

WOSSAC: 134  
631.4  
(676.2)

SOIL ANALYSIS RESULTS  
OF  
LAMBWE VALLEY,

SOUTH NYANZA

KENYA

SOIL INSPECTION PIT ; PONGE NUMBER 2.

PROFILE DESCRIPTION

LOCATION: To the North of the Roo on the lowest Southern slopes of the Gembe Hills.

SLOPE: 2° 40'

ASPECT: South.

LAND USE: Nil.

VEGETATION COVER: 100% ;

60% BUSH: On the edge of thicket extending to the North. Thicket comprises 20% *Rhus vulgaris*; also

*Acacia seyal fistula.*  
*Acacia brevispica*  
*Euclea schimperi*  
*Euphorbia candelabrum*  
*Grewia similis*

40% GRASS.

40% *Chloris gayana*  
also ; *Cynodon dactylon*  
*Setaria sphacelata*

ROOTING DEPTH: >50"

MAXIMUM ROOTING DENSITY: 0-5"

DRAINAGE: Fair

SOIL DEPTH: >50"

LAND USE CLASS 1

0-6" 10 YR 2/2 ; Very Dark Brown. Friable, moderately developed fine and medium subangular blocky clay. Few fine and medium stones. No reaction with HCl. Abundant fine and medium roots. Lower boundary even and clear.

6-29" 10 YR 3/2 ; Very dark greyish brown. Very firm, weak to moderately developed fine and medium prismatic clay; sticky and very plastic when wet. No reaction with HCl. Common very fine to medium roots. Gradual lower boundary.

29" + Faint blotches of 10 YR 2/2 and 7.5 YR 3/2 ; Very dark brown and dark brown. Slightly hard, strongly developed fine and medium sub angular blocky clay; friable when moist; slightly sticky and very plastic when wet. Common fine concretions of Manganese. Few fine stones of nephelinite. No reaction with HCl. Few fine to medium roots.

Depth	TEXTURE.			PH		%C	%N	P ppm	CEC me/100g Soil	Exchangeable Bases				Exchangeable Na % (ESP)	ECe 1:5 m/mhos/cm	ECe Sat. m/mhos/cm
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Mg	K	Na			
0-6"	20	26	54	6.8	6.1	2.01	0.23		17.2	7.4	5.3	2.7	0.75	4.6	0.42	0.45
6-29"				6.9	5.7	-	-		18.2	7.8	6.2	1.6	1.9	10.0	0.25	0.45
29" +	12	22	66	7.8	6.0	-	-		17.7	8.2	5.7	1.7	2.5	19.9	0.26	0.76

SOIL INSPECTION PIT 1, PONGE WARD 2

PROFILE DESCRIPTION

LOCATION: In the North of the road in the forest Southern slope of the Ganga hills.

PROFILE: 2' 40'

ASPECT: South

LAND USE: Nil

IMMEDIATE COVER: 100%

SOIL TYPE: On the edge of forest extending to the North, forest comprises 20% fine siltstone also

*Ascia regalis*  
*Ascia grisea*  
*Ascia ventralis*  
*Bipuncta candidula*  
*Cewis alba*

40% GRASS

40% Chloris  
also: *Gynerospora*  
*Setaria spharagata*

ROOTING SYSTEM:

ROOTING SYSTEM:

SOIL PROFILE:

SOIL PROFILE:

10 YR 2/2: Very dark brown, friable, moderately developed fine and medium subangular blocky clay, few fine roots and nodules. No reaction with HCl. Abundant fine and medium roots. Lower boundary even and clear.

10 YR 3/2: Very dark greyish brown, very fine, weak to moderately developed fine and medium subangular blocky clay, silty and very plastic when wet. No reaction with HCl. Common very fine to medium roots. Irregular lower boundary.

10 YR 4/2: Pale patches of 10 YR 5/2 and 7.5 YR 5/2 + very dark green and dark brown, slightly hard, strongly developed fine and medium subangular blocky clay, friable when moist, slightly sticky and very plastic when wet. Common fine concentrations of nodules. Few fine roots or nodules. No reaction with HCl. Few fine to medium roots.

LIT. REF. POWER 3

Rep. No. 1922 - 1922/22

Depth	TEXTURE			pH	NO	N	P	Soil moisture %	Ca	Exchangeable			Mg	K	Na	Manganese/cm	Iron/cm
	SS	SE	SO							Ca	Mg	K					
0-9"	SS	SE	SO	8.8	8.1	0.82		17.3	7.4	2.2	0.1	0.32			0.48		
9-18"	SS	SE	SO	8.8	8.1			18.3	7.8	2.3	1.9	0.32			0.32		
18-27"	SS	SE	SO	8.8	8.1			17.3	8.2	2.1	1.8	0.32			0.32		

SOIL INSPECTION PIT ; MBITA ROAD NUMBER 6  
PROFILE DESCRIPTION.

LOCATION: Plateau ; North of Obando.  
SLOPE: 40'  
ASPECT: North.  
LAND USE: Creditable sisal near the pit.  
VEGETATION COVER: 100%

BUSH:  
 Extensive bush clearing being undertaken.

Bushes in the environs include+  
 Acacia drepanolobium  
 Acacia seyal fistula  
 Balanites aegyptiaca  
 Euphorbia candelabrum  
 Rhus vulgaris.

GRASS:  
 Aristida adscensionis  
 Cynodon dactylon  
 Setaria sphacelata.

Rooting depth: > 55"

Maximum rooting density: 0-4".

Drainage: Good.

Soil Depth: >55"

LAND USE CLASS 2

0-5" 7.5YR 2/2 ; Very Dark Brown. Slightly hard, medium crumb and sub-angular blocky clay. Slightly sticky and very plastic when wet. Few medium calcium concretions. No matrix reaction with HCl. Abundant fine roots. Lower boundary even and clear.

5-22" 5 YR 2/2 ; Dark Red Brown. Hard, weakly developed medium prismatic clay. Microstructure fine to coarse sub-angular blocky. Common very fine to medium calcium concretions. Little very fine gravel. No matrix reaction with HCl. Abundant very fine roots. Lower boundary clear and undulating.

22-38" 7.5 YR 2/2 ; Very Dark Brown. Hard, moderately developed fine blocky clay with indistinct clay faces. Abundant very fine to medium calcium concretions. No matrix reaction with HCl. Common very fine roots. Lower boundary clear and even.

38-51" No sample. Caliche of a gravel layer with abundant fine to medium manganese concretions and abundant fine to coarse calcium concretions. Few fine roots.

51" + No sample. Matrix of:-

- 7.5 YR 3/3; Dark brown.
- 7.5 YR 3/2; Dark brown.
- 7.5 YR 4/2; Brown
- 10 YR 4/2; Dark Grey Brown.

Faint blotching. Friable, weakly developed medium sub-angular blocky clay. Few fine soft manganese concretions. Very few calcium concretions. Few fine to medium calcareous gravels. Slight matrix reaction with HCl. Rare very fine roots.

SOIL INSPECTION PIT ; ASINA ROAD NUMBER 2.

PROFILE DESCRIPTION

LOCATION: Western slopes down to the Asina Valley.

SLOPE: 2' 30'

ASPECT: North East.

LAND USE: Maize, Cassava, Sisal.

VEGETATION COVER: 100%

GRASS:

Chloris gayana 90%

OTHER HERBS: 10%

ROOTING DEPTH: >45"

MAXIMUM ROOTING DENSITY: 0-5".

DRAINAGE: Fair.

Soil Depth: >45"

LAND USE CLASS 2.

0-5" 10 YR 2/2 ; Very dark brown. Slightly hard, moderately developed fine and medium sub angular blocky clay. Common fine calcium concretions. Slight matrix reaction with HCl. Abundant fine roots. Crumb surface. Lower boundary clear and undulating.

5-22" 7.5 YR 3/1 ; Very dark brown. Hard, moderately developed coarse and medium sub-angular blocky clay . Very weak prismatic with slight vertical cracking. Few fine and medium calcium concretions. Occasional fine and medium stones. Moderate matrix reaction with HCl. Common fine roots. Lower boundary gradual.

22-42" 7.5 YR 3/1 ; Very dark brown. Very hard, strongly developed blocky clay. Lentil structured. Prominent clay faces. Common fine calcium concretions. A little gravel and a few fine stones. Moderate matrix reaction with HCl. Few fine roots. Lower boundary gradual.

42" + No sample . Faint blotches of 10 YR 3/2 ; Very dark grey brown, and 10 YR 2/2; Very dark brown. Very abundant fine calcium concretions. Few very fine roots.

Depth	Sand	Silt	Clay	H <sub>2</sub> O		pH	N	P	Soil me/100g CEC	Exchangeable			Ca	Mg	K	Na	(ESP) me/100g Excip.	mhos/cm DC 1:5	mhos/cm ECe 2:1
				Ca	Mg					K									
0-5"	81	14	68	1.8	0.1	7.5	0.15		12.8	8.8	8.8	1.2	0.1	0.8	0.8	0.8	0.8	0.32	0.8
5-22"	14	14	68	1.8	0.3				14.0	8.0	8.8	1.0	0.3	0.8	0.8	0.8	1.4	0.30	0.8
22-42"	18	18	62	1.8	0.3				12.8	8.8	4.4	0.8	0.8	0.8	0.8	0.8	2.2	0.32	0.8

PIT REF. WELTIA 8

PIT No. 8818 - 8831/88

Depth	TEXTURE			pH	H <sub>2</sub> O	KCl	%C	%N	P ppm	CEC meq/100g	Exchangeable Bases				Exch. Na (ESP)	ECe 1:5 ml/mhos/cm	ECe Sat. ml/mhos/cm
	Sand	Silt	Clay								Ca	Mg	K	Na			
0-5"	25	14	61	7.8	6.3	1.85	0.21	-	-	15.3	7.4	3.6	0.8	0.55	4.5	0.4	0.4
5-9 1/2"	27	12	61	7.9	6.4	-	-	-	-	16.5	9.2	6.1	0.5	0.85	5.1	0.4	0.35
22-42"	31	4	65	8.0	6.4	-	-	-	-	18.3	8.8	7.2	0.4	1.90	10.4	0.4	0.38

SOIL INSPECTION PIT : ASINA ROAD NUMBER 2

PROF. IS. DESCRIPTION

LOCATION: Western slopes down to the Asina Valley.

SLOPE: 2° 30'

ASPECT: North East.

LAND USE: Maize, Cassava, Sisal.

VEGETATION COVER: 100%

GRASS:

Chloris gayana 90%

OTHER HERBS: 10%

ROOTING DEPTH: 0-2"

MAXIMUM ROOTING DENSITY: 0-2"

DRAINAGE: Fair.

Soil Depth: 0-2"

LAND USE CLASS 2.

0-2" 10 YR 2/2 : Very dark brown, slightly acid, moderately developed fine and medium sub angular blocky clay. Common fine calcium concretions. Slight matrix reaction with HCl. Lower boundary roots. Crumb surface. Lower boundary clean and unshaded.

2-5 1/2" 7.5 YR 5/1 : Very dark brown, hard, moderately developed coarse and medium sub-angular blocky clay. Very weak prismatic with slight vertical cracking. Few fine and medium calcium concretions. Occasional fine and medium stones. Moderate matrix reaction with HCl. Common fine roots. Lower boundary gradual.

5-9 1/2" 7.5 YR 5/1 : Very dark brown, very hard, strongly developed blocky clay. Lenticle structure. Treatment clay lumps. Common fine calcium concretions. A little gravel and a few fine stones. Moderate matrix reaction with HCl. Few fine roots. Lower boundary gradual.

10-22" No sample. Paint blotches of 10 YR 7/2 : Very dark grey brown, and 10 YR 2/2 : Very dark brown. Very abundant fine calcium concretions. Few very fine roots.

DEPTH	TEXTURE	PH	KCl	H <sub>2</sub> O	Ca	Mg	K	Na	EXCH. (25%)	min/mil/cm	min/mil/cm
0-9"	st	8.3	1.88	0.31	12.2	7.4	2.9	0.8	4.2	0.4	0.4
9-23"	st	8.3	-	-	18.2	9.3	2.1	0.2	2.1	0.4	0.2
23-40"	st	8.0	-	-	18.2	8.3	1.3	0.1	10.4	0.4	0.2

SOIL INSPECTION PIT; WIGA ROAD NUMBER 3.

PROFILE DESCRIPTION.

LOCATION: Base of steep slope below the Gwasi Hills at the highest level of the lacustrine deposit.

SLOPE: 2°

ASPECT: North East.

LAND USE: Nil

VEGETATION COVER: 100%

< 10% BUSH

Acacia drepanolobium  
Rhus natalensis

100% GRASS:

Hyparrhenia filipendula 50%  
Themeda triandra 50%

ROOTING DEPTH: >50"

MAXIMUM ROOTING DENSITY: 0-9"

DRAINAGE: Receiving laterally.

SOIL DEPTH: >50"

LAND USE CLASS 2.

0-9" 10 YR 2/1; Black. Hard, moderately developed fine and medium subangular blocky clay with surface crumb. No reaction with HCl. Common fine roots. Lower Boundary gradual and even.

9-23" 10 YR 3/1; Very Dark Grey. Extremely hard, strongly developed fine and medium prismatic clay. Microstructure moderate medium blocky. Strong vertical cracking when dry. Few very fine roots, but common fine roots in cracks. No reaction with HCl. Lower boundary diffuse.

23-40" 10 YR 3/1; Very dark grey. Very hard, strongly developed coarse and medium blocky. Lenticular structures. Prominent clay cutans.

Strong vertical cracking. No reaction with HCl. Occasional fine stones. Common fine and very fine roots with some root galleries. Lower boundary gradual.

40" + 10 YR 3/2; Very dark grey brown. Hard, moderately developed fine blocky clay. No reaction with HCl. Very few fine roots.

Depth	Sand	Silt	Clay	pH		%C	%N	P ppm	CEC me/100g Soil	Exchangeable Bases (ESP)			Exch. Sodium % N (ESP)	ECe 1:5 m/mhos/cm	ECe Sat. m/mhos/cm	
				H <sub>2</sub> O	KCl					Ca	Mg	K				Na
0-9"	22	28	50	6.5	5.7	2.95	0.22	250+	14.3	6.6	4.2	1.4	0.65	5.00	0.12	0.35
9-23"	20	14	66	6.4	5.4	-	-	195	16.0	18.8	4.2	1.5	1.0	6.25	0.21	0.34
23-40"	20	12	68	7.4	5.8	-	-	250	18.2	10.0	5.0	1.8	1.40	14.0	0.31	0.20
40" +	16	22	72	7.6	5.9	-	-		19.3	10.6	5.3	2.0	1.2	6.2	0.20	0.22

SOIL INFORMATION PIT: WIGA ROAD NUMBER 3

PROFILE DESCRIPTION

LOCATION: Base of steep slope below the West Hills at the highest level of the lacustrine deposit.

SLOPE: S

ASPECT: North East

LAND USE: Nil

VEGETATION COVER: 100%

< 10% Bush

*Acacia drepanolobium*  
*Rhus natalensis*

100% Grass:

*Hyparrhenia filipendula* 50%  
*Themba triandra* 50%

ROOTING DEPTH: > 50"

MAXIMUM ROOTING DENSITY: 0-5"

DRAINAGE: Receding laterally

SOIL DEPTH: > 50"

LAND USE CLASS: S

0-9" 10 YR 2/1 Black. Hard, moderately developed fine and medium angular blocky clay with surface crumb. No reaction with HCl. Common fine roots, lower boundary gradual and even.

9-23" 10 YR 2/1 Very dark grey. Extremely hard, strongly developed fine and medium prismatic clay. Microstructure moderate medium blocky. Strong vertical cracking when dry. Few very fine roots, but common fine roots in cracks. No reaction with HCl. Lower boundary diffuse.

23-40" 10 YR 2/1 Very dark grey. Very hard, strongly developed coarse and medium blocky, lensil structure. Prominent clay coatings.

40" + 10 YR 2/1 Very dark grey brown. Hard, moderately developed fine blocky clay. No reaction with HCl. Very few fine roots, lower boundary gradual.



Chemical test.

PIT REF: WIGA 3.

LAB NO. 7656-7658/65.

Depth	pH	Na m.e.%	K m.e.%	Ca m.e.%	Mg m.e.%	Mn m.e.%	P p.p.m.	Hp m.e.%
0-9"	6.0	0.85	0.96	20.0	7.6	0.83	250 <sup>+</sup>	-
9-23"	5.9	1.20	0.82	18.4	7.2	0.60	193	-
23-40"	7.0	1.08	0.84	18.2	7.2	0.45	250	-

Biological Test (Cunninghamella) % of plus all.

Depth	N	P	S
0-9"	0	85	35

Depth	SS	JS	H <sub>2</sub> O	KCl	NO <sub>3</sub>	Mn	P	SO <sub>4</sub>	Ca	Mg	K	Mn	(P <sub>2</sub> O <sub>5</sub> )	Na	mg/cm	mg/cm
10, +	TS	SS	JS	2.8	2.9	-	-	TS.9	10.8	2.2	3.0	1.3	2.8	0.80	0.33	0.33
SS-10,	SO	TS	JS	2.4	2.3	-	-	18.3	10.0	2.0	1.9	1.40	2.4	0.31	0.30	0.30
0-SS,	SO	TS	JS	2.4	2.4	-	-	19.0	18.9	4.2	1.2	1.0	6.02	0.31	0.24	0.24
0-8,	SO	SS	JS	2.2	2.2	8.32	0.33	320+	2.0	4.3	1.4	0.62	2.00	0.13	0.22	0.22

BILL BARR... ALIBI 3

Top No. 3656 - 3658/65

SOIL INSPECTION PIT; LINE 1 NUMBER 2. (L<sub>1</sub> P<sub>2</sub>)

PROFILE DESCRIPTION.

LOCATION: ? On lacustrine material; at the South West corner of the valley. 200 metres below and to the East of the alluvial fan descending the valley North of Magunga. On a very slight slope.

LAND USE: Nil.

VEGETATION COVER: 100%

40% BUSH

Acacia seyal fistula <10%  
 Balanites aegyptiaca <10%  
 Euphorbia candelabrum 10%  
 Rhus natalensis 30%

On the edge of a thicket of RHUS with accompanying EUPHORBIA.

60% GRASS:

Chloris gayana 50%  
 Setaria sphacelata <10%  
 Themeda triandra 10%

ROOTING DEPTH: >50"

MAXIMUM ROOTING DENSITY: 0-6"

DRAINAGE: Fair.

SOIL DEPTH: >50"

LAND USE CLASS 2.

0-6" 10 YR 2/2; Very dark brown. Slightly hard, strongly developed fine and medium crumb and sub-angular blocky clay. No reaction with HCl. Abundant roots. Lower boundary clear and even.

6-24" Faint blotches of 10 YR 2/2; Very dark brown, and 7.5YR 2/2; Very dark brown. Very hard weakly developed medium prismatic clay. Microstructure strong medium blocky with faint clay faces. Lime efflorescence on ped faces exposed to the sun in the pit. No matrix reaction with HCl: slight reaction on the efflorescence. Common fine and medium roots. Lower boundary gradual.

24" + 10 YR 3/1; Very dark grey with abundant and prominent coarse rust blotches (5YR 3/4; Dard red brown). Hard, strongly developed fine and medium blocky clay with distinct clay faces. Lenticular structured. Very firm when moist. Below 39" locally few fine calcium concretions. Occasional fine stones of nephelinite. No matrix reaction with HCl. Few very fine roots with few root galleries, increasing with depth (to 50" +).

Depth	Moisture	Temperature	pH	Reaction	Structure	Consistency	Color	Notes
0-6"	0.0	2.3	1.0	1.09	0.81	18.3	1.3	5.0
6-24"	0.02	1.50	0.85	16.4	3.2	0.20	1.2	5.0
24" +	0.20	0.85	18.3	1.3	0.42	1.2	5.0	5.0

Depth	Moisture	Temperature	pH	Reaction	Structure	Consistency	Color	Notes
0-6"	0	82	2					

Depth	TEXT. J.P.P.			pH	H <sub>2</sub> O	KCl	% C	% N	P p.p.m	CEC me/100g soil	Exchangeable bases				Exchangeable % Na (ESP)	ECE 1:5 Mimhos/cm	ECE Sat. Mimhos/
	SAND	STIF	CLY.								Ca	Mg	K	Na			
0-6"	14	20	66	7.3	5.9	5.9	2.80	0.27	250 <sup>+</sup>	18.2	8.6	4.6	2.7	0.2	1.2 1.09	0.34	0.60
6-24"	16	18	66	7.2	5.8	5.8	-	-	250 <sup>+</sup>	17.3	9.5	5.7	1.1	0.6	3.48	0.21	0.40
24" +	18	12	70	7.7	6.0	6.0	-	-	250 <sup>+</sup>	20.4	10.6	7.2	1.0	1.3	6.5 6.40	0.24	0.30

Soil description: ...  
 Location: ...  
 Date: ...  
 Moisture: ...  
 Temperature: ...  
 pH: ...  
 Cation exchange capacity: ...  
 Organic matter: ...  
 Phosphorus: ...  
 Nitrogen: ...  
 Sulfur: ...  
 Chlorine: ...  
 Sodium: ...  
 Potassium: ...  
 Calcium: ...  
 Magnesium: ...  
 Iron: ...  
 Zinc: ...  
 Manganese: ...  
 Copper: ...  
 Boron: ...  
 Molybdenum: ...

Soil description: ...  
 Location: ...  
 Date: ...  
 Moisture: ...  
 Temperature: ...  
 pH: ...  
 Cation exchange capacity: ...  
 Organic matter: ...  
 Phosphorus: ...  
 Nitrogen: ...  
 Sulfur: ...  
 Chlorine: ...  
 Sodium: ...  
 Potassium: ...  
 Calcium: ...  
 Magnesium: ...  
 Iron: ...  
 Zinc: ...  
 Manganese: ...  
 Copper: ...  
 Boron: ...  
 Molybdenum: ...

Depth (ft)	Moisture (%)	Temperature (°C)	pH	Reaction	Color	Texture	Structure	Blockiness	Rooting Density (no./m <sup>2</sup> )	Rooting Depth (cm)	Land Use Class	Notes
0-6"	15.0	23.5	5.2	acid	7.5YR 2/2	Very dark brown	Blocky	+	500+	5.0	7.5YR 2/2	
6-23"	15.0	23.5	5.2	acid	10YR 3/1	Very dark grey	Blocky	+	500+	5.0	10YR 3/1	
23-37"	15.0	23.5	5.2	acid	10YR 3/1	Very dark grey	Blocky	+	500+	5.0	10YR 3/1	
37"+	15.0	23.5	5.2	acid	7.5YR 2/2	Very dark brown	Blocky	+	500+	5.0	7.5YR 2/2	

SOIL INSPECTION PIT; WAONDO ROAD NUMBER 2.

PROFILE DESCRIPTION .

LOCATION: Base of Asina Valley.

SLOPE: 20'

ASPECT: North East.

LAND USE: Cotton, Maize.

VEGETATION COVER: 100%

50% GRASS  
50% OTHER HERBS.

ROOTING DEPTH: >55"

MAXIMUM ROOTING DENSITY: 0-4"

DRAINAGE: Fair.

SOIL DEPTH: >55"

LAND USE CLASS 3

0-6" 7.5YR 2/2; Very dark brown. Slightly hard to hard, moderately developed fine and medium subangular blocky clay. Friable when moist. Sticky and very plastic when wet. No reaction with HCl. Abundant fine roots. Lower boundary clear and even.

6-23" 10 YR 3/1; Very dark grey. Very hard, moderately developed prismatic clay with some vertical cracks. Microstructure moderate blocky. Few fine and medium calcium concretions. Occasional fine roots. Lower boundary clear and undulating.

23-37" 10 YR 3/1; Very dark grey. Very hard, strongly developed coarse and medium blocky clay with occasional clay faces and vertical cracks. Few very fine calcium concretions. No matrix reaction with HCl. Few very fine roots, tending to follow the cracks. Lower boundary diffuse.

37"+ 10 YR 2/2; Very dark brown, with abundant fine yet distinct blotches. Slightly hard, moderately developed fine and medium sub-angular blocky clay. Abundant blue/black faces on the peds. Very faint lime spots. No matrix reaction with HCl; reaction slight on the lime spots. Few very fine roots.

Depth	TEXTURE			pH		%C	%N	P ppm	CEC me/100g Soil	Exchangeable Bases			Exchangeable Sodium %	EC <sub>e</sub> 1:5 mlmhos/cm	EC <sub>e</sub> Sat. mlmhos/cm	
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Ma	K				Na
0-6"	9	20	71	7.3	64	1.68	0.16		15.5	8.4	3.8	2.1	0.95	6.3 6.10	0.4	0.44
6-23"	17	18	65	7.7	6.2	-	-		15.7	8.2	3.4	0.8	3.43	21.7	0.4	0.53
23-37"	17	18	65	8.0	6.2	-	-		18.3	9.6	2.8	0.8	6.0	31.2 32.8	0.6	0.75
37" +	9	20	71	7.9	6.0	-	-		16.1	7.8	2.8	0.7	4.45	28.2 27.6	0.4	0.95

Base of Antioch Valley  
 50'  
 100'  
 150'  
 200'  
 250'  
 300'  
 350'  
 400'  
 450'  
 500'

10 to 20% Very dark brown, slightly hard to hard  
 distinct fibrous. Slightly hard, moderately developed fine  
 and medium sub-angular blocky clay. Abundant fine fibrous  
 on the surface. Very fine line spots, no matrix reaction with  
 bit, reaction slight on the line spots, few vertical roots.  
 10 to 20% Very dark brown, as abundant fine  
 course and medium blocky clay with occasional clay lines and  
 vertical cracks. Few very fine calcium carbonate  
 matrix reaction with bit, few very fine roots, reaction  
 follow the cracks. Lower boundary diffuse.  
 10 to 20% Very dark brown, as abundant fine  
 and medium blocky clay with occasional clay lines and  
 vertical cracks. Few very fine calcium carbonate  
 matrix reaction with bit, few very fine roots, reaction  
 follow the cracks. Lower boundary diffuse.  
 10 to 20% Very dark brown, as abundant fine  
 and medium blocky clay with occasional clay lines and  
 vertical cracks. Few very fine calcium carbonate  
 matrix reaction with bit, few very fine roots, reaction  
 follow the cracks. Lower boundary diffuse.



Depth	TEXTURE			pH		% C	% N	P ppm	CEC me/100g Soil	Exchangeable Bases			Exch. Na %	ECe 1:5 mlmhos/cm	ECe Sat. mlmhos/cm
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Mg	K			
0-5"	30	10	60	7.6	6.0	2.39	0.18		19.6	8.4	4.5	1.6	16.5	87.2	
5-16"	24	12	64	8.3	6.4				21.0	9.4	4.3	0.9	21.2	98.1	
16-21"	18	12	70	8.5	6.6				22.4	9.9	3.9	1.1	27.3	98.2	
21"+	20	14	66	8.7	6.5				24.0	9.6	5.4	0.9	27.5	98.8	

SOIL INVESTIGATION FOR LIME IN WATERS (Part 1)

LOCATION: Part way down the slope of a grassy plateau.  
 DATE: 10/20/65  
 ACTIVITY: West  
 SURFACE: Some stones, weak surface crust.  
 SOIL USE: Pasture, mixed, grasses.  
 VEGETATION COVER: 30%

SOIL DATA

ACIDITY: Acidic to slightly acidic  
 SALINITY: Slightly saline  
 TOC DATA: 2.39% C, 0.18% N, 0.18 ppm P

SOIL DEPTH

0-5" depth: 19.6 me/100g soil, 8.4 Ca, 4.5 Mg, 1.6 K, 16.5 Na, 87.2 ECe 1:5, 27.5 ECe Sat.  
 5-16" depth: 21.0 me/100g soil, 9.4 Ca, 4.3 Mg, 0.9 K, 21.2 Na, 98.1 ECe 1:5, 21.2 ECe Sat.  
 16-21" depth: 22.4 me/100g soil, 9.9 Ca, 3.9 Mg, 1.1 K, 27.3 Na, 98.2 ECe 1:5, 27.3 ECe Sat.  
 21"+ depth: 24.0 me/100g soil, 9.6 Ca, 5.4 Mg, 0.9 K, 27.5 Na, 98.8 ECe 1:5, 27.5 ECe Sat.

LAND USE CLASS

0-5" depth: Very dark gray, strongly developed very fine to medium carbon clay blocky, like till. Few fine to very coarse roots, no matrix reaction with ECL. Abundant very fine to medium roots, lower boundary clear and even.  
 5-16" depth: Very dark gray, extremely hard, weakly developed fine platy clay. Abundant coarse medium blocky. Some vertical cracks, abundant extremely fine to fine calcium concretions. No matrix reaction with ECL. Common very fine to medium roots, lower boundary even and abrupt.  
 16-21" depth: Very dark gray, very hard, weakly developed medium carbon clay blocky, very dense clay. Abundant fine coated fine gravel, very little matrix reaction with ECL. Few rootlets of very fine roots, lower boundary abrupt.  
 21"+ depth: Brown, with later pitholes. Slightly hard to soft, moderately developed very fine to medium sub-angular blocky clay with blue/gray faces. Very abundant fine calcium concretions. No matrix reaction with ECL. Very few very fine roots.

SOIL INSPECTION PIT; SCARP ROAD NUMBER 11.

PROFILE DESCRIPTION.

LOCATION: On the lacustrine apron below Sigama hill (Kaniamwia escarpment).

SLOPE: 2°

ASPECT: West.

LAND USE: Nil.

VEGETATION COVER: 100%

<10% BUSH:

Balanites aegyptiaca.

100% GRASS:

Setaria sphacelata 80%

Themeda triandra 20%

Eragrostis racemosa <10%

ROOTING DEPTH: >56"

MAXIMUM ROOTING DENSITY: 0-3"

DRAINAGE: Fair. Slight surface cracking.

SOIL DEPTH: >56"

LAND USE CLASS 4.

Top 2 horizons sampled together as 0-15".

0-3" 10 YR 2/1; Black. Slightly hard, moderately developed fine and medium sub-angular blocky clay. No reaction with HCl. Abundant fine roots.

3-15" 2.5 Y 2/1; Black. Common fine rust mottles. Very hard, moderately developed medium prismatic clay. No reaction with HCl. Common fine roots. Lower boundary gradual.

15-28" 10 YR 3/1; Very dark grey. Few very fine rust mottles. Extremely hard, strongly developed very fine to medium blocky clay. Common fine root galleries. No reaction with HCl. Lower boundary gradual.

28-46" Faintly blotched with 10 YR 3/1; very dark grey, and 10 YR 2/2; Very dark brown. Hard, strongly developed fine to medium subangular blocky and blocky clay. Few white ferral casts. Rare fine manganese concretions. No reaction with HCl. Very few very fine roots. Lower boundary diffuse.

46" + 10 YR 4/2; Dark grey brown. Hard, strongly developed very fine to medium blocky clay. White ferral casts. Fine calcium concretions. Common manganese concretions. Rare medium stones. Matrix reaction with HCl. No roots.

Depth	Band	Clay	H <sub>2</sub> O	KCl	R.O.	A.M.	D.M.	Soft me/100g	Ca	Mg	K	Na	Exhaustible	Respl.	Me	Fe	manganese/cm	ECe 1:2	manganese/cm	ECe 2:2
0-3"	80	14	68	8.1	8.9			13.8	8.4	4.2	1.8	1.1	1.1	1.1	1.1	1.1	8.8	8.8		
3-15"	84	18	64	8.2	8.4			81.0	8.4	4.3	0.9	1.1	1.1	1.1	1.1	1.1	8.8	8.8		
15-28"	18	18	60	8.2	8.8			8.4	8.4	4.3	1.1	1.1	1.1	1.1	1.1	1.1	8.8	8.8		
28-46"	18	18	60	8.2	8.8			8.4	8.4	4.3	1.1	1.1	1.1	1.1	1.1	1.1	8.8	8.8		
46"+	80	14	68	8.1	8.9			8.4	8.4	4.3	1.1	1.1	1.1	1.1	1.1	1.1	8.8	8.8		

PIT REF. 1115

Exp. No. 1115 - 1153/82



Depth	TEXTURE			pH		% C	% N	P ppm	CEC me/100g Soil	Exchangeable Bases			Exchangeable Na% (ESP)	ECE 1:5 m/mhos/cm	ECE sat. m/mhos/cm	
	SAND	SILT	CLAY	H <sub>2</sub> O	KCl					Ca	Mg	K				Na
0-15"	19	12	69	6.2	4.6	1.76	0.19		15.9	6.4	3.6	0.7	0.8	7.0-5.1	0.5	0.27
15-26"	15	10	75	7.2	5.1	-	-		21.3	9.4	5.6	1.1	1.5	8.5-7.0	0.3	0.30
26-46"	17	8	75	8.2	6.0	-	-		19.7	10.6	5.4	1.2	1.6	8.5-8.1	0.3	0.35
46-56"									18.9	10.5	5.2	1.1	1.7	9.0		0.40

On the landscape upon below signs will (Remarks):  
 LOCATION: On the landscape upon below signs will (Remarks):  
 ESCARPMENT: (Remarks):  
 SLOPE: 2°  
 ASPECT: West;  
 LAND USE: M.L.  
 VEGETATION COVER: 100%  
 CLOSURE: (Remarks):  
 Salinities (Remarks):  
 TOSS CRASS: (Remarks):  
 Sotaria sphaerata 50%  
 Thymus triandrus 20%  
 Eragrostis racemosa 10%  
 ROOTING DEPTH: >50"  
 MAXIMUM ROOTING DENSITY: 0-2"  
 DRAINAGE: Fair, slight surface cracking;  
 SOIL DEPTH: >50"  
 LAND USE CLASS: A  
 Top 2 horizons sampled together as 0-15".  
 0-3" 10 YR 2/1; Black, slightly hard, moderately developed line and medium sub-angular blocky clay. No reaction with HCl. Abundant fine roots.  
 3-15" 2.5 Y 2/1; Black, common fine root nodules; very hard; moderately developed medium prismatic clay. No reaction with HCl. Common fine roots. Lower boundary gradual.  
 15-26" 10 YR 2/1; Very dark grey, few very fine root nodules; extremely hard, strongly developed very fine to medium blocky clay. Common fine root nodules; no reaction with HCl. Lower boundary gradual.  
 26-46" Partly blotched with 10 YR 2/1 very dark grey, and 10 YR 2/2; Very dark brown, hard, strongly developed fine to medium subangular blocky and blocky clay. Few white lateral coats; rare fine manganese concretions; no reaction with HCl. Very few very fine roots; lower boundary diffuse.  
 46" + 10 YR 4/2; Dark grey brown, hard, strongly developed very fine to medium blocky clay; little lateral coats; fine calcium concretions; common manganese concretions; rare medium stones; matrix reaction with HCl; no roots.

SOIL INVESTIGATION PLOT: SOIL NO. 6512-6515/65

SCARP 11

SOIL INSPECTION PIT; FOREST ROAD NUMBER 7.

PROFILE DESCRIPTION

LOCATION: On the slight slope (1° 50') between the Kaniamwia escarpment and the Olambwe River.

ASPECT: West.

LAND USE: Nil.

VEGETATION COVER: 100%

<10% BUSH.

Acacia seyal fistula.

100% GRASS.

Hyparrhenia rufa 80%  
Themeda triandra 20%  
Setaria spachelata <10%

ROOTING DEPTH: 52"

MAXIMUM ROOTING DENSITY: 3 - 7".

DRAINAGE.: Slightly poorly drained.  
Slight surface cracking.

SOIL DEPTH: > 57"

LAND USE CLASS 4.

0 - 6" 10 YR 2/0; Black. Slightly hard, moderately developed fine and medium crumb and sub-angular blocky clay loam. Sticky and plastic when wet. Very few rather fine nephelinite stones. No reaction with HCl. Abundant fine roots. Lower boundary clear and even.

6-27" 2.5 Y 3/1; Very dark grey. Few very fine rust mottles. Extremely hard, moderately developed medium prismatic clay; Microstructure weak medium sub-angular blocky with clay faces. Very sticky and plastic when wet; Firm when moist. Very few very fine calcium concretions towards the horizon base. No matrix reaction with HCl. Common fine roots. Lower boundary clear and undulating.

27-36" 2.5 Y 2/2; Black. Common very fine rust mottles. Very hard, strongly developed blocky clay. Few fine Manganese concretions. Common very fine calcium concretions. Slight HCl reaction on the Ca concretions: no reaction on the matrix. Common fine roots: roots concentrated into dense root galleries. Lower boundary gradual.

36-43" 10 YR 4/1; Dark grey, and 10 YR 4/2 Dark grey brown with yellow mottles and dark manganese streaks. Hard, strongly developed medium sub-angular blocky clay with clay faces. Very sticky and very plastic when wet. Common fine manganese concretions. Few very fine calcium concretions. Slight HCl reaction on the Ca concretions: no reaction on the matrix. Few fine roots. Lower boundary even and abrupt.

43" + 10 YR 3/1; Very dark grey, 10 YR 4/1; Dark grey, and 10 YR 5/3 Light olive brown blotches. Manganese streaks. Moderately developed fine and medium blocky clay with clay faces. Some white faunal casts. Common fine manganese concretions. Very abundant fine calcium concretions. Strong HCl reaction on the concretions: slight reaction on the matrix. Roots rare.

Depth	TEXTURE			H <sub>2</sub> O	pH	%C	%N	P ppm	CEC me/100g Soil	Exchangeable Bases			Exch. Na % (ESP)	ECe 1:5 mMhos/cm	ECe Sat. mMhos/cm	
	Sand	Silt	Clay							Ca	Mg	K				Na
0-6"	22	34	44	5.7	5.0	4.21	0.29		15.0	5.4	4.0	2.1	0.65	5.1 4.35	0.1	0.35
6-27"	20	10	70	5.8	4.9	-	-		16.2	7.6	6.0	1.4	1.60	9.6 9.9	0.6	0.45
27-36"	12	10	78	6.9	5.6	-	-		18.8	8.0	7.2	1.6	2.0	10.6	0.4	0.32
36-43"	12	10	78	7.3	5.8	-	-		19.8	7.4	6.9	1.9	1.8	10.0 9.0	0.6	0.26
43" +	24	12	64	7.8	6.0	-	-		18.8	7.5	7.5	1.6	1.65	9.0 8.8	0.4	0.35

SOIL IDENTIFICATION PIT FOREST ROAD NUMBER 7

SOIL DESCRIPTION

LOCATION: On the right slope (1° 30') between the  
Lakawia escarpment and the Gumbo River.

VEGETATION: West

LAND USE: 100%

ROOT GROWTH:

ROOT GROWTH:

ROOT GROWTH:

ROOT GROWTH:

ROOT GROWTH:

ROOT GROWTH:

ROOT GROWTH:

LAND USE CLASS:

0-6" 10 YR 2/0: Black. Slightly hard, and rarely developed  
fine and medium crumb and sub-angular blocky clay loam.  
Sticky and plastic when wet. Very few rather fine neoplastic  
stones. No reaction with HCl. Abundant fine roots, lower boundary  
clear and even.

6-27" 2.5 Y 2/1: Very dark gray, few very fine root nodules.  
Extremely hard, moderately developed medium prismatic clay  
micaceous with medium sub-angular blocky clay  
faces. Very sticky and plastic when wet. Fine when moist.  
Very low very fine calcium concretions towards the  
horizon base. No matrix reaction with HCl. Common fine  
roots, lower boundary clear and abrupt.

27-36" 2.5 Y 2/2: Black. Common very fine root nodules. Very hard,  
strongly developed blocky clay. Few fine manganese concretions.  
Common very fine calcium concretions. Slight HCl reaction on  
the Ca concretions; no reaction on the matrix. Common fine  
roots, roots concentrated into dense root galleries. Lower  
boundary gradual.

36-43" 10 YR 4/1: Dark gray, and 10 YR 4/2: Dark gray brown with  
yellow mottles and dark manganese streaks. Hard, strongly  
developed medium sub-angular blocky clay with clay faces.  
Very sticky and very plastic when wet. Common fine manganese  
concretions. Few very fine calcium concretions. Slight HCl  
reaction on the Ca concretions; reaction on the matrix.  
Few fine roots, lower boundary even and abrupt.

43"+ 10 YR 3/1: Very dark gray, 10 YR 4/1: Dark gray, and  
10 YR 3/2: Light olive green blotches, manganese streaks.  
Moderately developed fine and medium blocky clay with clay  
faces. Some white lateral casts. Common fine manganese  
concretions. Very abundant fine calcium concretions. Strong  
HCl reaction on the concretions; slight reaction on the  
matrix. Roots rare.

SOIL INSPECTION PIT; FOREST ROAD NUMBER 11

PROFILE DESCRIPTION.

LOCATION: On top of a slight white-back ridge on a clay plain.

LAND USE: Nil.

VEGETATION COVER: 100%

<10% BUSH:

Balanites aegyptiaca

100% GRASS:

Setaria sphacelata 60%  
Hyparrhenia rufa 30%  
Sporobolus pyramidalis <10%  
Themeda triandra <10%

ROOTING DEPTH: >40"

MAXIMUM ROOTING DENSITY: 0 - 5"

DRAINAGE: Slightly poorly drained.

SOIL DEPTH: >40"

LAND USE CLASS 4

- 0 - 2" 2.5Y 2/1; Black. Slightly hard, strongly developed fine and medium crumb and sub-angular blocky clay. Friable when moist. No reaction with HCl. Very abundant fine roots. Lower boundary even and abrupt.
- 2 - 12" 2.5 Y 2/1; Black. Extremely hard, moderately developed coarse and medium prismatic clay. Microstructure weak coarse blocky. Sticky and very plastic when wet. Vertical cracks. No reaction with HCl. Common fine roots concentrated near cracks. Lower boundary gradual.
- 12 - 29" 2.5 Y 2/2; Black. Extremely hard, strongly developed fine to coarse blocky clay with distinct clay faces. Lentil structured. No reaction with HCl. Abundant very fine and fine roots especially concentrated in a layer 20" to 28". Lower boundary gradual.
- 29 - 38" 2.5 Y 3/1; Very dark grey. Faint dark blotches. White line streaks. Firm, moderately developed fine to coarse sub-angular blocky clay. Long medium lime streaks. Slight HCl reaction on the streaks: no reaction on the matrix. Very few very fine roots. Lower boundary gradual.
- 38" + 10 YR 4/1; Dark grey. Hard, strongly developed fine and medium blocky clay. Abundant fine and medium calcium concretions. Common lime efflorescence. Very slight HCl reaction on the matrix. Very few very fine roots.

Depth	Moisture	Temp	pH	Soil	Ca	Mg	K	Na	EC	CEC	Organic	Other
0-6"	85	36	44	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
6-12"	80	40	40	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
12-18"	75	40	48	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
18-24"	78	40	48	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
24-30"	84	40	48	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
30-36"	84	40	48	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1
36-42"	84	40	48	2.5	2.4	0.1	0.05	0.1	0.1	0.1	0.1	0.1

Depth	TEXTURE			PH		%C	%N	P ppm	CEC me/100g	Exchangeable Bases			Exchangeable Na% (ESP)	ECe 1:5 m/mhos/cm	EC Sat. m/mhos/cm	
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Mg	K				Na
0-2"	24	8	68	5.3	5.0	1.68	0.14		16.3	6.8	4.2	1.6	0.7	5.5 4.3	0.4	0.42
2-12"	16	14	70	6.6	4.5	-	-		17.5	8.2	4.9	1.3	1.1	7.1 6.3	0.7	0.23
12-29"	10	10	80	7.2	5.4	-	-		17.5	9.4	4.7	1.4	1.6	9.4 9.15	0.3	0.40
29-38"	8	10	82	7.2	6.0	-	-		18.3	8.4	4.7	1.4	1.8	11.0 9.85	1.1	0.38
38" +	20	8	72	8.0	6.7	-	-		22.5	10.6	3.9	1.0	4.4	22.1 19.5	0.44	0.40

SOIL INSPECTION PIN FOREST ROAD NUMBER 11

PROFILE DESCRIPTION

LOCATION: On top of a slight white-back ridge on a clay plain.

LAND USE: R1.

VEGETATION COVER: 100%

CLAY BURN:

Minerals: kaolinite

100% grass:

Spores: *Sporobolus pyramidalis* 100%  
*Stachys trifida* 100%  
*Stachys sp.* 100%  
*Stachys sp.* 100%

WATERING: None

MAXIMUM WATERSHED: 0-2"

DRAINAGE: Slightly poorly drained

SOIL DEPTH: None

LAND USE CODE: A

0-2"

2.5 Y 2/1: Black, slightly hard, strongly developed fine and medium crumb and sub-angular blocky clay. Particulate when moist. No reaction with HCl. Very abundant fine roots. Lower boundary even and abrupt.

2-12"

2.5 Y 2/1: Black, extremely hard, moderately developed coarse and medium prismatic clay. Microcracking weak coarse blocky, sticky and very plastic when wet. Vertical cracks. No reaction with HCl. Lower fine roots concentrated near cracks. Lower boundary gradual.

12-29"

2.5 Y 2/1: Black, extremely hard, strongly developed fine to coarse blocky clay with distinct clay lamellae. Jammy structure. No reaction with HCl. Abundant very fine and fine roots especially concentrated in a layer 20" to 25" lower boundary gradual.

29-38"

2.5 Y 2/1: Very dark grey, faint dark blotches, white line streaks. Firm, moderately developed fine to coarse sub-angular blocky clay. Long medium fine streaks. Slight HCl reaction on the streaks; no reaction on the matrix. Very few very fine roots. Lower boundary gradual.

38" +

10 Y 4/1: Dark grey, hard, strongly developed fine and medium blocky clay. Abundant fine and medium siltstone concretions. Common fine efflorescence. Very slight HCl reaction on the matrix. Very few very fine roots.



PIT REF: JUNCTION 1.

LAB NO. 7620 - 7622/65.

DEPTH	Texture			pH		% C	% N	P ppm	CEC me/100g soil	Exchangeable bases				Exch. Na% (ESP)	3Ce 1:5 m/lhos/cm	ECe Sat. m/lhos/cm.
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Mg	K	Na			
0-26"	20	12	68	7.7	6.4	1.17	0.12		22.2	10.6	7.6	1.1	2.0	9.1	0.52	0.60
26-34"	18	12	70	8.4	6.6	-	-		25.2	10.0	8.1	1.2	1.8	8.5	0.52	0.62
34"+	18	12	70	8.5	6.8	-	-		22.6	9.3	7.2	1.2	4.6	20.3	0.47	0.58

SOIL INSPECTION PIT; SCARP ROAD NUMBER 6

PROFILE DESCRIPTION.

LOCATION : In a seepage basin on the lowest slopes of the Kaniamwia escarpment.  
SLOPE: 1° 50'.  
ASPECT: West.  
LAND USE: Nil.  
VEGETATION COVER: 100%

< 10% BUSH:

Acacia seyal fistula.  
 Harrisonia abyssinica  
 Rhus natalensis

90% GRASS:

Imperata cylindrica africana 75%  
 Hyparrhenia rufa 15%

ROOTING DEPTH: >62"

MAXIMUM ROOTING DENSITY: 0 - 7"

DRAINAGE: Poor.

SOIL DEPTH: >62"

LAND USE CLASS 6.

- 0 - 7" 10 YR 2/1; Black. Hard, strongly developed fine and medium subangular blocky clay. No reaction with HCl. Abundant medium roots; Common fine roots. Lower boundary even and abrupt.
- 7 - 22" 2.5 Y 2/1; Black. Contains few very fine to medium sized pronounced rust mottles (2.5YR 3/4; Dark reddish brown). Extremely hard, strongly developed fine prismatic clay; microstructure moderate blocky with distinct clay faces. Vertical cracking. Occasional fine stones. No reaction with HCl. Common very fine to medium roots. Lower Boundary diffuse.
- 22 - 55" 2.5 Y 2/1 ; Black. Pronounced rust streaks (7.5YR 3/2; Dark brown). Extremely hard, strongly developed coarse and very coarse blocky clay with very prominent clay faces. Lentil structures are here very pronounced. Vertical rust streaks are associated with vertical cracks. Groups of fine rust mottles are associated with occasional pockets of fine and medium gravel which create conditions of temporary oxidation. No reaction with HCl. Few fine roots. Lower boundary diffuse.
- 55" + No sample. 10 YR 3/1; Very dark grey. Somewhat gleyed with faint blotches of 10 YR 4/1; Dark grey, and 10 YR 5/2; grey brown. Very hard, strongly developed coarse and medium blocky clay. Lentil structured. Pockets of lime-coated fine gravel. Pockets of fine and medium calcium concretions. The concretions, rust mottles and gravels tend to be associated. Common root galleries on ped faces.

DEPTH (cm)	MOISTURE (%)	TEMPERATURE (°C)	PH	SOIL CLASS	TEXTURE	STRUCTURE	ROOTING	REMARKS
0-5	15	25	5.5	10 YR 2/1	Blocky	Hard	Abundant	Black, strongly developed fine and medium subangular blocky clay.
5-15	10	25	5.5	2.5 Y 2/1	Blocky	Extremely hard	Common	Black, contains few very fine to medium sized pronounced rust mottles.
15-55	10	25	5.5	2.5 Y 2/1	Blocky	Extremely hard	Common	Black, pronounced rust streaks.
55+	10	25	5.5	10 YR 3/1	Blocky	Very hard	Common	Very dark grey, somewhat gleyed.



PROFILE DESCRIPTION

LOCATION: In a seepage basin on the lowest slope of the Kamikawa escarpment.

SLOPE: 1:50

ASPECT: West

LAND USE: WRI

VEGETATION COVER: 100%

< 10% BUSH

*Asclepias speciosa*  
*Harrisia brysonii*  
*Rhus copallina*

POD GRASS:

*Imperata cylindrica straminea* 15%  
*Hyparrhenia rufa* 15%

ROOTING DEPTH: > 2m

MAXIMUM ROOTING DENSITY: 0 - 1m

DRAINAGE: Poor

SOIL DEPTH: > 2m

LAND USE CLASS 6

10 YR 2/1: Black. Hard, strongly developed fine and medium subangular blocky clay. No reaction with HCl. Abundant medium roots. Common fine roots. Lower boundary even and abrupt.

2.5 Y 2/1: Black. Contains few very fine to medium sized pronounced rust mottles (2.5YR 2/2: Dark reddish brown). Extremely hard, strongly developed fine prismatic clay. Microstructure moderate blocky with distinct clay faces. Vertical cracks. Occasional fine stems. No reaction with HCl. Common very fine to medium roots. Lower boundary diffuse.

2.5 Y 2/1: Black. Pronounced rust streaks (2.5YR 2/2: Dark brown). Extremely hard, strongly developed coarse and very coarse blocky clay with very prominent clay faces. Small structures are here very pronounced. Vertical rust streaks are associated with vertical cracks. Groups of fine mottles are associated with occasional pockets of fine and medium gravel with greater concentrations of temporary oxidation. No reaction with HCl. Few fine roots. Lower boundary diffuse.

No sample. 10 YR 3/1: Very dark grey. Somewhat clayed with faint blotches of 10 YR 4/1: Dark grey and 10 YR 5/2: Grey brown. Very hard, strongly developed coarse and medium blocky clay. Small structures. Pockets of fine coated fine gravel. Pockets of fine and medium calcium concretions. The concretions, rust mottles and gravel tend to be associated. Common root galleries on bed faces.

Depth	TEXTURE			pH	KCl	%C	%N	P ppm	CEC me/100g soil	Exchangeable Bases				Exch. Na% (ESP)	ECE 1:5 m/mhos/cm	ECE sat m/mhos/cm
	Sand	Silt	Clay							Ca	Mg	K	Na			
0-7"	14	28	58	6.3	5.5	4.47	0.40	225	15.2	7.8	4.6	1.1	0.6	4.25 3.94	0.28	0.57
7-23"	14	20	66	6.4	5.1	-	-	168	21.1	10.4	6.7	1.1	1.1	5.7 5.2	0.15	0.44
23-55"	12	18	70	7.4	5.6	-	-	194	22.0	10.8	7.9	0.8	2.25	10.7 10.2	0.35	0.30

Depth	pH	Na m.e.%	K m.e.%	Ca m.e.%	Mg m.e.%	Mn m.e.%	P p.p.m.	Hp m.e.%
0-7"	5.9	0.40	0.92	19.6	10.0	0.60	225	-
7.22"	5.9	0.92	0.50	19.2	10.0 <sup>+</sup>	0.28	168	-
22-55"	7.1	1.88	0.27	17.2	10.0 <sup>+</sup>	0.28	194	-

BIOLOGICAL TEST (CUNNINGHAMELLA) % OF PLUS ALL.

Depth	N	P	S
0-7"	0	72	0

Depth	Temp	Rel. Hum.	Wind	Dir. Wind	Clouds	Moisture	Soil Temp	Soil Moisture	Soil pH	Soil Conductivity	Soil Nitrogen	Soil Phosphorus	Soil Potassium	Soil Calcium	Soil Magnesium	Soil Manganese	Soil Sulfur
53-55"	15	18	10	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1-32"	14	50	69	1.4	2.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0-1m	14	56	26	1.1	2.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

PLT REP: 200108 8

TRP... NO... 1058 - 120/102

PHYSIOLOGY TEST (MELTING POINT) X OF THE VIT

Depth	HP	m.e.% HP	m.e.% K	m.e.% G	m.e.% M	m.e.% B	m.e.% R	B.D.M. B	m.e.% HP
SS-25a	1.1	1.98	0.51	11.5	10.04	0.58	104	-	-
1.55	2.0	0.28	0.40	10.5	10.04	0.58	108	-	-
0-15	2.0	0.40	0.35	13.0	10.0	0.60	552	-	-

Depth	a	b	g
0-15	0	15	0

SOIL INSPECTION PIT; LINE 1 NUMBER 1 (L<sub>1</sub>P<sub>1</sub>).

PROFILE DESCRIPTION.

LOCATION: Towards the South East end of the valley. On lacustrine material, 400 metres West of the Olambwe River.

SLOPE: 35'

ASPECT: East.

LAND USE: Nil.

VEGETATION COVER: 100%

60% BUSH:

Acacia seyal fistula 20%  
and 40% "Grouped Bush" essentially composed of:-

Euclea schimperii

Euphorbia candelabrum

Grewia similis

Rhus natalensis

40% GRASS:

Setaria sphacelata 40 %

Hyparrhenia rufa <10%

Themeda triandra <10%

ROOTING DEPTH: >55"

MAXIMUM ROOTING DENSITY: 0 - 7"

DRAINAGE: Poor. Slight surface cracking.

SOIL DEPTH: >55"

LAND USE CLASS 8

0 - 16"

10 YR 3/1; Very dark grey. Extremely hard, moderately developed coarse and medium prismatic clay. Microstructure fine and medium strong blocky. Surface 0 - 1" very fine strong blocky only. Incipient lentils below 1". No reaction with HCl. Common fine and very fine roots. Lower boundary clear and even.

16 - 23"

10 YR 3/1; very dark grey. Extremely hard, strongly developed blocky clay. No reaction with HCl. Common root galleries. Occasional medium roots. Lower boundary clear and even.

23 - 33"

10 YR 3/1; Very dark grey. Very hard, strongly developed fine blocky clay. No reaction with HCl. Very few very fine roots. Lower boundary gradual.

33" +

10 YR 4/2; Dark grey brown. Slightly hard to hard, strongly developed fine and medium blocky clay with occasional distinct clay faces. Lentil structures. Blue faces on the peds common. White faunal casts. Few very fine manganese concretions. Very few fine and medium calcium concretions. Abundant medium gypsum crystals, occasionally lime coated. No matrix reaction with HCl. Rare roots.





SOIL INSPECTION PIT; LINE 13 NUMBER 2. (L<sub>1</sub>, P<sub>2</sub>)

PROFILE DESCRIPTION

LOCATION: Olambwe valley alluvium; 100 metres East of the Olambwe.

SLOPE: Plane.

LAND USE: Nil.

VEGETATION COVER: 100%

Acacia seyal fistula 30%

Sesbania quadrata <10%

Pennisetum mezianum 70%

ROOTING DEPTH: 50"

MAXIMUM ROOTING DENSITY: 0 - 4"

DRAINAGE: Poor. Slight surface cracking.

SOIL DEPTH: >55"

LAND USE CLASS 8.

- 0 - 7" 10 YR 3/1; Very dark grey. Hard, strongly developed fine and medium blocky heavy clay. Very few fine spots at the base of the horizon. No matrix reaction with HCl. Abundant fine roots. Lower boundary clear and even.
- 7 - 23" 10 YR 3/1; Very dark grey. Hard, weakly developed fine and medium prismatic heavy clay. Microstructure moderate fine and medium blocky. Few very fine calcium concretions. Abundant medium and coarse gypsum crystals. No matrix reaction with HCl. Common very fine roots. Lower boundary clear and even.
- 23 - 38" 2.5 Y 3/1; Very dark grey. Abundant coarse faint blotches of 10 YR 3/2; Very dark grey brown. Very hard, strongly developed fine and medium blocky heavy clay. Very firm when moist. Very few very fine calcium concretions. Common fine to coarse gypsum crystals. No matrix reaction with HCl. Fine root galleries. Lower boundary gradual.
- 38" + 2.5Y 4/1; Dark grey. Very hard, strongly developed fine and medium blocky heavy clay with prominent and thick clay faces. Lentil structured. Very few very fine calcium concretions. Very abundant fine to coarse gypsum crystals. No matrix reaction with HCl. Very few fine roots.

Open field

Depth	0-6"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"	48-54"	54-60"
Moisture	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.06	0.04
Temperature	28.1	24.6	21.0	18.0	15.0	12.0	9.0	6.0	3.0	0.0
pH	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Other										

11.5 11.5 11.5 11.5 11.5 11.5 11.5 11.5 11.5 11.5 11.5

Depth	0-6"	6-12"	12-18"	18-24"	24-30"	30-36"	36-42"	42-48"	48-54"	54-60"
Moisture	0	100	05							

SOIL INSPECTION PIT: LINE 13 NUMBER 2.  
(12 P.)  
PROFILE DESCRIPTION

LOCATION: Olompoe valley alluvium 100 meters East of the Olompoe.  
SICKE: Plains.  
LAND USE: Will.  
VEGETATION COVER: 100%  
 Acacia acyral fistulifera 30%  
 Sesbania quadrata 40%  
 Lemniscatum mesianum 30%  
ROOTING DEPTH: 50"  
MAXIMUM ROOTING DENSITY: 0 - 4"  
DRAINAGE: Poor, slight surface cracking.  
SOIL DEPTH: >50"

LAND USE CLASS 8.

0 - 7"  
 10 YR 3/1: Very dark grey. Hard, strongly developed fine and medium blocky heavy clay. Very few fine roots at the base of the horizon. No matrix reaction with HCl. Abundant fine roots. Lower boundary clear and even.

7 - 23"  
 10 YR 3/1: Very dark grey. Hard, weakly developed fine and medium prismatic heavy clay. Microstructure moderate. Fine and medium blocky. Few very fine calcium concretions. Abundant medium and coarse gypsum crystals. No matrix reaction with HCl. Common very fine roots. Lower boundary clear and even.

23 - 38"  
 2.5Y 4/1: Very dark grey. Abundant coarse faint blotches of 10 YR 3/5: Very dark grey brown. Very hard, strongly developed fine and medium blocky heavy clay. Very firm when moist. Very few very fine calcium concretions. Common fine to coarse gypsum crystals. No matrix reaction with HCl. Fine root galleries. Lower boundary gradual.

38" +  
 2.5Y 4/1: Dark grey. Very hard, strongly developed fine and medium blocky heavy clay with prominent and thick clay faces. Lenticular. Very few very fine calcium concretions. Very abundant fine to coarse gypsum crystals. No matrix reaction with HCl. Very few fine roots.



PIT REF. L13 2

Lab.No. 7733 - 7736/65.

Depth	TEXTURE			pH		%C	%N	P ppm	CEC me/100g SOIL	Exchangeable Bases			Exch. Na (ESP)	EC <sub>e</sub> 1:5 m/mhos/cm	EC <sub>e</sub> Sat. m/mhos/cm	
	Sand	Silt	Clay	H <sub>2</sub> O	KCl					Ca	Mg	K				Na
0-7"	6	8	86	8.0	6.6	1.62	0.16		30.0	11.8	5.9	1.9	8.95	<del>31.4</del> 29.9	1.15	2.65
7.23"	10	2	88	7.8	6.7	-	-		33.2	8.8	5.7	1.4	6.95	<del>30.3</del> 21.0	7.9	18.0
23-38"	14	2	84	7.7	6.7	-	-		30.0	6.2	4.7	1.1	9.20	<del>45.4</del> 30.6	8.5	15.0
38" +	18	0	82	7.7	6.6	-	-		28.8	6.6	4.3	0.8	8.0	<del>40.6</del> 27.8	8.0	14.0