

Reference soil Kenya 67:

Description

Location: Kajiado district. Themeda triandra is dominant grass species. Slides: 10,225 - 10,228.



Classification

WRB 2006:

WRB 1998:

FAO-UNESCO-ISRIC 1988:

FAO-UNESCO 1974:

Site description

General information:

Names of person(s) : Kuyper J & S Mwangi
who described the
profile
General description of : Kajiado District, plateau near
location of profile (e.g., Manyatta Muranya, 5km S of
town, province) Olyangalani school
Date : November 1985
Latitude / Longitude : S -1.7944444° / E 36.7889°

Physiography:

The altitude of the : 1765 m asl
soil profile relative
to mean sea level,
specified in meters
Regional landform : plain
Topography of the : undulating
surrounding country
Physiographic Unit : gently undulating plain
in the immediate
surrounding of the
site
The slope refers to : 3 %
the inclination of the
land immediately
surrounding the
site. The measured
or estimated slope
angle is specified to
the nearest per cent
The physiographic : upper slope
position of the site
where the profile is
located

Form of the slope : convex
surrounding the site
Slope Aspect of the :
site

Parent material:

The main parent rock/ : tuff
material over which
the soil has been
formed (1st entry)
Mode of Accumulation : residual material
or deposition of parent
material (1st entry)
Texture of parent : clayey
material (1st entry)
Weathering status of : highly
solid rock (1st entry)
Resistance against : poor
weathering (solid rock)
(1st entry)
Depth1 of lithological : cm
boundary
The main parent rock/ :
material over which
the soil has been
formed (2nd entry)
Resistance against :
weathering (solid rock)
(2nd entry)
Soil Depth; depth to : 90 cm
which roots can easily
penetrate throughout
the year
Remarks on Parent : Olorgesailie biotite phonolite
Materials

Land use / vegetation:

Current land use at : semi-natural grassland, grazed
the site
Major crops :
Main type of irrigation :
Rotation scheme : crop rotation scheme not relevant
Vegetation Type;The : medium tall grassland
natural vegetation at
the site
Status of vegetation : degraded
Remarks on Land : VEGETATION: Natural
Use / Vegetation : grasslands; dominant grass
species Themeda triandra

Hydrology and drainage:

Depth of : cm
groundwater table
Groundwater Top : cm
Groundwater Bottom : cm
Kind of groundwater : no groundwater table observed
table
Top Stagnating : 15 cm
Layer
Bottom Stagnating : 70 cm
Layer
Runoff : medium
Flooding frequency : never
Estimated : slow
permeability (class)
of least permeable
part of the profile
Drainage Class : imperfect
To Drainage Class :
Moisture conditions : 0-120 cm
of the profile: dry
from -to
Moisture conditions : cm
of the profile: moist
from -to
Wet From - To : cm

Erosion and aggradation:

Soil erosion type (1st :
entry)
Occurrence of soil : absent
aggradation
Slope Stability : stable

Surface characteristics:

Microrelief type: small-scale :
differences in relief in the
direct vicinity of the site
Microrelief Pattern : none
Microrelief Height :
Rockiness : none
Stoniness : stony
Average size of stones : 5
Shape of stones (on average) : angular irregular
Cracks : small cracks (width less than 1 cm, or depth less than 50
cm)
Slaking of aggregates by : surface partly slaked, round smooth aggregates
tillage, rainfall or frost
Evidence of salt : non-saline
Evidence of alkali : non-alkaline

Nearest climate station:

Station : Kajiado DC office
Country : Kenya
WMO Code : 9999
Distance : 10 km SE (good)
Latitude / Longitude : S 1°50 / E 36°48

Climate data*:

dataType(Station)	: nrecord	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (mm)(Kajiado DC office)	: 42	43	42	67	119	62	12	4	3	7	21	65	59	504

*Data are considered representative for site

Profile description:

Ah 0-5 cm	: black (7.5YR 2/0, moist) grey (10YR 5/1, dry), silty clay, strong fine and medium crumb, slightly hard friable sticky very plastic, many very fine pores and few fine pores, many very fine and few fine roots, non calcareous, gradual smooth boundary to,
AB 5-15 cm	: black (2.5Y 2/0, moist) black (2.5Y 2/0, dry), silty clay, strong fine and medium crumb and strong fine subangular blocky, hard friable sticky very plastic, many very fine pores and few fine pores, many very fine and few fine roots, non calcareous, clear wavy boundary to,
Bth 15-35 cm	: black (2.5Y 2/0, moist) black (10YR 2/1, dry), clay, strong medium prismatic parting to strong fine and medium angular blocky, very hard firm sticky plastic, continuous thin clay and humus cutans on horizontal and vertical pedfaces, many very fine pores and few fine pores, many very fine and few fine roots, moderately calcareous (2-10%), gradual smooth boundary to,
Bt 35-60 cm	: very dark grey (2.5Y 3/0, moist) black (10YR 2/1, dry), clay, strong very coarse prismatic, very hard firm sticky plastic, continuous moderately thick clay cutans on horizontal and vertical pedfaces, many very fine pores and few fine pores, many very fine and few fine roots, moderately calcareous (2-10%), gradual smooth boundary to,
Bci 60-70 cm	: dark greyish brown (2.5Y 4/2, dry) very dark grey (10YR 3/1, moist), clay, moderate coarse angular blocky, hard friable sticky plastic, patchy moderately thick slickensides, many very fine pores and few fine and medium pores, many very fine roots, moderately calcareous (2-10%), clear smooth boundary to,
Ckc1 70-90 cm	: light yellowish brown (2.5Y 6/4, dry) dark greyish brown (2.5Y 4/2, moist), clay, weakly coherent massive parting to moderate fine subangular blocky, slightly hard friable sticky plastic, many very fine pores and few fine pores, many very fine and few fine roots, very few medium irregular soft calcareous concretions, moderately calcareous (2-10%), gradual smooth boundary to,
Ckc2 90-120 cm	: light yellowish brown (2.5Y 6/4, dry) dark greyish brown (2.5Y 4/2, moist), clay, weakly coherent massive parting to moderate fine subangular blocky, slightly hard friable sticky plastic, many very fine pores and few fine and medium pores, many very fine roots, very few medium irregular soft calcareous concretions, moderately calcareous (2-10%), gradual smooth boundary to,
Ckc3 120-140 cm	: weak red (2.5YR 4/2, moist) brown (10YR 5/3, dry), sandy clay loam, weakly coherent massive, slightly hard (dry) friable (moist) sticky plastic, common large irregular hard calcareous concretions, strongly calcareous (10-25%),

Physical

Particle size distribution:

Depth (cm)	Gravel (%)	Very Coarse Sand (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Very Fine Sand (%)	Total Sand (%)	Coarse Silt (%)	Fine Silt (%)	Total Silt (%)	Clay (%)
0-5	: 1	1.2	1.9	3.4	6.8	4.4	17.7	11.5	25.2	36.7	45.6
5-15	: 1	0.2	1.5	2.5	6.5	2.4	13.1	9.3	14.8	24.1	62.8
15-35	: 0	0.2	0.7	1.3	2.5	1.7	6.4	2.4	10.2	12.6	81.0
35-60	: 0	0.2	0.7	1.1	2.4	1.1	5.5	4.6	13.5	18.1	76.5
60-70	: 0	0.2	0.7	1.2	2.1	1.4	5.6	3.6	22.0	25.6	68.8
70-90	: 0	0.2	0.4	0.8	1.9	0.9	4.2	0.6	15.1	15.7	80.2
90-120	: 0	-	-	-	-	-	-	-	-	-	-
120-140	: 20	-	-	-	-	-	-	-	-	-	-

Other physical data

Depth (cm)	Bulk Density (kg/dm ³)	Spec. Surf. Area (m ² /g)	COLE (cm/cm)	Water Disp. Clay (%)	Clay (%)
0-5	:	-	-	-	45.6
5-15	:	-	-	-	62.8
15-35	:	-	-	-	81.0
35-60	:	-	-	-	76.5
60-70	:	-	-	-	68.8
70-90	:	-	-	-	80.2
90-120	:	-	-	-	-
120-140	:	-	-	-	-

Chemical characteristics:

Depth (cm)	pH H ₂ O	pH KCl	EC 1 : 2.5 (mS/cm)	CaCO ₃ (%)	Org. C (%)	Org. N (%)	C / N	Exch. Acid (cmol/kg)	Exch. Al (cmol/kg)	Ca (cmol/kg)	Mg (cmol/kg)	K (cmol/kg)	Na (cmol/kg)	Sum Cations (cmol/kg)
0-5	: 6.2	5.1	0.12	-	3.10	0.24	13	-	-	23.0	9.6	4.9	0.1	37.6
5-15	: 6.3	5.0	0.18	-	2.12	0.19	11	-	-	24.2	9.7	5.6	0.3	39.8
15-35	: 6.6	5.1	0.21	2.3	1.41	0.14	10	-	-	27.7	10.4	7.1	0.7	45.9
35-60	: 7.3	5.7	0.17	2.6	1.09	0.13	8	-	-	30.4	10.8	7.8	1.3	50.3
60-70	: 7.6	6.1	0.27	3.2	0.98	-	-	-	-	32.6	11.3	8.3	1.8	54
70-90	: 7.9	6.7	0.74	3.8	0.80	0.09	9	-	-	34.2	12.4	9.3	2.8	58.7
90-120	: 7.8	6.8	1.22	4.0	0.72	0.09	8	-	-	33.6	13.0	9.7	4.0	60.3
120-140	: 7.9	7.1	1.69	9.6	0.32	0.02	16	-	-	52.1	12.2	10.0	4.8	79.1

Depth (cm)	CEC Soil (cmol/kg)	CEC Clay (cmol/kg)	CEC Org (cmol/kg)	ECEC (cmol/kg)	Base sat. (%)	Al sat. (%)	ESP (%)
0-5	: 42.2	73	10.9	-	89	-	0
5-15	: 44.6	62	7.4	-	89	-	1
15-35	: 48.5	57	4.9	-	95	-	1
35-60	: 48.8	62	3.8	-	103	-	3
60-70	: 51.0	73	3.4	-	106	-	4
70-90	: 50.1	175	2.8	-	117	-	6
90-120	: 48.2	196	2.5	-	125	-	8
120-140	: 44.2	204	1.1	-	179	-	11

Clay mineralogy:

Depth (cm)	Kaolinite	Mica / illite	Vermiculite	Chlorite	Sme c	Halloysite	Mixed layer	Quartz	Feldspar	Gibbsite	Goethite	Hematite
0-5	: very weak	weak to medium	-	-	-	-	weak	-	-	-	-	-
5-15	: -	-	-	-	-	-	-	-	-	-	-	-
15-35	: very weak	weak to medium	-	-	-	-	weak	-	-	-	-	-
35-60	: -	-	-	-	-	-	-	-	-	-	-	-
60-70	: very weak	weak to medium	-	-	-	-	weak	-	-	-	-	-
70-90	: -	-	-	-	-	-	-	-	-	-	-	-
90-120	: -	-	-	-	-	-	-	-	-	-	-	-
120-140	: very weak	weak to medium	-	-	-	-	weak	-	-	-	-	-

Source of analyzing procedures:

Laboratory	Attribute	Description	Proc. ref
ISRIC	Base sat.	Calculation; Sum of Exchangeable Cations (Na, K, Ca, Mg) / CEC soil	labmanual
ISRIC	C / N	Calculation; Organic Carbon / Organic Nitrogen	labmanual
ISRIC	Ca	Exchangeable bases with 1 M ammonium acetate at pH 7; Ca by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC	CaCO ₃ eq.	Carbonates are dissolved with dilute HCl. Residual acid is titrated. Carbonates expressed as CaCO ₃	7
ISRIC	CEC Clay	Calculation; ((CEC soil - CEC org.m.)/ clay %)*100	9-6.3
ISRIC	CEC Org	CEC organic matter; expert estimate for charge per unit C	9-6.3
ISRIC	CEC Soil	CEC; with index cation in buffered solution pH7	9-4 and 9-5.3.3
ISRIC	Clay; < 0.002 mm	Fraction by Pipette analysis; after removal CaCO ₃ and organic matter, dispersion and sedimentation	3-4.7
ISRIC	EC 1 : 2.5	Electro Conductivity of a soil / water (1:2.5) suspension	4-1.4 and 13-4
ISRIC	ESP	Calculation; (Exchangeable Na / CEC soil) * 100	9-6.3

ISRIC	Gravel	Fraction from field sample, after drying, crushing, sieving	1-1
ISRIC	K	Exchangeable bases with 1 M ammonium acetate at pH 7; K by flame atomic emission spectrometry	9-6.1
ISRIC	Kaolinite	Kaolinite; relative abundance scale 0 - 7	16-1
ISRIC	Mg	Exchangeable bases with 1 M ammonium acetate at pH 7; Mg by atomic absorption spectrometry	9-4 and 9-5.3
ISRIC	Mica / Illite	Mica / ilite; relative abundance scale 0 - 7	16-1
ISRIC	Mixed-layer	Mixed layer minerals; relative abundance scale 0 - 7	16-1
ISRIC	Na	Exchangeable bases with 1 M ammonium acetate at pH 7; Na by flame atomic emission spectrometry	9-4 and 9-5.3
ISRIC	Organic Carbon	Wet combustion of organic matter by potassium dichromate and sulphuric acid at about 125 degrees Celcius. Residual dichromate is back titrated against ferrous sulphate. To compensate for incomplete destruction an empirical correction factor of 1.3 is applied	5
ISRIC	Organic Nitrogen	Organic Matter is digested in sulphuric acid (and hydrogen peroxide) with selenium as catalyst. Nitrogen is converted to ammonium sulphate. The solution is made alkaline and ammonia is distilled off. The evolved ammonia is trapped in boric acid and titrated with standardized acid solution	6
ISRIC	pH H2O	pH electrode; in supernatant suspension	4
ISRIC	pH KCl	In supernatant suspension; potentiometrically	4-1
ISRIC	Sand; 0.10 - 0.05 mm	Fraction by sieving; after removal CaCO3 and organic matter	3-4.6
ISRIC	Sand; 0.25 - 0.10 mm	Fraction by sieving; after removal CaCO3 and organic matter	3-4.6
ISRIC	Sand; 0.5 - 0.25 mm	Fraction by sieving; after removal CaCO3 and organic matter	3-4.6
ISRIC	Sand; 1.0 - 0.5 mm	Fraction by sieving; after removal CaCO3 and organic matter	3-4.6
ISRIC	Sand; 2.0 - 0.05 mm	Total sand fractions by sieving; after removal CaCO3 and organic matter	3-5
ISRIC	Sand; 2.0 - 1.0 mm	Fraction by sieving; after removal CaCO3 and organic matter	3-4.6
ISRIC	Silt; 0.02 - 0.002 mm	Fraction by Pipette analysis ; after removal CaCO3 and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Silt; 0.05 - 0.002 mm	Calculation; Sum fractions Silt 0.05 - 0.02 mm	3-4.7
ISRIC	Silt; 0.05 - 0.02 mm	Fraction by Pipette analysis ; after removal CaCO3 and organic matter, dispersion and sedimentation	3-4.7
ISRIC	Sum cations	Sum of Exchangeable Cations (Ca, Mg, Na, K) with 1 M ammonium acetate at pH 7	9-

*ref: no labmanual available, link to presumable used analytical methode

Other classification

USDA-NRCS (1999) :

USDA-SCS (1975) :

Classification (other) :