soils with a low level of fertility).

Code	Text		Ranges
H	High	H	L,M,L M,M H
M	Moderate	M	L,L M,M H
L	Low	L	L M

Range of codes and searches in the Fertility field.

For an explanation of the ranges see under 2.17 (Light).

2.33 Soil fertility range (code: FERR)

The minimum soil fertility level satisfactory growth. codes used under this field are the same as under FER.

2.34 Limitations for introduction (code: LIMITS)

This field is coded as follows:

A = The species is at some or at all of its stages of growth susceptible to hail.
I = The species is at some or at all of its stages of growth susceptible to high winds.
T = The species or parts of the species contains toxins which may be poisonous to animals or human beings.
W = There is a danger of the species becoming a troublesome or noxious weed if introduced.
E = Planting significantly increases the danger of erosion.
H = The species can be important as a host plant for insects, fungi, viruses, or other pests and diseases.
F = The species is susceptible to fire (only indicated for tree species).

N = The species are susceptible to nematodes.
U = The species is at some or at all of its stages of growth susceptible to humidity.

2.35 Notes (code: MEMO)

The following information is given as text in the Memo section of the database:

(To inter Memo, highlight the Memo field and press (Control + Home), or <F9>, to exit Memo press Esc).

2.36 Sources

The list of the references used in compiling data for the database.

2.37 Brief description

A brief description of the species including plant type, height and habitus and description of leaves, flowers and fruit.

2.38 Growing period

In the case of perennials, the number of years from planting until the product can be harvested, and the average economic life of the plant. In the case of annuals further information on growing period until different harvest products etc.

2.38 Common names

Common names in different languages.

2.39 Further information (code: FURTHER INF)

Where there are additional information about the species these are mentioned. E.g. origin and distribution of the species, latitudinal and altitudinal range, factors important in relation to the use of the species or whether or not the plant should be introduced in new areas. Is it e.g.. sensitive to high winds or hail storms, high or low temperature or humidity at different points in the growth cycle, toxinous, a weed, or host for pests (it should, however, be noted that if no such factors are mentioned here it does not mean that there are none, only that they were not known or appreciated when the database was compiled), harvest possibilities either per ha or per plant, photosynthesis pathway, usefulnes in agroforestry, or any other information found useful to include in the description of the species.

2.40 Additional information

1. Where there is a * symbol against the name of a species this is an indication that for one or other of the requirements no information could so far be found, and an estimate has been made. This has only been done where there is either strong evidence in the references or anecdotal evidence for the value selected.

2. In addition, for data classes which are coded by letter (Photo period sensitivity onwards in the above list), the class letter is given in

capitals when data was available from published sources. When it was assumed from the context or from personal knowledge it is given as a lower case (ie not capital) letter.

Crop Environmental Requirements — Section A: climate requirements
Selected crops -

Number of species selected: 16 of 1710 - printed: 10/28/97 -

Crop name	Scientific name	Family name
Climate (code)	Kill. temp	Temperature (degC) min	optmn	optmx	max	Rain (mm) min	optmn	optmx	max	Light (code) opt	range	Photo-sensit.
Maize	Zea mays L. s. mays	Gramineae
Aw C D Bs	0	10	18	33	47	400	600	1200	1800	1	1 2	S N
Cassava	Manihot esculenta Crantz.	Euphorbiaceae
A Bs	7	10	20	29	35	500	1000	1500	5000	1	1 3	S N
Sorghum (low altitude)	Sorghum bicolor (L.) Moench	Gramineae
Aw Cf B	0	8	27	35	40	300	500	1000	3000	1	1 2	S
Soyabean	Glycine max (L.) Merrill	Leguminosae
Aw Cs Bs	0	10	20	33	38	450	600	1500	1800	1	1 2	S
Sweet potato	Ipomoea batatas (L.) Lam.	Convolvulaceae
A Cf Bs	1	10	18	28	38	500	750	1250	5000	1	1 2	S N
Groundnut	Arachis hypogaea L.	Leguminosae
Aw Bs Cf	0	10	22	32	45	400	600	1500	4000	1	1 2	N
Citrus	Citrus spp	Rutaceae
Cs Aw	-2	13	23	30	42	450	1200	1600	2700	1	1 2	S N
Cowpea	Vigna unguiculata unguic. L	Leguminosae
A Bs C	0	10	20	35	40	400	600	1500	4100	1 2	1 4	S N
Cotton, American upland	Gossypium hirsutum L.	Malvaceae
A C D Bs	0	15	22	36	42	450	750	1200	1500	1	1 2	N
Tobacco	Nicotiana tabacum L.	Solanaceae
A Bs C D	0	7	15	30	35	350	500	750	3000	1	1 4	S N
Sunflower	Helianthus annuus L v macro	Compositae
Aw C D Bs	-10	5	17	34	45	300	600	1000	1600	1	1 2	S
Mango	Mangifera indica L.	Anacardiaceae
A Cs B	-1	8	24	30	48	300	600	1500	2600	1	1 3	N
Cashew	Anacardium occidentale L.	Anacardiaceae
Aw Cs Cw Bs	0	5	15	35	46	400	750	1600	4000	1	1 2	N
Pigeon Pea	Cajanus cajan (L.) Mill ssp	Leguminosae
A C Bs	0	10	18	38	45	400	600	1500	4000	1	1 2	S N
Finger millet	Eleusine coracana (L)Gaertn	Gramineae
Aw C B	0	8	18	27	35	600	800	1100	4300	1	1 2	S N
Rice paddy (Japonica)	Oryza sativa L. s. japonica	Gramineae
C D	0	10	20	30	36	1000	1500	2000	4000	1	1 3	N
Chick pea	Cicer arietinum L.	Leguminosae
A B C D	-9	7	15	29	35	300	600	1000	1800	1	1 2	S N

Crop Environmental Requirements
- Selected crops -

Section B: soil requirements and uses

Number of species selected: 16 of 1710 - printed: 10/28/97 -

Crop name	Scientific name	Family name
Soil text. opt / range	Soil depth opt / range	Soil drain. opt / range	Soil pH min / optmn / optmx / max	Salinity opt / range	Fertility opt / range
Maize	Zea mays L. s. mays	Gramineae
M O W	M S	W W E	4.5 5.0 7.0 8.5	L M H	L
Cassava	Manihot esculenta Crantz.	Euphorbiaceae
L M W O	M M	W W E	4.0 5.5 8.0 9.0	L L M	L
Sorghum (low altitude)	Sorghum bicolor (L.) Moench	Gramineae
M H W	M M	W I E	5.0 6.0 7.0 8.5	L M M	L
Soyabean	Glycine max (L.) Merrill	Leguminosae
M O W	M S	W I E	4.5 5.5 6.5 8.4	L M H	L
Sweet potato	Ipomoea batatas (L.) Lam.	Convolvulaceae
M W	M S	W W	4.0 5.0 7.0 8.0	L L H	L
Groundnut	Arachis hypogaea L.	Leguminosae
M W O	M M	W W	4.5 5.5 6.5 8.5	L L H	M
Citrus	Citrus spp	Rutaceae
L M W	D M	W W E	4.0 5.0 6.5 8.0	L L M	L
Cowpea	Vigna unguiculata unguic. L	Leguminosae
M W	M S	W W E	4.3 5.5 7.5 8.8	L L M	L
Cotton, American upland	Gossypium hirsutum L.	Malvaceae
M H W O	D M	W W	5.0 6.0 7.5 9.5	L M M	M
Tobacco	Nicotiana tabacum L.	Solanaceae
L M W	D M	W W	4.5 5.0 6.5 7.5	L L M	M
Sunflower	Helianthus annuus L v macro	Compositae
L M W	M M	W W	5.5 6.0 7.5 8.0	L L H	L
Mango	Mangifera indica L.	Anacardiaceae
L M W	D M	W W E	4.3 5.5 7.5 8.5	L L M	L
Cashew	Anacardium occidentale L.	Anacardiaceae
L M W	D M	W W E	3.8 4.5 6.5 8.7	L L M	L
Pigeon Pea	Cajanus cajan (L.) Mill ssp	Leguminosae
L M W	D M	W W E	4.5 5.0 7.0 8.4	L M H M	L
Finger millet	Eleusine coracana (L)Gaertn	Gramineae
M W	M S	W W E	5.5 6.0 6.5 7.5	L L M	L
Rice paddy (Japonica)	Oryza sativa L. s. japonica	Gramineae
W W	M S	I I	4.5 5.5 7.0 9.0	L L H	M
Chick pea	Cicer arietinum L.	Leguminosae
M H W	M S	W W E	4.7 6.0 8.5 9.5	L M M	L

end of selection

Crop Environmental Requirements
- Selected forestry species -

Section A: climate requirem

Number of species selected: 8 of 1710 - printed: 10/28/97 -

Crop name / Climate (code)	Kill. temp	Scientific name / Temperature (degC) min	optmn	optmx	max	Rain (mm) min	optmn	optmx	max	Family name / Light (code) opt	range	Photo-sensit.
Winter thorn *		Acacia albida Del.								Mimosaceae		
B Aw	-1	6	18	30	44	250	400	900	2000	1	1 2	s
Neem *		Azadirachta indica A. Juss.								Meliaceae		
B Aw	0	14	26	40	46	200	450	1200	2000	1 2	1 4	s
Yellow cassia *		Cassia siamea Lam.								Leguminosae		
Aw Bs	5	13	23	33	48	500	650	1500	1800	1	1 2	s
River red gum (NP)		Eucalyptus camaldulensis NP								Myrtaceae		
B Cf Aw	3	10	25	35	50	250	700	1300	2500	1	1 2	N
Flooded gum		Eucalyptus grandis W. Hill								Myrtaceae		
Cf Cw Aw	-8	7	24	35	40	700	1000	2500	4000	1	1 2	N
Forest red gum		Eucalyptus tereticornis Sm.								Myrtaceae		
Aw Cf Cw Bs	-7	4	18	38	42	400	800	1500	3500	1	1 3	N
Yemane *		Gmelina arborea Roxb.								Verbenaceae		
A	0	16	22	34	46	750	1500	2500	5000	1	1 2	s
Chinaberry *		Melia azedarach L.								Meliaceae		
A C	-18	8	16	30	34	400	600	1000	1500	1 2	1 3	s

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end of selectior

Crop Environmental Requirements
- Selected forestry species -

Section B: soil requirements and

Number of species selected: 8 of 1710 - printed: 10/28/97 -

Crop name / Soil text. opt	range	Soil depth opt	range	Scientific name / Soil drain. opt	range	Soil pH min	optmn	optmx	max	Salinity opt	range	Family name / Fertility opt	range
Winter thorn *				Acacia albida Del.								Mimosaceae	
L M	L M	D	S	W	I W	4.5	5.0	6.5	7.5	L	M	M	L
Neem *				Azadirachta indica A. Juss.								Meliaceae	
W	W	D	S	W	W E	5.0	5.5	7.0	7.5	L	M	L	L
Yellow cassia *				Cassia siamea Lam.								Leguminosae	
L M	L M	D	M	W	W	5.0	5.5	6.5	7.5	L	L	M	M
River red gum (NP)				Eucalyptus camaldulensis NP								Myrtaceae	
L M	W	M	M	I W	I W	6.0	6.5	7.5	8.0	L	M	M	L
Flooded gum				Eucalyptus grandis W. Hill								Myrtaceae	
L M	W	D	M	W	I W	5.0	5.5	6.5	7.5	L	L	H	L
Forest red gum				Eucalyptus tereticornis Sm.								Myrtaceae	
L M	W	D	M	W	I W	5.5	6.0	7.0	7.5	L	M	H	M
Yemane *				Gmelina arborea Roxb.								Verbenaceae	
M H	W	D	M	W	W	4.0	5.0	6.0	7.5	1	1	H	M
Chinaberry *				Melia azedarach L.								Meliaceae	
L M	W	D	M	W	I W	5.5	6.0	7.0	7.5	L	M	M	L

page 1
end of selection

ANNEX VII: TABLES, QUERRY, FORM, AND REPORT FROM DATABASE KAHAMA.MDF.

Annex VIIa: Examples of data base tables.

Table agro-climate.

ID	Division	Wardname	Map-unit	Area in ha
1	Isagehe	Isaka	<800	3390
2	Isagehe	Isaka-jana	<800	24358
3	Isagehe	Kinaga	<800	26786
4	Isagehe	Mwalugulu	<800	3247
5	Msalala	Bulige	<800	20351
6	Msalala	Busangi	<800	1130
7	Msalala	Ngaya	<800	15548
8	Dakama	Idahina	>1000	4523
9	Mweli	Bulungwa	>1000	127021
10	Mweli	Ulowa	>1000	47559
11	Mweli	Ushetu	>1000	487
12	Isagehe	Isagehe	800-900	8807
13	Isagehe	Isaka	800-900	9177
14	Isagehe	Kinaga	800-900	9071
15	Isagehe	Mwalugulu	800-900	9680
16	Kahama	Malunga	800-900	1259
17	Kahama	Mhongolo	800-900	3234
18	Kahama	Mwendakulima	800-900	1845
19	Msalala	Bugarama	800-900	22516
20	Msalala	Bulige	800-900	16191
21	Msalala	Busangi	800-900	21359
22	Msalala	Chela	800-900	21217
23	Msalala	Lunguya	800-900	31850
24	Msalala	Ngaya	800-900	338
25	Msalala	Ngogwa	800-900	1833
26	Msalala	Ntobo	800-900	7186
27	Msalala	Segese	800-900	20913
28	Dakama	Chambo	900-1000	23162
29	Dakama	Chona	900-1000	19251
30	Dakama	Idahina	900-1000	31080
31	Dakama	Igwamanoni	900-1000	20994
32	Dakama	Kilago	900-1000	30296
33	Dakama	Kinamapula	900-1000	11206
34	Dakama	Kisuke	900-1000	27442
35	Dakama	Mpunze	900-1000	17188
36	Dakama	Nyandekwa	900-1000	11906
37	Dakama	Ukune	900-1000	13242
38	Isagehe	Isagehe	900-1000	12220
39	Isagehe	Mwalugulu	900-1000	1
40	Kahama	Kahama	900-1000	3779
41	Kahama	Malunga	900-1000	2941
42	Kahama	Mhongolo	900-1000	1567
43	Kahama	Mwendakulima	900-1000	4873
44	Kahama	Nyahogo	900-1000	2682
45	Kahama	Zongomera	900-1000	7873
46	Msalala	Lunguya	900-1000	1737
47	Msalala	Ngogwa	900-1000	38972
48	Msalala	Ntobo	900-1000	2543
49	Msalala	Segese	900-1000	12348
50	Mweli	Bulungwa	900-1000	32568
51	Mweli	Ulowa	900-1000	8123
52	Mweli	Ushetu	900-1000	29389
53	Mweli	Uyogo	900-1000	19434

Table Topomap.

ID	Division	Wardname	Area in ha
1	Dakama	Chambo	23162
2	Dakama	Chona	19251
3	Dakama	Idahina	35601
4	Dakama	Igwamanoni	20994
5	Dakama	Kilago	30296
6	Dakama	Kinamapula	11206
7	Dakama	Kisuke	27442
8	Dakama	Mpunze	17191
9	Dakama	Nyandekwa	11906
10	Dakama	Ukune	13242
11	Isagehe	Isagehe	21027
12	Isagehe	Isaka	12567
13	Isagehe	Isaka-jana	24358
14	Isagehe	Kinaga	35858
15	Isagehe	Mwalugulu	12927
16	Kahama	Kahama	3779
17	Kahama	Malunga	4200
18	Kahama	Mhongolo	4802
19	Kahama	Mwendakulima	6718
20	Kahama	Nyahogo	2682
21	Kahama	Zongomera	7873
22	Msalala	Bugarama	22516
23	Msalala	Bulige	36542
24	Msalala	Busangi	22489
25	Msalala	Chela	21217
26	Msalala	Lunguya	33587
27	Msalala	Ngaya	15886
28	Msalala	Ngogwa	40805
29	Msalala	Ntobo	9729
30	Msalala	Segese	33260
31	Mweli	Bulungwa	159588
32	Mweli	Ulowa	55683
33	Mweli	Ushetu	29876
34	Mweli	Uyogo	19434

Table Land Resources.

ID	Division	Ward	Geology	Physiography	Soil-unit	Area in ha
1	Msalala	Chela	BI	Hilly land	A11	4486
2	Msalala	Ntobo	BI	Hilly land	A11	165
3	Msalala	Segese	BI	Hilly land	A11	1361
4	Msalala	Bulige	BI/C	Undulating plains	A21	659
5	Msalala	Busangi	BI/C	Undulating plains	A21	331
6	Msalala	Chela	BI/C	Undulating plains	A21	8474
7	Msalala	Ntobo	BI/C	Undulating plains	A21	138
8	Msalala	Segese	BI/C	Undulating plains	A21	1839
9	Msalala	Bulige	BI/C	Gently undulating plains	A31	1871
10	Msalala	Chela	BI/C	Gently undulating plains	A31	1389
11	Dakama	Idahina	BI/C	Gently undulating plains	A32	7756
12	Dakama	Mpunze	BI/C	Gently undulating plains	A32	138
13	Mweli	Bulungwa	BI/C	Gently undulating plains	A32	90
14	Dakama	Kilago	BI/C	Almost flat plains	A41	4807
15	Isagehe	Isaka	BI/C	Almost flat plains	A41	671
16	Msalala	Bugarama	BI/C	Almost flat plains	A41	1998
17	Msalala	Chela	BI/C	Almost flat plains	A41	2040
18	Msalala	Lunguya BI/C	Almost flat plains		A41	4837
19	Msalala	Ntobo	BI/C	Almost flat plains	A41	2718
20	Msalala	Segese	BI/C	Almost flat plains	A41	10451
21	Dakama	Idahina	BI/C	Almost flat plains	A42	8878
22	Dakama	Igwamanoni	BI/C	Almost flat plains	A42	47
23	Msalala	Bugarama	BI/C	Almost flat plains	A42	2013
24	Msalala	Segese	BI/C	Almost flat plains	A42	2941
25	Dakama	Igwamanoni	G	Hilly land	B11	2284
26	Dakama	Kilago	G	Hilly land	B11	393
27	Dakama	Nyandekwa	G	Hilly land	B11	2
28	Isagehe	Kinaga	G	Hilly land	B11	70
29	Kahama	Kahama	G	Hilly land	B11	503
30	Kahama	Malunga	G	Hilly land	B11	5
31	Kahama	Nyahogo	G	Hilly land	B11	403
32	Kahama	Zongomera	G	Hilly land	B11	677
33	Msalala	Busangi	G	Hilly land	B11	138
34	Msalala	Ngaya	G	Hilly land	B11	1125
35	Msalala	Ngogwa	G	Hilly land	B11	11318
36	Msalala	Ntobo	G	Hilly land	B11	104
37	Mweli	Bulungwa	G	Hilly land	B11	394
38	Dakama	Igwamanoni	G	Undulating plains	B21	327
39	Dakama	Kilago	G	Undulating plains	B21	432
40	Dakama	Nyandekwa	G	Undulating plains	B21	103
41	Isagehe	Kinaga	G	Undulating plains	B21	186
42	Kahama	Kahama	G	Undulating plains	B21	3275
43	Kahama	Malunga	G	Undulating plains	B21	2514
44	Kahama	Mhongolo	G	Undulating plains	B21	3046
45	Kahama	Mwendakulima	G	Undulating plains	B21	1052
46	Kahama	Nyahogo	G	Undulating plains	B21	2279
47	Kahama	Zongomera	G	Undulating plains	B21	5274
48	Msalala	Busangi	G	Undulating plains	B21	34
49	Msalala	Ngogwa	G	Undulating plains	B21	14437
50	Msalala	Ntobo	G	Undulating plains	B21	142
51	Dakama	Chambo	G	Undulating plains	B22	1596
52	Dakama	Chona	G	Undulating plains	B22	1816
53	Dakama	Idahina	G	Undulating plains	B22	153
54	Dakama	Igwamanoni	G	Undulating plains	B22	378
55	Dakama	Kilago	G	Undulating plains	B22	850
56	Dakama	Kinamapula	G	Undulating plains	B22	1357
57	Dakama	Kisuke	G	Undulating plains	B22	3046
58	Dakama	Mpunze	G	Undulating plains	B22	2052

Table Land Resources (cont'd).

ID	Division	Ward	Geology	Physiography	Soil-unit	Area in ha
59	Dakama	Nyandekwa	G	Undulating plains	B22	1041
60	Dakama	Ukune	G	Undulating plains	B22	2265
61	Mweli	Bulungwa	G	Undulating plains	B22	2558
62	Mweli	Ulowa	G	Undulating plains	B22	884
63	Mweli	Ushetu	G	Undulating plains	B22	1977
64	Mweli	Uyogo	G	Undulating plains	B22	850
65	Dakama	Idahina	G	Undulating plains	B23	93
66	Dakama	Igwamanoni	G	Undulating plains	B23	6631
67	Dakama	Mpunze	G	Undulating plains	B23	2049
68	Dakama	Nyandekwa	G	Undulating plains	B23	15
69	Msalala	Ngogwa	G	Undulating plains	B23	2469
70	Mweli	Bulungwa	G	Undulating plains	B23	907
71	Dakama	Chambo	G	Gently undulating plains	B31	3376
72	Dakama	Chona	G	Gently undulating plains	B31	441
73	Dakama	Kisuke	G	Gently undulating plains	B31	2683
74	Dakama	Ukune	G	Gently undulating plains	B31	1987
75	Msalala	Bugarama	G	Gently undulating plains	B31	7739
76	Msalala	Lunguya	G	Gently undulating plains	B31	3
77	Mweli	Uyogo	G	Gently undulating plains	B31	268
78	Dakama	Chambo	G	Gently undulating plains	B32	1586
79	Dakama	Chona	G	Gently undulating plains	B32	12934
80	Dakama	Idahina	G	Gently undulating plains	B32	12550
81	Dakama	Igwamanoni	G	Gently undulating plains	B32	7137
82	Dakama	Kilago	G	Gently undulating plains	B32	6515
83	Dakama	Kinamapula	G	Gently undulating plains	B32	7031
84	Dakama	Kisuke	G	Gently undulating plains	B32	12038
85	Dakama	Mpunze	G	Gently undulating plains	B32	8717
86	Dakama	Nyandekwa	G	Gently undulating plains	B32	5988
87	Dakama	Ukune	G	Gently undulating plains	B32	6848
88	Isagehe	Mwalugulu	G	Gently undulating plains	B32	977
89	Kahama	Zongomera	G	Gently undulating plains	B32	4
90	Msalala	Busangi	G	Gently undulating plains	B32	236
91	Msalala	Chela	G	Gently undulating plains	B32	332
92	Msalala	Lunguya	G	Gently undulating plains	B32	840
93	Msalala	Ntobo	G	Gently undulating plains	B32	5
94	Msalala	Segese	G	Gently undulating plains	B32	20
95	Mweli	Bulungwa	G	Gently undulating plains	B32	144849
96	Mweli	Ulowa	G	Gently undulating plains	B32	41278
97	Mweli	Ushetu	G	Gently undulating plains	B32	15133
98	Mweli	Uyogo	G	Gently undulating plains	B32	4378
99	Dakama	Chambo	G	Gently undulating plains	B33	9819
100	Dakama	Kisuke	G	Gently undulating plains	B33	629
101	Msalala	Lunguya	G	Gently undulating plains	B33	8332
102	Msalala	Ngogwa	G	Gently undulating plains	B33	940
103	Msalala	Segese	G	Gently undulating plains	B33	455
104	Mweli	Ushetu	G	Gently undulating plains	B33	931
105	Mweli	Uyogo	G	Gently undulating plains	B33	4310
106	Dakama	Kilago	G	Gently undulating plains	B34	6091
107	Isagehe	Kinaga	G	Gently undulating plains	B34	8231
108	Kahama	Malunga	G	Gently undulating plains	B34	732
109	Kahama	Mhongolo	G	Gently undulating plains	B34	876
110	Msalala	Busangi	G	Gently undulating plains	B34	3004
111	Msalala	Lunguya	G	Gently undulating plains	B34	1215
112	Msalala	Ngogwa	G	Gently undulating plains	B34	3
113	Msalala	Ntobo	G	Gently undulating plains	B34	2164
114	Msalala	Segese	G	Gently undulating plains	B34	1920
115	Isagehe	Kinaga	G	Gently undulating plains	B35	1216
116	Kahama	Malunga	G	Gently undulating plains	B35	262
117	Msalala	Busangi	G	Gently undulating plains	B35	8275
118	Msalala	Ngaya	G	Gently undulating plains	B35	6073
119	Msalala	Ngogwa	G	Gently undulating plains	B35	1475
120	Dakama	Idahina	G	Almost flat plains	B41	3274

Table Land Resources (cont'd).

ID	Division	Ward	Geology	Physiography	Soil-unit	Area in ha
121	Dakama	Igwamanoni	G	Almost flat plains	B41	919
122	Isagehe	Isagehe	G	Almost flat plains	B41	67
123	Isagehe	Isaka	G	Almost flat plains	B41	3
124	Isagehe	Kinaga	G	Almost flat plains	B41	1558
125	Isagehe	Mwalugulu	G	Almost flat plains	B41	3065
126	Msalala	Bugarama	G	Almost flat plains	B41	4260
127	Msalala	Lunguya	G	Almost flat plains	B41	6769
128	Msalala	Segese	G	Almost flat plains	B41	4114
129	Mweli	Ushetu	G	Almost flat plains	B41	3706
130	Mweli	Uyogo	G	Almost flat plains	B41	808
131	Dakama	Kilago	G	Almost flat plains	B42	350
132	Isagehe	Isagehe	G	Almost flat plains	B42	10192
133	Isagehe	Kinaga	G	Almost flat plains	B42	4674
134	Isagehe	Mwalugulu	G	Almost flat plains	B42	3084
135	Msalala	Bulige	G	Almost flat plains	B42	2896
136	Msalala	Busangi	G	Almost flat plains	B42	1920
137	Msalala	Ngaya	G	Almost flat plains	B42	3268
138	Isagehe	Isaka	G	Almost flat plains	B43	375
139	Dakama	Kilago	G	Almost flat plains	B44	1310
140	Isagehe	Isaka	G	Almost flat plains	B44	8531
141	Isagehe	Isaka-jana	G	Almost flat plains	B44	8371
142	Isagehe	Mwalugulu	G	Almost flat plains	B44	827
143	Isagehe	Isagehe	A/C	Almost flat plains	C41	307
144	Isagehe	Isaka	A/C	Almost flat plains	C41	244
145	Isagehe	Kinaga	A/C	Almost flat plains	C41	2426
146	Isagehe	Mwalugulu	A/C	Almost flat plains	C41	904
147	Msalala	Bulige	A/C	Almost flat plains	C41	6755
148	Msalala	Ngaya	A/C	Almost flat plains	C41	766
149	Dakama	Kilago	A/C	Almost flat plains	C42	872
150	Isagehe	Isagehe	A/C	Almost flat plains	C42	4824
151	Isagehe	Kinaga	A/C	Almost flat plains	C42	577
152	Kahama	Mwendakulima	A/C	Almost flat plains	C42	3330
153	Isagehe	Isagehe	A/C	Flat and very wide bottomlands	C51	616
154	Isagehe	Isaka	A/C	Flat and very wide bottomlands	C51	1643
155	Isagehe	Isaka-jana	A/C	Flat and very wide bottomlands	C51	12764
156	Isagehe	Kinaga	A/C	Flat and very wide bottomlands	C51	12998
157	Isagehe	Mwalugulu	A/C	Flat and very wide bottomlands	C51	2923
158	Kahama	Mhongolo	A/C	Flat and very wide bottomlands	C51	363
159	Kahama	Mwendakulima	A/C	Flat and very wide bottomlands	C51	1152
160	Msalala	Bulige	A/C	Flat and very wide bottomlands	C51	18187
161	Msalala	Ngaya	A/C	Flat and very wide bottomlands	C51	3225
162	Dakama	Kilago	A	Flat and wide valleys (Mbugas)	D51	1597
163	Isagehe	Isagehe	A	Flat and wide valleys (Mbugas)	D51	1141
164	Msalala	Bugarama	A	Flat and wide valleys (Mbugas)	D51	1330
165	Msalala	Bulige	A	Flat and wide valleys (Mbugas)	D51	357
166	Msalala	Chela	A	Flat and wide valleys (Mbugas)	D51	3992
167	Msalala	Lunguya	A	Flat and wide valleys (Mbugas)	D51	4076
168	Msalala	Ntobo	A	Flat and wide valleys (Mbugas)	D51	240
169	Msalala	Segese	A	Flat and wide valleys (Mbugas)	D51	6812
170	Dakama	Chambo	A	Flat and wide valleys (Mbugas)	D52	6786
171	Dakama	Chona	A	Flat and wide valleys (Mbugas)	D52	4059
172	Dakama	Idahina	A	Flat and wide valleys (Mbugas)	D52	2899
173	Dakama	Igwamanoni	A	Flat and wide valleys (Mbugas)	D52	3272
174	Dakama	Kilago	A	Flat and wide valleys (Mbugas)	D52	7080
175	Dakama	Kinamapula	A	Flat and wide valleys (Mbugas)	D52	2819
176	Dakama	Kisuke	A	Flat and wide valleys (Mbugas)	D52	9046
177	Dakama	Mpunze	A	Flat and wide valleys (Mbugas)	D52	4231
178	Dakama	Nyandekwa	A	Flat and wide valleys (Mbugas)	D52	4758
179	Dakama	Ukune	A	Flat and wide valleys (Mbugas)	D52	2143
180	Isagehe	Isagehe	A	Flat and wide valleys (Mbugas)	D52	3881
181	Isagehe	Isaka	A	Flat and wide valleys (Mbugas)	D52	1098

Table Land Resources (cont'd).

ID	Division	Ward	Geology	Physiography	Soil-unit	Area in ha
182	Isagehe	Isaka-jana	A	Flat and wide valleys (Mbugas)	D52	3223
183	Isagehe	Kinaga	A	Flat and wide valleys (Mbugas)	D52	3921
184	Isagehe	Mwalugulu	A	Flat and wide valleys (Mbugas)	D52	1149
185	Kahama	Malunga	A	Flat and wide valleys (Mbugas)	D52	686
186	Kahama	Mhongolo	A	Flat and wide valleys (Mbugas)	D52	517
187	Kahama	Mwendakulima	A	Flat and wide valleys (Mbugas)	D52	1184
188	Kahama	Zongomera	A	Flat and wide valleys (Mbugas)	D52	1919
189	Msalala	Bugarama	A	Flat and wide valleys (Mbugas)	D52	5176
190	Msalala	Bulige	A	Flat and wide valleys (Mbugas)	D52	5817
191	Msalala	Busangi	A	Flat and wide valleys (Mbugas)	D52	8553
192	Msalala	Chela	A	Flat and wide valleys (Mbugas)	D52	504
193	Msalala	Lunguya	A	Flat and wide valleys (Mbugas)	D52	7514
194	Msalala	Ngaya	A	Flat and wide valleys (Mbugas)	D52	1428
195	Msalala	Ngogwa	A	Flat and wide valleys (Mbugas)	D52	10163
196	Msalala	Ntobo	A	Flat and wide valleys (Mbugas)	D52	4055
197	Msalala	Segese	A	Flat and wide valleys (Mbugas)	D52	3346
198	Mweli	Bulungwa	A	Flat and wide valleys (Mbugas)	D52	10790
199	Mweli	Ulowa	A	Flat and wide valleys (Mbugas)	D52	13520
200	Mweli	Ushetu	A	Flat and wide valleys (Mbugas)	D52	8130
201	Mweli	Uyogo	A	Flat and wide valleys (Mbugas)	D52	8819

Annex VIIb: One sheet (record) of form 'Soil data'.

Profile number	3
Soil group	Nduha
Soil type	c2
Lithology	Colluvium derived from Banded Ironstone
Land unit	Almost flat plains
Land element	Slope
Major land use	Extensive grazing
Soil depth	Deep
Soil drainage	Well drained
Soil texture	Coarse sandy clay loam
Soil colour	Reddish brown to yellowish red
FAO classification	Plinthic Acrisol
Remarks	Laterite in sub-soil

Soil chemical data

Sample depth (cm)	Texture				pH		EC	Org C	Total N	C/N
	Clay (%)	Silt (%)	Sand (%)	Class	H20	KCl	mS/cm	%	%	
0-20	25	6	69	SCL	4,6	3,9	0,06	0,62	0,05	12
30-50	31	7	62	SCL	5,0	4,0	0,01	0,63	0,03	21
80-100	39	11	50	SC	5,5	4,1	0,08	0,73	0,04	18

Avail P	CEC	Exchangble ions (me/100g)						TEB	BS
%	(me/100g)	Ca	Mg	K	Na	H	Al	(me/100g)	%
1,6	8,5	1,1	0,9	0,08	0,04	99,00	99,00	2,1	25
0,9	1,3	0,2	0,2	0,04	0,04	99,00	99,00	0,4	36
0,6	1,0	0,3	0,2	0,04	0,01	99,00	99,00	0,5	56

Soil physical data

Bulk density	Soil moisture			
g/cm3	pF 2	pF 2,4	pF 3	pF 4,2
99,0	99,0	99,0	99,0	99,0
99,0	99,0	99,0	99,0	99,0
99,0	99,0	99,0	99,0	99,0

Annex VIIc: Part of the results of querry 'Soil groups'.

Soil-unit	Area in ha	Soil group 1	Area group 1	Soil group 2	Area group 2	Soil group 3	Area group 3	Soil group 4	Area group 4
A11	4486	Luguru	4486						
A11	165	Luguru	165						
A11	1361	Luguru	1361						
A21	659	Nduha	263,6	Lukili	197,7	Idalafuma	164,75	Itogoro	32,95
A21	331	Nduha	132,4	Lukili	99,3	Idalafuma	82,75	Itogoro	16,55
A21	8474	Nduha	3389,6	Lukili	2542,2	Idalafuma	2118,5	Itogoro	423,7
A21	138	Nduha	55,2	Lukili	41,4	Idalafuma	34,5	Itogoro	6,9
A21	1839	Nduha	735,6	Lukili	551,7	Idalafuma	459,75	Itogoro	91,95
A31	1871	Lukili	935,5	Idalafuma	748,4	Itogoro	187,1		
A31	1389	Lukili	694,5	Idalafuma	555,6	Itogoro	138,9		
A32	7756	Lukili	3102,4	Idalafuma	2326,8	Nduha	1551,2	Itogoro	775,6
A32	138	Lukili	55,2	Idalafuma	41,4	Nduha	27,6	Itogoro	13,8
A32	90	Lukili	36	Idalafuma	27	Nduha	18	Itogoro	9
A41	4807	Lukili	2403,5	Idalafuma	1442,1	Nduha	961,4		
A41	671	Lukili	335,5	Idalafuma	201,3	Nduha	134,2		
A41	1998	Lukili	999	Idalafuma	599,4	Nduha	399,6		
A41	2040	Lukili	1020	Idalafuma	612	Nduha	408		
A41	4837	Lukili	2418,5	Idalafuma	1451,1	Nduha	967,4		
A41	2718	Lukili	1359	Idalafuma	815,4	Nduha	543,6		
A41	10451	Lukili	5225,5	Idalafuma	3135,3	Nduha	2090,2		
A42	8878	Nduha	3995,1	Lukili	2219,5	Idalafuma	1775,6	Itogoro	887,8
A42	47	Nduha	21,15	Lukili	11,75	Idalafuma	9,4	Itogoro	4,7
A42	2013	Nduha	905,85	Lukili	503,25	Idalafuma	402,6	Itogoro	201,3
A42	2941	Nduha	1323,45	Lukili	735,25	Idalafuma	588,2	Itogoro	294,1
B11	2284	Luguru	2284						
B11	393	Luguru	393						
B11	2	Luguru	2						
B11	70	Luguru	70						
B11	503	Luguru	503						
B11	5	Luguru	5						
B11	403	Luguru	403						
B11	677	Luguru	677						
B11	138	Luguru	138						
B11	1125	Luguru	1125						
B11	11318	Luguru	11318						
B11	104	Luguru	104						
B11	394	Luguru	394						
B21	327	Luseni	179,85	Lukele	114,45	Luguru	32,7		
B21	432	Luseni	237,6	Lukele	151,2	Luguru	43,2		
B21	103	Luseni	56,65	Lukele	36,05	Luguru	10,3		
B21	186	Luseni	102,3	Lukele	65,1	Luguru	18,6		
B21	3275	Luseni	1801,25	Lukele	1146,25	Luguru	327,5		
B21	2514	Luseni	1382,7	Lukele	879,9	Luguru	251,4		
B21	3046	Luseni	1675,3	Lukele	1066,1	Luguru	304,6		
B21	1052	Luseni	578,6	Lukele	368,2	Luguru	105,2		
B21	2279	Luseni	1253,45	Lukele	797,65	Luguru	227,9		
B21	5274	Luseni	2900,7	Lukele	1845,9	Luguru	527,4		
B21	34	Luseni	18,7	Lukele	11,9	Luguru	3,4		
B21	14437	Luseni	7940,35	Lukele	5052,95	Luguru	1443,7		
B21	142	Luseni	78,1	Lukele	49,7	Luguru	14,2		
B22	1596	Luguru	877,8	Kikungu	558,6	Luseni	239,4	Lukele	79,8
B22	1816	Luguru	998,8	Kikungu	635,6	Luseni	272,4	Lukele	90,8
B22	153	Luguru	84,15	Kikungu	53,55	Luseni	22,95	Lukele	7,65
B22	378	Luguru	207,9	Kikungu	132,3	Luseni	56,7	Lukele	18,9
B22	850	Luguru	467,5	Kikungu	297,5	Luseni	127,5	Lukele	42,5
B22	1357	Luguru	746,35	Kikungu	474,95	Luseni	203,55	Lukele	67,85
B22	3046	Luguru	1675,3	Kikungu	1066,1	Luseni	456,9	Lukele	152,3
B22	2052	Luguru	1128,6	Kikungu	718,2	Luseni 307,8	Lukele	102,6	
B22	1041	Luguru	572,55	Kikungu	364,35	Luseni 156,15	Lukele	52,05	
B22	2265	Luguru	1245,75	Kikungu	792,75	Luseni 339,75	Lukele	113,25	
B22	2558	Luguru	1406,9	Kikungu	895,3	Luseni 383,7	Lukele	127,9	
B22	884	Luguru	486,2	Kikungu	309,4	Luseni 132,6	Lukele	44,2	
B22	1977	Luguru	1087,35	Kikungu	691,95	Luseni 296,55	Lukele	98,85	
B22	850	Luguru	467,5	Kikungu	297,5	Luseni 127,5	Lukele	42,5	
B23	93	Luseni	60,45	Kikungu	23,25	Luguru 4,65	Lukele	4,65	

Etc, etc, etc,.....

Annex VIId: Parts of the report 'Area soil groups'.

Areas in ha of soil groups aggregated at soil mapping unit level for the Kahama district.

Soil-unit	Soil group 1	Area group 1	Soil group 2	Area group 2	Soil group 3	Area group 3	Soil group 4	Area group 4
A11	Luguru	165						
	Luguru	1.361						
	Luguru	4.486						
Summary for 'Soil-unit' = A11 (3 detailed records)								
Sum:	**Luguru**	**6.012**						
A21	Nduha	736	Lukili	552	Idalafuma	460	Itogoro	92
	Nduha	264	Lukili1	98	Idalafuma	165	Itogoro	33
	Nduha	132	Lukili	99	Idalafuma	83	Itogoro	17
	Nduha	3.390	Lukili	2.542	Idalafuma	2.119	Itogoro	424
	Nduha	55	Lukili	4	Idalafuma	35	Itogoro	7
Summary for 'Soil-unit' = A21 (5 detailed records)								
Sum:	**Nduha**	**4.57**	**Lukili**	**3.432**	**Idalafuma**	**2.86**	**Itogoro**	**572**
A31	Lukili	936	Idalafuma	748	Itogoro	187		
	Lukili	695	Idalafuma	556	Itogoro	139		
Summary for 'Soil-unit' = A31 (2 detailed records)								
Sum:	**Lukili**	**1.63**	**Idalafuma**	**1.304**	**Itogoro**	**32**		
A32	Lukili	3.102	Idalafuma	2.327	Nduha	1.551	Itogoro	776
	Lukili	55	Idalafuma	41	Nduha	28	Itogoro	14
	Lukili	36	Idalafum	27	Nduha	18	Itogoro	9
Summary for 'Soil-unit' = A32 (3 detail records)								
Sum:	**Lukili**	**3.19**	**Idalafuma**	**2.395**	**Nduha**	**1.597**	**Itogoro**	**798**
A41	**Etc., etc.,.....**							