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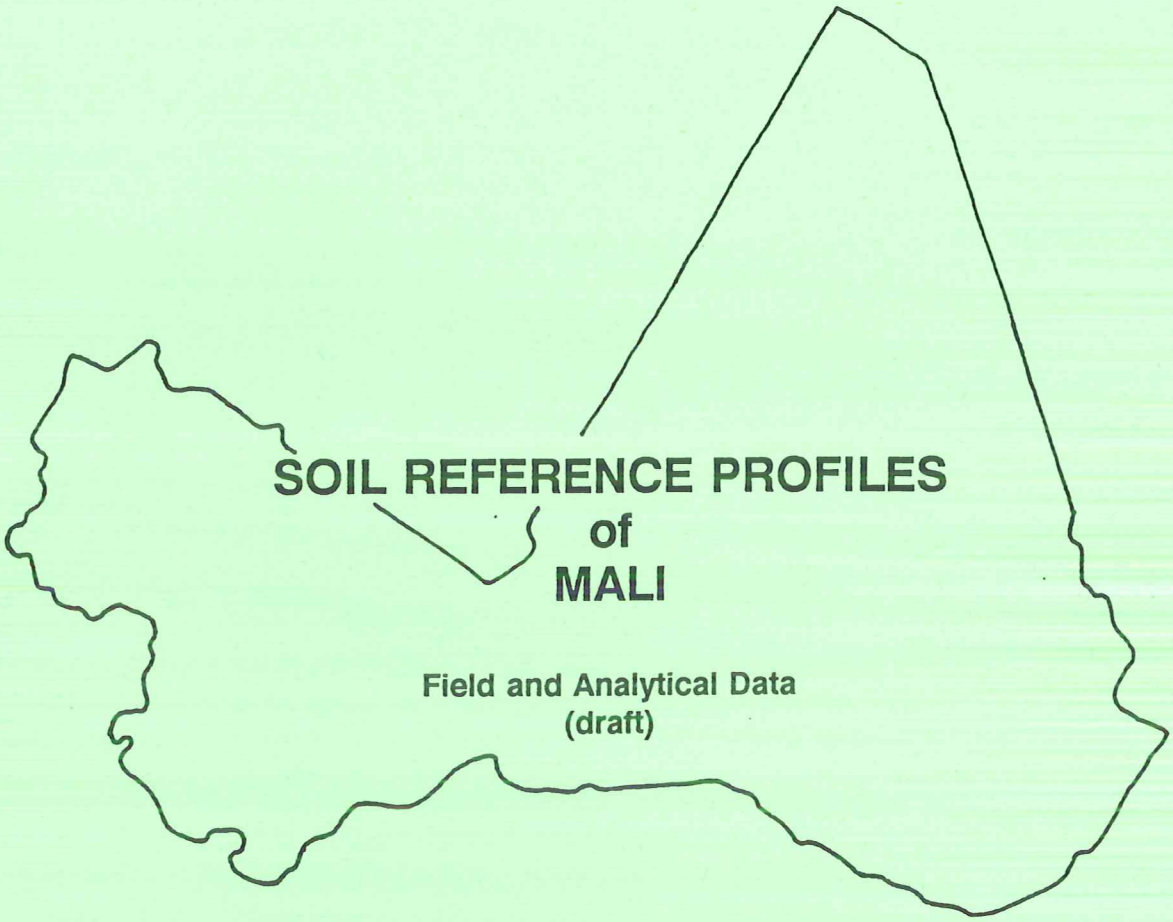

SOIL REFERENCE PROFILES of MALI

Field and Analytical Data
(draft)

April 1993

ISRIC

INTERNATIONAL SOIL REFERENCE AND INFORMATION CENTRE
WAGENINGEN - THE NETHERLANDS

CODE	LOCATION	CLASS		
mli01	Mali, Koulikoro, Kangaba, Siby, 21km SW of Bankoumana (SP 24)	Af	uua	ox
mli02	Mali, Niono, Office de Niger, canal G2	Vc	vur	en
mli03	Mali, Nampala, 20km NE of Nampala, permanent site no. 10	Xl	dra	us
mli04	Mali, Nampala, 45km NE of Nampala, permanent site no.11	Xh	drn	aa
mli05	Mali, Tombouctou, Goundam, 4 km N of Gargandou,Lac Daouna, SP 33	Re	eop	aa
mli06	Mali, Gao, 3 km W of Niger river	Qf	esp	aa

ISRIC monolith number: MLI01 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: ferric acrisol (Tent. class.)
USDA,1975: haplustult oxic, clayey, isohyperthermic
Diagnostic horizons: argillic
(other) Diagn. criteria:
Local classification: Sol ferrugineux *

LOCATION : Mali, Koulikoro, Kangaba, Siby, 21km SW of Bankoumana (SP 24)
: Latitude: 12 5 0 N Longitude: 8 24 0 W Altitude: 350 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 10.86

GENERAL LANDFORM : alluvial terrace Topography: flat or almost flat
PHYSIOGRAPHIC UNIT :
SLOPE Gradient/Aspect/Form: 0.2% straight
POSITION OF SITE : flat
MICRO RELIEF Kind: termite mounds Pattern: isolated Height (cm): 50
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: slaked Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: slight sheet

PARENT MATERIAL 1 : alluvium Derived from: Texture: clayey
Remarks: Terrace of Niger

EFFECTIVE SOIL DEPTH cm : 140

WATER TABLE Depth cm : 230 est.highest level: 140 est. lowest level:500 Kind: groundwater table
DRAINAGE : well
PERMEABILITY :
FLOODING frequency: nil Run-off: medium
MOISTURE CONDITIONS PROFILE : 0 - 28 cm dry 28 - 250 cm moist 250 - 500 cm wet

LAND USE : (semi) natural vegetation
VEGETATION Structure: deciduous woodland
Land use/vegetation remarks: See file species listing

CLIMATE Koeppen: Aw Soil Moisture Regime: ustic
Station: BAMAKO_VILLE -----12 38 N/8 2 W;332 (m.a.s.l); 070 km NE from site. Relevance: moderate

BAMAKO_VILLE		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP Penman	mm		196	209	242	225	262	160	143	131	132	153	166	177	2136
Relative Humidity	%	30	34	30	30	40	50	67	77	81	78	69	52	42	0
Bright sunsh.hrs/day		30	88	91	88	82	78	80	69	61	70	80	86	81	0
Precipitation	mm	50	1	0	1	17	65	141	240	333	213	66	7	1	1087
Tot.global rad.MJ/m2			18.0	19.5	21.2	20.7	18.9	18.5	18.0	16.8	18.2	18.5	17.8	15.8	18.5
T mean	C	30	24.8	27.9	30.5	32.7	32.1	28.7	26.4	25.6	26.0	17.0	25.7	25.2	27.6
T max	C	30	33.4	35.2	38.4	39.2	38.1	35.2	31.9	30.9	32.0	34.5	34.8	33.0	34.8
T min	C	30	16.7	19.3	22.5	24.6	25.2	23.2	22.1	21.7	21.5	21.0	18.0	16.5	21.0
Windspeed at 2m	m/s	30	2.1	2.5	2.6	2.7	2.8	2.5	2.3	2.2	1.9	1.7	1.9	2.1	2.3

PROFILE DESCRIPTION

A 0- 6cm 7.5YR 3.0/2.0 moist; ; fine to medium weak platy; slightly sticky non plastic soft; few medium tubular pores; clear smooth boundary to

BA 6- 28cm 7.5YR 5.0/6.0 moist; silty clay loam; fine to very fine moderate subangular blocky; slightly sticky slightly plastic slightly hard; many very fine pores; frequent termite channels; gradual smooth boundary to

Bt1 28- 50cm 7.5YR 5.0/7.0 moist; silty clay; fine to very fine moderate subangular blocky; slightly sticky slightly plastic friable; broken moderately thick clay cutans on on pedfaces ; many very fine pores; frequent termite channels; diffuse smooth boundary to

Bt2 50-100cm 7.5YR 5.0/6.0 moist; silty clay; fine to very fine moderate subangular blocky; slightly sticky slightly plastic friable; few medium faint mottles; patchy moderately thick clay cutans on on pedfaces ; common very fine pores; frequent termite channels; gradual smooth boundary to

BCg1 100-141cm 10.0YR 5.0/4.0 moist; silty clay; fine moderate to strong angular blocky; slightly sticky slightly plastic firm; many fine distinct clear (5.0YR 5.0/4.0) and common medium prominent sharp mottles; few fine pores; few termite channels; gradual smooth boundary to

Cg1 141-155cm 10.0YR 6.0/2.0 moist; silty clay; medium to coarse angular blocky; sticky plastic firm; many coarse prominent sharp (5.0YR 4.0/6.0) and common medium prominent sharp mottles; few fine pores; gradual smooth boundary to

REMARKS:

See also unit PL11 in 'Mali land and water resourses' 1983,PIRT, mapscale 1:500 000.
Termite mounds are present, height about 50cm. Smooth soil surface is indicative for superficial run-off.
Consistency when dry at a depth of 28cm and deeper will be probably hard when dry. Oval termite nests with a diameter of 2 to 5cm are present in the soil profile from 0 to 150cm. Greatest depth of the watertable will be probably more than 500cm. Effective soil depth depends on the depth of the watertable.
Windspeed is recorded at a height of 10 meter. Monthly precipitation records of the period 1922-1985, as well as max /min relative humidity data are available in the file.
*Sols ferrugineux lessives a concretions. FAO classification: ferric Acrisol or dystric Nitosol.
Deep augering from 155-500cm: texture stays more or less the same,4 horizons can be distinguished based on quantity and colour of dominant mottling, brownish 160-225cm, blackish 225-275, reddish 275-375, light gray 375-500cm. Also low level arable farming is present in the same physiographic unit; main crop is sorghum.

monolith number: MLI01 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	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2
1	0	6	-1	2	2	2	5	9	19	42	16	23	9	1.42	43	41	37	32	30	24	13	12
2	6	28	-1	2	2	1	2	4	11	27	19	43	16	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
3	28	50	-1	2	1	1	2	4	9	28	22	42	10	1.40	48	47	41	36	34	30	21	20
4	50	100	-1	1	1	1	1	3	6	28	23	42	12	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
5	100	141	-1	0	1	1	2	4	8	26	25	41	18	1.45	45	44	40	36	35	32	26	23
6	141	160	-1	1	1	2	4	5	14	26	24	36	20	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
7	160	225	-1	1	1	2	5	7	17	28	21	34	19	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
8	225	275	-1	7	6	3	5	6	27	24	18	32	18	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
9	275	375	-1	2	3	3	4	7	20	27	19	35	18	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
a	375	500	-1	0	0	1	7	15	24	27	13	35	22	-1.00	-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	6.2	4.9	-1.0	0.9	0.1	2.6	2.1	0.4	0.0	5.1	0.0	0.0	5.9	-1	3	5.1	86	0	0.04
2	5.7	4.0	-1.0	0.6	0.0	2.1	2.4	0.4	0.0	4.9	1.1	1.1	8.0	-1	2	6.0	61	14	0.02
3	5.6	4.2	-1.0	0.2	-1.0	2.5	2.9	0.5	0.0	5.9	0.5	0.5	8.6	-1	1	6.4	69	6	0.03
4	5.7	4.4	-1.0	0.2	-1.0	3.1	3.5	0.6	0.0	7.2	0.2	0.0	9.1	-1	1	7.4	79	0	0.03
5	6.3	4.7	-1.0	0.1	-1.0	4.3	3.9	0.5	0.0	8.7	0.1	0.0	10.0	-1	0	8.8	87	0	0.03
6	6.4	4.6	-1.0	0.1	-1.0	4.1	3.4	0.4	0.0	7.9	0.1	0.0	9.2	-1	0	8.0	86	0	0.02
7	6.2	4.4	-1.0	0.1	-1.0	3.1	2.9	0.2	0.0	6.2	0.1	0.0	7.4	-1	0	6.3	84	0	0.02
8	6.2	4.5	-1.0	0.0	-1.0	2.9	2.6	0.2	0.0	5.7	0.0	0.0	7.5	-1	0	5.7	76	0	0.02
9	6.0	4.3	-1.0	0.0	-1.0	2.6	2.7	0.1	0.0	5.4	0.1	0.0	6.9	-1	0	5.5	78	0	0.02
a	6.1	4.4	-1.0	0.0	-1.0	4.1	4.0	0.1	0.0	8.2	0.0	0.0	8.6	-1	0	8.2	95	0	0.03

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	2				7		3				3		0.0	0.1	0.1	2.3	0.2	-1.0	-1.0
2	2				7		3				4		0.1	0.2	0.0	3.8	0.4	-1.0	-1.0
3	1				7		4				4		0.1	0.1	0.2	3.7	0.4	-1.0	-1.0
4					7		4				4		0.1	0.1	0.1	3.8	0.4	-1.0	-1.0
5					7		4				4		0.1	0.1	0.0	3.7	0.3	-1.0	-1.0
6					8		4				4		0.1	0.1	0.0	3.3	0.2	-1.0	-1.0
7	2				8		3				3		0.1	0.1	0.0	2.5	0.2	-1.0	-1.0
8	2				7		3				3		0.1	0.1	0.0	4.8	0.3	-1.0	-1.0
9	2				7		3				3		0.1	0.1	0.0	3.8	0.3	-1.0	-1.0
a	2				8		4				4		0.1	0.1	0.0	3.1	0.2	-1.0	0.0

ISRIC monolith number: MLI02 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: chromic vertisol (Tent. class.)
USDA,1975: chromustert entic, clayey, thermic
Diagnostic horizons:
(other) Diagn. criteria: slickensides, vertic properties
Local classification: Moursi

LOCATION : Mali, Niono, Office de Niger, canal G2
: Latitude: 14 14 0 N Longitude: 6 0 0 W Altitude: 280 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 10.86

GENERAL LANDFORM : alluvial plain Topography: flat or almost flat
PHYSIOGRAPHIC UNIT : lower part of the plain
SLOPE Gradient/Aspect/Form: 0 % straight
POSITION OF SITE : flat
MICRO RELIEF Kind:
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: large cracks Sealing: partly slaked
SLOPE PROCESSES Soil erosion: nil Aggradation: nil

PARENT MATERIAL 1 : alluvium Derived from: Texture:
Remarks: "delta mort" Niger

EFFECTIVE SOIL DEPTH cm : 150

WATER TABLE Depth cm : 100 est.highest level: 0 est. lowest level:200 Kind: groundwater table
DRAINAGE : imperfectly
PERMEABILITY : moderate
FLOODING frequency: nil Run-off: very slow
MOISTURE CONDITIONS PROFILE : 0 - 10 cm dry 10 - 50 cm moist 50 - 150 cm wet

LAND USE : high level arable farming, , paddy, monoculture, draining
VEGETATION Structure:
Land use/vegetation remarks: Irrigation system exists 40/50 years

CLIMATE Koeppen: BSh Soil Moisture Regime: aridic
Station: NIONO-SAHEL -----14 14 N/6 0 W;280 (m.a.s.l); km from site. Relevance: good

	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
NIONO-SAHEL														
Relative Humidity %	30	34	29	28	33	46	59	73	79	77	63	47	40	51
Bright sunsh.hrs/day	30	93	98	93	89	88	89	81	74	83	92	94	91	88
Precipitation mm	30	0	0	1	5	25	60	129	203	86	16	1	0	550
Tot.global rad.MJ/m2		18.6	20.6	22.3	22.6	21.3	21.6	20.3	19.4	20.3	21.0	19.5	17.9	20.4
T mean C	30	24.1	27.0	29.9	32.5	33.5	31.6	25.3	28.7	28.3	29.3	26.2	24.1	28.6
T max C	30	31.9	34.9	37.1	37.4	39.4	37.2	32.3	31.8	31.5	35.0	35.9	31.2	34.8
T min C	30	12.8	15.7	18.8	22.5	24.9	24.5	23.1	22.4	22.6	21.4	17.5	14.0	20.0
Windspeed at 2m m/s	30	2.6	2.7	2.5	2.2	2.0	2.3	1.9	1.2	1.1	1.2	2.1	2.3	2.0

PROFILE DESCRIPTION

Ap 0- 30cm 10.0YR 5.0/2.0 moist; silty clay; very coarse strong prismatic; sticky very plastic extremely hard; common fine distinct clear (7.5YR 5.0/6.0) mottles; few very fine pores; common very fine roots throughout; clear smooth boundary to

AC1 30- 60cm 5.0Y 4.5/2.5 moist; silty clay; coarse weak angular blocky; sticky slightly plastic friable; broken moderately thick slickensides on on pedfaces ; common very fine pores; few very fine roots throughout; gradual smooth boundary to

AC2 60-100cm 5.0Y 5.0/3.0 moist; silty clay; coarse moderate wedge-shaped ang.bl.; sticky slightly plastic friable; broken moderately thick slickensides on on pedfaces ; common very fine pores; common very fine roots throughout; very few large spherical hard calcareous nodules; diffuse smooth boundary to

AC3 100-150cm 5.0Y 5.0/2.0 moist; silty clay loam; very coarse moderate to strong wedge-shaped ang.bl.; sticky very plastic friable; continuous moderately thick slickensides on on pedfaces ; common very fine pores; gradual smooth boundary to

Cg1 150-175cm 2.5Y 5.0/2.0 moist; silty clay loam; very coarse weak wedge-shaped ang.bl.; sticky plastic friable; common medium distinct clear (7.5YR 5.0/6.0) and common medium distinct clear (2.5Y 6.0/1.0) mottles; common very fine pores;

AUGER 175-375cm 2.5Y 5.0/2.0 moist; clay loam; ; many medium prominent (7.5YR 5.0/6.0) mottles;

REMARKS:

See also unit TI5 of "Mali Land and Water Resources" 1983, PIRT, mapscale 1:500.000
Max.depth watertable without irrigation probably more than 200cm. Wedge shaped structure elements not well visible, tilted shearplanes with slickensides are well visible. Around biopores greyish soil colour. Permeability of the soil is moderately high due to biopores and cracks, which is also reflected by the considerable fluctuation of the watertable. Under cultivation the soil structure is easily destroyed and a compact soil remains settling hard when dry.
The soil is classified as chromic Vertisol based on oral information of presence of wide open cracks in the dry season; if cracks are not according Vertisol definition the soil will classify as vertic Cambisol.
Windspeed is recorded at 10m height. Insolation, relative humidity and windspeed data are taken from Segou meteo station. Monthly precipitation records of a 30 year period are available in the file.

monolith number: MLI02 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	30	-1	1	3	2	2	11	20	13	2	65	30	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
2	30	60	-1	1	3	2	3	12	20	10	6	64	32	1.47	46	45	43	40	38	35	30	26
3	60	100	-1	1	2	2	2	12	18	13	8	60	33	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
4	100	150	-1	1	2	2	2	11	17	14	6	63	31	1.45	45	45	44	41	40	37	32	28
5	150	175	-1	1	3	2	2	26	34	15	5	46	16	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
6	175	250	-1	2	10	7	6	33	58	14	3	25	13	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
7	300	375	-1	2	8	10	14	18	54	15	6	26	14	-1.00	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO 3 %	ORG- C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g	Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	8.1	6.3	2.0	0.6	0.1	18.0	4.2	0.2	1.6	24.0	-1.0	-1.0	22.8	-1	2	24.0	105	-1	0.29
2	8.8	6.8	2.1	0.2	-1.0	20.1	4.5	0.1	2.4	27.1	-1.0	-1.0	21.2	-1	1	27.1	128	-1	0.24
3	8.8	6.8	1.8	0.2	-1.0	18.4	4.8	0.1	2.7	26.0	-1.0	-1.0	-1.0	-1	1	26.0	109	-1	0.26
4	8.8	6.9	2.5	0.1	-1.0	21.2	5.3	0.2	2.3	29.0	-1.0	-1.0	20.2	-1	0	29.0	144	-1	0.26
5	8.9	7.0	2.6	0.1	-1.0	23.2	4.2	0.1	1.7	29.2	-1.0	-1.0	15.4	-1	0	29.2	190	-1	0.25
6	8.9	7.0	1.8	0.0	-1.0	15.9	2.6	0.1	1.0	19.6	-1.0	-1.0	9.1	-1	0	19.6	215	-1	0.20
7	8.9	7.1	1.5	0.0	-1.0	13.8	4.1	0.1	0.7	18.7	-1.0	-1.0	11.4	-1	0	18.7	164	-1	0.17

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	2			2	8		4	2			2		0.2	0.2	0.1	1.2	0.2	-1.0	-1.0
2	1			2	8		4	2			2		0.1	0.2	0.1	1.4	0.2	-1.0	-1.0
3	1			2	8		4	2			2		0.1	0.2	0.1	1.4	0.2	-1.0	-1.0
4	1			2	8		4	2			2		0.1	0.1	0.0	1.3	0.2	-1.0	-1.0
5	2			4	8		4	2			2		0.0	0.1	0.0	0.9	0.1	-1.0	-1.0
6	1			4	8		3	1			2		0.0	0.0	0.0	0.6	0.1	-1.0	-1.0
7	1			7	8		1	1			1		0.0	0.0	0.0	0.7	0.1	-1.0	-1.0

ISRIC monolith number: MLI03 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: luvic xerosol (Tent. class.)
USDA,1975: haplargid ustalfic, loamy, hyperthermic
Diagnostic horizons: argillic
(other) Diagn. criteria:
Local classification: Sols brun-rouges *

LOCATION : Mali, Nampala, 20km NE of Nampala, permanent site no. 10
: Latitude: 15 23 N Longitude: 5 25 W Altitude: 265 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.86

GENERAL LANDFORM : dune field Topography: flat or almost flat
PHYSIOGRAPHIC UNIT : transition toward lower unit
SLOPE Gradient/Aspect/Form: 2 % straight
POSITION OF SITE : middle 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 : eolian sand Derived from: Texture:

--- 2 : alluvium Derived from: Texture:
Depth boundary 1/2 (cm): 80
Remarks: "delta mort"alluvium

EFFECTIVE SOIL DEPTH cm : 110

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : moderately well to well
PERMEABILITY : slow Slow permeable layer from (cm): 108 to: 170
FLOODING frequency: nil
MOISTURE CONDITIONS PROFILE : 0 - 170 cm dry

LAND USE : semi natural grassland, grazed
VEGETATION Structure: short grassland Status: degraded
Land use/vegetation remarks: Species listing in file *

CLIMATE Koeppen: BSh Soil Moisture Regime: aridic
Station: KOGONI -----14 50 N/ 6 0 W;260 (m.a.s.l); 120 km SW from site. Relevance: moderate

Station: NIAFUNKE -----15 55 N/ 4 W;260 (m.a.s.l); 140 km ENE from site. Relevance: moderate

	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
KOGONI														
Precipitation mm	30	0	0	1	5	15	59	131	173	84	19	1	1	485
NIAFUNKE														
Precipitation mm	30	0	1	0	1	11	46	62	115	59	2	1	1	280

PROFILE DESCRIPTION

Ap 0- 12cm 7.5YR 5.0/4.0 moist; loamy sand; weakly coherent porous massive; non sticky non plastic very friable soft; common very fine pores; common fine roots throughout; abrupt smooth boundary to

Bt1 12- 37cm 6.0YR 4.0/4.0 moist; loamy sand; moderately coherent porous massive; slightly sticky non plastic friable hard; patchy thin clay cutans on in root channels/pores ; common very fine random interstitial tubular pores; few fine roots throughout; gradual smooth boundary to

Bt2 37- 74cm 6.0YR 4.0/4.0 moist; sandy loam; moderately coherent porous massive; slightly sticky slightly plastic friable hard; patchy moderately thick clay cutans on in root channels/pores ; many very fine random interstitial tubular pores; few fine roots throughout; abrupt wavy boundary to

E 74- 80cm 10.0YR 6.0/3.0 moist; loamy sand; weakly coherent porous massive; non sticky non plastic very friable soft; many very fine pores; few fine roots throughout; abrupt wavy boundary to

IIBt 80-108cm 5.0YR 4.0/4.0 moist; sandy loam; strongly coherent porous massive; slightly sticky slightly plastic friable very hard; patchy moderately thick clay cutans on in root channels/pores ; many very fine random interstitial tubular pores; gradual smooth boundary to

IIIBt 108-124cm 10.0YR 5.0/2.0 moist; sandy clay loam; very coarse moderate angular blocky; sticky slightly plastic firm very hard; broken moderately thick clay cutans on in root channels/pores ; many very fine random interstitial tubular pores; gradual smooth boundary to

IIICg 124-170cm 10.0YR 6.0/2.0 moist; sandy clay loam; very coarse moderate angular blocky; sticky plastic firm ; many fine distinct clear (10.0YR 6.0/6.0) mottles; common very fine random interstitial tubular pores;

REMARKS:

See also data of unit DA4 in "Mali Land and Water Resources" 1983, PIRT, mapscale 1:500.000
*Sols brun-rouges sub-arides de transition vers les ferrugineux.
*Monitoring of vegetation by PIRT period 1980-1986.
Landscape: eroded dunes, very weak undulating. Deeper subsoil is imperfectly drained. Geogenesis:probably cover sand over ancient alluvial plain (check with textural analysis and micromorphology). Groundwater in nearby wells at a depth of about 50 meters.
No meteo station with reliable data nearby site; precipitation is approximately the average of data from Kogoni(54.2cm) and Niafunke(28,0cm), for other meteo elements the average values of the meteo stations of Segou and Timbuctu should be taken.

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monolith number: MLI03 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	12	-1	0	5	10	39	31	86	9	0	5	0	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
2	12	37	-1	1	7	11	38	24	81	9	1	8	5	1.63	37	36	34	15	10	6	5	4
3	37	74	-1	1	6	10	36	24	78	8	4	10	8	1.51	40	38	29	18	13	11	6	6
4	74	80	-1	1	7	11	38	27	84	11	0	5	11	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
5	80	108	-1	1	7	10	30	22	70	4	6	20	8	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
6	108	124	-1	1	8	10	28	19	66	6	2	25	12	1.56	44	43	40	32	28	25	15	14
7	124	170	-1	1	4	10	37	21	73	4	1	22	10	-1.00	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG- C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g	Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	6.7	5.6	-1.0	-1.0	-1.0	1.0	0.5	0.2	0.0	1.7	0.1	0.0	2.0	-1	-1	1.8	85	0	0.03
2	6.2	4.7	-1.0	0.1	-1.0	1.2	0.9	0.2	0.0	2.3	0.1	0.0	2.6	-1	0	2.4	88	0	0.01
3	6.0	4.3	-1.0	0.1	-1.0	1.2	1.3	0.2	0.0	2.7	0.1	0.0	3.5	-1	0	2.8	77	0	0.01
4	6.4	4.7	-1.0	0.0	-1.0	0.6	0.4	0.0	0.0	1.0	0.1	0.0	1.2	-1	0	1.1	83	0	0.01
5	6.6	4.4	-1.0	0.1	-1.0	3.6	1.7	0.2	0.4	5.9	0.1	0.0	6.6	-1	0	6.0	89	0	0.03
6	8.3	6.1	1.0	0.1	-1.0	6.9	2.9	0.2	0.6	10.6	0.0	0.0	10.0	-1	0	10.6	106	0	0.04
7	8.9	7.6	0.9	0.0	-1.0	11.0	2.8	0.2	0.7	14.7	0.0	0.0	9.8	-1	0	14.7	150	0	0.15

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	2			3	6		3	2			1		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
2	2			4	7		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
3	2			4	7		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4	2			4	6		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
5	2			5	7		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
6	2			7	7		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7	2			7	7		3	2					-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

ISRIC monolith number: MLI04 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: haplic xerosol (Tent. class.)
USDA,1975: natrargid typic, clayey, hyperthermic
Diagnostic horizons: natric
(other) Diagn. criteria:
Local classification: Sols sodiques

LOCATION : Mali, Nampala, 45km NE of Nampala, permanent site no.11
: Latitude: 15 30 N Longitude: 5 9 W Altitude: 260 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.86

GENERAL LANDFORM : alluvial plain Topography: flat or almost flat
PHYSIOGRAPHIC UNIT : low flat plain
SLOPE Gradient/Aspect/Form: 0 % straight
POSITION OF SITE : flat
MICRO RELIEF Kind:
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: slaked Salt: nil Alkali: strong
SLOPE PROCESSES Soil erosion:

PARENT MATERIAL 1 : alluvium Derived from: Texture:
Remarks: "delta mort"alluvium

EFFECTIVE SOIL DEPTH cm : 150

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE :
PERMEABILITY :
FLOODING frequency:
MOISTURE CONDITIONS PROFILE : 0 - 150 cm dry

LAND USE : semi natural grassland, grazed
VEGETATION Structure: short grassland Status: degraded
Land use/vegetation remarks: Species listing in file *

CLIMATE Koeppen: BSh Soil Moisture Regime: aridic
Station: KOGONI -----14 50 N/ 6 0 W;260 (m.a.s.l); km from site. Relevance:

Station: NIAFUNKE -----15 55 N/ 4 W;260 (m.a.s.l); km from site. Relevance:

		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
KOGONI															
Precipitation	mm	30	0	0	1	5	15	59	131	173	84	19	1	1	485
NIAFUNKE															
Precipitation	mm	30	0	1	0	1	11	46	62	115	59	2	1	1	280

PROFILE DESCRIPTION

A 0- 14cm 10.0YR 5.0/2.0 moist; sandy clay loam; medium to coarse strong angular blocky; sticky plastic hard; few very fine pores; common very fine roots; gradual smooth boundary to

BA 14- 50cm 5.0Y 4.0/1.0 moist; silty clay loam; coarse- very coarse strong angular blocky; sticky slightly plastic hard; broken moderately thick slickensides ; common very fine pores; common very fine roots; diffuse smooth boundary to

Btn1 50- 85cm 2.5Y 4.5/1.0 moist; silty clay; very coarse strong angular blocky; sticky slightly plastic hard; broken moderately thick slickensides ; few very fine pores; few very fine roots; diffuse smooth boundary to

Btn2 85-135cm 2.5Y 4.0/1.0 moist; silty clay loam; strongly coherent massive to very coarse weak columnar; sticky slightly plastic very hard; patchy moderately thick slickensides ; few very fine pores; few very fine roots; gradual smooth boundary to

C 135-160cm 7.5YR 5.0/2.0 moist; loamy sand; strongly coherent massive to very coarse weak columnar; non sticky non plastic hard; few very fine pores; clear smooth boundary to

Cg 160-170cm 5.0Y 6.0/1.0 moist; clay loam; coarse- very coarse strong angular blocky; sticky slightly plastic very hard; common fine distinct clear (10.0YR 6.0/6.0) mottles; continuous moderately thick pressure cutans ; few very fine pores;

REMARKS:

See also data of unit TH4 in "Mali Land and Water Resources", 1983, PIRT, mapscale 1:500.000.
*Monitoring of vegetation by PIRT in the period 1980-1986. At the moment of site description no grass cover present, nearly 100% bare soil.
Classification:(ST) when not Natrargid than typic Halaquept;(FAO) when not Xerosol then orthic Solonetz.
Angular blocks of the horizons deeper than 14cm have tilted pedfaces (shearplanes/vertic properties?).
No meteostation with reliable data nearby the site; precipitation is approximately the average of data from Kogoni(48.5cm) and Niafunke(28.0cm), for other elements average values of the meteostations of Segou and Timbuctu should be taken.

monolith number: MLI04 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	14	-1	1	4	8	27	14	53	8	8	31	14	1.50	45	44	39	32	30	25	15	13
2	14	50	-1	1	3	7	22	11	44	4	6	46	19	1.56	44	42	41	37	35	30	18	16
3	50	85	-1	1	3	8	21	10	42	6	8	44	20	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
4	85	135	-1	1	3	8	21	9	42	7	6	46	20	1.47	46	45	43	38	36	32	20	18
5	135	160	-1	0	2	7	40	26	75	2	2	20	10	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
6	160	170	-1	0	1	2	15	7	26	5	7	-1	47	-1.00	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG- C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g	Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	7.6	5.7	1.3	-0.1	-1.0	11.5	2.5	0.7	0.1	14.8	-1.0	-1.0	13.6	-1	-1	14.8	109	-1	0.13
2	7.9	5.7	1.3	0.2	-1.0	15.6	2.5	0.1	0.1	18.3	-1.0	-1.0	18.4	-1	1	18.3	99	-1	0.11
3	8.2	5.7	1.6	0.1	-1.0	15.6	2.1	0.1	0.3	18.1	-1.0	-1.0	18.2	-1	0	18.1	99	-1	0.07
4	8.3	6.1	1.3	0.1	-1.0	16.0	2.3	0.2	0.3	18.8	-1.0	-1.0	18.2	-1	0	18.8	103	-1	0.14
5	8.2	5.8	0.5	0.0	-1.0	6.5	1.1	0.1	0.1	7.8	-1.0	-1.0	7.5	-1	0	7.8	104	-1	0.06
6	8.2	5.7	1.6	0.1	-1.0	18.6	3.4	0.2	0.4	22.6	-1.0	-1.0	22.4	-1	0	22.6	101	-1	0.09

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			6	8		3						0.0	0.1	0.0	0.3	0.0	-1.0	-1.0
2	1			6	8		2						0.0	0.1	0.0	0.3	0.1	-1.0	-1.0
3	2			6	8		3						0.0	0.1	0.0	0.2	0.1	-1.0	-1.0
4	2			5	8		3						0.0	0.1	0.0	0.2	0.1	-1.0	-1.0
5	2			6	8		3						0.0	0.0	0.0	0.1	0.0	-1.0	-1.0
6	2			6	8		3						0.0	0.1	0.0	0.4	0.1	-1.0	-1.0

ISRIC monolith number: MLI05 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: eutric regosol (Tent. class.)
USDA,1975: torriorthent typic, fine silty, hyperthermic
Diagnostic horizons:
(other) Diagn. criteria:
Local classification: Lacs desseches *

LOCATION : Mali, Tombouctou, Goundam, 4 km N of Gargandou,Lac Daouna, SP 33
: Latitude: 16 30 N Longitude: 4 11 W Altitude: 260 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.86

GENERAL LANDFORM : lacustrine plain Topography: flat or almost flat
PHYSIOGRAPHIC UNIT : lake bottom, no subdivision
SLOPE Gradient/Aspect/Form: 0 % straight
POSITION OF SITE : flat
MICRO RELIEF Kind:
SURFACE CHAR. Rock outcrop: none Stoniness: none
Cracking: nil Sealing: nil
SLOPE PROCESSES Soil erosion:

PARENT MATERIAL 1 : lacustrine sediments Derived from: Texture:
Remarks: Diatomitic sediments

EFFECTIVE SOIL DEPTH cm : 60

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : moderately well to well
PERMEABILITY :
FLOODING frequency: nil Run-off: slow
MOISTURE CONDITIONS PROFILE : 0 - 200 cm dry

LAND USE : semi natural grassland, grazed
VEGETATION Structure: short grassland Status: degraded
Land use/vegetation remarks: "steppe a epineux xeromorphic" see file*

CLIMATE Koeppen: BWh Soil Moisture Regime: aridic
Station: TIMBUCTU -----16 44 N/3 W;264 (m.a.s.l); 120 km W from site. Relevance: good

TIMBUCTU		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP Penman	mm		216	227	294	318	330	282	232	182	209	267	244	210	3011
Relative Humidity	%	5	25	24	24	23	23	27	41	53	62	52	32	29	35
Bright sunsh.hrs/day		20	88	92	89	87	90	84	85	83	80	92	88	88	87
Precipitation	mm	30	0	0	0	2	4	17	49	65	24	7	0	0	166
Tot.global rad.MJ/m2			17.5	20.1	21.5	21.4	22.1	22.0	22.6	21.8	21.5	20.6	18.4	16.5	0.0
T mean	C	30	21.1	24.0	27.5	31.0	33.8	33.9	31.6	30.0	29.6	30.4	25.9	21.4	28.5
T max	C	30	30.0	33.4	36.7	39.7	41.9	41.3	38.4	36.4	38.1	39.0	35.0	30.1	36.7
T min	C	30	12.8	15.2	18.3	21.5	25.7	26.9	25.6	24.7	24.5	22.2	17.4	12.6	20.7
Windspeed at 2m	m/s	10	2.4	2.5	2.7	2.7	2.6	3.1	3.2	2.7	2.1	1.9	2.2	2.3	2.5

PROFILE DESCRIPTION

A 0- 14cm 10.0YR 5.0/2.0 moist; silt; ; slightly sticky slightly plastic soft; many very fine roots ; gradual smooth boundary to

AC 14- 35cm 5.0Y 6.0/2.0 moist; silt; medium weak to moderate subangular blocky into very fine weak crumb; slightly sticky slightly plastic slightly hard; many very fine roots ; clear smooth boundary to

CA 35- 60cm 5.0Y 6.0/2.0 moist; silt; medium moderate granular; slightly sticky slightly plastic slightly hard; many coarse prominent sharp (5.0YR 4.0/4.0) mottles; few fine roots; clear wavy boundary to

C 60- 85cm 5.0Y 5.0/3.0 moist; silt; fine strong platy; slightly sticky slightly plastic hard; clear wavy boundary to

Cg1 85-125cm 5.0Y 4.5/3.0 moist; silt; fine to medium moderate platy into medium moderate granular; slightly sticky slightly plastic slightly hard; few medium faint clear (7.5YR 5.0/6.0) mottles; gradual smooth boundary to

Cg2 125-180cm 5.0Y 6.0/2.0 moist; silt; moderately coherent massive; slightly sticky slightly plastic very hard; many coarse prominent sharp (7.5YR 4.0/6.0) mottles;

REMARKS:

See also data from unit X1 in"Mali land and water resources", 1983, PIRT, mapscale 1:500.000.
Oral information indicates that the lake was yearly flooded by the Niger. The flooding stopped due to the blocking of the entrance/outlet by sand dunes.
The soil has a very low bulk density. Structure of the Ah horizon is powdery. Porosity is difficult to assess, infact a high micro porosity is present. Effective soil depth is probably limited by platy structure of the subsoil. Texture is probably silt (the soil brought into suspension settles quickly). When the ferro-oxyde mottling is not fossile but caused by stagnant water,the soil will classify as an aquic torriorthent.
Monthly precipitation records of the period 1907 to 1985 are available in the file. The windspeed is recorded at a height of 10 meter.
Vegetation changes has been monitored by PIRT for the period 1980-1986.

monolith number: MLI05 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	14	-1	1	1	1	5	4	13	14	48	25	14	0.66	72	68	63	56	52	46	22	17
2	14	32	-1	1	0	0	2	2	5	12	58	25	15	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
3	60	80	-1	1	2	2	4	2	11	8	45	-1	24	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
4	80	125	-1	0	0	0	1	1	2	2	41	55	29	0.54	78	76	69	64	62	58	31	25
5	125	160	-1	0	1	1	8	6	16	3	35	46	20	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
6	160	180	-1	0	0	0	1	1	2	9	53	36	23	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
7	180	200	-1	2	3	3	6	5	19	8	34	39	28	-0.10	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG-C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al	Al /100g	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	8.3	7.1	14.3	1.2	0.1	57.2	4.1	4.0	0.1	65.4	-1.0	-1.0	19.8	-1	4	65.4	330	-1	0.25
2	8.3	7.0	13.8	-1.0	0.1	51.0	4.8	2.5	0.2	58.5	-1.0	-1.0	20.1	-1	-1	58.5	291	-1	0.26
3	8.3	6.9	5.0	0.8	0.1	46.3	8.4	2.9	1.1	58.7	-1.0	-1.0	-1.0	-1	3	58.7	187	-1	0.27
4	8.6	7.0	3.5	0.9	0.1	23.3	6.3	3.6	3.0	36.2	-1.0	-1.0	26.4	-1	3	36.2	137	-1	0.30
5	8.8	7.0	3.5	0.8	0.1	28.5	6.5	3.7	3.8	42.5	-1.0	-1.0	25.3	-1	3	42.5	168	-1	0.35
6	8.9	7.4	55.6	0.6	0.1	46.5	8.2	1.8	2.5	59.0	-1.0	-1.0	15.1	-1	2	59.0	391	-1	0.34
7	9.1	7.2	30.7	0.7	0.1	51.7	8.1	7.1	5.2	72.1	-1.0	-1.0	29.9	-1	3	72.1	241	-1	0.34

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	2			2	3		4						0.1	0.1	0.1	0.4	0.0	-1.0	-1.0
2	3			3	4		4	2					0.1	0.1	0.1	0.6	0.1	-1.0	-1.0
3	3			5	5		3	2					2.5	0.0	0.4	6.1	0.0	-1.0	-1.0
4	3			5	6		3	2					0.3	0.1	0.1	1.9	0.1	-1.0	-1.0
5	3			6	6		3	2					0.1	0.1	0.1	1.5	0.1	-1.0	-1.0
6				4	3		2	2					0.9	0.0	0.2	4.1	0.0	-1.0	-1.0
7	3			4	4		3	2					0.2	0.2	0.1	0.5	0.0	-1.0	-1.0

ISRIC monolith number: MLI06 country: MALI SOIL DESCRIPTION print date (mm/dd/yy): 04/01/93

CLASSIFICATION FAO/UNESCO,1974: ferralic arenosol (Tent. class.)
USDA,1975: torripsamment typic, sandy, hyperthermic
Diagnostic horizons:
(other) Diagn. criteria:
Local classification: Sols mineraux bruts*

LOCATION : Mali, Gao, 3 km W of Niger river
: Latitude: 16 10 N Longitude: 0 6 W Altitude: 260 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman, J.H. - 11.86

GENERAL LANDFORM : dune field Topography: rolling
PHYSIOGRAPHIC UNIT : dune
SLOPE Gradient/Aspect/Form: 10 % n convex
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: severe wind

PARENT MATERIAL 1 : eolian sand Derived from: Texture: sandy
Remarks:

EFFECTIVE SOIL DEPTH cm : 170

WATER TABLE Depth cm : Kind: no watertable observed
DRAINAGE : somewhat excessive
PERMEABILITY :
FLOODING frequency: nil
MOISTURE CONDITIONS PROFILE : 0 - 170 cm dry

LAND USE : semi natural grassland, grazed
VEGETATION Structure: medium tall grassland Status: degraded
Land use/vegetation remarks: Species listing in file *

CLIMATE Koeppen: BWh Soil Moisture Regime: aridic
Station: GAO -----16 16 N/0 3 W;260 (m.a.s.l); 20 km E from site. Relevance: very good

		Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GAO															
EP Penman	mm		187	198	286	280	287	245	239	194	200	216	185	180	2697
Relative Humidity	%	30	25	23	23	24	24	37	50	59	52	33	28	28	34
Precipitation	mm	30	0	0	0	3	8	24	66	77	27	5	0	0	212
Tot.global rad.MJ/m2			17.4	19.8	21.4	22.9	22.3	21.6	21.6	21.2	21.5	20.6	18.9	16.7	20.5
T mean	C	30	22.6	25.5	29.2	32.7	35.3	34.8	32.2	30.7	31.8	31.9	27.7	23.4	29.8
T max	C	30	30.7	31.9	37.4	40.4	43.7	41.4	38.4	36.7	39.7	39.2	35.6	31.2	37.2
T min	C	30	14.6	17.0	20.8	24.5	28.1	28.5	26.4	25.3	25.8	24.6	20.0	15.7	22.6
Windspeed at 2m	m/s	10	4.1	4.0	4.7	4.5	4.2	4.9	4.9	4.3	3.7	3.3	3.8	4.1	4.2
Bright sunshine	%	30	8.6	9.6	9.3	8.6	9.2	8.9	8.8	8.9	9.1	9.5	9.7	8.9	9.1

PROFILE DESCRIPTION

Cu1 0- 49cm 5.0YR 5.0/6.0 moist; ; weakly coherent porous massive; non sticky non plastic soft; few fine roots; abrupt smooth boundary to

Cu2 49- 72cm 5.0YR 5.0/8.0 moist; ; weakly coherent porous massive; non sticky non plastic soft; few fine roots; abrupt smooth boundary to

Cu3 70-170cm 5.0YR 5.0/8.0 moist; ; weakly coherent porous massive; non sticky non plastic soft; few fine roots;

REMARKS:

See also data of unit D1 in "Mali land and water resources", 1983, PIRT, mapscale 1:500.000.
*Panicum turgidum is most frequent species.
*Sols mineraux bruts d'apport eolien.
In the whole soil profile a fine stratification is visible due to colour differences as well as particle size of sand grains.
Monthly precipitation data of the period 1919-1985 are available in the file. Windspeed is recorded at a height of 10 meter.

monolith number: MLI06 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	49	-1	0	4	26	57	8	96	1	0	3	3	1.67	31	31	25	7	5	5	2	2
2	49	72	-1	0	4	32	51	9	96	1	0	3	2	-1.00	-1	-1	-1	-1	-1	-1	-1	-1
3	72	150	-1	0	5	36	48	8	96	1	0	3	3	-1.00	-1	-1	-1	-1	-1	-1	-1	-1

No.	pH- H2O	KCl	CaCO3 %	ORG- C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g	Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	7.2	6.5	0.4	0.0	-1.0	0.8	0.3	0.1	0.0	1.2	-1.0	-1.0	1.1	-1	0	1.2	109	-1	0.08
2	6.9	5.8	0.3	0.1	-1.0	0.6	0.3	0.0	0.0	0.9	-1.0	-1.0	0.9	-1	0	0.9	100	-1	0.03
3	7.4	6.4	0.5	0.0	-1.0	0.8	0.4	0.0	0.0	1.2	-1.0	-1.0	1.0	-1	0	1.2	120	-1	0.03

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			3	6		3				3		0.0	0.0	0.0	1.5	0.0	-1.0	-1.0
2	3			3	5		3				3		0.0	0.0	0.0	1.4	0.0	-1.0	-1.0
3	3			3	6		3				3		0.0	0.0	0.0	1.6	0.0	-1.0	-1.0