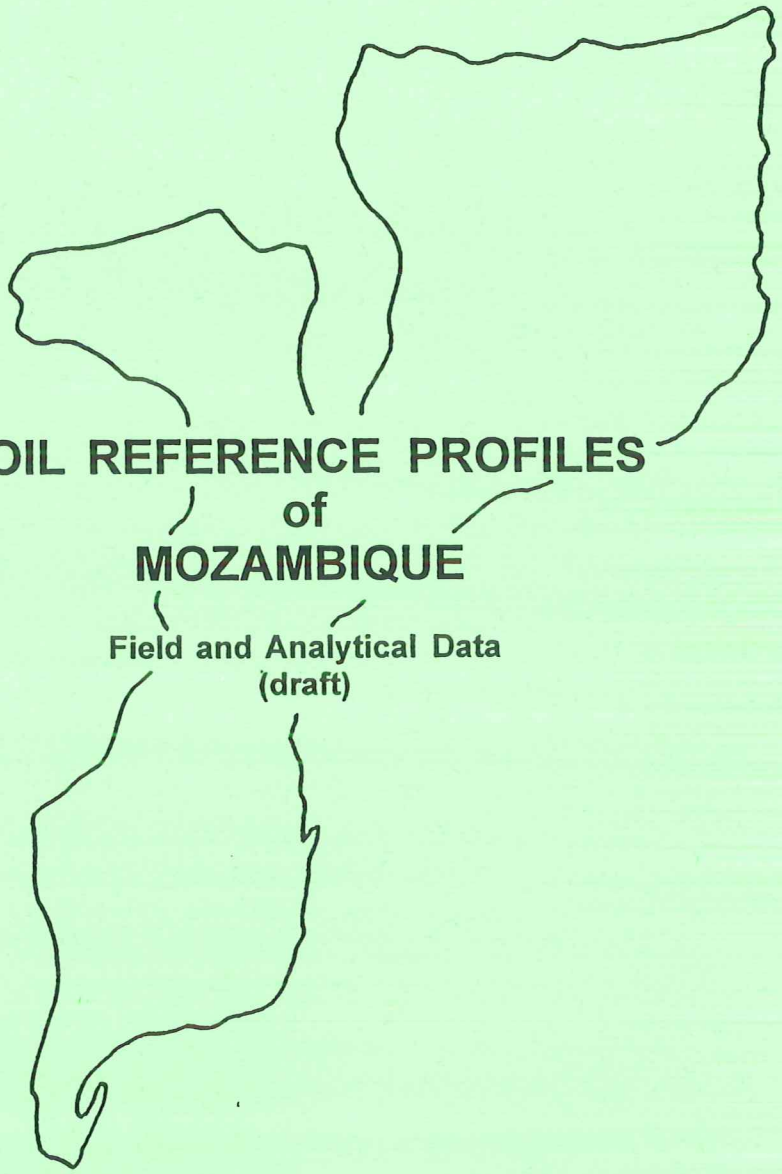
Mozambique C II

MA



SOIL REFERENCE PROFILES of MOZAMBIQUE

Field and Analytical Data
(draft)

April 1993

ISRIC

INTERNATIONAL SOIL REFERENCE AND INFORMATION CENTRE
WAGENINGEN - THE NETHERLANDS

CODE	LOCATION	CLASS		
moc01	Tete province, Angonia, south of Calomue	Af	aub	ox
moc02	Niassa,Lichinga	Fr	oua	tr02
moc03	Niassa,Sanga,Unango	Nd	uub	aa
moc04	Cabo Delgado province, Montepuez, Chipembe	Af	aub	ox
moc05	Nampula province, Monapo, Metocheria	Hl	mur	ud02
moc06	Nampula Province, Nampula, Nova Chaves	Af	aub	ox

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29420

ISRIC monolith number: MOC01 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: ferric acrisol (Final class.)
USDA,1975: paleustalf oxic, fine clayey, kaolinitic, thermic
Diagnostic horizons: ochric, oxic, argillic
(other) Diagn. criteria:
Local classification:

LOCATION : Tete province, Angonia, south of Calomue
: Latitude: 14 27 S Longitude: 34 22 E Altitude: 1480 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 10.82

GENERAL LANDFORM : plateau Topography: undulating
PHYSIOGRAPHIC UNIT : smooth interfluve
SLOPE Gradient/Aspect/Form: 3 % convex
POSITION OF SITE : upper slope
MICRO RELIEF Kind: termite mounds Pattern: isolated
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: slight sheet

PARENT MATERIAL 1 : residual material Derived from: gneiss Texture: clayey
Weathering degree: high Resistance:
Remarks: Basement complex

EFFECTIVE SOIL DEPTH cm : 170

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : well
PERMEABILITY : No slow permeable layer(s)
FLOODING frequency: very poor Run-off: medium
MOISTURE CONDITIONS PROFILE : 0 - 200 cm dry 200 - cm moist

LAND USE : low level arable farming, maize, , shifting - fallow bush,
VEGETATION Structure: woodland Status: cut over
Land use/vegetation remarks: Miombo woodland, recently strongly cut

CLIMATE Koeppen: Cw Soil Moisture Regime: ustic
Station: VILA COUTINHO VELHA -----14 34 S/ 34 18 E;1300 (m.a.s.l); 9 km NW from site. Relevance: good

		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
VILA COUTINHO VELHA															
EP Penman	mm		120	109	114	102	93	86	95	124	143	176	149	126	1437
Relative Humidity	%	26	73	75	73	69	65	62	58	50	49	47	57	67	62
Precipitation	mm	25	233	211	133	47	11	4	2	2	4	10	90	180	929
Tot.global rad.MJ/m2			17.8	19.0	17.6	16.7	16.9	15.2	15.6	18.4	21.5	21.4	21.1	17.5	18.2
T mean	C	26	21.4	21.3	20.8	20.0	17.6	15.6	15.3	16.6	18.9	21.8	22.6	21.8	19.5
T max	C	26	26.2	26.2	25.8	25.7	24.1	22.6	22.3	23.9	25.5	28.6	28.4	26.8	25.5
T min	C	26	16.5	16.4	15.7	14.4	11.2	8.6	8.3	9.4	12.3	14.9	16.8	16.7	13.4
Windspeed at 2m	m/s		2.1	2.1	2.4	2.5	2.5	2.6	2.6	2.9	3.1	3.3	2.8	2.2	2.6
Bright sunshine	%		40	49	48	54	71	67	66	74	78	66	59	39	59

PROFILE DESCRIPTION

Ah 0- 15cm 5.0YR 3.0/3.0 moist; sandy clay; fine to very fine moderate subangular blocky and fine to very fine moderate crumb; slightly sticky slightly plastic very friable slightly hard; no cutans ; many very fine pores; many very fine roots; gradual smooth boundary to

AB 15- 25cm 2.5YR 3.0/4.0 moist; clay; fine to very fine moderate subangular blocky; slightly sticky slightly plastic friable ; no cutans ; many very fine pores; common very fine roots and common fine roots; gradual smooth boundary to

Bt 25- 62cm 2.5YR 3.0/6.0 moist; clay; fine to very fine weak subangular blocky; slightly sticky slightly plastic friable ; broken moderately thick clay cutans ; many very fine pores; common very fine roots and common fine roots; gradual smooth boundary to

Bws 62-170cm 2.5YR 3.5/6.0 moist; clay; weakly coherent porous massive; slightly sticky slightly plastic very friable slightly hard; broken moderately thick clay cutans ; many very fine pores; few very fine roots and few fine roots; very few medium spherical soft argilleous nodules;

Auger 170-400cm 2.5YR 4.0/6.0 moist; clay; ; very few medium spherical hard argilleous nodules; diffuse boundary to

Auger 400-600cm 2.5YR 4.0/6.0 moist; clay; ; few medium spherical hard ferrigenous concretions;

REMARKS:

Short description of the profile: very deep, well drained dark red clay soil; weakly to moderately structured up to 62 cm, than porous massive.
Physiography: smooth interfluves and "dambo's", few bare rock inselbergs.
local soil name : Katonde (Chinhandje/Chichewa)
In the Bws the structure is difficult to describe, no ped is clearly visible, in fact every ped size can be made with a slight force; massive porous-weakly coherent can also be described as very weak, very fine to fine subangular blocky (coffee granules structure).
The nodules have the same colour as the soil matrix.They differ from the soil by their coherency and the absence of pores.Their nature is probably clay indurated with iron.
Spherical termite holes with flat bottom and a diameter of about 8 cm are visible in the whole soil profile with a density of 1 to 2 per square meter; mainly empty but sometimes filled with fungus combs.
Classification, even on high level, of this soil is problematic, due to the occurrence of both an argillic and an oxic horizon.

monolith number: MOC01 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	4	0	3	10	16	16	5	50	6	13	31	8	0.00	0	0	0	0	0	0	0	0
2	4	15	0	2	8	14	16	5	45	6	3	46	10	0.00	0	0	0	0	0	0	0	0
3	30	45	0	4	7	9	11	4	35	5	7	53	0	0.00	0	0	0	0	0	0	0	0
4	70	85	0	3	7	8	12	5	35	12	14	39	0	0.00	0	0	0	0	0	0	0	0
5	130	145	0	3	6	7	9	5	30	8	11	51	0	0.00	0	0	0	0	0	0	0	0
6	260	290	0	3	5	6	8	5	27	11	14	48	0	0.00	0	0	0	0	0	0	0	0
7	400	460	0	5	10	6	5	3	29	11	17	43	-1	0.00	0	0	0	0	0	0	0	0

No.	pH- H2O	pH- KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g	Al	CEC soil	CEC clay	CEC OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	5.7	5.0	-1.0	1.7	0.1	2.6	1.5	0.0	0.5	4.6	0.1	0.0	11.4	-1	-1	-1.0	41	-1	0.08
2	5.5	4.8	-1.0	1.3	0.1	1.8	0.9	0.0	0.4	3.1	0.1	0.0	8.4	-1	-1	-1.0	38	-1	0.05
3	5.1	4.6	-1.0	0.3	0.0	0.8	0.4	0.0	0.3	1.5	0.2	0.0	8.3	-1	-1	-1.0	19	-1	0.03
4	5.6	5.6	-1.0	0.2	0.0	0.8	0.5	0.0	0.2	1.5	0.0	0.0	6.7	-1	-1	-1.0	23	-1	0.01
5	5.5	5.6	-1.0	0.2	0.0	1.8	1.0	0.0	0.2	3.0	0.0	0.0	7.4	-1	-1	-1.0	41	-1	0.01
6	5.4	5.7	-1.0	0.1	0.0	1.6	0.8	0.0	0.1	2.5	0.0	0.0	7.5	-1	-1	-1.0	33	-1	0.01
7	-1	-1	-1.0	-0.1	-0.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1.0	-1	-1	-1.00

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	-	-	-	-	5	-	-	1	-	1	3	2	0.2	0.3	0.0	2.5	0.3	0.1	0.1
2	-	-	-	-	5	-	-	1	-	1	3	2	0.2	0.3	0.0	2.8	0.4	0.1	0.1
3	-	-	-	-	5	-	-	1	-	1	3	2	0.2	0.3	0.0	3.1	0.5	0.0	0.1
4	-	-	-	-	5	-	-	1	-	2	3	2	0.1	0.2	0.0	2.8	0.3	0.0	0.1
5	-	-	-	-	5	-	-	1	-	1	3	2	0.1	0.2	0.0	3.1	0.4	0.0	0.1
6	-	-	-	-	5	-	-	1	-	1	3	2	0.1	0.2	0.1	3.8	0.4	0.0	0.1
7	-	-	-	-	-	-	-	-	-	-	-	-	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

ISRIC monolith number: MOC02 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: rhodic ferralsol (Tent. class.)
USDA,1975: haplustox tropeptic, clayey, kaolinitic, thermic
Diagnostic horizons: ochric, oxic
(other) Diagn. criteria:
Local classification: Chicunja

LOCATION : Niassa,Lichinga
: Latitude: 13 8 S Longitude: 35 16 E Altitude: 1325 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 10.82

GENERAL LANDFORM : plain Topography: undulating
PHYSIOGRAPHIC UNIT : interfluve
SLOPE Gradient/Aspect/Form: 2 %
POSITION OF SITE : crest
MICRO RELIEF Kind: termite mounds
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: partly slaked Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion:

PARENT MATERIAL 1 : Derived from: coarse-intermediate igneous Texture:
Remarks: Basement complex

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : well
PERMEABILITY :
FLOODING frequency: very poor
MOISTURE CONDITIONS PROFILE : 000 - 130 cm dry 130 - 500 cm moist

LAND USE : low level arable farming, , shifting - fallow grass
VEGETATION Structure:
Land use/vegetation remarks:

CLIMATE Koeppen: Soil Moisture Regime: ustic
Station: LICHINGA (VL CABRAL) -----13 18 S/ 35 14 E;1364 (m.a.s.l); 5 km W from site. Relevance: very good

		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
LICHINGA (VL CABRAL)															
EP Penman	mm		105	94	101	91	85	74	83	104	130	152	132	109	1260
Relative Humidity	%	27	82	83	81	80	73	70	68	65	59	55	66	78	72
Precipitation	mm	27	250	228	174	75	22	3	2	3	3	16	50	236	1062
Tot.global rad.	MJ/m2	19	16.2	16.7	16.7	16.4	16.2	15.0	14.8	17.3	19.7	22.1	19.5	16.3	17.2
T mean	C	27	20.4	20.5	20.0	19.6	17.8	16.0	15.6	16.7	18.9	21.3	21.5	20.6	19.1
T max	C	27	25.0	25.1	24.8	24.7	23.7	22.2	21.7	23.2	25.7	28.0	27.3	25.4	24.7
T min	C	27	15.8	15.9	15.3	14.4	11.8	9.8	9.4	10.2	12.1	14.6	15.7	15.8	13.4
Windspeed at 2m	m/s	24	2.2	2.0	2.2	2.4	2.4	2.4	2.7	3.1	3.0	2.4	2.8	2.3	2.5
Bright sunshine	%	19	32	36	42	51	64	63	58	64	66	70	51	33	53

PROFILE DESCRIPTION

Ap 0- 15cm 2.5YR 3.0/4.0 moist; sandy clay; fine to very fine moderate subangular blocky to crumb; slightly sticky slightly plastic very friable slightly hard; many very fine pores; many fine roots; abrupt smooth boundary to

Bt 15- 58cm 2.5YR 3.0/6.0 moist; clay; fine to very fine weak to moderate subangular blocky; slightly sticky slightly plastic friable hard; broken thin clay cutans ; many very fine pores; many fine roots; diffuse smooth boundary to

Bws 58-180cm 2.5YR 3.0/6.0 moist; clay; weakly coherent porous massive; slightly sticky slightly plastic very friable slightly hard; patchy thin clay cutans ; many very fine pores; common medium roots; few medium spherical soft argilleous nodules;

AUGER 180-400cm 1.3YR 3.0/6.0 moist; clay; ;

Auger 400-650cm 1.3YR 3.0/6.0 moist; clay; ; few strongly weathered rot.rock,incr.% fragments;

REMARKS:

Brief description of the profile: A very deep, well drained, dark red clay soil, weakly structured up to 58 cm then porous massive, topsoil is weakly developed.
Original vegetation: Brachystegia woodland("miombo")
- Structure is difficult to describe; every "ped" size can be formed with little force.
Clear natural ped surfaces are not present in the subsoil > 58cm.
Horizon differentiation is a combined effect of structure and consistency. The subsoil > 58cm can be described in terms of "floury", "coffee granules" etc.
-The massive soft, clay nodules with same colour as soil matrix are present from about 100cm and deeper.
-A few fine vertical cracks are visible in the profile.
-Magnetite is present in the whole profile; weatherable minerals are visible from 200 cm and deeper.
-Precence of cutans in deeper subsoil is disputable

monolith number: MOC02 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	15	-1	0	0	1	4	3	8	6	31	56	26	1.14	54	50	42	31	28	26	20	19
2	15	30	-1	0	0	1	3	2	6	5	32	56	25	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
3	30	50	-1	0	0	1	2	2	5	7	30	58	23	1.16	51	50	44	35	32	30	25	24
4	65	90	-1	0	0	0	2	2	4	1	29	66	2	1.04	55	52	46	34	29	26	22	22
5	130	150	-1	0	0	0	2	2	4	8	24	64	1	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
6	0	0	-1	0	0	0	1	1	2	10	27	62	1	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
7	240	280	-1	0	0	0	1	1	2	10	30	58	1	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
8	350	370	-1	0	0	0	1	1	2	12	29	57	0	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
9	550	560	-1	1	2	1	2	1	7	11	22	60	25	-0.10	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH Ca	CAT. Mg	K	Na	sum meq	EXCH H+Al /100g	AC. Al	CEC soil	CEC clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	5.2	4.5	-1.0	1.2	-0.1	0.6	0.8	0.1	0.2	1.7	0.3	8.0	9.1	25	6	1.6	17	0	-1.00
2	5.0	4.7	-1.0	0.5	-0.1	0.2	0.8	0.0	0.1	1.1	0.2	0.0	8.1	13	2	1.1	13	0	-1.00
3	5.1	4.9	-1.0	0.3	-0.1	0.2	0.8	0.0	0.1	1.1	0.1	0.0	6.7	10	2	1.1	15	0	-1.00
4	5.5	5.7	-1.0	0.2	-0.1	0.6	0.9	0.0	0.1	1.6	0.0	0.0	5.2	11	1	1.6	31	0	-1.00
5	5.5	5.7	-1.0	0.1	-0.1	0.2	0.7	0.1	0.1	1.1	0.0	0.0	5.4	9	1	1.1	21	0	-1.00
6	5.5	5.1	-1.0	0.1	-0.1	0.6	0.4	0.1	0.2	1.3	0.2	0.0	5.8	10	0	1.3	22	0	-1.00
7	5.5	5.1	-1.0	0.1	0.0	0.6	0.4	0.1	0.2	1.3	0.1	0.0	5.8	-1	-1	-1.0	22	-1	0.01
8	5.6	4.5	-1.0	0.1	0.0	0.0	0.1	0.2	0.2	0.5	0.6	0.0	6.3	-1	-1	-1.0	3	-1	0.01
9	5.5	4.2	-1.0	0.0	0.0	0.2	0.0	0.1	0.1	0.4	2.1	1.8	4.6	-1	-1	-1.0	9	-1	0.01

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	-	-	-	-	5	-	-	1	-	3	3	2	0.3	0.3	0.0	4.7	0.3	0.1	0.1
2													-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
3													-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4					4			1		2	2	1	0.2	0.2	-1.0	7.1	0.5	-1.0	-1.0
5					4			1		2	2	1	0.2	0.2	-1.0	8.5	0.5	-1.0	-1.0
6													0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	-	-	-	-	5	-	-	1	-	1	3	2	0.2	0.2	0.1	6.5	0.3	0.0	0.0
8	-	-	-	-	5	-	-	1	-	-	3	2	0.1	0.1	0.0	6.4	0.3	0.0	0.1
9	-	-	-	-	5	-	-	1	-	1	3	2	0.1	0.1	0.0	5.7	0.2	0.0	0.1

ISRIC monolith number: MOC03 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: dystric nitosol (Final class.)
USDA,1975: paleustult typic, clayey, kaolinitic, thermic
Diagnostic horizons:
(other) Diagn. criteria:
Local classification: Chicunja

LOCATION : Niassa,Sanga,Unango
: Latitude: 12 57 S Longitude: 35 23 E Altitude: 1075 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 10.82

GENERAL LANDFORM : plain Topography: undulating
PHYSIOGRAPHIC UNIT : slope
SLOPE Gradient/Aspect/Form: 2 %
POSITION OF SITE : upper slope
MICRO RELIEF Kind:
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion:

PARENT MATERIAL 1 : Derived from: coarse-intermediate igneous Texture:
Remarks: Basement complex

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : well
PERMEABILITY :
FLOODING frequency: very poor
MOISTURE CONDITIONS PROFILE : 017 - 200 cm dry 000 - 017 cm moist

LAND USE : high level arable farming, maize
VEGETATION Structure:
Land use/vegetation remarks: Recently cleared

CLIMATE Koeppen: Cw Soil Moisture Regime: ustic
Station: LICHINGA (VL CABRAL) -----13 18 S/ 35 14 E;1364 (m.a.s.l); 60 km S from site. Relevance: moderate

Station: MANIAMBA -----12 46 S/ 34 59 E;1093 (m.a.s.l); 45 km WNW from site. Relevance: moderate

	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
LICHINGA (VL CABRAL)														
EP Penman mm		105	94	101	91	85	74	83	104	130	152	132	109	1260
Relative Humidity %	27	82	83	81	80	73	70	68	65	59	55	66	78	72
Precipitation mm	27	250	228	174	75	22	3	2	3	3	16	50	236	1062
Tot.global rad.MJ/m2	19	16.2	16.7	16.7	16.4	16.2	15.0	14.8	17.3	19.7	22.1	19.5	16.3	17.2
T mean C	27	20.4	20.5	20.0	19.6	17.8	16.0	15.6	16.7	18.9	21.3	21.5	20.6	19.1
T max C	27	25.0	25.1	24.8	24.7	23.7	22.2	21.7	23.2	25.7	28.0	27.3	25.4	24.7
T min C	27	15.8	15.9	15.3	14.4	11.8	9.8	9.4	10.2	12.1	14.6	15.7	15.8	13.4
Windspeed at 2m m/s	24	2.2	2.0	2.2	2.4	2.4	2.4	2.7	3.1	3.0	2.4	2.8	2.3	2.5
Bright sunshine %	19	32	36	42	51	64	63	58	64	66	70	51	33	53
MANIAMBA														
EP Penman mm		116	101	111	101	90	78	85	108	132	169	152	129	1372
Relative Humidity %	26	78	79	77	70	66	61	59	56	53	54	59	71	65
Precipitation mm	26	306	278	308	168	31	8	3	3	3	22	86	246	1449
Tot.global rad.MJ/m2		18.6	18.3	19.1	18.5	18.1	17.0	16.6	19.3	22.0	25.1	23.1	20.0	19.6
T mean C	25	21.4	21.4	21.1	20.4	18.8	17.0	16.8	18.0	20.6	23.3	23.5	22.2	20.4
T max C	25	25.6	25.5	25.3	25.0	23.9	22.7	22.6	24.1	26.6	29.5	28.9	26.8	25.5
T min C	25	17.2	17.2	16.9	15.8	13.7	11.4	10.9	12.0	14.5	17.1	18.1	17.6	15.2
Windspeed at 2m m/s		1.7	1.5	1.5	1.7	1.8	1.9	2.0	2.2	2.3	2.7	2.5	1.9	2.0
Bright sunshine %		45	45	56	64	76	77	70	77	80	87	71	54	67

PROFILE DESCRIPTION

Ah 0- 15cm 2.5YR 3.0/3.0 moist; clay; fine to very fine moderate subangular blocky to crumb; friable; many very fine pores; many fine roots; clear smooth boundary to

AB 15- 25cm 2.5YR 3.0/4.0 moist; clay; fine to medium moderate subangular blocky; friable hard; broken thin clay cutans ; many very fine pores; many fine roots; gradual smooth boundary to

Bt1 25- 70cm 2.5YR 3.0/4.0 moist; clay; fine to medium moderate subangular blocky; friable hard; few fine (2.5YR 2.5/0.0) mottles; continuous thick clay cutans ; many very fine pores; many fine roots; diffuse smooth boundary to

Bt2 70-105cm 2.5YR 3.0/5.0 moist; clay; fine to very fine weak to moderate subangular blocky; very friable slightly hard; broken moderately thick clay cutans ; many very fine pores; many fine roots; few medium soft argilleous nodules; diffuse smooth boundary to

Bws 105-185cm 2.5YR 3.0/5.0 moist; clay; fine to very fine weak subangular blocky; very friable slightly hard; patchy moderately thick clay cutans ; many very fine pores; common fine roots;

AUGER 185-670cm 2.5YR 3.0/5.0 moist; clay; ;

Auger 185-400cm 1.2YR 3.0/5.0 moist; clay; ;

Auger 400-600cm 1.2YR 3.0/5.0 moist; clay; ; frequent weather. miner. fragments;

Auger 600-670cm ; ; dominant strongly weathered rotten rock fragments;

REMARKS:

Brief description of the profile: A very deep, well drained, dark red clay soil, moderately structured.About 2 cm of dry litter at the surface.

Original vegetation: Brachystegia woodland ("miombo")
-Windspeed measured at 2 meter
-Magnetite is present in whole profile
-Soft nodules have same colour as soil matrix, inner side of nodules is massive.
-Horizon boundaries in subsoil are very diffuse

monolith number: MOC03 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	5	-1	0	1	1	2	1	5	10	11	73	2	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
2	5	17	12	1	2	8	19	6	36	10	12	42	13	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
3	17	30	-1	1	1	7	17	5	31	10	15	45	21	1.24	54	52	41	33	30	28	27	25
4	30	60	-1	0	1	8	18	5	32	9	12	46	22	1.26	51	50	41	35	33	31	30	29
5	65	95	-1	0	1	8	21	6	36	8	8	48	19	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
6	130	160	-1	0	1	8	21	6	36	9	9	46	17	1.11	56	54	47	36	31	28	25	24
7	230	290	-1	0	1	8	22	6	37	8	10	45	16	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
8	330	390	-1	0	1	9	22	6	38	8	10	44	1	-0.10	-1	-1	-1	-1	-1	-1	-1	-1
9	600	670	-1	0	1	7	20	6	34	6	11	48	3	-0.10	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH Ca	CAT. Mg	K	Na	sum meq	EXCH H+Al /100g	AC. Al	CEC soil	clay	OrgC	ECEC	BASE SAT,%	Al SAT %	EC 2.5 mS/cm
1	5.5	4.9	-1.0	2.0	-0.1	2.9	2.5	0.1	0.7	6.2	0.1	0.0	16.2	41	11	6.2	39	0	-1.00
2	5.5	4.7	-1.0	1.4	-0.1	2.5	1.8	0.1	0.6	5.0	0.1	0.0	14.0	26	8	5.0	36	0	-1.00
3	5.8	4.9	-1.0	0.7	-0.1	2.5	1.6	0.1	0.5	4.7	0.0	0.0	12.3	18	4	4.6	38	0	-1.00
4	5.6	5.2	-1.0	0.3	-0.1	2.1	1.4	0.1	0.6	4.2	0.0	0.0	9.8	13	2	4.1	42	0	-1.00
5	5.6	5.4	-1.0	0.2	-0.1	1.6	1.1	0.2	0.5	3.4	0.0	0.0	7.9	13	1	3.4	43	0	-1.00
6	5.8	5.7	-1.0	0.2	-0.1	1.4	1.2	0.1	0.3	3.0	0.0	0.0	7.5	12	1	2.9	39	0	-1.00
7	5.8	5.7	-1.0	0.1	-0.1	1.9	1.3	0.2	0.5	3.9	0.2	0.0	9.0	16	0	3.8	42	0	-1.00
8	6.0	5.6	-1.0	0.1	0.0	2.3	2.1	0.2	0.4	5.0	0.0	0.0	10.1	-1	-1	-1.0	48	-1	0.01
9	-1	-1	-1.0	-0.1	-0.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1.0	-1	-1	-1.00

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	-	-	-	-	5	-	-	1	-	3	3	2	0.2	0.3	0.1	5.7	0.3	0.0	0.1
2	-	-	-	-	5	-	-	1	-	2	3	2	0.3	0.3	0.1	6.3	0.3	0.0	0.1
3	-	-	-	-	5	-	-	1	-	3	3	2	0.3	0.3	0.0	6.6	0.3	0.0	0.1
4													-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
5					4			1		2	2	1	0.2	0.2	-1.0	7.6	0.4	-1.0	-1.0
6					4			1		1	2	1	0.2	0.2	-1.0	8.1	0.4	-1.0	-1.0
7	-	-	-	-	5	-	-	1	-	2	3	2	0.2	0.2	0.1	7.0	0.3	0.0	0.1
8	-	-	-	-	5	-	-	1	-	-	3	2	0.1	0.2	0.0	6.7	0.3	0.0	0.1
9	-	-	-	-	-	-	-	-	-	-	-	-	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

ISRIC monolith number: MOC04 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: ferric acrisol (Final class.)
USDA,1975: paleustalf oxic, fine clayey, kaolinitic, isohyperthermic
Diagnostic horizons: ochric, argillic, oxic
(other) Diagn. criteria:
Local classification: Ithaya Yoquilla

LOCATION : Cabo Delgado province, Montepuez, Chipembe
: Latitude: 13 9 S Longitude: 38 37 E Altitude: 500 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 3.83

GENERAL LANDFORM : peneplain Topography: undulating
PHYSIOGRAPHIC UNIT : very broad, smooth, interfluve
SLOPE Gradient/Aspect/Form: 1 % straight
POSITION OF SITE : upper slope
MICRO RELIEF Kind: termite mounds Pattern: isolated
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: slight sheet

PARENT MATERIAL 1 : residual material Derived from: igneous rock Texture: clayey
Weathering degree: high Resistance:
Remarks: Prob. gabro norite

EFFECTIVE SOIL DEPTH cm : 400

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : well
PERMEABILITY : No slow permeable layer(s)
FLOODING frequency: very poor Run-off: very slow
MOISTURE CONDITIONS PROFILE : 25 - 300 cm dry 0 - 25 cm moist

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LAND USE : afforestation, , ,
VEGETATION Structure: closed forest Status: secondary
Land use/vegetation remarks: Closed bambu forest (see gen. remarks)

CLIMATE Koeppen: Aw Soil Moisture Regime: ustic
Station: MONTEPUEZ -----13 08 S/ 39 02 E;534 (m.a.s.l); 40 km W from site. Relevance: good

MONTEPUEZ		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP Penman	mm		127	114	121	109	96	84	91	113	128	163	158	139	1443
Relative Humidity	%	30	77	78	76	72	68	67	65	59	56	54	58	68	66
Precipitation	mm	30	242	205	187	57	8	2	1	1	1	12	53	163	932
Tot.global rad.	MJ/m2	18	18.3	18.5	18.2	17.2	16.9	15.7	15.5	17.1	19.8	22.0	21.3	19.0	18.3
T mean	C	30	25.4	25.4	25.2	24.8	22.7	21.7	21.4	22.3	23.4	25.3	26.7	26.3	24.2
T max	C	30	30.0	30.2	30.1	30.0	28.2	27.8	27.5	28.9	29.8	32.7	33.3	31.8	30.0
T min	C	30	20.7	20.6	20.4	19.7	17.3	15.6	15.3	15.7	16.9	17.9	20.1	20.8	18.4
Windspeed at 2m	m/s	20	1.1	1.0	1.0	1.1	1.1	1.1	1.2	1.4	1.5	1.6	1.5	1.2	1.2
Bright sunshine	%	18	37	40	45	51	64	64	58	58	62	65	56	42	53

PROFILE DESCRIPTION

Ah 0- 18cm 5.0YR 2.5/2.0 moist; sandy clay loam; fine to very fine weak crumb; non sticky slightly plastic very friable; no cutans ; many very fine/medium pores; many fine roots and many medium roots; clear smooth boundary to

AB 18- 30cm 2.5YR 3.0/2.0 moist; sandy clay; fine to very fine weak subangular blocky; slightly sticky slightly plastic very friable; no cutans ; many very fine/medium pores; many fine roots and many medium roots; gradual smooth boundary to

Bt1 30- 60cm 1.2YR 3.0/4.0 moist; clay; fine to very fine weak to moderate subangular blocky; slightly sticky slightly plastic very friable hard; broken moderately thick clay cutans ; many very fine/medium pores; many fine roots; diffuse smooth boundary to

Bt2 60-125cm 10.0R 3.0/5.0 moist; clay; fine to very fine weak subangular blocky; slightly sticky slightly plastic very friable slightly hard; patchy thin clay cutans ; many very fine/medium pores; common fine roots; diffuse smooth boundary to

Bws 125-175cm 10.0R 3.0/5.0 moist; clay; weakly coherent porous massive; slightly sticky slightly plastic very friable slightly hard; patchy thin clay cutans ; many very fine pores; common fine roots; very few medium soft argilleous nodules;

Auger 175-320cm 10.0R 3.0/5.0 moist; clay; ;

Auger 320-400cm 10.0R 3.0/5.0 moist; clay; ; few medium spherical soft ferrigenous concretions and few medium spherical hard ferrigenous concretions;

Auger 400-430cm clay; ; frequent medium spherical soft ferrigenous concretions and frequent medium spherical hard ferrigenous concretions; abrupt boundary to

Auger 430- + cm; ; dominant extremely coarse hard rock fragments;

REMARKS:

Short description of the profile: a very deep, well drained, dusky red clay soil, weakly to moderately structured up to 125 cm, than porous massive; a dark coloured topsoil.
Vegetation: closed bambu forest with scattered high trees.
Nearby permanent , mechanized farming with maize and cotton as crops.
At the surface an about 1 cm thick layer of litter.
The upper horizon has a few holes filled with reddish subsoil; the subsoil has a few holes filled with dark coloured topsoil.
Traces of magnetite are present from 30 cm and deeper.
Spherical termite holes with a flat bottom and with a diameter of 4 to 8 cm are visible throughout the profile, the density is about 4 per square meter.

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monolith number: MOC04 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	5	0	2	8	17	24	12	63	7	8	22	7	0.00	0	0	0	0	0	0	0	0
2	5	18	0	2	9	16	22	11	60	6	7	27	10	0.00	0	0	0	0	0	0	0	0
3	18	28	0	2	9	14	18	9	52	6	3	39	14	0.00	0	0	0	0	0	0	0	0
4	30	50	0	3	8	10	13	7	41	4	1	55	15	0.00	0	0	0	0	0	0	0	0
5	60	90	0	2	5	8	11	5	31	3	2	63	10	0.00	0	0	0	0	0	0	0	0
6	125	170	0	2	5	8	12	7	34	4	3	59	0	0.00	0	0	0	0	0	0	0	0
7	225	275	0	3	4	7	11	7	32	6	5	57	0	0.00	0	0	0	0	0	0	0	0

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH H+Al /100g	AC. Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	5.9	5.3	-1.0	2.3	0.1	4.7	4.2	0.1	0.3	9.3	0.0	0.0	15.9	-1	-1	-1.0	58	-1	0.06
2	5.7	4.8	-1.0	1.8	0.1	3.3	2.8	0.1	0.1	6.3	0.0	0.0	12.9	-1	-1	-1.0	48	-1	0.03
3	5.6	4.7	-1.0	1.1	0.1	2.4	2.0	0.1	0.1	4.6	0.1	0.0	9.7	-1	-1	-1.0	48	-1	0.03
4	5.5	4.5	-1.0	0.7	0.1	1.9	1.7	0.1	0.1	3.8	0.1	0.0	9.1	-1	-1	-1.0	41	-1	0.02
5	5.9	4.9	-1.0	0.4	0.0	2.1	1.5	0.1	0.1	3.8	0.0	0.0	8.2	-1	-1	-1.0	45	-1	0.01
6	6.4	5.5	-1.0	0.0	0.1	2.1	1.7	0.1	0.1	4.0	0.0	0.0	7.2	-1	-1	-1.0	55	-1	0.01
7	6.4	5.6	-1.0	0.0	0.0	2.5	1.8	0.1	0.1	4.5	0.0	0.0	7.4	-1	-1	-1.0	59	-1	0.02

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	-	-	-	-	5	-	-	1	-	-	2	2	0.1	0.1	0.0	2.7	0.1	0.0	0.0
2	-	-	-	-	5	-	-	1	-	-	2	2	0.1	0.1	0.0	3.1	0.2	0.1	0.1
3	-	-	-	-	5	-	-	1	-	-	2	2	0.1	0.1	0.1	4.2	0.2	0.1	0.1
4	-	-	-	-	5	-	-	1	-	-	2	2	0.2	0.1	0.1	5.4	0.2	0.1	0.1
5	-	-	-	-	5	-	-	1	-	-	2	2	0.2	0.1	0.1	6.0	0.3	0.0	0.1
6	-	-	-	-	5	-	-	1	-	-	2	2	0.2	0.1	0.0	6.3	0.3	0.0	0.0
7	-	-	-	-	5	-	-	1	-	-	2	2	0.2	0.1	0.1	6.4	0.0	0.0	0.0

ISRIC monolith number: MOC05 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: luvic phaeozem (Final class.)
USDA,1975: argiustoll udic, fine clayey, kaolinitic, thermic
Diagnostic horizons: mollic, argillic
(other) Diagn. criteria:
Local classification:

LOCATION : Nampula province, Monapo, Metocheria
: Latitude: 14 49 S Longitude: 40 5 E Altitude: 180 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.82

GENERAL LANDFORM : peneplain Topography: flat or almost flat
PHYSIOGRAPHIC UNIT : dissected interfluve
SLOPE Gradient/Aspect/Form: 2 % convex
POSITION OF SITE : crest
MICRO RELIEF Kind: termite mounds Pattern: isolated
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: small cracks Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: severe loc. unstable

PARENT MATERIAL 1 : residual material Derived from: igneous rock Texture: clayey
Remarks: Probably gabro

EFFECTIVE SOIL DEPTH cm : 140

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : well
PERMEABILITY :
FLOODING frequency: very poor Run-off: very slow
MOISTURE CONDITIONS PROFILE : 85 - 160 cm dry 0 - 85 cm moist

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LAND USE : low level arable farming
VEGETATION Structure: grassland Status: secondary
Land use/vegetation remarks: Originally probably dense rich forest

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CLIMATE Koeppen: Aw Soil Moisture Regime: ustic
Station: MECONTA -----14 59 S/ 39 51 E;235 (m.a.s.l); 35 km W from site. Relevance: good

MECONTA		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP Penman	mm		132	115	119	106	97	83	89	108	125	154	156	141	1425
Relative Humidity	%	23	76	76	76	77	77	76	77	75	74	68	68	72	74
Precipitation	mm	25	228	192	178	57	10	8	8	9	4	15	38	186	933
Tot.global rad.MJ/m2			19.7	19.6	18.8	18.1	17.4	15.8	15.9	18.0	20.6	22.9	22.8	20.3	19.2
T mean	C	24	25.0	25.0	24.9	24.5	23.3	22.3	22.3	22.7	23.2	24.3	25.2	25.1	24.0
T max	C	24	31.1	30.8	30.5	30.4	29.6	28.8	28.8	29.3	30.1	31.2	31.9	31.4	30.3
T min	C	24	19.0	19.2	19.3	18.6	17.0	15.9	15.9	16.2	16.4	17.5	18.4	18.8	17.7
Windspeed at 2m	m/s		1.3	1.1	1.1	1.3	1.6	1.8	1.9	2.0	2.1	2.1	2.1	1.7	1.7
Bright sunshine	%		50	52	55	64	75	73	69	71	73	75	68	54	65

PROFILE DESCRIPTION

Ah 0- 30cm 5.0YR 3.0/1.0 moist; clay; fine to very fine moderate subangular blocky and fine to very fine moderate crumb; slightly sticky slightly plastic very friable slightly hard; no cutans ; many very fine/medium pores; many fine roots and many medium roots; clear smooth boundary to

AB 30- 50cm 5.0YR 3.0/2.0 moist; clay; fine to medium moderate to strong subangular blocky and fine to medium moderate to strong angular blocky; sticky plastic friable hard; broken thick clay cutans ; many very fine pores; many fine roots; gradual smooth boundary to

Bt 50- 95cm 2.5YR 3.0/4.0 moist; clay; fine to medium moderate to strong subangular blocky and fine to medium moderate to strong angular blocky; sticky plastic friable hard; continuous thick clay cutans ; common very fine/fine pores; common fine roots; gradual smooth boundary to

BC 95-140cm 2.5YR 3.0/5.0 moist; clay; fine moderate subangular blocky and fine moderate angular blocky; sticky plastic friable hard; continuous thick clay cutans ; common fine pores; common fine roots; very few medium strongly weathered rotten rock fragments and few fine fresh fragments; diffuse wavy boundary to

CB 140-160cm 7.5YR 5.0/8.0 moist;; ; (2.5YR 3.0/4.0) mottles; dominant strongly weathered rotten rock fragments;

REMARKS:

Brief description of the profile: A deep, well drained, dark reddish brown clay soil, strongly or moderately structured; with a thick dark coloured topsoil; subsoil aggregates fall apart when wetted.
Soil when dry has a few cracks, width is less than 0.5 cm.
Soil clods fall apart in very fine angular aggregates when saturated with water.
At a depth of about 70-100 cm a "stone layer" is present with a thickness of 5 to 15 cm, containing few, fine to medium, iron rich angular concretions and few quartz gravels; the layer forms no limitation for root development.
Land use: at site nearly permanently cultivated plots of smallholders, nearby large cotton estates.

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monolith number: MOC05 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	15	0	2	5	8	12	8	35	8	15	41	16	0.00	0	0	0	0	0	0	0	0
2	15	30	0	1	3	6	11	8	29	8	16	48	20	0.00	0	0	0	0	0	0	0	0
3	30	50	0	1	2	5	9	5	22	7	11	60	25	0.00	0	0	0	0	0	0	0	0
4	50	82	0	1	2	3	5	3	14	3	6	77	22	0.00	0	0	0	0	0	0	0	0
5	82	125	0	1	3	4	6	5	19	5	8	67	21	0.00	0	0	0	0	0	0	0	0
r	140	160	0	2	11	13	17	10	53	9	3	24	-1	0.00	0	0	0	0	0	0	0	0

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH Ca	CAT. Mg	K	Na	sum meq	EXCH H+Al /100g	AC. Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	7.1	6.0	3.1	2.8	0.2	20.5	3.5	0.1	1.2	25.3	0.1	0.0	35.3	-1	-1	-1.0	72	-1	0.13
2	7.9	6.6	2.3	1.9	0.1	20.9	2.5	0.1	1.2	24.7	0.1	0.0	31.6	-1	-1	-1.0	78	-1	0.13
3	7.9	6.3	3.0	1.2	0.1	15.1	5.0	0.1	0.2	20.4	0.0	0.0	27.2	-1	-1	-1.0	75	-1	0.09
4	7.8	6.1	2.0	0.7	0.1	12.5	7.0	0.1	0.3	19.9	0.0	0.0	25.6	-1	-1	-1.0	78	-1	0.08
5	8.0	6.0	2.7	0.5	0.1	11.4	7.5	0.1	0.2	19.2	0.0	0.0	25.0	-1	-1	-1.0	77	-1	0.06
r	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0	0	0.00

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	-	-	-	3	4	-	-	1	-	-	1	1	0.2	0.2	0.1	4.4	0.2	0.1	0.2
2	-	-	-	3	4	-	-	1	-	-	1	1	0.2	0.2	0.1	5.1	0.3	0.0	0.1
3	-	-	-	3	4	-	-	1	-	-	1	1	0.2	0.2	0.1	5.7	0.3	0.0	0.1
4	-	-	-	2	5	-	-	1	-	-	1	1	0.2	0.2	0.1	5.7	0.4	0.0	0.1
5	-	-	-	2	5	-	-	1	-	-	1	1	0.2	0.2	0.1	5.6	0.4	0.0	0.1
r	-	-	-	-	-	-	-	-	-	-	-	-	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

ISRIC monolith number: MOC06 country: MOZAMBIQUE SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: ferric acrisol (Final class.)
USDA,1975: paleustalf oxic, sandy over clayey, kaolinitic, hyperthermic
Diagnostic horizons: ochric, argillic
(other) Diagn. criteria:
Local classification:

LOCATION : Nampula Province, Nampula, Nova Chaves
: Latitude: 15 18 S Longitude: 39 7 E Altitude: 450 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.82

GENERAL LANDFORM : peneplain Topography: undulating
PHYSIOGRAPHIC UNIT : irregular interfluves
SLOPE Gradient/Aspect/Form: % straight
POSITION OF SITE : upper slope
MICRO RELIEF Kind: termite mounds Pattern: isolated
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: nil

PARENT MATERIAL 1 : residual material Derived from: Texture: sandy clay
Weathering degree: high Resistance:
Remarks: Granite,basement cpx

EFFECTIVE SOIL DEPTH cm : 165

WATER TABLE Depth cm : est.highest level: 121 Kind: no watertable observed
DRAINAGE : moderately well to well
PERMEABILITY : Slow permeable layer from (cm): 165 to:
FLOODING frequency: very poor Run-off: very slow
MOISTURE CONDITIONS PROFILE : 000 - 165 cm moist

LAND USE : low level arable farming, cassava, , shifting - fallow grass,
VEGETATION Structure: grassland Status: secondary
Land use/vegetation remarks: Cashew; fallow grasses and herbs

CLIMATE Koeppen: Aw Soil Moisture Regime: ustic
Station: NAMPULA AGRICOLA -----15 09 S/39 20 E;432 (m.a.s.l); 25 km W from site. Relevance: good

NAMPULA AGRICOLA		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP Penman	mm		142	124	126	105	89	71	75	100	128	164	162	145	1432
Relative Humidity	%	19	69	70	72	73	74	78	77	72	66	60	59	66	69
Precipitation	mm	19	251	228	199	89	23	17	19	8	9	15	75	204	1138
Tot.global rad.	MJ/m2	10	20.5	20.3	19.3	17.9	16.6	14.7	14.9	18.0	21.0	21.9	23.0	20.4	19.0
T mean	C	19	26.9	27.0	26.1	25.0	23.3	21.6	21.2	22.5	24.5	26.6	27.6	27.4	25.0
T max	C	19	32.3	32.4	31.3	29.9	28.9	27.4	27.1	29.2	31.8	34.2	34.6	33.4	31.0
T min	C	19	21.6	21.7	20.9	20.1	17.7	15.8	15.3	15.8	17.2	19.0	20.7	21.5	18.9
Windspeed at 2m	m/s	18	1.0	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.6	1.4	1.1	1.1
Bright sunshine	%	10	54	56	58	63	70	65	62	72	76	69	69	54	64

PROFILE DESCRIPTION

Ah 0- 21cm 10.0YR 3.0/1.0 moist; loamy sand; fine to medium weak subangular blocky; non sticky non plastic loose; many very fine pores; many very fine roots; nil inclusions; nil fragments; clear smooth boundary to

E 21- 52cm 7.5YR 3.5/2.0 moist; loamy sand; medium weak subangular blocky; non sticky non plastic loose; many fine pores; many very fine roots; clear smooth boundary to

Bt 52-121cm 5.0YR 4.0/6.0 moist; sandy clay loam; weakly coherent porous massive; slightly sticky slightly plastic very friable; patchy thin clay cutans ; many very fine/fine pores; few very fine roots and few fine roots; gradual smooth boundary to

Btg 121-165cm 2.5YR 4.0/6.0 moist; sandy clay; medium weak angular blocky; sticky slightly plastic friable very hard; many prominent (10.0YR 7.0/1.0) and many prominent (10.0YR 6.0/6.0) mottles; many very fine/fine pores; few very fine roots and few fine roots;

REMARKS:

A deep, well drained, yellowish red sandy clay (loam) with a loamy sand topsoil and having a strongly mottled low permeable subsoil deeper than 150 cm. Texture is sandy clay from 93 to 121 cm.
Medium to large size, dome and chimney shaped, termite mounds.
The structure of the topsoil can also be described as single grain or massive porous/weakly coherent.
In the topsoil are holes filled with redder coloured subsoil; in the subsoil are holes filled with darker coloured topsoil.
At 90 cm depth one can observe a slight increase in clay content.
Termite holes are present, density about 2 per square meter.
The strong mottling in the subsoil is caused by temporarily stagnant water.

monolith number: MOC06 analytical data <missing value = -1> ISRIC print date: 04/01/93

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	21	0	5	17	28	24	7	81	4	4	12	10	0.00	0	0	0	0	0	0	0	0
2	21	52	0	5	19	30	23	5	82	2	3	12	12	0.00	0	0	0	0	0	0	0	0
3	52	93	0	7	21	25	16	4	73	2	2	23	3	0.00	0	0	0	0	0	0	0	0
4	93	121	0	11	15	13	9	3	51	2	2	45	11	0.00	0	0	0	0	0	0	0	0
5	131	160	0	5	9	9	8	3	34	3	4	59	2	0.00	0	0	0	0	0	0	0	0
6	275	310	0	13	15	12	9	4	53	7	9	31	2	0.00	0	0	0	0	0	0	0	0
7	325	375	0	13	12	8	5	3	41	5	8	46	2	0.00	0	0	0	0	0	0	0	0
b	0	20	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0.00	0	0	0	0	0	0	0	0

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH H+Al /100g	AC. Al	CEC soil	CEC clay	CEC OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	6.3	5.7	-1.0	1.0	-0.1	2.2	0.4	0.0	0.1	2.7	0.0	0.0	5.4	-1	-1	-1.0	50	-1	0.05
2	6.2	4.8	-1.0	0.2	-0.1	0.8	0.2	0.2	0.0	1.2	0.0	0.1	2.5	-1	-1	-1.0	46	-1	0.04
3	6.0	4.7	-1.0	0.5	-0.1	1.2	0.2	0.0	0.1	1.5	0.0	0.1	4.0	-1	-1	-1.0	38	-1	0.04
4	5.9	5.1	-1.0	0.5	-0.1	1.8	0.3	0.0	0.1	2.2	0.0	0.1	4.3	-1	-1	-1.0	51	-1	0.04
5	6.2	5.6	-1.0	0.3	-0.1	3.1	0.5	0.0	0.1	3.7	0.0	0.0	5.5	-1	-1	-1.0	66	-1	0.03
6	5.5	5.4	-1.0	0.2	-0.1	0.2	0.8	0.0	0.1	1.1	0.1	0.0	5.9	-1	-1	-1.0	18	-1	0.03
7	5.4	4.7	-1.0	0.2	-0.1	0.3	1.1	0.0	0.1	1.5	0.2	0.2	5.2	-1	-1	-1.0	29	-1	0.04
b	-1	-1	-1.0	-0.1	-0.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1.0	-1	-1	-1.00

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	FEd	ALd	FEp	ALp
1	1	-	-	-	5	-	-	1	1	-	2	-	0.0	0.1	0.0	0.4	0.1	0.0	0.1
2	1	-	-	-	5	-	-	1	1	-	2	-	0.0	0.1	0.0	0.4	0.1	0.0	0.1
3	-	-	-	-	5	-	-	1	1	-	2	-	0.0	0.1	0.0	0.6	0.1	0.0	0.0
4	-	-	-	-	5	-	-	1	1	-	2	-	0.0	0.1	0.0	1.1	0.1	0.0	0.0
5	-	-	-	-	5	-	-	1	-	-	2	-	0.0	0.1	0.0	1.7	0.2	0.0	0.0
6	-	-	-	-	5	-	-	1	-	-	3	-	0.1	0.1	0.0	6.4	0.4	0.0	0.0
7	-	-	-	-	5	-	-	1	-	-	3	-	0.1	0.1	0.0	3.2	0.2	0.0	0.0
b	-	-	-	-	-	-	-	-	-	-	-	-	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0