MISCELLANEOUS REPORT M18
1992

SOIL CHARACTERIZATION OF TRIAL SITES IN THE WESTERN COTTON GROWING AREAS OF TANZANIA

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The National Soil Service does not accept responsibility for any damage or loss from the use of the results of this study or from the applications of its recommendations.

The conclusions and recommendations given in this report are those considered appropriate at the time of its preparation. They may be modified and/or adjusted in the light of further knowledge gained through additional research.

CONTENTS

1 BACKGROUND

The study of the soils of the major cotton growing areas of western Tanzania was initiated as a follow up of the fertilizer experiments on cotton that have been undertaken by the National Soil Service (NSS) over the previous four to ten years. As these experiments come to a conclusion a proper characterization of the soils at the trial sites was deemed essential. The soil characterization data would enable possible extrapolation of the findings of the fertilizer experiments to sites with similar soil and environmental conditions.

The study was initiated at the request of the Cotton Research Coordinator and the National Soil Service representative in the Lake zone.

This report presents the descriptions and classification of the representative soil profile of twenty seven (27) cotton trial sites. The data provides an overview of the major soils on which cotton is grown in what is popularly known as the Western Cotton Growing Areas. The "Western Cotton Growing Areas" as used in this report comprises the areas around Lake Victoria and southward as far down as Nzega.

The report is a compilation of the soil profile descriptions at the experimental sites. Some general information on climate, agro-ecology, landforms and parent material has been included in order to give the interested user some background on the soil environment. A summary of previous studies in the area is also included. In the general description of the soils, an attempt is made to group the soils and summarise a range of characteristics. A simple index at the end of the report serves as a guide to the location of the individual soil profiles, i.e. experimental sites.

2 EXECUTION AND METHODOLOGY

The site characterization of the trial sites in the Western Cotton Growing Area of Tanzania was carried out from 7th to 22nd June 1989. It entailed traversing the regions of Mwanza, Kagera, Kigoma, Shinyanga, Tabora and Mara. The sites selected for soil profile description were long-term fertilizer experimental fields. At each site a profile was opened, described and sampled within hours.

Profiles were described according to FAO (1977) guidelines for soil profile description, soil analysis was done according to NSS (1989) laboratory procedures for soil analysis. The soils were classified according to the FAO-Unesco (1988) revised legend of the soil map of the world and the Soil Taxonomy key (Soil Survey Staff, 1990). At the office the field and laboratory analytical data were entered into the national soil information system, *SISTAN* (Magoggo, 1991) which was then used to produce the printouts of the soil profile descriptions. Using the *SISTAN* data extraction/export facility, the analytical data were moved into *Quattro* (Borland International, 1989) to determine the ranges of various chemical properties.

3 DESCRIPTION OF THE WESTERN COTTON GROWING AREA (WCGA)

This report is based on a study of 27 sites. The location of the studied sites is shown in figure 1 which also shows the agro-ecological zones as defined and mapped by de Pauw (1984).

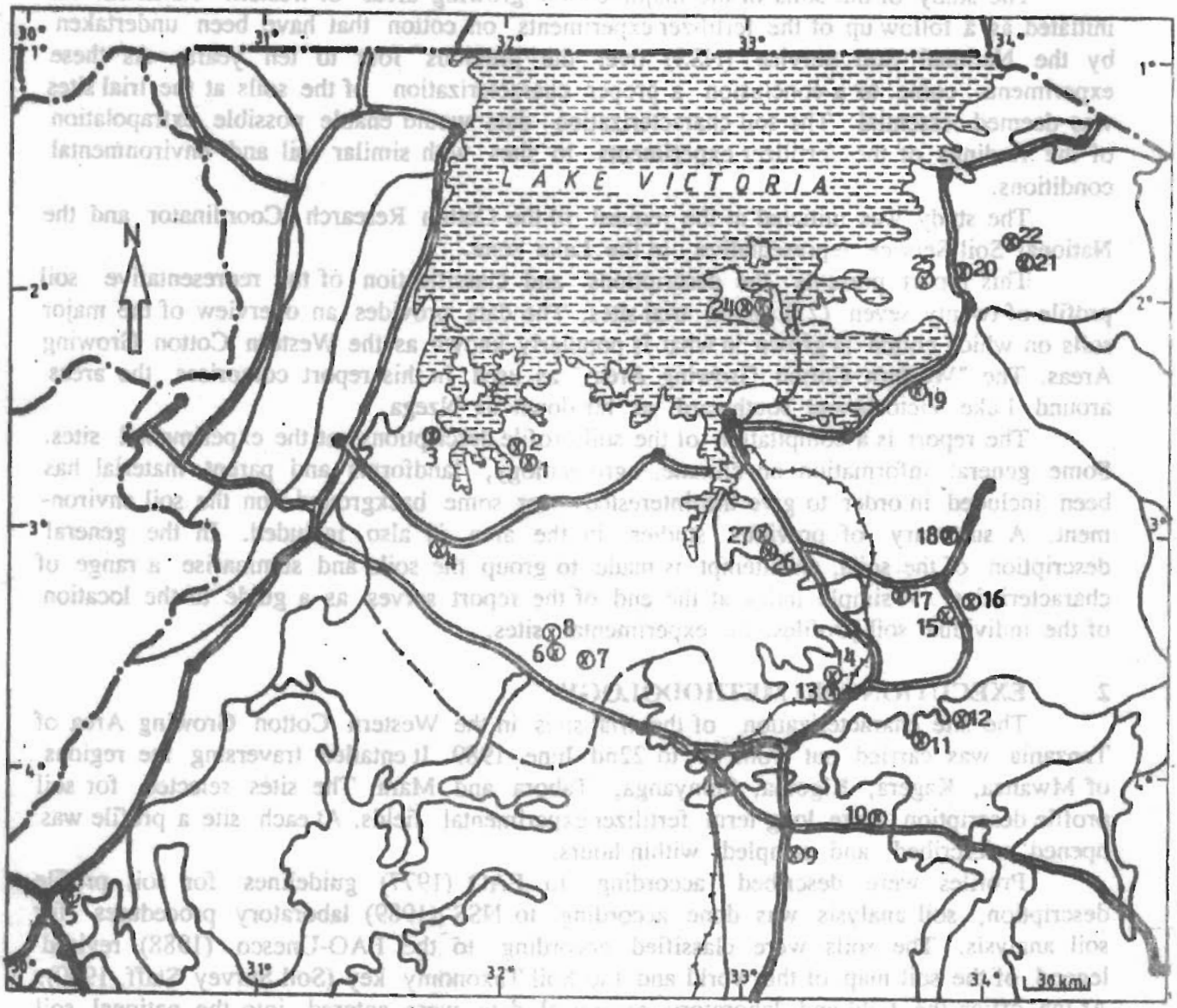

Figure 1: Location of trial sites characterized

Key to profile sites

1. Kasota
2. Katoma
3. Buzilayombo
4. Bwanga
5. Mubondo
6. Busangi
7. Ntobo
8. Masabi
9. Mwanhala
10. Iborogero
11. Mwamala
12. Lagana
13. Ndala
14. Azimio
15. Isulilo
16. Mwadila
17. Hinduki
18. Lugulu
19. Ngunga
20. Mgaja
21. Sanzate
22. Marambeka
23. Bukongo
24. Malegeya
25. Kandegutya
26. Inonelwa
27. Nduha

3.1 Landforms and Geology

The greater part of the WCGA lies at an altitude ranging between 1080 m (the level of Lake Victoria) and 1355 m. The general landscape comprises broad, almost flat to undulating plains with rather long slopes and shallow valley bottoms or mbuga. Such surfaces have been described by Milne (1936) as *plateau surfaces with minor granite outcrops*. Some areas are more dissected and show a pattern of ridges separated by narrow V-shaped valleys. Slope gradients vary but are mostly between 0 and 8 %. On the flat plains periodic water-logging is common. On the steeply sloping land considerable soil erosion has taken place although the severity varies with respect to rainfall intensity (de Pauw, 1984) and land use and soil cover.

Closer to Lake Victoria the landscape is characterized by inselberg-footslope-valley bottom association and the slopes become shorter and steeper, commonly with rocky summits. The relief intensity, which is generally less than 50 meters in the southern parts, increases to over 100 meters around the lake.

According to the Mining and Geology Division (1976) most of the area south and east of the lake is underlain by granites and granodiorites. Dominant in the southern extreme are undifferentiated granites, but further north synorogenic granites of Precambrian age (porphyroblastic granites or adamellite) dominate (GSD, 1956; MCI, 1962). In the central part of the WCGA granitic rocks of the Neogene age overlie the basement granitic rocks. Some areas in Shinyanga region have an overmantle of lacustrine deposits. The area east of the lake from north of Biharamulo right down through Uvinza comprises sedimentary rocks of the Bukoban and Karagwe-Ankolean systems namely mudstones, shales, phyllites and sandstones. A strip along the Kasulu-Kibondo-Nyankana road is underlain by volcanic rocks (flood basalt and andesite) of the Bukoban system.

3.2 Climate

The climate of the WCGA is characterized by a monomodal rainfall distribution with a within-season dry spell. The severity and duration of this within-season dry period decreases with distance from the lake such that in the south the growing season, though shorter and with less annual rainfall total, is not generally interrupted by it. Data for Ukiriguru show that the rain starts in November/December and continues to April/May, with April receiving the highest amount of rainfall. On the basis of monthly data, the January dry spell still has a monthly rainfall total above half the potential evapotranspiration which, according to the definition of growing periods by FAO (1978), does not constitute an interruption to the growing period. What may be concluded from this is that the within-season dry period is less than one month in duration. A humid period (i.e. the period when rainfall exceeds potential evapotranspiration) exists only around April.

Since only few meteorological stations exist in the WCGA, a detailed inventory of the climatic characteristics for each trial site could not be carried out. For this report, the climate of the WCGA is described basing on the recent agro-ecological zones map of Tanzania published at a scale of 1:2 000 000 (de Pauw, 1984). Moreover, the agro-ecological zones map was published so as to provide interpretative data related to the agricultural environment with a statement on its physical potential or constraints for

agricultural development. The information available in the agro-ecological zones map was therefore thought to be sufficient and relevant for the purpose of this report. A more detailed analysis of the agroclimate has been done by de Pauw (1982) for Geita and Sengerema districts.

The main climatic factors specified in the agro-ecological zone are the growing period onset date and duration and the temperature regime. Moisture availability is expressed in terms of the soil moisture storage capacity and crop rooting habits. The temperature regimes are defined in terms of mean annual maximum and mean annual minimum temperatures. The studied sites fall into six agro-ecological zones as recognised by de Pauw (1984). Agroecological zones P3, P4, P5, P7 and P8 are situated on a medium altitude plateau (750 to 1500 m); agro-ecological zone W2 is situated on a high altitude plateau (1500 to 2300 m).

P3: The moisture regime is characterized by one dependable growing period lasting for about 4 to 5 months. The onset dates are reliable with December as the most likely onset period. Maximum temperatures range from 27 to 30 °C and minimum temperatures between 15 and 18 °C. The mean difference between maximum and minimum temperatures is about 12 °C. Iborogero and Mwanhala trial sites are situated in this agro-ecological zone.

P4: The moisture regime is characterized by one dependable growing period lasting for about 3.5 to 5 months. The onset dates are unreliable with November as the most likely onset period. Maximum temperatures ranges from 27 to 30 °C and minimum temperatures between 15 and 18 °C. The mean difference between maximum and minimum temperatures is about 12 °C. Trial sites situated within this agro-ecological zone are Bukongo, Buzilayombo, Bwanga, Kasota, Katoma, Malegeya and Masabi.

P5: The moisture regime is characterized by one dependable growing period the length of which is determined by the duration and depth of flooding. The most likely onset period falls between November and December. Maximum temperatures range from 27 to 30 °C and minimum temperatures between 15 and 18 °C. The mean difference between maximum temperatures and minimum temperatures is about 12 °C. Trial sites situated within this agro-ecological zone are Busangi and Ntobo.

P7: The moisture regime is characterized by one dependable growing period lasting for about 3 to 3.5 months. The onset dates are unreliable, with the most likely onset period between February and March. Maximum temperatures range from 27 to 30 °C and minimum temperatures between 15 and 18 °C. The mean difference between maximum and minimum temperatures is about 12 °C. Trial sites situated within this agro-ecological zone are Lagana and Mwamala.

P8: The moisture regime is characterized by one dependable growing period lasting for about 3 to 3.5 months. The onset dates are unreliable, with the most likely

onset period between November and March, varying according to location. Maximum temperatures range from 27 to 30 °C and minimum temperatures between 15 and 18 °C. The mean difference between maximum and minimum temperatures is about 12 °C. Trial sites situated within this agro-ecological zone are Azimio, Hinduki, Inonelwa, Isulilo, Kandegutya, Lugulu, Marambeka, Mgaja, Mwadila, Ndala, Nduha, and Sanzate.

W2: The moisture regime is characterized by one dependable growing period lasting for about 6.5 to 8 months. The onset dates are reliable, with November as the most likely onset period. Maximum temperatures ranges from 22 to 25 °C and minimum temperatures between 10 and 15 °C. The mean difference between maximum and minimum temperatures is about 11 °C. Mubondo is the only trial site that is situated in this agro-ecological zone.

3.3 Soils

3.3.1 Previous studies

Perhaps the earliest pedological study in Tanzania is that by Milne (1936) who made an exploratory soil survey through the part of the country north of the Dar es Salaam to Kigoma railway line. Milne describes a succession of soil types related to physiographic position in the Tabora and Mwanza areas (skeletal red loam -> dull colored sand -> hard pan soils -> mbuga clays [*itongo*, *lusenyi*, *ibambasi* and *mbuga*]). The *ibambasi* soil in the inselberg-footslope-mbuga landscape occupies the lowest position in the footslope, next to the mbuga. This typical succession has been mapped in detail by Magoggo and Mbogoni (1990) around Ukiriguru.

De Pauw (1982), reporting on the work carried in Geita and Sengerema districts by the National Soil Service, also notes a soil-topography association (catena) with the following soils from the hill top or upland summit to the bottomland: dark to yellowish brown sandy loams -> yellowish red or brown sandy loams and sandy clay loams with a gravel layer within 100 cm -> light colored sands of variable drainage -> hard pan soils -> compact, grey or brown sandy loams to sandy clays -> black cracking clays. The relative proportions of these soils are determined by the nature of the surrounding physiography. However, this clear succession of soil types is not found outside the granitic areas.

One characteristic common in the red loams (*itongo*) on the gently undulating plateau areas is the presence of concretionary ironstone at a depth of about 1 meter. Milne suggests that this ironstone is a remnant of mature topography before denudation was renewed by the warping which was accompanied by formation of Lake Victoria.

The soils are shallow to deep, in general well drained, various shades of brown, loamy sands to sandy clay loams. Commonly they are directly underlain by either a semi-coherent layer of ironstone (lateritic material) or calcareous bedrock.

3.3.2 General description of the soils of the WCGA

The sites selected for fertilizer experimentation on cotton in the Western Cotton

Growing Areas seem to be mainly on the soils most commonly used for cotton by the local population. These soils may be described under three headings based on the nature of the soils and the parent material in which they are developed. In the description of the soils in this chapter, the approximate local soil names willbe included in order to convey a practical meaning of the soils, their correlation to other soils in the area and their agricultural significance.

Sandy and loamy soils developed in weathering products of granitic rocks, having concretionary ironstone (iron crust) at depth (luseni)

These soils are on gently undulating to undulating land with slopes between 1 and 8% and an elevation between 1110 and 1355 m above sea level. They are moderately deep to deep, well drained soils having dark yellowish brown loamy sand and sandy loam topsoils over dark yellowish brown or yellowish red sandy loam or sandy clay loam subsoil, generally having an iron crust within about 1 meter depth. The absolute soil depth range is 18 to 130; most of the profiles described are between 40 and 100 cm deep.

The soils have pH mainly below 6.5; the absolute range is 4.7 to 7.7; organic carbon ranges between 0.3 and 1.6 percent in the topsoil; CEC is between 1.5 and 21.9 meq/100 g of soil. The base saturation ranges between 11 and 100 percent.

These soils are the ones described in Mwanza, Kagera, Kigoma, Tabora and Mara regions and some parts of Shinyanga region and are represented by 21 profiles.

These soils classify as Plinthic and Haplic Acrisols, Eutric Regosols, Haplic Alisols, Haplic Luvisols, Eutric Plinthosols, Eutric Leptosols and Ferric Lixisols

Calcareous black or grey soils developed in lacustrine marls (ibushi)

These soils are on gently undulating land with slopes between 3 and 4% and an elevation between 1080 and 1120 m above sea level. They are moderately deep, well drained, very dark greyish brown sandy clay loams and clay loams having a calcareous layer within about 60 cm.

The soils have a pH ranging between 6.9 and 8.3, organic carbon between 1.2 and 2.3 percent, CEC between 13.2 and 49.8 meq/100 g of soil and a base saturation of 100 percent.

These soils are described in Shinyanga rural and Maswa district and are represented by 3 profiles.

These soils classify as Vertic Luvisols, Haplic Chernozems and Eutric Cambisols.

Red clays developed in metamorphic rocks

These soils are on undulating land with long slopes of about 5% at an elevation of

about 1230 m above sea level. They are very deep, well drained, dark red clays with pH between 4.1 and 5.2, organic carbon about 3 percent, CEC between 3.4 and 14.6 meq/100 g of soil and a base saturation between 5 and 33 percent.

This soil is described in Mubondo and is represented by one profile. The soil classifies as Rhodic Ferralsol.

Acknowledgements

This work would not have been done but for the financial backing of the Tanzania Cotton Marketing Board through the Cotton Research Coordinator, Mr. Kapingu and the Director of Ukiriguru Research Institute. We would like to acknowledge Mr. Bakari "Baker" Mtila of Ukiriguru Research Institute, Shinyanga sub-station whose encyclopedic knowledge of the experimental sites was very instrumental in the efficiency of the field investigations. It was on account of his presence that the twenty seven profiles of this report spread over six regions were studied in a period of sixteen days. Due to the amount of travelling that was involved during the field examination of the soils there was usually no opportunity for lunches; the traditional hospitality of the people in those areas took care of that by surprising us with impromptu lunches. This is a fact we would not like to leave unsaid.

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ANNEX: SOIL PROFILE DESCRIPTION AND ANALYTICAL DATA

Profile site : AZIMIO
Region : Shinyanga
Distrit : Shinyanga Urban
Location : Azimio Primary School, on the summit of a convex slope
Elevation : 1120 m asl.
Parent material: calcareous sedimentary rocks (marl)
Landform : peneplain; flat or almost flat; relief intensity about 10 m.
Described by J.P. Magoggo and J.D.J. Mbogoni on 13/06/89

Soil: Moderately deep, well drained dark brown sandy clay with a thick very dark grey and brown topsoil and overlying a petrocalcic layer at about 65 cm. It has over 1 cm wide, 10 cm deep cracks.

Profile description

Ap1 0 - 4 cm: very dark grey (10YR3/1) when dry, black (10YR2/1) when moist; sandy clay loam; hard dry, friable moist, sticky and plastic wet; strong very coarse angular blocks; many fine and few medium pores; common fine and very fine roots; abrupt smooth boundary to

Ap2 4 - 16 cm: very dark brown (10YR2/2) when moist; sandy clay loam; friable moist, sticky and plastic wet; strong medium subangular blocks and coarse subangular blocks; many fine and few medium pores; common fine roots; clear smooth boundary to

Bt1 16 - 49 cm: dark brown (7.5YR3/2) when moist; sandy clay; friable moist, slightly sticky and plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; many fine pores; few small spherical fresh quartz stones; few small spherical fresh quartz nodules; many fine and few coarse roots; clear smooth boundary to

Bt2 49 - 66 cm: dark brown (5YR3/2) when moist; sandy clay; friable moist, sticky and plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; many fine pores; common fine roots; clear smooth boundary to

Ck 66 - 98+ cm: indurated calcareous layer

Remarks: A thin horizontal band (about 1 - 2 cm) of fine sandy material is presnt below the Ap1 horizon. Tongues of dark colored material of overlying horizons are to be found in the Bt1 horizon. Below the Bt2 horizon a gravelly (quartz) horizon exists of about 10 cm.

SOIL CLASSIFICATION: FAO legend : Vertic Luvisol

USDA taxonomy: Typic Ustropept

ANALYTICAL DATA FOR PROFILE AZIMIO

Horizon		Ap1	Ap2	Bt1	Bt2
Sample depth (cm)		0 - 4	4 - 16	20 - 40	45 - 66
Clay	%	34	33	40	40
Silt	%	12	14	10	12
Very fine sand	%	6	4	4	4
Fine sand	%	10	10	8	6
Medium sand	%	12	12	10	9
Coarse sand	%	15	15	13	14
Very coarse sand	%	11	13	14	15
Texture class		SCL	SCL	SC	SC
pH H2O	1:2.5	6.9	7.2	7.2	7.4
pH KCl	1:2.5	5.7	5.8	5.8	6.3
EC mS/cm	1:2.5	0.05	0.03	0.06	0.12
Organic C	%	1.6	1.7	1.7	1.6
Total N	%	0.12	0.12	0.12	0.11
C/N		13	14	14	15
Available P	mg/kg	5	-	-	-
CEC NH_4OAc	me/100g	25.0	24.0	28.7	31.5
Exch. Ca	me/100g	23.6	23.7	22.4	28.2
Exch. Mg	me/100g	2.2	2.1	1.4	1.4
Exch. K	me/100g	0.84	0.56	0.30	0.35
Exch. Na	me/100g	0.09	0.07	0.08	0.10
Exch. H	me/100g	-	-	-	-
TEB	me/100g	26.7	26.4	24.2	30.1
Base saturation	%	100	100	84	95
CECclay	me/100g	74	73	72	79

Profile site : BUKONGO
Region : Mwanza
District : Ukerewe Map sheet: 22/1
Location : Bukongo Primary School. Coordinates: 5098/97718
Elevation : 1170 m asl.
Parent material: felsic igneous rocks (granitic)
Landform : peneplain; undulating; slope : 3 %; convex slope
Described by J.P. Magoggo and J.D.J. Mbogoni on 19/06/89

Soil: Deep, well drained, dark reddish brown to yellowish red sandy loam over a soft iron crust layer at about 110 cm. The topsoil is a brownish loamy sand.

Profile description

Ap 0 - 10 cm: dark yellowish brown (10YR4/4) when dry, dark yellowish brown (10YR3/4) when moist; loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; moderately strong fine crumbs and medium crumbs; many fine pores; many fine roots; clear smooth boundary to

Ah 10 - 20 cm: dark brown (7.5YR4/4) when moist; loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; moderately strong fine subangular blocks and coarse crumbs; many fine pores; many fine roots; clear wavy boundary to

BA 20 - 54 cm: dark reddish brown (5YR3/4) when moist; loamy sand; friable moist, slightly sticky and non-plastic wet; moderate coarse subangular blocks; many fine pores; common fine roots; gradual smooth boundary to

Bt 54 - 110 cm: yellowish red (5YR4/6) when moist; gravelly sandy loam; friable moist, slightly sticky and slightly plastic wet; weak coarse subangular blocks; many fine pores; frequent medium irregular hardnodules; common fine roots; clear wavy boundary to

Bms 110+ cm: soft iron crust layer.

SOIL CLASSIFICATION: FAO legend : Plinthic Alisol
USDA taxonomy: Ustic Dystropept

ANALYTICAL DATA FOR PROFILE BUKONGO

Horizon		Ap	Ah	BA	Bt	Bt
Sample depth (cm)		0 - 10	10 - 20	30 - 50	60 - 80	90 - 11
Clay	%	8	8	10	15	14
Silt	%	10	10	8	10	12
Very fine sand	%	11	8	5	7	6
Fine sand	%	25	21	14	18	13
Medium sand	%	20	20	18	17	17
Coarse sand	%	12	18	21	14	14
Very coarse sand	%	13	15	24	19	24
Texture class		LS	LS	LS	SL	SL
pH H2O	1:2.5	5.8	5.5	5.3	5.1	5.0
pH KCl	1:2.5	4.4	4.1	4.2	4.3	4.2
EC mS/cm	1:2.5	0.01	0.01	0.02	0.02	0.02
Organic C	%	0.3	0.3	0.2	0.2	0.2
Total N	%	0.03	0.03	0.03	0.03	0.03
C/N		10	10	7	7	7
Available P	mg/kg	24	10	12	3	30
CEC NH_4OAc	me/100g	2.7	2.9	2.9	3.6	3.6
Exch. Ca	me/100g	0.6	0.5	0.4	0.9	0.8
Exch. Mg	me/100g	0.2	0.2	0.2	0.2	0.2
Exch. K	me/100g	0.20	0.17	0.09	0.14	0.12
Exch. Na	me/100g	0.08	0.08	0.03	0.10	0.10
Exch. H	me/100g	-	-	0.10	0.30	0.13
Exch. Al	me/100g			0.13	0.10	0.32
Al saturation	%			4	3	9
TEB	me/100g	1.1	1.0	0.7	1.3	1.2
Base saturation	%	40	33	25	37	34
CECclay	me/100g	34	36	29	24	26

Profile site : BUSANGI
Region : Shinyanga
District : Kahama Map sheet: 63/1
Location : Busangi Primary school, peasant's farm on a convex slope.
Coordinates: 4510/95960
Elevation : 1160 m asl.
Parent material: felsic igneous rocks (granitic)
Landform : peneplain; gently undulating
Described by J.P. Nagoggo and J.D.J. Mbogoni on 10/06/89

Soil: Moderately deep, well drained dark yellowish brown sand overlying fractured iron crust at about 65 cm. Topsoil is dark brown sand.

Profile description

Ap 0 - 20 cm: dark brown (10YR3/3) when moist; sand; loose dry, very friable moist, non-sticky and non-plastic wet; weak medium subangular blocks; many fine and medium pores; many fine roots; clear smooth boundary to

AC 20 - 38 cm: dark brown to brown (10YR4/3) when moist; sand; loose moist, non-sticky and non-plastic wet; structureless single grain; many fine and medium pores; many fine roots; clear smooth boundary to

C 38 - 65 cm: dark yellowish brown (10YR4/4) when moist; sand; loose moist, non-sticky and non-plastic wet; structureless single grain; many fine and medium pores; many fine roots; gradual smooth boundary to

Cms 65 cm + iron crust (lateritic material)

SOIL CLASSIFICATION: FAO legend : Luvic Arenosol
USDA taxonomy: Ustic Quartzipsamment

ANALYTICAL DATA FOR PROFILE BUSANGI

Horizon		Ap	AC	C
Sample depth (cm)		0 - 20	20 - 38	40 - 60
Clay	%	2	2	6
Silt	%	6	8	8
Very fine sand	%	5	6	5
Fine sand	%	24	25	22
Medium sand	%	30	28	28
Coarse sand	%	24	21	23
Very coarse sand	%	9	10	11
Texture class		S	S	S
pH H2O	1:2.5	5.6	5.4	5.0
pH KCl	1:2.5	4.1	4.0	4.1
EC mS/cm	1:2.5	0.01	0.01	0.03
Organic C	%	0.4	0.2	0.1
Total N	%	0.04	0.02	0.01
C/N		10	10	10
Available P	mg/kg	11	6	3
CEC NH_4OAc	me/100g	1.4	1.3	1.9
Exch. Ca	me/100g	0.4	0.3	0.2
Exch. Mg	me/100g	0.2	0.1	0.1
Exch. K	me/100g	0.08	0.05	0.04
Exch. Na	me/100g	0.04	0.06	0.05
Exch. H	me/100g	-	0.38	0.18
Exch. Al	me/100g		0.37	0.42
Al saturation	%		28	22
TEB	me/100g	0.7	0.5	0.4
Base saturation	%	51	39	21
CECclay	me/100g	70	65	32
ESP			5	

Profile site : BUZILAYOMBO
Region : Kagera
District : Biharamulo Map sheet: 31/2
Location : Kahumo village, about 200 m from Lake Victoria on a concave slope. Coordinates: 3644/97048
Elevation : 1110 m asl.
Parent material: unconsolidated granitic material
Landform : intermontane plain; undulating; slope : 1 %
It is reported that the locality has pools of standing water during the rains but they occur at isolated spots - not a continuous blanket of water.
Described by J.P. Magoggo and J.D.J. Mbogoni on 08/06/89

Soil: Moderately deep, moderately well drained, very dark grey sandy clay loam soil over boulders of (parent) rock (ironstone and granite). The topsoil is very dark brown sandy loam.

Profile description

Ah 0 - 14 cm: very dark brown (10YR2/2) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderate very coarse subangular blocks; many fine and medium pores; few coarse slightly weathered irregularly shaped ironstone gravel; many fine and medium roots; gradual smooth boundary to

Bt1 14 - 34 cm: very dark brown (10YR2/2) when moist; sandy clay loam; friable moist, slightly sticky and plastic wet; moderately strong coarse subangular blocks; many fine and medium pores; many fine and medium roots; clear wavy boundary to

Bt2 34 - 70+cm: very dark greyish brown (10YR3/2) when moist; sandy clay loam; friable moist, sticky and plastic wet; weak medium subangular blocks and coarse subangular blocks; many fine and medium pores; many coarse slightly weathered irregularly shaped ironstone gravel and stones

70 cm + Boulders of slightly weathered granite and ironstone

SOIL CLASSIFICATION: FAO legend : Haplic Luvisol
USDA taxonomy: Typic Ustorthent

ANALYTICAL DATA FOR PROFILE BUZILAYOMBO

Horizon		Ah	AC1	AC2
Sample depth (cm)		0 - 14	14 - 34	34 - 50
Clay	%	14	25	27
Silt	%	16	16	20
Very fine sand	%	8	5	8
Fine sand	%	17	17	14
Medium sand	%	14	13	12
Coarse sand	%	15	14	11
Very coarse sand	%	16	10	10
Texture class		SL	SCL	SCL
pH H2O	1:2.5	6.3	6.4	6.5
pH KCl	1:2.5	5.2	5.0	4.9
EC mS/cm	1:2.5	0.04	0.04	0.03
Organic C	%	1.4	1.0	0.7
Total N	%	0.10	0.07	0.06
C/N		14	14	12
Available P	mg/kg	3	2	1
CEC NH_4OAc	me/100g	12.3	14.8	16.1
Exch. Ca	me/100g	7.3	7.8	8.8
Exch. Mg	me/100g	3.5	4.6	5.7
Exch. K	me/100g	0.49	0.28	0.26
Exch. Na	me/100g	0.15	0.10	0.18
Exch. H	me/100g	-	-	-
TEB	me/100g	11.4	12.8	14.9
Base saturation	%	93	86	93
CECclay	me/100g	88	59	60

Profile site : BWANGA
Region : Kagera
District : Biharamulo Map sheet: 45/2
Location : Kalembela Primary school, Bwanga village, on a straight slope.
Coordinates: 3685/96660
Elevation : 1230 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 5 %. The landscape is a broad, undulating plain with relatively long slopes and rather narrow valley bottoms.
Described by J.P. Magoggo and J.D.J. Mbogoni on 08/06/89

Soil: Very deep, well drained, (dark) yellowish brown sandy (clay) loam subsoil underlying a dark (yellowish) brown sandy topsoil.

Profile description

Ap 0 - 20 cm: dark brown (10YR4/3) when dry, dark brown (10YR3/3) when moist; loamy sand; soft dry, very friable moist, slightly sticky and non-plastic wet; weak medium subangular blocks; many fine pores; many fine roots; clear smooth boundary to

Au 20 - 36 cm: dark yellowish brown (10YR3/4) when moist; loamy sand; friable moist, slightly sticky and slightly plastic wet; moderately weak coarse subangular blocks; many fine pores; many fine roots; clear smooth boundary to

Bt 36 - 87 cm: dark yellowish brown (10YR4/4) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; few fragments (about 1 cm) of weathered granitic rock; common fine roots; diffuse smooth boundary to

Bw 87 - 250+ cm: yellowish brown (10YR5/8) when moist; sandy clay loam; friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks and medium subangular blocks; many fine pores; common fine roots

SOIL CLASSIFICATION: FAO legend : Haplic Ferralsol
USDA taxonomy: Arenic Kandiustult

ANALYTICAL DATA FOR PROFILE BWANGA

Horizon		Ap	Au	Bt	Bw
Sample depth (cm)		0 - 20	20 - 36	60 - 80	110 - 130
Clay	%	7	7	19	22
Silt	%	8	6	14	6
Very fine sand	%	5	5	6	6
Fine sand	%	21	17	14	16
Medium sand	%	24	23	13	17
Coarse sand	%	23	27	17	21
Very coarse sand	%	12	16	16	12
Texture class		LS	LS	SL	SCL
pH H2O	1:2.5	6.3	5.8	5.3	5.5
pH KCl	1:2.5	4.9	4.3	4.3	4.0
EC mS/cm	1:2.5	0.02	0.01	0.02	0.01
Organic C	%	0.4	0.3	0.2	0.2
Total N	%	0.02	0.02	0.02	0.01
C/N		20	15	10	20
Available P	mg/kg	9	4	-	-
CEC NH_4OAc	me/100g	1.9	1.9	2.5	2.6
Exch. Ca	me/100g	0.7	0.3	0.1	0.1
Exch. Mg	me/100g	0.4	0.3	0.2	0.2
Exch. K	me/100g	0.17	0.24	0.16	0.22
Exch. Na	me/100g	0.04	0.04	0.04	0.07
Exch. H	me/100g	-	-	0.25	-
Exch Al	me/100g			0.20	
Al saturation	%			8	
TEB	me/100g	1.3	0.9	0.5	0.6
Base saturation	%	69	46	20	23
CECclay	me/100g	27	27	13	12

Profile site : HINDUKI
Region : Shinyanga
District : Maswa Map sheet: 64/1
Location : Hinduki (Mwangala) Primary School on a convex slope.
Coordinates: 5232/95912
Elevation : 1290 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 3 %.
Described on 14/06/89

Soil: Shallow, well drained dark reddish brown sandy clay loam overlying saprolite at 33 cm soil depth. The topsoil is a dark brown sandy loam.
Remarks: It appears that a quartz vein occurs close to the surface in a part of the field. The field is therefore not on uniform soil. The central part of the field is very gravelly on the surface.

Profile description

Ap 0 - 6 cm: dark brown (7.5YR4/4) when dry, dark brown (7.5YR3/4) when moist; sandy loam; soft dry, friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks; many fine and few medium pores; few fine roots; horizontal sand bands at horizon bottom, abrupt smooth boundary to

Bt1 6 - 13 cm: dark brown (7.5YR3/4) when moist; sandy clay loam; friable moist, slightly sticky and slightly plastic wet; moderately strong medium platy; many fine pores; few fine roots; horizontal bands of very fine sand 5 cm apart; abrupt smooth boundary to

Bt2 13 - 22 cm: dark reddish brown (5YR3/3) when moist; sandy clay loam; friable moist, sticky and plastic wet; moderate fine angular blocks and medium angular blocks; many fine pores; very few medium irregular quartz fragments; few fine roots; clay lined cavities about 4 cm in diameter; clear smooth boundary to

Bt3 22 - 33 cm: dark reddish brown (5YR3/4) when moist; sandy clay loam; friable moist, sticky and plastic wet; moderate fine angular blocks and medium angular blocks; many fine pores; very few small rounded quartz fragments; few fine roots; cavities about 2.5 cm in diameter; abrupt wavy boundary to

C 33 - 64+cm: mainly quartz rock and saprolyte

SOIL CLASSIFICATION: FAO legend : Chromic Luvisol, skeletic phase
USDA taxonomy: Fluventic Ustropept

ANALYTICAL DATA FOR PROFILE HINDUKI

Horizon		Ap	Bt1	Bt2	Bt3
Sample depth (cm)		0 - 6	6 - 13	13 - 22	22 - 33
Clay	%	17	29	28	30
Silt	%	4	8	10	12
Very fine sand	%	6	5	5	5
Fine sand	%	15	10	11	10
Medium sand	%	18	10	12	11
Coarse sand	%	21	17	15	15
Very coarse sand	%	19	22	19	18
Texture class		SL	SCL	SCL	SCL
pH H2O	1:2.5	6.5	6.3	5.7	5.5
pH KCl	1:2.5	4.8	4.4	4.0	3.8
EC mS/cm	1:2.5	0.02	0.02	0.02	0.02
Organic C	%	0.4	0.6	0.7	0.6
Total N	%	0.03	0.05	0.06	0.06
C/N		13	12	12	10
Available P	mg/kg	5	2	1	1
CEC NH_4OAc	me/100g	5.1	7.9	11.7	13.0
Exch. Ca	me/100g	2.8	3.0	3.4	3.5
Exch. Mg	me/100g	1.1	1.8	2.9	3.1
Exch. K	me/100g	0.35	0.45	0.48	0.45
Exch. Na	me/100g	0.08	0.06	0.05	0.12
Exch. H	me/100g	-	-	-	-
TEB	me/100g	4.3	5.3	6.8	7.2
Base saturation	%	85	67	58	55
CECclay	me/100g	30	27	42	43

Profile site : IBOROGERO
Region : Tabora
District : Igunga Map sheet: 80/2
Location : Iborogero Primary School on a convex slope with slight sheet erosion. Coordinates: 5538/95334
Elevation : 1180 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 2 %. The landscape is a very broadly undulating plain with long slopes and wide but not very clearly marked valley bottoms. The relief intensity is about 50 m.
Described by J.P. Magoggo and J.D.J. Mbogoni on 11/06/89

Soil: Deep, well drained, dark reddish brown to red sandy (clay) loamy soil over moderately weathered granitic regolith at 90 cm. The topsoil is brown sand. High biological activity.

Profile description

Ap1 0 - 12 cm: brown (7.5YR5/4) when dry, dark brown (7.5YR3/4) when moist; gravelly loamy sandy; soft dry, friable moist, slightly sticky and non-plastic wet; moderately strong fine crumbs and coarse crumbs; many fine and medium pores; frequent small slightly weathered rounded quartz fragments; many fine roots; abrupt smooth boundary to

Ap2 12 - 20 cm: dark brown (7.5YR4/4) when dry, dark brown (7.5YR3/4) when moist; slightly gravelly sandy loam; soft dry, friable moist, slightly sticky and non-plastic wet; moderate medium platy; many fine and medium pores; many fine and medium pores; frequent small slightly weathered rounded quartz fragments; common fine roots; abrupt smooth boundary to

Bt1 20 - 34 cm: dark reddish brown (5YR3/3) when moist; gravelly sandy loam; soft dry, friable moist, slightly sticky and slightly plastic wet; moderately strong fine subangular blocks and coarse subangular blocks; many fine and medium pores; frequent small slightly weathered rounded quartz fragments; common fine roots; clear smooth boundary to

Bt2 34 - 82 cm: dark red (2.5YR3/6) when moist; very gravelly sandy clay loam; friable moist, slightly sticky and slightly plastic wet; many fine and medium pores; frequent small and big irregular weathered quartz and feldspathic fragments; many fine roots; clear broken boundary to

C 82 - 115+cm: yellowish red (5YR4/6) weathering granitic regolith, feldspars are the main minerals and some quartz; sandy loam texture.

SOIL CLASSIFICATION: FAO legend : Haplic Alisol
USDA taxonomy: Typic Haplustult

ANALYTICAL DATA FOR PROFILE IBOROGERO

Horizon		Ap1	Ap2	Bt1	Bt2	C
Sample depth (cm)		0 - 12	12 - 20	20 - 34	50 - 70	90 - 110
Clay	%	10	12	20	28	18
Silt	%	10	10	6	14	16
Very fine sand	%	14	13	12	9	10
Fine sand	%	23	22	19	10	13
Medium sand	%	14	15	13	10	15
Coarse sand	%	12	13	12	14	18
Very coarse sand	%	16	14	13	16	10
Texture class		LS	SL	SL	SCL	SL
pH H2O	1:2.5	5.9	6.0	5.4	4.7	4.7
pH KCl	1:2.5	4.8	4.8	4.0	3.7	3.7
EC mS/cm	1:2.5	0.02	0.03	0.02	0.04	0.03
Organic C	%	0.8	0.9	0.7	0.5	0.3
Total N	%	0.10	0.07	0.07	0.06	0.04
C/N		8	13	10	8	8
Available P	mg/kg	7	5	3	2	-
CEC NH_4OAc	me/100g	4.2	5.1	6.2	8.5	8.6
Exch. Ca	me/100g	2.1	3.0	2.6	2.3	1.9
Exch. Mg	me/100g	0.8	1.0	1.1	1.3	2.1
Exch. K	me/100g	0.32	0.25	0.20	0.10	0.15
Exch. Na	me/100g	0.03	0.04	0.04	0.08	0.12
Exch. H	me/100g	-	-	0.05	0.21	0.17
Exch. Al	me/100g			0.20	0.96	1.01
Al saturation	%			3	11	12
TEB	me/100g	3.3	4.3	3.9	3.8	4.3
Base saturation	%	77	84	64	44	50
CECclay	me/100g	42	42	31	30	48

Profile site : ISULILO
Region : Shinyanga
District : Maswa Map sheet: 49/1
Location : Isulilo Primary School on a convex slope. Coordinates: 5741/96458
Elevation : 1300 m asl.
Parent material: weathering products of granitic rock
Landform : peneplain; undulating; slope : 1 %. The landscape is a broad undulating plain with scattered hills and inselbergs. This change from the very broad, gently undulating plains of Shinyanga occurs at an altitude of about 1200 m.
Described by J.P. Magogga and J.D.J. Mbogoni on 15/06/89

Soil: Moderately deep (about 36 cm to a very gravelly horizon which rests at 80 cm on granitic regolith), well drained yellowish brown loamy sand topsoil over brownish sandy loam subsoil overlying granitic regolith at about 78 cm.

Profile description

Ap1 0 - 10 cm: dark yellowish brown (10YR4/4) when dry, dark yellowish brown (10YR3/4) when moist; loamy sand; soft dry, very friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and fine crumbs; few fragments of weathered rock; many fine pores; common fine roots; abrupt broken boundary to

Ap2 10 - 26 cm: dark yellowish brown (10YR4/4) when dry, dark yellowish brown (10YR3/4) when moist; loamy sand; soft dry, very friable moist, slightly sticky and slightly plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; few fragments of weathered rock; many fine pores; common fine roots; clear smooth boundary to

Bw 26 - 36 cm: dark brown (7.5YR3/4) when moist; loamy sand; very friable moist, slightly sticky and slightly plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; few (more than above) fragments of wethered rock; many fine pores; common fine roots; clear broken boundary to

Bt 36 - 78 cm: dark yellowish brown (10YR4/6) when moist; very gravelly sandy loam; loose moist, slightly sticky and slightly plastic wet; frequent 5 - 10 mm quatrzitic gravel; many fine roots; abrupt wavy boundary to

CR 78 + cm: granitic saprolyte

SOIL CLASSIFICATION: FAO legend : Haplic Luvisol
USDA taxonomy: Fluventic Ustropept

ANALYTICAL DATA FOR PROFILE ISULILO

Horizon		Ap1	Ap2	Bw	Bt
Sample depth (cm)		0 - 10	10 - 26	26 - 36	50 - 70
Clay	%	6	8	10	18
Silt	%	8	8	8	8
Very fine sand	%	10	9	9	7
Fine sand	%	24	23	22	15
Medium sand	%	23	22	22	22
Coarse sand	%	15	15	15	16
Very coarse sand	%	14	15	15	14
Texture class		LS	LS	LS	SL
pH H2O	1:2.5	6.9	7.1	7.0	5.8
pH KCl	1:2.5	5.9	6.0	5.7	4.7
EC mS/cm	1:2.5	0.04	0.03	0.03	0.07
Organic C	%	0.5	0.4	0.5	0.6
Total N	%	0.04	0.04	0.04	0.06
C/N		13	10	13	10
Available P	mg/kg	30	-	2	-
CEC NH_4OAc	me/100g	4.1	3.7	4.0	5.8
Exch. Ca	me/100g	2.7	2.8	2.5	2.2
Exch. Mg	me/100g	0.8	0.9	0.9	1.0
Exch. K	me/100g	0.34	0.20	0.21	0.13
Exch. Na	me/100g	0.04	0.04	0.09	0.07
Exch. H	me/100g	-	-	-	-
TEB	me/100g	3.9	3.9	3.7	3.4
Base saturation	%	95	100	93	59
CECclay	me/100g	68	46	40	32

Profile site : KANDEGUTYA
Region : Mara
District : Bunda
Location : Kandegutya Primary School on convex slope.
Elevation : 1250 m asl.
Parent material: granitic colluvium
Landform : peneplain; undulating; slope : 5 %
Described by J.P. Magoggo and J.D.J. Mbogoni on 20/06/89

Soil: Moderately deep (70 cm to murram), well drained dark (reddish) brown loamy sand, very gravelly in the subsoil (murram layer)

Profile description

Ap 0 - 9 cm: grayish brown (10YR5/2) when dry, very dark grayish brown (10YR3/2) when moist; loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; moderate medium subangular blocks; many fine pores; many fine roots; abrupt smooth boundary to

Ah 9 - 28 cm: very dark grayish brown (10YR3/2) when moist; loamy sand; very friable moist, slightly sticky and non-plastic wet; moderate fine subangular blocks and medium subangular blocks; many fine pores; many fine roots; clear smooth boundary to

AC 28 - 49 cm: dark brown (7.5YR4/2) when moist; loamy sand; friable moist, slightly sticky and non-plastic wet; moderately strong medium subangular blocks; many fine pores; many fine roots; clear smooth boundary to

C 49 - 72 cm: dark reddish brown (5YR3/3) when moist; gravelly loamy sand; friable moist, slightly sticky and non-plastic wet; moderate medium subangular blocks; many fine pores; few large irregular fresh quartzitic fragments; many fine roots; abrupt smooth boundary to

Ccs 72 - 140+ cm: dark reddish brown (5YR3/4) when moist; very gravelly loamy sand; slightly sticky and slightly plastic wet; massive; many fine pores; frequent large irregular weathered quartz gravel and rock fragments; frequent medium spherical hard iron/manganese nodules; many fine roots

Remarks: The profile has a sedimentary (laminated) structure at the base of the Ap horizon (due to water deposition in furrows).

SOIL CLASSIFICATION: FAO legend : Haplic Arenosol
USDA taxonomy: Ustic Quartzipsamment

ANALYTICAL DATA FOR PROFILE KANDEGUTYA

Horizon		Ap	Ah	AC	C	Ccs
Sample depth (cm)		0 - 9	9 - 28	28 - 49	50 - 70	90 - 120
Clay	%	5	6	6	7	9
Silt	%	12	8	8	10	8
Very fine sand	%	6	7	4	5	4
Fine sand	%	19	20	12	13	6
Medium sand	%	18	19	15	19	13
Coarse sand	%	23	21	21	20	28
Very coarse sand	%	20	19	34	26	32
Texture class		LS	LS	LS	LS	LS
pH H2O	1:2.5	7.1	6.8	6.9	7.3	6.6
pH KCl	1:2.5	6.1	5.6	5.8	6.2	5.2
EC mS/cm	1:2.5	0.03	0.03	0.03	0.04	0.02
Organic C	%	0.8	0.7	0.6	0.5	0.4
Total N	%	0.05	0.08	0.04	0.03	0.03
C/N		16	9	15	17	13
Available P	mg/kg	-	5	2	-	-
CEC NH_4OAc	me/100g	3.6	4.1	3.9	4.2	4.8
Exch. Ca	me/100g	2.5	2.8	3.1	3.1	2.1
Exch. Mg	me/100g	0.7	0.5	0.4	0.6	1.0
Exch. K	me/100g	0.30	0.22	0.13	0.09	0.15
Exch. Na	me/100g	0.05	0.07	0.08	0.10	0.09
Exch. H	me/100g	-	-	-	-	-
TEB	me/100g	3.7	4.2	3.7	3.9	3.3
Base saturation	%	99	88	95	93	70
CECclay	me/100g	72	68	65	60	53

Profile site : KASOTA
Region : Mwanza
District : Geita Map sheet: 32/0
Location : Kasota Primary School on a convex slope. Coordinates: 4074/97012
Elevation : 1230 m asl.
Parent material: granite and ironstone admixture
Landform : erosional plain; rolling; slope : 5 %
Described by J.P. Magoggo and J.D.J. Mbogoni on 07/06/89

Soil: Moderately deep, well drained, brownish gravelly sandy clay loam over ironstone and granitic parent material. The topsoil is brownish sandy clay loam.

Profile description

Ap 0 - 14 cm: grayish brown (10YR4/6) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderately weak fine subangular blocks and coarse subangular blocks; many fine pores; many fine roots; abrupt wavy boundary to

Bt1 14 - 27 cm: yellowish brown (10YR5/6) when dry, dark yellowish brown (10YR4/6) when moist; sandy clay loam; soft dry, friable moist, slightly sticky and slightly plastic wet; weak fine subangular blocks and coarse subangular blocks; many fine and medium pores; many fine roots; gradual smooth boundary to

Bt2 27 - 50 cm: strong brown (7.5YR4/6) when dry, dark brown (7.5YR4/4) when moist; slightly gravelly sandy clay loam; non-sticky and slightly plastic wet; moderately weak fine subangular blocks and coarse subangular blocks; many fine and medium pores; many fine roots; clear smooth boundary to

Bt3 50 - 90 cm: strong brown (7.5YR4/6) when moist; very gravelly sand clay loam; weak coarse subangular blocks; many pores; common fine roots; clear smooth boundary to

Bms 90 - 95+ cm: weathered ironstone.

SOIL CLASSIFICATION: FAO legend : Haplic Acrisol
USDA taxonomy: Ustoxic Dystropept

ANALYTICAL DATA FOR PROFILE KASOTA

Horizon		Ap	Bt1	Bt2	Bt3
Sample depth (cm)		0 - 14	14 - 27	30 - 45	65 - 85
Clay	%	16	23	27	24
Silt	%	12	12	12	10
Very fine sand	%	4	6	3	8
Fine sand	%	14	16	13	10
Medium sand	%	19	12	16	8
Coarse sand	%	16	9	7	10
Very coarse sand	%	22	22	22	27
Texture class		SL	SCL	SCL	SCL
pH H2O	1:2.5	5.0	4.8	5.0	4.9
pH KCl	1:2.5	4.0	4.1	4.2	4.2
EC mS/cm	1:2.5	0.04	0.04	0.01	0.02
Organic C	%	0.8	0.5	0.5	0.4
Total N	%	0.06	0.04	0.04	0.03
C/N		13	13	13	13
Available P	mg/kg	8	4	9	-
CEC NH_4OAc	me/100g	4.3	3.9	3.6	3.3
Exch. Ca	me/100g	0.2	0.7	0.3	0.2
Exch. Mg	me/100g	0.1	0.3	0.3	0.1
Exch. K	me/100g	0.15	0.25	0.12	0.12
Exch. Na	me/100g	0.02	0.11	0.10	0.11
Exch. H	me/100g	0.24	0.27	0.28	0.40
Exch. Al	me/100g	0.56	0.48	0.42	0.76
Al saturation	%	13	12	12	23
TEB	me/100g	0.5	1.4	0.8	0.5
Base saturation	%	11	35	23	16
CECclay	me/100g	27	17	13	14

Profile site : KATOMA
Region : Mwanza
District : Geita
Location : Katoma Primary School, cotton trial site on a convex slope. Map sheet: 32/1
Coordinates: 3960/97185
Elevation : 1250 m asl.
Parent material: granite
Landform : plain; rolling; slope : 3 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 07/06/89

Soil: Deep, well drained, strong brown loam having a greyish brown loamy sand topsoil and overlying plinthite at about 130 cm.

Profile description

Ap 0 - 10 cm: dark brown (10YR3/3) when moist; loamy sand; very friable moist, slightly sticky and non-plastic wet; weak coarse subangular blocks; many medium pores; many fine roots; clear smooth boundary to

Ah 10 - 32 cm: dark brown (10YR4/3) when dry, dark grayish brown (10YR4/2) when moist; loamy sand; soft dry, friable moist, slightly sticky and non-plastic wet; weak medium subangular blocks and coarse subangular blocks; many medium pores; many fine roots; clear smooth boundary to

BA 32 - 62 cm: dark brown (7.5YR3/4) when moist; loamy sand; very friable moist, slightly sticky and non-plastic wet; moderately weak coarse subangular blocks and medium subangular blocks; many medium pores; many fine roots; clear smooth boundary to

Bt1 62 - 91 cm: dark brown (7.5YR4/4) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderately weak coarse subangular blocks and medium subangular blocks; many medium pores; few fine roots; gradual smooth boundary to

Bt2 91 - 130 cm: grayish brown (7.5YR4/6) when moist; sandy loam; very friable moist, slightly sticky and slightly plastic wet; moderately weak medium subangular blocks and medium subangular blocks; many medium pores; few fine roots; clear smooth boundary to

Cki 130 - 135+ cm: indurated fresh ironstone layer

SOIL CLASSIFICATION: FAO legend : Haplic Acrisol
USDA taxonomy: Ustoxic Dystropept

ANALYTICAL DATA FOR PROFILE KATOMA

Horizon		Ap	Ah	BA	Bt1	Bt2
Sample depth (cm)		0 - 10	15 - 30	40 - 55	70 - 85	100 - 125
Clay	%	6	4	8	15	18
Silt	%	14	10	12	24	14
Very fine sand	%	5	8	4	7	7
Fine sand	%	21	26	21	12	11
Medium sand	%	26	23	23	12	12
Coarse sand	%	19	16	19	15	13
Very coarse sand	%	12	13	14	15	11
Texture class		LS	LS	LS	SL	SL
pH H2O	1:2.5	5.8	6.0	5.5	5.0	4.9
pH KCl	1:2.5	4.8	5.0	4.1	4.0	4.0
EC mS/cm	1:2.5	0.04	0.04	0.01	0.06	0.02
Organic C	%	0.6	0.6	0.4	0.3	0.3
Total N	%	0.05	0.04	0.03	0.02	0.02
C/N		12	15	13	15	15
Available P	mg/kg	5	3	3	-	-
CEC NH_4OAc	me/100g	2.9	2.5	1.9	2.9	3.6
Exch. Ca	me/100g	1.0	1.0	0.1	0.3	0.1
Exch. Mg	me/100g	0.3	0.3	0.2	0.2	0.1
Exch. K	me/100g	0.18	0.17	0.16	0.26	0.24
Exch. Na	me/100g	0.04	0.14	0.11	0.06	0.16
Exch. H	me/100g	-	-	0.20	0.20	0.20
Exch. Al	me/100g			0.25	0.91	0.90
Al. saturation	%			13	31	25
TEB	me/100g	1.5	1.6	0.6	0.8	0.6
Base saturation	%	52	64	30	28	17
CECclay	me/100g	48	63	24	19	20
ESP	%		6	6		4

Profile site : LAGANA
Region : Shinyanga
District : Shinyanga rural Map sheet: 65/4
Location : Lagana Primary School on a convex slope. Coordinates: 6033/95725
Elevation : 1080 m asl.
Parent material: limestone
Landform : peneplain; flat or almost flat; slope : 3 %.
Surface characteristics : about 2 % rock outcrops; surface sealing, thickness about 3 mm
Described by J.P. Magoggo and J.D.J. Mbogoni on 12/06/89

Soil: Moderately deep, well drained, very dark (grayish) brown sandy (clay) loam overlying limestone bedrock. The topsoil is very dark grayish brown to black sandy (clay) loam.

Profile description

Apk 0 - 7 cm: very dark grayish brown (10YR3/2) when dry, very dark brown (10YR2/2) when moist; sandy loam; soft dry, friable moist, sticky and plastic wet; moderately strong fine crumbs and medium subangular blocks; many fine pores; common large spherical slightly weathered calcareous gravel; many very fine roots; clear smooth boundary to

Ahk1 7 - 16 cm: brown (10YR2/1) when moist; sandy clay loam; friable moist, sticky and plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; many fine pores; common large spherical slightly weathered calcareous gravel; many very fine roots; clear smooth boundary to

Ahk2 16 - 37 cm: very dark brown (10YR2/2) when moist; sandy loam; friable moist, sticky and plastic wet; moderately strong medium subangular blocks; many fine pores; common large spherical slightly weathered calcareous gravel; many very fine roots; gradual smooth boundary to

AC 37 - 54 cm: very dark grayish brown (10YR3/2) when moist; gravelly sandy clay loam; sticky and plastic wet; moderately strong medium subangular blocks and coarse subangular blocks; common large spherical slightly weathered calcareous gravel; frequent large spherical slightly weathered carbonates nodules; many very fine roots; clear wavy boundary to

R 54 + cm: calcareous (limestone) bedrock

SOIL CLASSIFICATION: FAO legend : Haplic Chernozem

USDA taxonomy: Petrocalcic Calciustoll

ANALYTICAL DATA FOR PROFILE LAGANA

Horizon		Apk	Ahk1	Ahk2	AC
Sample depth (cm)		0 - 7	7 - 16	16 - 37	37 - 54
Clay	%	18	21	20	21
Silt	%	8	8	12	12
Very fine sand	%	5	7	7	7
Fine sand	%	22	25	26	24
Medium sand	%	20	19	18	19
Coarse sand	%	19	14	14	14
Very coarse sand	%	9	7	6	6
Texture class		SL	SCL	SL	SCL
pH H2O	1:2.5	8.3	8.3	8.3	8.3
pH KCl	1:2.5	7.3	7.3	7.3	7.3
EC mS/cm	1:2.5	0.10	0.12	0.14	0.17
Organic C	%	1.4	1.5	1.2	1.2
Total N	%	0.11	0.13	0.10	0.09
C/N		13	12	12	13
Available P	mg/kg	6	1	2	5
CEC NH_4OAc	me/100g	16.6	18.0	16.3	13.2
Exch. Ca	me/100g	36.7	39.6	46.1	38.1
Exch. Mg	me/100g	1.6	1.6	1.8	1.4
Exch. K	me/100g	0.60	0.36	0.22	0.10
Exch. Na	me/100g	0.04	0.12	0.10	0.04
Exch. H	me/100g	-	-	-	-
TEB	me/100g	38.9	41.7	48.2	39.6
Base saturation	%	100	100	100	100
CECclay	me/100g	92	86	82	63

Profile site : LUGULU
Region : Shinyanga
District : Bariadi
Location : Lugulu Primary School on a convex slope.
Elevation : 1340 m asl.
Parent material: unconsolidated granitic material
Landform : peneplain; undulating; slope : 2 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 14/06/89

Soil: Shallow, well drained, very dark grayish brown to dark yellowish brown sandy clay on quartz line over regolith at about 45 cm. The topsoil is dark brown loamy sand.

Profile description

Ap1 0 - 7 cm: dark brown (10YR4/3) when dry, very dark brown (10YR2/2) when moist; loamy sand; slightly hard dry, very friable moist, slightly sticky and slightly plastic wet; moderately strong fine crumbs and coarse crumbs; many fine pores; many fine roots; clear smooth boundary to

Ap2 7 - 14 cm: dark grayish brown (10YR4/2) when dry, very dark brown (10YR2/2) when moist; loamy sand; slightly hard dry, very friable moist, slightly sticky and slightly plastic wet; moderately strong coarse subangular blocks and fine crumbs; common coarse fresh fragments; many fine pores; many fine roots; clear smooth boundary to

Bt1 14 - 20 cm: very dark grayish brown (10YR3/2) when moist; sandy clay loam; friable moist, sticky and plastic wet; moderately strong coarse angular blocks; many fine pores; many fine roots; clear wavy boundary to

Bt2 20 - 45 cm: dark yellowish brown (10YR3/4) when moist; sandy clay; friable moist, sticky and plastic wet; moderately strong medium subangular blocks; many fine pores; many fine roots; abrupt wavy boundary to

RC 45 + cm: quartz line overlying saprolyte.

Remarks: In the third and fourth horizon are worm casts infilled with dark soil material.

SOIL CLASSIFICATION: FAO legend : Haplic Luvisol
USDA taxonomy: Lithic Haplustalf

ANALYTICAL DATA FOR PROFILE LUGULU

Horizon		Ap1	Ap2	Bt1	Bt2
Sample depth (cm)		0 - 7	7 - 14	14 - 25	25 - 45
Clay	%	11	12	25	38
Silt	%	8	8	10	12
Very fine sand	%	11	9	9	8
Fine sand	%	23	17	17	13
Medium sand	%	20	17	16	11
Coarse sand	%	18	21	15	12
Very coarse sand	%	9	17	8	9
Texture class		LS	LS	SCL	SC
pH N2O	1:2.5	5.6	6.0	5.9	5.6
pH KCl	1:2.5	4.8	5.0	4.6	4.6
EC mS/cm	1:2.5	0.18	0.12	0.05	0.15
Organic C	%	0.7	0.7	1.2	0.9
Total N	%	0.05	0.05	0.08	0.07
C/N		14	14	15	13
Available P	mg/kg	5	2	-	-
CEC NH_4OAc	me/100g	6.5	6.4	9.6	13.8
Exch. Ca	me/100g	3.6	3.6	5.5	6.6
Exch. Mg	me/100g	1.0	1.2	2.5	4.3
Exch. K	me/100g	0.70	0.81	0.51	0.26
Exch. Na	me/100g	0.10	0.19	0.06	0.17
Exch. H	me/100g	-	-	-	-
TEB	me/100g	5.4	5.8	8.6	11.3
Base saturation	%	83	91	89	82
CECclay	me/100g	59	53	38	36

Profile site : MALEGEYA
Region : Mwanza
District : Ukerewe Map sheet no. : ZZ/1
Location : Malegeya Primary School on a convex slope. Coordinates: 5073/97712
Elevation : 1230 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 3 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 19/06/89

Soil: Very deep, well drained, yellowish red very gravelly sandy loam over plinthite at 140 cm depth. The topsoil is dark yellowish brown loamy sand.

Profile description

Ap 0 - 26 cm: dark yellowish brown (10YR4/4) when dry, dark brown (10YR3/4) when moist; loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; weak medium subangular blocks; many fine pores; many fine and common medium roots; clear smooth boundary to

Bt1 26 - 46 cm: dark brown (7.5YR3/4) when moist; sandy loam; very friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; many fine and common medium roots; clear smooth boundary to

Bt2 46 - 75 cm: dark brown (7.5YR4/4) when moist; very gravelly sandy loam; very friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks; many fine pores; common fine roots; clear smooth boundary to

Bt3 75 - 140 cm: yellowish red (5YR4/6) when moist; very gravelly sandy loam; very friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; common fine roots; clear wavy boundary to

Bsq 140 + cm: Iron crust

SOIL CLASSIFICATION: FAO legend : Haplic Acrisol
USDA taxonomy: Ustic Dystropept

ANALYTICAL DATA FOR PROFILE MALEGEYA

Horizon		Ap	Bt1	Bt2	Bt3	Bt3
Sample depth (cm)		0 - 26	26 - 46	50 - 70	80 - 100	110 - 130
Clay	%	7	13	15	19	17
Silt	%	8	10	10	12	6
Very fine sand	%	8	6	5	6	7
Fine sand	%	20	14	11	10	7
Medium sand	%	18	15	12	11	8
Coarse sand	%	15	16	12	15	17
Very coarse sand	%	25	26	35	27	32
Texture class		LS	SL	SL	SL	SL
pH H2O	1:2.5	5.6	5.1	4.8	4.7	5.0
pH KCl	1:2.5	4.3	4.0	3.8	3.7	4.0
EC mS/cm	1:2.5	0.02	0.03	0.02	0.02	0.07
Organic C	%	0.3	0.4	0.3	0.3	0.2
Total N	%	0.03	0.04	0.04	0.03	0.03
C/N		10	10	8	10	7
Available P	mg/kg	30	30	30	-	-
CEC NH_4OAc	me/100g	2.3	4.4	4.1	4.4	4.8
Exch. Ca	me/100g	0.5	0.5	0.4	0.3	1.2
Exch. Mg	me/100g	0.1	0.1	0.2	0.2	0.1
Exch. K	me/100g	0.12	0.11	0.08	0.05	0.10
Exch. Na	me/100g	0.09	0.10	0.10	0.04	0.19
Exch. H	me/100g	-	0.30	0.22	0.20	0.12
Exch. Al	me/100g		0.60	0.99	0.55	0.34
Al saturation	%		14	24	13	7
TEB	me/100g	0.8	0.8	0.8	0.6	1.6
Base saturation	%	35	18	19	13	33
CECclay	me/100g	33	34	27	23	28

Profile site : MARAMBEKA
Region : Mara
District : Bunda
Location : Marambeka Primary School on a convex slope.
Elevation : 1355 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 5 %. The landscape is an undulating plain which rises to about 1500 m above the Serengeti (1100 m) and the Bigegu plains (1200 m).
Described by J.P. Magoggo and J.D.J. Mbogoni on 18/06/89

Soil: Moderately deep, imperfectly drained, black sandy clay overlying plinthite at 90 cm depth. The topsoil is greyish brown loamy sand.

Profile description

Ap 0 - 5 cm: grayish brown (10YR5/2) when dry, very dark brown (10YR2/2) when moist; loamy sandy; soft dry, very friable moist, slightly sticky and non-plastic wet; moderate medium subangular blocks; many fine pores; many fine roots; abrupt smooth boundary to

Ah 5 - 19 cm: dark grayish brown (10YR4/2) when dry, very dark brown (10YR2/2) when moist; loamy sand; few fine faint diffuse dark yellowish brown (10YR3/4) mottles; friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; many fine roots; clear smooth boundary to

Btg 19 - 44 cm: very dark grayish brown (10YR3/2) when moist; sandy loam; common fine faint diffuse dark yellowish brown (10YR4/4) mottles; friable moist, sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; many fine roots; abrupt smooth boundary to

2Btg 44 - 90 cm: black (10YR2/1) when moist; sandy clay; common fine distinct clear dark brown 7.5YR3/4 mottles; extremely firm moist, sticky and plastic wet; strong coarse angular blocks; few fine pores; many fine roots; abrupt wavy boundary to

Bsq 90 + cm: Iron crust

SOIL CLASSIFICATION: FAO legend : Plinthic Alisol
USDA taxonomy: Typic Dystropept

ANALYTICAL DATA FOR PROFILE MARAMBEKA

Horizon		Ap	Ah	Btg	2Btg
Sample depth (cm)		0 - 5	5 - 19	20 - 41	70 - 90
Clay	%	8	9	17	37
Silt	%	12	10	12	16
Very fine sand	%	14	7	11	9
Fine sand	%	34	25	25	19
Medium sand	%	18	20	18	7
Coarse sand	%	10	14	11	6
Very coarse sand	%	5	15	6	7
Texture class		LS	LS	SL	SC
pH H2O	1:2.5	5.9	5.6	5.4	7.7
pH KCl	1:2.5	4.6	4.3	4.2	6.1
EC mS/cm	1:2.5	0.02	0.03	0.11	0.20
Organic C	%	0.7	0.8	0.5	0.4
Total N	%	0.05	0.06	0.05	0.06
C/N		14	13	10	7
Available P	mg/kg	5	3	4	2
CEC NH_4OAc	me/100g	5.1	7.0	9.7	16.0
Exch. Ca	me/100g	2.0	2.4	2.7	10.5
Exch. Mg	me/100g	0.6	0.9	1.0	2.6
Exch. K	me/100g	0.19	0.19	0.19	1.02
Exch. Na	me/100g	0.03	0.04	0.31	1.62
Exch. H	me/100g	-	-	-	-
Exch. Al	me/100g			0.15	
Al saturation	%			2	
TEB	me/100g	2.8	3.5	4.2	15.8
Base saturation	%	55	50	43	99
CECclay	me/100g	64	78	57	43
ESP	%				10

Profile site : MASABI
Region : Shinyanga
District : Kahama
Location : Masabi Primary School on a straight slope.
Elevation : 1220 m asl.
Parent material: colluvial material from granitic rocks
Landform : footslope (undefined); hilly; slope : 4 %.
Surface characteristics : Surface sealing: 2 mm thickness
Described by J.P. Magoggo and J.D.J. Mbogoni on 10/06/89

Soil: Shallow, moderately well drained, very dark grayish brown sandy loam on plinthite/laterite at 40 cm depth.

Profile description

Ap1 0 - 11 cm: dark brown (10YR4/3) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks and very coarse subangular blocks; many very fine and fine pores; few small spherical hard iron nodules; many fine roots; clear wavy boundary to

Ap2 11 - 20 cm: dark yellowish brown (10YR3/4) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks and very coarse subangular blocks; many very fine and fine pores; few small spherical hard iron nodules; many fine roots; abrupt smooth boundary to

Au 20 - 29 cm: dark brown (10YR4/3) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; weak fine subangular blocks and medium subangular blocks; many very fine and fine pores; frequent small spherical hard iron nodules; many fine roots; clear smooth boundary to

AC 29 - 42 cm: dark yellowish brown (10YR4/4) when moist; gravelly sandy loam; friable moist, moderately weak fine subangular blocks and medium subangular blocks; many very fine and fine pores; frequent small spherical hard iron nodules; common fine roots; abrupt wavy boundary to

Cms 42+ cm: Iron crust (plinthite)

SOIL CLASSIFICATION: FAO legend : Dystric Regosol
USDA taxonomy: Typic Ustifluvent

ANALYTICAL DATA FOR PROFILE MASABI

Horizon		Ap1	Ap2	Au	AC
Sample depth (cm)		0 - 11	11 - 20	20 - 29	29 - 42
Clay	%	14	12	12	9
Silt	%	22	18	16	20
Very fine sand	%	13	12	8	7
Fine sand	%	25	27	24	21
Medium sand	%	12	15	15	12
Coarse sand	%	7	8	9	8
Very coarse sand	%	7	8	16	23
Texture class		SL	SL	SL	SL
pH H2O	1:2.5	5.9	5.9	5.8	6.1
pH KCl	1:2.5	4.8	4.6	4.5	4.5
EC mS/cm	1:2.5	0.02	0.01	0.09	0.04
Organic C	%	1.3	0.7	0.8	0.6
Total N	%	0.10	0.07	0.06	0.07
C/N		13	10	13	9
Available P	mg/kg	1	1	1	1
CEC NH_4OAc	me/100g	6.7	4.5	4.3	3.5
Exch. Ca	me/100g	2.5	1.7	1.4	0.9
Exch. Mg	me/100g	1.1	0.6	0.3	0.1
Exch. K	me/100g	0.18	0.05	0.09	0.04
Exch. Na	me/100g	0.05	0.04	0.34	0.15
Exch. H	me/100g	-	-	-	-
TEB	me/100g	3.8	2.4	2.1	1.2
Base saturation	%	57	53	50	34
CECclay	me/100g	48	38	36	39
ESP	%			8	4

Profile site : MGAJA
Region : Mara
District : Bunda
Location : Mgaja Primary School on a convex slope.
Elevation : 1320 m asl.
Parent material: granite
Landform : ersional plain; undulating; slope : 8 %; relief intensity about 50 m.
Described by J.P. Magoggo and J.D.J. Mbogoni on 17/06/89

Soil: Deep, somewhat excessively drained, dark brown sandy clay loam on granitic saprolyte at about 100 cm depth. The topsoil is very dark grey sand.

Profile description

Ap 0 - 8 cm: dark grayish brown (10YR4/2) when dry, very dark brown (10YR2/2) when moist; very gravelly loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; weak fine crumbs; many fine pores; many fine roots; abrupt smooth boundary to

Ah 8 - 26/46 cm: dark brown (10YR3/3) when moist; very gravelly loamy sand; friable moist, non-sticky and non-plastic wet; moderately weak fine subangular blocks and medium crumbs; many fine pores; very few medium angular fresh quartzitic gravel; many fine roots; clear irregular boundary to

Bt/C 26/46 - 74/110cm: dark brown (10YR4/3) when moist; very gravelly sandy clay loam; friable moist, slightly sticky and slightly plastic wet; weak medium subangular blocks; many fine pores; frequent gravel-sized irregular weathered granitic fragments; many fine roots; clear irregular boundary to

C 110+ cm: highly weathered granitic saprolyte.

SOIL CLASSIFICATION: FAO legend : Haplic Alisol
USDA taxonomy: Ustic Dystropept

ANALYTICAL DATA FOR PROFILE MGAJA

Horizon		Ap	Ah	Bt/C
Sample depth (cm)		0 - 8	8 - 26/46	26/46 - 74/110
Clay	%	7	10	21
Silt	%	8	8	16
Very fine sand	%	9	9	10
Fine sand	%	14	14	9
Medium sand	%	10	11	9
Coarse sand	%	12	10	13
Very coarse sand	%	40	38	22
Texture class		LS	LS	SCL
pH H2O	1:2.5	6.5	6.5	5.5
pH KCl	1:2.5	5.3	5.3	4.1
EC mS/cm	1:2.5	0.03	0.03	0.03
Organic C	%	0.9	1.1	1.2
Total N	%	0.06	0.08	0.08
C/N		15	14	15
Available P	mg/kg	22	30	5
CEC NH_4OAc	me/100g	3.9	5.4	7.8
Exch. Ca	me/100g	1.3	1.6	2.0
Exch. Mg	me/100g	0.5	0.5	1.3
Exch. K	me/100g	0.20	0.17	0.30
Exch. Na	me/100g	0.08	0.05	0.04
Exch. H	me/100g	-	-	-
TEB	me/100g	2.1	1.8	3.6
Base saturation	%	53	45	46
CECclay	me/100g	56	54	37

Profile site : MUBONDO
Region : Kigoma
District : Kasulu
Location : MATI/ARI Mubondo on a straight slope.
Elevation : 1230 m asl.
Parent material: metamorphic rocks
Landform : peneplain; undulating; slope : 5 %
Described by J.P. Magoggo and J.D.J. Mbogoni on 09/06/89

Soil: Very deep, well drained dusky red clay.

Profile description

Ap 0 - 19 cm: dark reddish brown (2.5YR2.5/4) when moist; clay; friable moist, sticky and plastic wet; strong medium subangular blocks and medium crumbs; many fine pores; many fine roots; clear smooth boundary to

BA 19 - 34 cm: dark red (10R3/3) when moist; clay; friable moist, sticky and plastic wet; strong medium subangular blocks and coarse crumbs; broken thick clay cutans; many fine pores; common fine and medium roots; clear smooth boundary to

Bw 34 - 57 cm: dusky red (10R3/4) when moist; clay; friable moist, sticky and plastic wet; strong medium subangular blocks and coarse subangular blocks; broken thick clay cutans; many fine pores; common fine and medium roots; gradual smooth boundary to

Bt 57 - 130 cm: dusky red (10R3/4) when moist; clay; friable moist, slightly sticky and slightly plastic wet; strong very coarse subangular blocks and coarse subangular blocks; patchy thin clay cutans; many fine pores; common fine and medium roots

SOIL CLASSIFICATION: FAO legend : Rhodic Ferralsol
USDA taxonomy: Rhodic Acrustox

ANALYTICAL DATA FOR PROFILE MUBONDO

Horizon		Ap	BA	Bw	Bt	Bt
Sample depth (cm)		0 - 19	19 - 34	34 - 57	80 - 100	130 - 150
Clay	%	70	76	74	85	89
Silt	%	20	20	22	12	3
Very fine sand	%	1	2	1	4	1
Fine sand	%	2	2	1	-	1
Medium sand	%	3	2	1	-	1
Coarse sand	%	2	1	1	-	1
Very coarse sand	%	1	-	-	-	1
Texture class		C	C	C	C	C
pH H2O	1:2.5	5.2	4.4	4.1	4.5	5.7
pH KCl	1:2.5	4.4	4.1	4.1	4.4	5.5
EC mS/cm	1:2.5	0.07	0.08	0.12	0.10	0.01
Organic C	%	3.1	2.0	1.2	0.5	0.3
Total N	%	0.18	0.13	0.08	0.05	0.04
C/N		17	15	15	10	8
Available P	mg/kg	-	-	1	-	-
CEC NH_4OAc	me/100g	14.6	11.3	7.2	4.3	3.4
Exch. Ca	me/100g	3.3	0.3	0.3	0.7	0.2
Exch. Mg	me/100g	1.3	0.2	0.1	0.4	0.2
Exch. K	me/100g	0.13	0.05	0.07	0.05	0.03
Exch. Na	me/100g	0.04	0.04	0.04	0.04	0.05
Exch. H	me/100g	0.17	0.41	0.15	0.10	-
Exch. Al	me/100g	0.18	0.88	1.10	1.00	-
Al saturation	%	1	8	15	23	
TEB	me/100g	4.8	0.6	0.5	1.2	0.5
Base saturation	%	33	5	7	28	14
CECclay	me/100g	21	15	19	5	4

Profile site : MWADILA
Region : Shinyanga
District : Maswa
Location : Mwadila - A Primary School on a convex slope.
Elevation : 1335 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 1 %
Described by J.P. Magoggo and J.D.J. Mbogoni on 14/06/89

Soil: Moderately deep, well drained, dark brown loamy sand over a gravelly layer of quartzitic material at about 45 cm.

Profile description

Ap 0 - 8 cm: brown (10YR5/3) when dry, dark brown (10YR4/3) when moist; loamy sand; soft dry, very friable moist, non-sticky and non-plastic wet; moderate medium subangular blocks and crumbs; many fine and medium pores; common fine roots; abrupt smooth boundary to

BA 8 - 25 cm: dark brown (10YR4/3) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks; many fine and medium pores; common fine roots; clear smooth boundary to

Bw 25 - 45 cm: very dark grayish brown (10YR3/2) when moist; sandy loam; friable moist, slightly sticky and slightly plastic wet; moderately weak fine subangular blocks; many fine pores; few fine roots; abrupt smooth boundary to

C 45+ cm: consolidated gravel layer of quartz.

SOIL CLASSIFICATION: FAO legend : Eutric Regosol
USDA taxonomy: Typic Ustifluvent

ANALYTICAL DATA FOR PROFILE MWADILA

Horizon		Ap	BA	Bw
Sample depth (cm)		0 - 8	8 - 25	25 - 45
Clay	%	8	11	12
Silt	%	8	12	10
Very fine sand	%	10	16	12
Fine sand	%	26	32	29
Medium sand	%	24	19	19
Coarse sand	%	14	8	9
Very coarse sand	%	10	3	9
Texture class		LS	SL	SL
pH H2O	1:2.5	6.8	7.2	7.2
pH KCl	1:2.5	5.7	6.0	6.1
EC mS/cm	1:2.5	0.05	0.04	0.05
Organic C	%	0.4	0.6	0.5
Total N	%	0.03	0.05	0.05
C/N		13	12	10
Available P	mg/kg	30	-	-
CEC NH_4OAc	me/100g	3.8	6.2	7.2
Exch. Ca	me/100g	2.4	4.2	4.4
Exch. Mg	me/100g	0.6	1.6	1.5
Exch. K	me/100g	0.53	0.65	0.64
Exch. Na	me/100g	0.03	0.04	0.04
Exch. H	me/100g	-	-	-
TEB	me/100g	3.6	6.5	6.6
Base saturation	%	94	100	100
CECclay	me/100g	48	56	49

Profile site : MWAMALA
Region : Shinyanga
District : Shinyanga rural
Location : Mwamala Agricultural Research Substation on a straight slope.
Elevation : 1080 m asl.
Parent material: limestone
Landform : peneplain; flat or almost flat; slope : 4 %.
Surface characteristics : Slight cracking.
Described by J.P. Magoggo and J.D.J. Mbogoni on 12/06/89

Soil: Moderately deep, well drained, dark grey clay over calcareous bedrock at 60 cm depth.

Profile description

Apk 0 - 12 cm: very dark brown (10YR2/2) when moist; clay; slightly hard dry, friable moist, sticky and plastic wet; strong fine subangular blocks and coarse subangular blocks; many fine pores; frequent small spherical slightly weathered calcareous nodules; many very fine roots; clear smooth boundary to

ABk 12 - 30 cm: very dark grayish brown (10YR3/2) when moist; clay; friable moist, sticky and plastic wet; strong fine subangular blocks and medium subangular blocks; many fine pores; frequent small spherical slightly weathered calcareous nodules; many very fine roots; clear smooth boundary to

Bwk 30 - 58 cm: very dark grayish brown (10YR3/2) when moist; clay; friable moist, sticky and plastic wet; strong medium subangular blocks and coarse subangular blocks; many fine pores; frequent small spherical slightly weathered calcareous nodules; many very fine and few medium roots; abrupt smooth boundary to

R 58+ cm: slightly weathered limestone bedrock.

SOIL CLASSIFICATION: FAO legend : Eutric Cambisol
USDA taxonomy: Typic Ustropept

ANALYTICAL DATA FOR PROFILE MWAMALA

Horizon		Apk	ABk	Bwk
Sample depth (cm)		0 - 12	12 - 30	35 - 55
Clay	%	39	43	31
Silt	%	30	32	40
Very fine sand	%	16	9	7
Fine sand	%	6	7	7
Medium sand	%	4	4	4
Coarse sand	%	3	3	5
Very coarse sand	%	1	2	3
Texture class		CL	C	CL
pH H2O	1:2.5	8.1	8.2	8.1
pH KCl	1:2.5	7.0	7.1	7.0
EC mS/cm	1:2.5	0.13	0.14	0.20
Organic C	%	2.3	2.1	2.0
Total N	%	0.18	0.16	0.16
C/N		13	13	13
Available P	mg/kg	12	2	1
CEC NH_4OAc	me/100g	49.8	42.5	44.4
Exch. Ca	me/100g	55.8	59.6	72.5
Exch. Mg	me/100g	3.2	3.0	2.7
Exch. K	me/100g	0.96	0.55	0.45
Exch. Na	me/100g	0.29	0.44	0.43
Exch. H	me/100g	-	-	-
TEB	me/100g	60.3	63.6	76.1
Base saturation	%	100	100	100
CECclay	me/100g	128	99	143

Profile site : MWANHALA
Region : Tabora
District : Nzega Map sheet: 80/3
Location : Mwanhala Agricultural Research sub-station on a convex slope.
Coordinates: 5155/95188
Elevation : 1215 m asl.
Parent material: granite
Landform : peneplain; flat or almost flat; slope : 1 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 11/06/89

Soil: Moderately deep, well drained, dark red sandy loam to sandy clay loam on hard plinthite at about 50 cm depth.

Profile description

Ap 0 - 9 cm: dark reddish brown (2.5YR3/4) when dry, dark reddish brown (2.5YR2.5/4) when moist; sandy loam; soft dry, friable moist, slightly sticky and slightly plastic wet; moderate fine subangular blocks and medium subangular blocks; many fine pores; very few small spherical hard iron nodules; many fine roots; clear smooth boundary to

BA 9 - 24 cm: dark red (2.5YR3/6) when dry, dark reddish brown (2.5YR3/4) when moist; sandy loam; soft dry, friable moist, slightly sticky and slightly plastic wet; moderately strong medium subangular blocks; many fine pores; very few medium spherical hard iron/manganese nodules; common fine roots; clear smooth boundary to

Bt 24 - 40 cm: red (2.5YR4/6) when dry, dark red (2.5YR3/6) when moist; sandy clay loam; soft dry, friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks; many fine pores; very few small spherical hard iron nodules; common fine roots; abrupt wavy boundary to

Bsq 40+ cm: Iron crust (plinthite)

SOIL CLASSIFICATION: FAO legend : Eutric Plinthosol
USDA taxonomy: Plinthustalf

ANALYTICAL DATA FOR PROFILE MWANHALA

Horizon		Ap	BA	Bt
Sample depth (cm)		0 - 9	9 - 24	24 - 40
Clay	%	17	20	28
Silt	%	6	6	6
Very fine sand	%	9	11	10
Fine sand	%	30	29	25
Medium sand	%	23	21	17
Coarse sand	%	11	9	8
Very coarse sand	%	4	4	5
Texture class		SL	SL	SCL
pH H2O	1:2.5	4.8	4.7	5.8
pH KCl	1:2.5	3.8	3.9	4.7
EC mS/cm	1:2.5	0.02	0.03	0.05
Organic C	%	0.3	0.3	0.3
Total N	%	0.03	0.03	0.03
C/N		10	10	10
Available P	mg/kg	5	3	1
CEC NH_4OAc	me/100g	3.6	3.2	3.9
Exch. Ca	me/100g	0.5	0.8	1.6
Exch. Mg	me/100g	0.3	0.3	0.6
Exch. K	me/100g	0.06	0.02	0.01
Exch. Na	me/100g	0.12	0.03	0.06
Exch. H	me/100g	0.19	0.05	0.15
Exch. Al	me/100g	0.56	0.25	-
Al. saturation	%	16	8	-
TEB	me/100g	1.0	1.2	2.3
Base saturation	%	27	36	58
CEC clay	me/100g	21	16	14

Profile site : NDALA
Region : Shinyanga
District : Shinyanga Urban Map sheet: 64/2
Location : Ndala Primary School on convex slope. Coordinates: 5445/95958
Elevation : 1110 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 0.5 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 13/06/89

Soil: Shallow, well drained brown sandy loam over laterite at about 40 cm depth.

Profile description

Ap 0 - 10 cm: dark brown (7.5YR4/4) when dry, dark brown (7.5YR3/4) when moist; loamy sand; soft dry, friable moist, slightly sticky and slightly plastic wet; moderately strong medium subangular blocks and crumbs; many fine and medium pores; common fine roots; clear smooth boundary to

BA 10 - 25 cm: dark reddish brown (5YR3/4) when dry, dark reddish brown (5YR3/2) when moist; sandy loam; slightly hard dry, friable moist, slightly sticky and slightly plastic wet; moderately strong medium subangular blocks; many fine and medium pores; very few medium irregular slightly weathered ironstone and quartz fragments; common fine roots; clear smooth boundary to

Bt 25 - 42 cm: yellowish red (5YR4/6) when dry, reddish brown (5YR4/4) when moist; sandy loam; slightly hard dry, friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and coarse subangular blocks; many fine and medium pores; few fine roots; abrupt wavy boundary to

Bsq 42+ cm: Iron crust (plinthite)

SOIL CLASSIFICATION: FAO legend : Eutric Plinthosol
USDA taxonomy: Plinthustalf

ANALYTICAL DATA FOR PROFILE NDALA

Horizon		Ap	BA	Bt
Sample depth (cm)		0 - 10	10 - 25	25 - 42
Clay	%	11	14	17
Silt	%	10	10	6
Very fine sand	%	8	8	6
Fine sand	%	18	18	13
Medium sand	%	17	18	15
Coarse sand	%	17	17	18
Very coarse sand	%	19	14	25
Texture class		LS	SL	SL
pH H2O	1:2.5	6.2	5.7	5.5
pH KCl	1:2.5	4.7	4.1	4.0
EC mS/cm	1:2.5	0.03	0.02	0.01
Organic C	%	0.6	0.6	0.6
Total N	%	0.05	0.06	0.06
C/N		12	10	10
Available P	mg/kg	6	-	2
CEC NH_4OAc	me/100g	5.1	6.2	5.3
Exch. Ca	me/100g	2.2	2.5	2.0
Exch. Mg	me/100g	0.9	1.0	1.0
Exch. K	me/100g	0.45	0.30	0.14
Exch. Na	me/100g	0.07	0.06	0.04
Exch. H	me/100g	-	-	-
TEB	me/100g	3.6	3.9	3.2
Base saturation	%	71	62	60
CECclay	me/100g	46	44	31

Profile site : NDUHA
Region : Mwanza
District : Kwimba
Location : Nduha Primary School on a convex slope.
Elevation : 1145 m asl.
Parent material: granite
Landform : peneplain; gently undulating; slope : 3 %
Described by J.P. Magoggo and J.D.J. Mbogoni on 22/06/89

Soil: Moderately deep, well drained, brown sandy clay loam over quartz/stone layer at about 80 cm depth. The topsoil is brown sandy loam.

Profile description

Ap 0 - 17 cm: brown (7.5YR5/4) when dry, dark brown (7.5YR3/2) when moist; sandy loam; slightly hard dry, very friable moist, slightly sticky and slightly plastic wet; moderately strong coarse subangular blocks; many fine and medium pores; many fine roots; abrupt smooth boundary to

BA 17 - 40 cm: dark brown (7.5YR4/2) when dry, dark brown (7.5YR3/2) when moist; sandy clay loam; very hard dry, very friable moist, sticky and plastic wet; moderately strong very coarse subangular blocks; many fine and common coarse pores; many fine roots; gradual wavy boundary to

Bt 40 - 80 cm: yellowish red (5YR4/6) when dry, dark brown (5YR3/4) when moist; sandy clay loam; very hard dry, friable moist, very sticky and plastic wet; moderately strong coarse subangular blocks; many fine and common coarse pores; common fine roots; abrupt smooth boundary to

2Bu 80 - 100+ cm: very gravelly sandy clay loam (stone (quartz) line)

SOIL CLASSIFICATION: FAO legend : Haplic Luvisol
USDA taxonomy: Typic Ustropept

ANALYTICAL DATA FOR PROFILE NDUHA

Horizon		Ap	BA	Bt
Sample depth (cm)		0 - 17	20 - 40	50 - 70
Clay	%	10	22	32
Silt	%	24	22	22
Very fine sand	%	14	11	8
Fine sand	%	26	21	14
Medium sand	%	15	14	11
Coarse sand	%	6	6	6
Very coarse sand	%	5	4	7
Texture class		SL	SCL	SCL
pH H2O	1:2.5	6.7	6.6	6.2
pH KCl	1:2.5	5.3	5.2	4.5
EC mS/cm	1:2.5	0.03	0.03	0.03
Organic C	%	0.8	0.7	0.5
Total N	%	0.04	0.05	0.04
C/N		20	14	13
Available P	mg/kg	8	2	4
CEC NH_4OAc	me/100g	5.6	10.3	13.9
Exch. Ca	me/100g	3.2	5.2	5.4
Exch. Mg	me/100g	1.4	3.0	3.0
Exch. K	me/100g	0.21	0.13	0.13
Exch. Na	me/100g	0.13	0.13	0.23
Exch. H	me/100g	-	-	-
TEB	me/100g	4.9	8.5	8.8
Base saturation	%	88	82	63
CECclay	me/100g	56	47	43

Profile site : NGUNGA
Region : Mwanza
District : Magu
Location : Ngunga (B) Primary School on a convex slope.
Elevation : 1230 m asl.
Parent material: metamorphic rocks
Landform : peneplain; gently undulating; slope : 2 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 17/06/89

Soil: Shallow, well drained, dark brown sandy clay on a gravelly layer at about 18 cm depth. The topsoil is very dark brown sandy loam.

Profile description

Ap 0 - 15 cm: dark brown (10YR3/3) when dry, very dark brown (10YR2/2) when moist; sandy loam; slightly hard dry, very friable moist, slightly sticky and plastic wet; moderately strong medium and coarse subangular blocks; many fine pores; common medium, rounded, fresh quartz gravel; many fine roots; clear smooth boundary to

Bt1 15 - 18/25 cm: dark brown (7.5YR3/4) when moist; sandy clay; friable moist, sticky and wet; moderate medium and coarse subangular blocks; many fine pores; common medium rounded fresh quartz gravel; many fine roots; abrupt wavy boundary to

Bt2? 18/25+ cm: A gravelly layer with rounded, 3 - 5 cm diameter quartz gravel.

SOIL CLASSIFICATION: FAO legend : Eutric Leptosol
USDA taxonomy: Typic Ustropept

ANALYTICAL DATA FOR PROFILE NGUNGA

Horizon		Ap	Bt1
Sample depth (cm)		0 - 15	15 - 18
Clay	%	20	37
Silt	%	18	16
Very fine sand	%	16	14
Fine sand	%	23	17
Medium sand	%	13	9
Coarse sand	%	6	4
Very coarse sand	%	4	3
Texture class		SL	SC
pH H2O	1:2.5	6.3	6.6
pH KCl	1:2.5	5.2	5.1
EC mS/cm	1:2.5	0.06	0.05
Organic C	%	1.6	1.3
Total N	%	0.09	0.09
C/N		18	14
Available P	mg/kg	30	23
CEC NH_4OAc	me/100g	10.6	21.9
Exch. Ca	me/100g	5.8	11.9
Exch. Mg	me/100g	2.1	5.3
Exch. K	me/100g	0.54	0.65
Exch. Na	me/100g	0.04	0.12
Exch. H	me/100g	-	-
TEB	me/100g	8.5	18.0
Base saturation	%	80	82
CECclay	me/100g	53	59

Profile site : INONELWA
Region : Mwanza
District : Kwimba
Location : Inonelwa Primary School on concave slope
Parent material: granite
Landform : peneplain; undulating; slope : 3 %.
Described by J.P. Magoggo and S.D.J. Mbogoni on 22/06/89

Soil: Moderately deep, well drained, grayish brown gravelly loamy sand over laterite at about 80 cm depth.

Profile description

Ap1 0 - 10 cm: dark grey (10YR6/1) when dry, dark grayish brown (10YR4/1) when moist; loamy sandy; soft dry, very friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and coarse crumbs; many fine pores; many fine roots; clear smooth boundary to

Ap2 10 - 34 cm: grayish brown (10YR5/2) when dry, dark grayish brown (10YR4/2) when moist; loamy sand; slightly hard dry, very friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and coarse crumbs; many fine pores; common fine roots; abrupt smooth boundary to

AC 34 - 55 cm: grayish brown (10YR5/2) when dry, dark grayish brown (10YR4/2) when moist; gravelly loamy sand; very hard dry, very friable moist, slightly sticky and slightly plastic wet; weak very coarse subangular blocks; many fine pores; common fine roots; gradual smooth boundary to

CA 55 - 80 cm: grayish brown (10YR5/2) when dry, brown (10YR4/3) when moist; very gravelly loamy sand; slightly hard dry, very friable moist, non-sticky and non-plastic wet; moderate medium subangular blocks; many fine pores; common fine roots; clear smooth boundary to

Cms 80 - 120+ cm: iron crust (laterite)

SOIL CLASSIFICATION: FAO legend : Luvic Arenosol
USDA taxonomy: Ustic Quartzipsamment

ANALYTICAL DATA FOR PROFILE INONELWA

Horizon		Ap1	Ap2	AC	CA
Sample depth (cm)		0 - 10	10 - 34	34 - 55	55 - 80
Clay	%	4	5	8	5
Silt	%	18	16	12	10
Very fine sand	%	10	12	8	6
Fine sand	%	20	25	19	18
Medium sand	%	15	18	16	17
Coarse sand	%	13	13	14	15
Very coarse sand	%	20	14	23	29
Texture class		LS	LS	LS	LS
pH H2O	1:2.5	6.8	6.8	6.9	6.5
pH KCl	1:2.5	5.8	5.8	5.6	5.1
EC mS/cm	1:2.5	0.04	0.03	0.02	0.02
Organic C	%	0.5	0.4	0.3	0.2
Total N	%	0.03	0.03	0.02	0.02
C/N		17	13	15	10
Available P	mg/kg	14	4	3	3
CEC NH_4OAc	me/100g	3.9	3.6	4.4	2.7
Exch. Ca	me/100g	2.5	2.7	3.5	1.8
Exch. Mg	me/100g	0.5	0.4	0.5	0.3
Exch. K	me/100g	0.25	0.14	0.14	0.07
Exch. Na	me/100g	0.04	0.07	0.10	0.10
Exch. H	me/100g	-	-	-	-
TEB	me/100g	3.3	3.3	4.2	2.3
Base saturation	%	84	92	96	84
CECclay	me/100g	98	72	55	54

Profile site : NTOBO
Region : Shinyanga
District : Kahama Map sheet: 63/1
Location : Gula Primary School on a straight slope. Coordinates: 4665/95927
Elevation : 1180 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 2 %.
Described by J.P. Magogo and J.D.J. Mbogoni on 10/06/89

Soil: Moderately deep (about 50 cm to murram), well drained, dark brown loamy sand over sandy loam.

Profile description

Ah1 0 - 11 cm: dark brown (7.5YR4/4) when dry, dark brown (7.5YR3/4) when moist; loamy sand; soft dry, friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and coarse subangular blocks; many fine and medium pores; few medium hard spherical iron/manganese nodules; many fine roots; clear smooth boundary to

Ah2 11 - 24 cm: dark brown (7.5YR4/4) when moist; loamy sand; friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks; many fine and medium pores; few medium hard spherical iron/manganese nodules; many fine roots; clear smooth boundary to

Bt1 24 - 50 cm: dark brown (7.5YR4/4) when moist; sandy loam; very friable moist, slightly sticky and slightly plastic wet; moderate medium subangular blocks and coarse subangular blocks; many fine and medium pores; few medium hard spherical iron/manganese nodules; many fine roots; abrupt smooth boundary to

Bt2 50 - 82+ cm: very gravelly sandy loam; few fine roots

SOIL CLASSIFICATION: FAO legend : Haplic Alisol
USDA taxonomy: Fluventic Dystropept

ANALYTICAL DATA FOR PROFILE NTOBO

Horizon		Ah1	Ah2	Bt1	Bt2
Sample depth (cm)		0 - 11	11 - 24	24 - 50	60 - 80
Clay	%	11	9	13	15
Silt	%	10	8	10	30
Very fine sand	%	7	7	5	6
Fine sand	%	26	28	20	15
Medium sand	%	25	28	24	19
Coarse sand	%	16	16	21	10
Very coarse sand	%	5	4	7	4
Texture class		LS	LS	SL	SL
pH H2O	1:2.5	6.1	5.9	5.2	5.3
pH KCl	1:2.5	4.8	4.5	4.2	4.5
EC mS/cm	1:2.5	0.02	0.02	0.02	0.02
Organic C	%	0.4	0.3	0.2	0.4
Total N	%	0.04	0.04	0.03	0.02
C/N		10	8	7	20
Available P	mg/kg	6	3	3	-
CEC NH_4OAc	me/100g	2.5	3.0	3.2	4.1
Exch. Ca	me/100g	0.9	0.9	0.9	1.0
Exch. Mg	me/100g	0.3	0.3	0.3	0.4
Exch. K	me/100g	0.26	0.14	0.15	0.05
Exch. Na	me/100g	0.04	0.04	0.04	0.06
Exch. H	me/100g	-	-	0.17	0.25
Exch. Al	me/100g			0.18	-
Al saturation	%			6	-
TEB	me/100g	1.5	1.4	1.4	1.5
Base saturation	%	60	46	43	37
CECclay	me/100g	23	33	25	27

Profile site : SANZATE
Region : Mara
District : Bunda
Location : Sanzate Primary School on a convex slope.
Elevation : 1340 m asl.
Parent material: granite
Landform : peneplain; undulating; slope : 2 %.
Described by J.P. Magoggo and J.D.J. Mbogoni on 18/06/89

Soil: Shallow, well drained, dark brown loamy sand on laterite at about 30 to 60 cm depth.

Profile description

Ap 0 - 20 cm: dark grayish brown (10YR4/2) when moist; loamy sand; very friable moist, non-sticky and non-plastic wet; weak fine and medium crumbs; many fine pores; many fine roots; abrupt wavy boundary to

Ah 20 - 29 cm: dark brown (10YR3/3) when moist; loamy sand; very friable moist, slightly sticky and slightly plastic wet; moderate coarse subangular blocks; many fine pores; common fine roots; clear smooth boundary to

Bt 29 - 30/60cm: dark yellowish brown (10YR3/4) when moist; loamy sand; very friable moist, slightly sticky and non-plastic wet; moderately weak medium and coarse subangular blocks; many fine pores; common fine roots; abrupt irregular boundary to

Btms 30/60+ cm: iron crust (laterite)

SOIL CLASSIFICATION: FAO legend : Ferric Lixisol
USDA taxonomy: Typic Ustorthent

ANALYTICAL DATA FOR PROFILE SANZATE

Horizon		Ap	Ah	Bt
Depth (cm)		0 - 20	20 - 29	29 - 50
Clay	%	6	4	11
Silt	%	6	5	6
Very fine sand	%	9	6	7
Fine sand	%	23	14	18
Medium sand	%	19	14	17
Coarse sand	%	21	24	20
Very coarse sand	%	13	28	18
Texture class		S	LS	LS
pH H2O	1:2.5	6.3	6.1	5.8
pH KCl	1:2.5	5.2	4.5	4.4
EC mS/cm	1:2.5	0.03	0.02	0.01
Organic C	%	0.4	0.4	0.2
Total N	%	0.04	0.03	0.03
C/N		10	13	7
Available P	mg/kg	8	3	2
CEC NH_4OAc	me/100g	3.0	2.1	1.5
Exch. Ca	me/100g	1.0	0.9	0.9
Exch. Mg	me/100g	0.3	0.3	0.1
Exch. K	me/100g	0.19	0.07	0.03
Exch. Na	me/100g	0.04	0.04	0.04
Exch. H	me/100g	-	-	-
TEB	me/100g	1.5	1.3	1.1
Base saturation	%	51	62	71
CECclay	me/100g	50	53	14

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