PHYSICO-CHEMICAL PROPERTIES AND CLASSIFICATION OF SOME SOILS OF USOMINI IN OGBALAND, SOUTHERN NIGERIA.

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ABSTRACT
The study investigated some soil properties for the purpose of classifying selected soils of Ogbaland in Rivers State of Nigeria. A total of six soil profiles fromsix communities were selected (Obor, Obie, Obrikom, Okprukpuali, Egbogoro and Omoku) based on macromorphological differences. In each community, a 100 x 100m grid was measured in the fallow farmland before profiling. All soil profiles were georeferenced using Global Positioning System (GPS) Receiver (Garmin Ltd, Kansas, USA). The profiles were dug, described and sampled according to FAO procedures. Soil samples were analyzed in the Rivers State University laboratory laboratory for some soil properties. The result further reveal that the Sand particles ranged from 620gkg^{-1} (Obrikom) to 880gkg^{-1} (Omoku) while silt particles recorded a minimum value of 33 gkg^{-1} (Omoku) and maximum value of 250 gkg^{-1} (Obrikom). Clay-sized particles ranged from 66 gkg^{-1} (Omoku) to 226 gkg^{-1} (Obor). Sandy loam dominated other textural classes in soils studied. The pH ranged from 5.10 (Egbogoro) to 5.90 (Obie) while Organic carbon ranged from 0.47% (Obrikom) to 2.26% (Okprurkpuali), Values of Total nitrogen ranged from 0.01% (Obor, Obie, Obrikom, Egbogoro and Omoku) to 0.07% (Okprurkpuali)and Available phosphorus had a minimum value of 1.40mgkg^{-1}(Obor,Obrikom and Okprurkpuali) and maximum value of 8.42mgkg^{-1} (Omoku). The effective cation exchange capacity(ECEC)had a minimum value of 2.52 Cmol kg^{-1} in Egbogoro and the maximum value of 7.00 Cmol kg^{-1} in Okprurkpuali. The base saturation was relatively high with a minimum range of 68.2% (Egbogoro) and maximum of 95.2% (Omoku)..Soils were classified as TypicHapluqualf/Gleyic Fluvisol (Obor), ArenicEndoaquept/Arenic Fluvisol(Obie), TypicEndoaqualf /GleyicLuvisol (Obrikom), TypicRhodualf/RhodicLuvisol(Okpurukpuali), TypicHapludalf/ArenicLuvisol (Egbogoro) and Arenic Hapludalf/Arenic Luvisol (Omoku).
Keywords: Classification, morphology Usomini and Ogbaland.

INTRODUCTION
Soils as a natural resources has both utilitarian and aesthetic values but varies in space (Onweremadu, 2006). The foregoing indicates that soils are used for agriculture and non-agricultural purposes. It becomes expedient to investigate properties of soils as they relate to use for different purposes including agriculture.

Pedological investigations at varying intensities can give information of the physico-chemical and biological properties of soils. Knowledge of such properties confers sustained use of soils for varying land utilization. Indeed pedoloical surveys precede land evaluation necessary for land use planning.

In Southern Nigeria, scholars (Onweremadu*et al*., 2010,; Onweremadu and Okoli, 2017) reported poor aggregation and compaction of some soils to poor knowledge of their characteristics. Unpredictable changes on the distribution of basic cations over space have been found to be a fertility concern (Onweremadu and Akamigbo, 2007).Soil characterization is an attempt to identify some features of soils, the features most often used in soil classification.

Soil classification is concerned with the knowledge of crop requirements, prevailing conditions and applied system that assesses the capacity of the soil for optimal use(FAO, 1985). Soils of a given area are classified based on suitability which is the fitness of a given soil or land mapping unit and the degree to which it satisfies the land user(Dent ,1978).

Ogbaland is in Rivers stateof Nigeria; and has a land area of 969.00km^2 and a population density of 396.08km^2 and a total population projection of 383,800 as at 2015(National Population Commission ,2006). Ogbaland is known as a home of farmers and fishermenand so many multinational oil companies (Ellah, 1995). Ogbaland has great potentials for arable crop production, forestry, horticulture, floriculture, aquaculture and other agricultural ventures.The area is proximal to Port Harcourt municipality thus can act as a feeder area supplying food,feed and fibre needs of the urban centre.

MATERIAL AND METHODS
The study was conducted in Ogbaland in Rivers State Nigeria. Ogbaland belongs to humid tropicshaving a annual temperature range of 27-29^{0}C and a long period of rainfall of over 2500mm annually. It supports a wide range of crop and animal species.

Differences in macromorphology were employed in the study. Six soil profiles were dug and described according to FAO (1998) procedure. Soil samples were collected based on horizon differentiation, beginning from the deepest genetic horizon upwards to minimize contamination. Macromorphological properties were recorded. Soil samples were collected and bagged in polythene bags preparatory

for routine laboratory analyses. Core samples were also collected for bulk density determinations. All soil profiles were geo-referenced with the help of hand-held Global Positioning System (GPS) Receiver (Garmin Ltd, Kansas, USA). Munsellcolour chart was used to determine soil colour in situ.Particle Size Analysis was performed using the Bouyoucous (Hydrometer) described by Gee and Or, (2002).Bulk Densitywas done by the procedure described by (Grossman and Reinsch,2002).Soil pH was determined in water as described byEno*et al*. (2009).Total Nitrogen Determination was measured using macro kjeldahl method, (Bremner,1996).Organic Carbon measured by the wetcombustion ofWalkley and Black (1934).

Effective Cation Exchange Capacity (ECEC) was by the summation total exchangeable base (TEB) and total exchangeable acidity (TEA) .

Cation Exchange Capacity (CEC) was determined by extracting the soil with 1N NH_4OAc (Thomas, 1982).

Exchangeable Bases:Na and K were determined by using flame photometer while exchangeable acidity was by titration as described by (McClean, 1965).

Soil Classification: The soils were classified using Soil Taxonomy (USDA Soil Taxonomy (2015)and World Reference Base(FAO ,2006). .

Statistics: Coefficient of variation was used to determine differences in soil properties of different horizons within the various pedons.

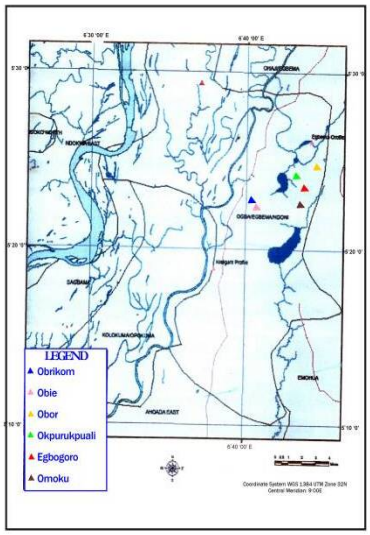

Fig 1.Map of the Study Area.

RESULTS AND DISCUSSION

Physical Properties of Soils of the Study Area. Theresult of Physical properties of soils of Usomini in Ogbaland are presented in Table 1.The result reveals that most of the soils were sandy loam and sandy clay loam soils especially at the top 0-15cm across the six profiles sunkwhich is relatively optimal for arable crop production (Sys. 1985).Despite the sandy nature of these soils, soil moisture is retained through capillary action form wetter regions (Adesemuyi, 204). The result further shows that the soils have relatively low bulk density.

Table 1: Physical Properties of the Study Area

Horizon	Depth (Cm)	Sand (gkg^{-1})	Silt (gkg^{1})	Clay (gkg^{1})	TC	BD gcm^{-3}	TP %	Θv Cm^3cm^3
SPO1 (Obor: $5^0$23'028N, $6^0$41'021E)								
A	0-10	740	114	146	SL	0.89	66	0.10
AB	10-22	740	114	146	SL	0.92	65	0.11
Bt1	22-52	640	134	226	SL	0.94	65	0.04
Bt2	52-92	706	121	173	SL	0.92	65	0.08
Bt3	92-120	705	120	172	SL	0.91	65	0.08
SPO2 (Obie: $5^0$22'N,$6^0$40'920E)								
A	0-19	860	54	86	SCL	0.94	65	0.04
AB	19-49	780	74	146	LS	0.94	65	0.05
Bt1	49-79	760	74	166	SL	0.95	64	0.03
Bt2	79-109	801	68	140	SL	0.94	65	0.04
Bt3	109-120	800	67	132	SL	0.93	64	0.03

SPO3 (Obrikom:$5^0$23'49N,$6^0$40'33E)								
A	0-8	620	250	126	SL	0.91	65	0.08
AB	8-45	680	194	126	SL	0.94	65	0.05
Bg1	45-101	680	134	186	SL	0.89	66	0.10
Bg2	101-120	660	133	146	SL	0.91	65	0.07
SPO4 (Okprukpuali:$5^0$22'853N,$5^0$40'299E)								
Ap	0-15	680	154	166	SL	0.92	65	0.07
A	15-45	680	154	166	SL	0.90	66	0.09
Bt1	45-79	660	134	206	SCL	0.93	64	0.04
Bt2	79-115	673	130	179	SL	0.91	65	0.05
SPO5 (Egbogoro: $5^0$22'784N,$6^0$40'447E)								
Ap	0-12	840	54	106	LS	0.94	64	0.04
A	12-35	840	34	126	LS	0.93	64	0.06
Bt1	35-80	760	74	166	SL	0.94	64	0.05
Bt2	80-130	813	54	130	SL	0.93	64	0.05
SPO6 (Omoku: $5^0$22'609N,$6^0$40'367E)								
A	0-17	880	34	86	LS	0.94	64	0.05
AB	17-43	880	54	66	LS	0.93	64	0.05
Bt1	43-90	780	34	186	SL	0.93	64	0.06
Bt2	90-150	846	33	120	SL	0.92	63	0.05

Key: BD=Bulk density,TP=Total porosity, θv= Volumetric moisture content, TC= Textural class, SL= Sandy loam, LS= Loamy sand, SCL= Sandy clay loam

Table 2: Chemical Properties of the Study Area.

Hz	$P^H_{1:1H_2O}$	O.C (%)	O.M (%)	TN (%)	Av.P ($Mgkg^{-1}$)	Exc.Base **Ca**	**Mg**	**K**	**Na**	Acidity **H+Al**	ECEC (Cmol/kg)	**BS (%)**
SPO1 (Obor: $5^0$23'028N,$6^0$41'021E)												
A	5.60	0.60	1.53	0.05	1.40	1.60	0.80	0.19	0.57	1.00	4.16	75.9
AB	5.40	0.72	1.48	0.05	5.61	1.20	1.20	0.24	0.30	0.40	3.34	88.0
Bt1	5.40	0.86	1.32	0.01	3.51	0.60	2.60	0.18	0.28	0.70	4.36	83.9
Bt2	5.40	0.77	1.32	0.02	3.40	0.60	1.53	0.20	0.38	0.67	3.91	69.3
Bt3	5.45	0.89	1.03	0.01	3.43	0.63	1.60	0.19	0.40	0.70	3.95	71.3
Mean	**5.45**	**0.78**	**1.34**	**0.03**	**3.47**	**0.92**	**1.54**	**0.20**	**0.38**	**0.69**	**3.94**	**77.68**
SPO2 (Obie: $5^0$22'N,$6^0$40'920E)												
A	5.90	0.72	1.24	0.04	7.02	1.60	1.00	0.13	0.24	0.20	3.17	93.6
AB	5.90	1.25	2.16	0.02	4.56	1.20	3.20	0.14	0.44	0.60	5.58	89.2
Bt1	5.70	0.29	0.50	0.01	4.56	1.20	1.60	0.09	0.35	0.50	3.74	86.6
Bt2	5.71	0.71	1.30	0.02	4.51	1.30	1.90	0.12	0.34	0.43	4.16	90.1
Bt3	5.80	0.70	1.26	0.01	4.50	1.33	1.93	0.10	0.32	0.41	4.11	88.8
Mean	**5.80**	**0.73**	**1.29**	**0.02**	**5.93**	**1.32**	**1.92**	**0.11**	**0.33**	**0.42**	**4.15**	**89.66**
SPO3 (Obrikom:$5^0$23'49N,$6^0$40'33E)												
A	5.40	0.74	1.28	0.06	4.56	3.20	0.40	0.19	0.38	0.50	4.67	89.3
Ab	5.40	0.47	0.81	0.04	1.57	2.20	0.80	0.19	0.57	0.50	4.26	88.2
Bg1	5.60	0.62	1.07	0.01	1.40	1.20	1.40	0.11	0.31	0.70	3.72	81.2
Bg2	5.40	0.61	1.10	0.02	1.45	1.22	1.39	0.10	0.29	0.60	3.70	81.0
Mean	**5.45**	**0.61**	**1.06**	**0.03**	**2.24**	**1.95**	**0.99**	**0.14**	**0.38**	**0.57**	**4.08**	**84.92**
SPO4 (Okprukpuali:$5^0$22'853N,$5^0$40'299E)												
Ap	5.50	1.91	3.29	0.07	2.11	2.88	1.60	0.18	0.43	0.80	5.81	87.6
A	5.60	2.26	3.90	0.07	2.11	1.40	3.40	0.21	0.59	1.40	7.00	80.6
Bt1	5.40	0.39	0.67	0.03	1.40	1.00	1.00	0.13	0.39	0.80	3.32	75.9

Bt2	5.50	1.60	2.62	0.04	1.60	1.25	1.40	0.10	0.40	1.60	4.37	72.0
Mean	**5.50**	**1.54**	**2.62**	**0.05**	**1.80**	**1.63**	**1.85**	**0.15**	**0.45**	**1.15**	**5.12**	**79.02**
SPO5 (Egbogoro: $5^0$22'784N,$6^0$40'447E)												
Ap	5.10	1.29	2.23	0.03	7.02	1.20	0.24	0.10	0.18	0.80	2.52	68.2
A	5.50	1.17	2.03	0.03	2.98	0.80	2.00	0.12	0.33	0.60	3.85	84.4
Bt1	5.50	0.86	1.49	0.01	2.11	0.80	1.20	0.15	0.57	0.60	3.32	81.9
Bt2	5.40	0.80	1.47	0.02	2.10	0.82	1.10	0.10	0.55	0.61	3.10	82.9
Mean	**5.37**	**1.03**	**1.80**	**0.02**	**3.55**	**0.90**	**1.13**	**0.11**	**1.63**	**0.56**	**3.19**	**79.35**
SPO6 (Omoku: $5^0$22'609N,$6^0$40'367E)												
A	5.20	1.29	2.23	0.01	6.66	2.00	2.20	0.07	0.20	0.20	5.17	86.4
Ab	5.30	1.25	2.16	0.01	8.42	2.80	2.80	0.08	0.40	0.30	6.38	95.2
Bt1	5.60	0.98	1.69	0.01	3.15	2.00	1.40	0.18	0.55	0.50	4.63	89.2
Bt2	5.40	1.20	1.60	0.01	3.10	2.10	1.50	0.09	0.50	0.40	4.60	91.0
Mean	**5.37**	**1.18**	**1.92**	**0.01**	**5.33**	**2.22**	**1.97**	**0.10**	**0.41**	**0.35**	**5.19**	**90.45**

Key: Hz = Horizon,TN =Total Nitrogen, O.C=Organic Carbon, Av.P= Available Phosphorus, ECEC=Effective Cation Exchange Capacity, O.M= Organic Matter, SPL= Sample Location

Table 3: Morphological Characterization of the Study Area.

Horizon	Depth cm	Description: Colour (moist)	Mottle	Texture	Structure	Consistency (moist)	Boundary
SPO1 (Obor: $5^0$23'028N,$6^0$41'021E)							
A	0-10	10YR 2/2	A	SL	MvfSa	F	C
AB	10-22	10YR 3/3	A	SL	MvfSa	Vf	Ds
Bt1	22-52	10YR 5/6	A	SCL	MvfSa	Vf	Dw
Bt2	52-92	10YR 6/6	Fff	SCL	MvfSa	Ef	Dw
Bt3	92-120	10YR 5/6	Fff	SCL	Smp	Ef	_
SPO2 (Obie: $5^0$22'N,$6^0$40'920E)							
A	0-19	7.5YR 3/1	A	SL	Mcg	L	Cs
AB	19-49	7YR4/2	A	SL	McSa	Vf	Cs
Bt1	49-79	5YR 4/6	A	SL	McSa	Vf	Gw
Bt2	79-109	2.5YR 5/8	Fff	SL	McSa	F	Gw
Bt3	109-180	2.5YR 4/8	Fff	SL	SmAb	F	_
SPO3 (Obrikom:$5^0$23'49N,$6^0$40'33E)							
A	0-8	10YR 5/2	Fmf	SC	Vfc	Vf	Dc
AB	8-45	10YR7/3	C	SC	Vfc	Ef	Cs
Bg1	45-99	10YR 7/1	Mmd	SC	Vfc	Ef	Cs
Bg2	99-120	2.5YR 5/8	Mcp	SC	SmAb	Ef	_
SPO4 (OkprukpualI:$5^0$22'853N,$5^0$40'299E)							
Ap	0-15	10YR 3/2	A	SL	Sfg	F	C
A	15-45	10YR3/3	A	SL	Sfg	Vf	Cw
Bt1	45-79	5YR 3/6	A	SCL	Sfg	Ef	Cs
Bt2	79 - 115	5YR 3/8	A	SCL	Sfg	Ef	_
SPO5 (Egbogoro: $5^0$22'784N,$6^0$40'447E)							
Ap	0-12	10YR 2/2	A	LS	Sfp	L	Cs
A	12-35	10YR3/3	A	LS	Sfp	Vf	Dw
Bt1	35-80	10YR 5/6	A	SL	Sfp	Fr	Dw
Bt2	80-130	10YR 5/6	A	SL	Sfp	F	_
SPO6 (Omoku: $5^0$22'609N,$6^0$40'367E)							
A	0-17	7.5 YR 3/1	A	LS	Mc	F	Cs
AB	17-43	7YR 4/2	A	LS	McSa	F	Cs
Bt1	43-90	5YR 4/6	A	SL	McSa	Vf	Gw
Bt2	90-150	2.5 YR 5/8	A	SL	McSa	Ef	_

Mottle: A= Absent, Fff= Few fine & faint, Fmf= Few medium & faint, C= common, Mmd =Many, medium & distinct, Mcp =Many, coarse & prominent.
Texture: Sl = Sandy loam, SCL = Sandy clay loam, SC = Sandy clay, LS = Loamy sand.
Structure: MvfSa = Moderate, very fine & Sub-angular, Smp = Strong medium &prismatic,Mcg = Moderate, coarse & granular, McSa =Moderate, coarse & sub-angular, Smab = Strong, medium & angular blocky, Vfc = Very fine & columnar, Sfg = Strong fine & granular, Mc = Moderately coarse.
Consistency: F = Firm, Vf = Very firm, Ef = Extremely firm, Fr = Friable, Vfr = Very friable,L = Loose
Boundary: C = Clear, Ds = Diffuse & smooth, Dw = diffuse & wavy, Cs = Clear & smooth, Gw = Gradual & wavy, Dc = Distinct & clear, Cw = clear & wavy, - = Non designable.

Table 4: Classification of Soils

Pedon	Order	Suborder	Greatgroup	Subgroup	WRB
Obor	Alfisols	Aqualf	Hapludalf	TypicHapluqualf	Gleyic Fluvisol
Obie	Inceptisol	Aquept	Hapludept	ArenicEndoaquept	Arenic Fluvisol
Obrikom	Alfisols	Aqualf	Hapludalf	TypicEndoaqualf	GleyicLuvisol
Okpurukpuali	Alfisols	Aqualf	Hapludalf	TypicRhodualf	RhodicLuvisol
Egbogoro	Alfisols	Udalf	Hapludalf	TypicHapludalt	ArenicLuvisol
Omoku	Alfisols	Udalf	Hapludalf	ArenicHapludalf	ArenicLuvisol

Chemical Properties of Soils of the Study Area. The result of the chemical properties of soils of Usomini in Ogbaland are presented in Table 2. Generally the result of chemical analysis reveals a mean pH range of 5.50 which is relatively acidic, organic carbon content of 0.99%, the organic carbon content of the study area were generally low and declined down the profile, the range where 0.60% (Obor) to 0.9% (Omoku) this could be probably because most of the microbial activities that aids organic matter decomposition takes place at the soil surface (0-15cm) depth. The result further reveals mean total nitrogen of 0.03% (Obor) this is also low possibly because the processes that necessitate nitrogen loss are predominant, available phosphorus of 3.89ppm and ECEC of 4.39Cmol/kg where recorded.

Characterization of soils
Pedon1 (SPO1:Obor) five genetic horizons were identified A, AB, Bt1,Bt2 and Bt3 with depth 0-10 to 92-120cm, the soil colours varied from Very dark greyish brown (10 YR2/2) moist to Brownish yellow(10 YR 5/6) moist, this actually indicate the presence of organic matter content in varying forms down the profile, there were no trace of mottles until about the depth of 52cm down the profile where few, faint mottles were observed, the texture of the area ranges from sandy loam (146 gkg-^{1}) to sandy clay loam (226 gkg-^{1}) , there were moderately fine structure soils, it has firm to extremely firm in consistency when moist and clear boundary demarcation at the top 0-10cm and diffuse and wavy down the profile.

Pedon2 (SPO2: Obie) five distinct horizons were identified as A, AB, Bt1, Bt2 and Bt3 with depth ranging from 0-19 to 109-180cm, the soil colour varied from Very dark grey (7.5 YR 3/1) moist to Brown(7YR 4/2) moist to Red (2.5 YR 4/8) moistthis is a clear indication of the presence of oxides especially at depth 49cm down the profile, there were presence of few fine mottles, the soil texture were basically sandy loam (86, 146 and 166 gkg-^{1}). The soil structure were moderate, coarse granular, these soils have loose to very friable consistency when moist and clear, smooth to gradual wavy boundary down the profile.
Pedon3 (SPO3: Obrikom), four horizons were identified from the delineation; A, AB, Bg1 and Bg2 respectively. The profile has a peculiar characteristic in that it has a transitional horizon AB and a Bg horizon which indicates strongly gleying reflection, consequently the area is associated with seasonal flooding. The depth of the profile ranges from 0-8 to 101-120cm, the soilcolours were Greyish brown (10 YR 5/2) moist, Very pale brown (10 YR 7/3) moist, Light- grey (10 YR 7/1) moist and Red (2.5 YR 5/8) moist. The profile had medium to distinct mottles with sandy clay 126-186 gkg-^{1}and very fine and columnar structure. It has firm to extremely firm consistency when moist and distinct boundary horizon.
Pedon4 (SPO4: Okprupkuali). This area were predominantly used for cultivation given rise to the Ap, A, Bt1, and Bt2 horizons, it also has clay accumulation, the profile depth ranges from 0-15 to 75 to 115cm, the soil colours were Greyish brown (10 YR 5/2) moist to Red (5YR 5/8) moist, few,

coarse and faint mottles were noticed, the soil texture were mainly sandy loam (166 gkg-^{1}) and sandy clay loam (206 gkg-^{1}) respectively. It has strong, fine and blocky structures down the profile and very firm consistency when moist with clear,smooth boundary delineation.

Pedon5 (SPO5: Egbogoro). In this profile, four horizons Ap, A, Bt1, Bt2 were identified. The soils are well drained and consolidated, the terrain were relatively flat and smooth. The depth of the profile rages from 0-12 to 80-130cm, the soil colours varied from Very dark greyish brown (10 YR 2/2) moist, Dark brown (10 YR 3/3) moist, Yellow brown (10 YR 5/6) moistto Brownish yellow(10 YR 5/6) moist, this also indicate the availability of organic matter content. There were few, fine mottles at the top 0-35cm while below 35cm down the profile the mottles became abundant, coarse and distinct, the soil texture were basically loamy sand (54 gkg-^{1}) and sandy loam (166 gkg-^{1}), strong, fine and prismatic structure were predominant, the consistency of the soil when moist ranges from loose to very friable, it also has clear to smooth and wavy boundary demarcations.

Pedon6 (SPO6: Omoku). This is a typical upland soil of about 19m ASL, the soils are well drained and associated with altered vegetation due to anthropogenic activities like cultivation and constructions. Four distinct horizons were identified; A, AB, Bt1 and Bt2 with depth 0-17, 17-43, 43-90 and 90-150cm, respectively. The soil colurs ranges from Very dark grey (7.5 YR 3/1) moist, Brown (7 YR 4/2) moist, Yellowish red (5 YR 4/6) moist and Red (2.5 YR 5/8) moist. This indicates a high availability of ferric iron oxides, few mottle were seed, the soil texture were basically loamy sand (86 gkg-^{1}) and sandy loam (186 gkg-^{1}) ,respectively. The soil structure identified were moderate, coarse to sub angular, the soils were firm to very firm in consistency when moist and there clear, smooth boundary delineation.

Classification of soils

The classification of some soils of Ogbaland was done based on the macromorphological features of the soils, physical and chemical properties the soils were classified in accordance to USDA and WRB procedures:

Obor: Soil has argillic horizon, organic matter decreased consistently with depth and base saturation ranged from 71.3 to 88.0%. Soil is an Alfisol. Soil has aquic moisture regime (wet moisture status), as indicated by few mottles at a depth of 52cm meaning it is an Aqualf. The clay bulge is not properly developed hence simple; therefore soil is a Hapludalf based on these soils of Obor is hereby classified as TypicHapluqualf/Gleyic Fluvisol.

Obie: Soil has an argillic horizon with prominent clay bulge. Sand-sized particle size ranged from 760 to 860g kg^{-1}. Mottles were present at deeper horizons. There was an irregular distribution of organic matter throughout the soil profile. Base saturation ranged from 86.6 to 93.6 % indicating an Inceptisol. There is a sandy particle size throughout the profile from the mineral surface (A- horizon) to a depth of 60cm (19-79cm)but weak horizon differentiation with irregular organic matter distribution indicating an ,Arenic Endoaquept/Arenic Fluvisol.

Obrikom: Distinct clay bulge showing pronounced argillation, slight gleying at deeper horizons and organic matter decreased with depth. Base saturation ranged from 81.0 to 89.3%. Soil has attributes of an Alfisol. There is sandy particle size throughout the soil profile from mineral surface soil is classified as TypicEndoaqualf/GleyicLuvisol**.**

Okpurukpuali: Argillation is pronounced given the clay bulge sand sized particles dominated throughout the profile. Has Udic moisture regime with base saturation of 72.0 to 87.6% indicating an Udalf Hue is greater than 2.5YR with a value of 3 thus the soil is classified as TypicRhodualf/RhodicLuvisol.

Egbogoro: Slight Argillation with simple clay bulge Sandy with sand content ranging from 760 to 840g kg^{-1}.Mottles were absent organic matter decreased with depth. Has udic moisture regime and base saturation ranges from 68.2 to 84.4% indicating an Udalf with simple argillation, soil is a Hapludalf. Based on the above soil is classified as TypicHapludalf/ArenicLuvisol**.**

Omoku: Mottles are absent; argillation is shown given a clay bulge with peak at 180g kg^{-1} at Bt1 horizon. Sand sized particles ranged from 780 to 880gkg^{-1}. It has an udic moisture regime and Organic matter decreased consistently with depth. Base saturation ranged from 86.4 to 95.2%. The soils of Omoku indicate Alfisol at order category, and at Suborder ,it is classified as Udalf, and Subgroup as Hapludalfbut Great group asArenic Hapludalf/Arenic Luvisol .

CONCLUSION

The study aimed characterized and classified some soils of Usomini in Ogbaland, Southern Nigeria. Sandsized particles dominated other particle sizes but soils showed high percentage base saturation.Soils were classified as TypicHapluqualf/Gleyic Fluvisol (Obor), Arenic Endoaquept/Arenic Fluvisol (Obie), TypicEndoaqualf/GleyicLuvisol (Obrikom), TypicRhodualf/RhodicLuvisol (Okpurukpuali), TypicHapludalf/ArenicLuvisol(Egbogoro) and Arenic Hapludalf/Arenic Luvisol (Omoku).

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