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SOIL TAXONOMY AND EVALUATION OF SOME SOILS UINT THE WESTERN SIDE OF THE NILE DELTA, EGYPT

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ABSTRACT

Ten soil profiles were selected to represent the main geomorphic units in the western side of the Nile Delta in order to evaluate their physical and chemical properties of these soils to be classified, land capability for cultivation as well as land suitability for growing crops were carried out.

According to the Taxonomic system (2010), the soils could be classified into three orders (*Vertisols*; *Aridisols* and *Entisol*s) and five sub orders (Aquerts, *Torrerts*, *Calcids*, *Psamments* and *Orthens*) and their degradation up to the salinity levels (i.e. seven families).

The current suitability of the studied soils could be categorized into two suitability classes [i.e. moderately (S_2) and marginally suitable (S_3)]. The studied soils are affected by many of limiting factors, i.e. texture, salinity and alkalinity and calcareoresness with variable intensity degrees.

Land suitability for certain crops can be achieved by matching the ratings of land characteristics with the crop requirements in different suitability levels as proposed by Sys et al (1993). The obtained data of soil suitability for same selected crops (16 crops), which are presented for the studied the studied soils developed on the identified geomorphic units as land suitability guide tables, reveal that the current suitability classes of the studied soil profiles include all the suitable classes (S_1, S_2, S_3 and N).

INTRODUCTION

Nowadays, horizontal expansion on new area in the desert is necessary to meet the demand of food due to the nature of Egypt population growth. The western part of the Nile Delta (Western

Desert) represents a promising area for future agricultural expansion plans. Land evaluation using a scientific procedure is essential to assess the potential and constraints of a given land parcel for agricultural purposes.

The land capability classification is one of a number of interpretive groupings mode primarily for agricultural purpose. The aim of the system is to asses the degree of soil limitation to land use or potentials imposed by land characteristics on the basics of permanent properties. In this respect, many systems have been suggested to evaluate the agricultural limitations affecting land capability, classification Prevailing conditions. According to Storie (1964) and Sys *et a*l., (1991), all systems aim at gaining a better knowledge and of the soil properties and defining limitations affecting the agricultural potentials of soils.

Geology

The geological aspects of the western Desert of Egypt are reported by a number of researchers including Shata (1961), Said (1962), El-Fayoumy(1968), Abu El-Ezz(1971), Attia (1975) and Said (1990). From the stratigraphic point of view, the area of the western Nile Delta which lies in the western desert of Egypt is covered by sedimentary rocks, ranging in age from the Quaternary to the tertiary periods. According to El-Fayoumy (1968) and Said (1990) the following deposits of the western Nile Delta region are distinguished in this region:

I-Young littaral Deposits (Coastal lagonal deposits).

II-Young Terrastrial Deposits

These include the following deposits

A) Inland lake
B) Costal sand dunes
C) Inland sand dunes
D) Alluvial deposits of desert wadies
E) Young deltaic deposits

III- Pleistocene deposits

These includes

A) Old gravel deposits
B) Yong gravel and sand deposits

Geomorphology of the ragion west of the Nile Delta

According to ASRT(1982) showed that there are six geomorphic units in this region, they are coastal plain, young deltaic plain, old deltic plain, alluvial depostics of deseret wadess(Abu Mina basin), fluvio-marine plain and include dunes.

I-Coastal plain

This plain is a shore-belt which is a very narrow strip restricted to the tidal zone. Several forms are included within this plain, which are either a gradational or degradational. The gradational shore platforms constitute developed beaches which from typical coastal flats covered with present beach deposits between Abu-Qir and Rosetta towns. The degradational shores have numerous mir….bologic features in the form of wave cut cliffs, merarrotional platforms and on shore islands.

II-Young deltaic plain

The plain lies between Abu-Mina Basin to the west and the Rosettal Nile Branch to the east. This geomorphic sector part of the fertile land of the Nile Delta. The area is generally flat and gently sloping northwards an within elevation ranging from +20 m to +30m.

III- Old Deltaic plain

This plain lies south of young deltic plain and occupies the area North and East of Wadi El-Natrun. The elevation varies between +20m mear. The Nile Delta to 60m near Wadi El-Natrun. Aeolian sand and flaviatile sheets are frequent within this plain.

IV-Alluvial Deposits of Desert wadies (Abu Mina Basin)

These deposits constitute a depositional valley draining the surface, towards the Nile Delta,, with an average gradient the 3 m/km. The alluvial deposits gradually intermix with fresh water middy deposits of the Nile as well as with the brackish water silty deposits of Maryut lake. The elevation ranges between 20m to the east and 70 m to the west.

V-Fluvio-Marine plain

This plain occupies a large area in the Nile Delta in the North along the Sea Coast and the northern lakes. It is almost flat within elevation near O and is characterized by its heavy clay texture

VI-Inland Dunes

These dunes are close to the desert ffringes on the western side of the delta. The texture becomes gradually coarse as the Nile clayey sediments intermix with the desert sands. Two sub-unites could be recognized. The first one consists of yellow desert sandy soils, flat to gently undulating, with a single grains structure and low lime content. The second are consists of pale-yellow coleareous sandy soils located in the western desert fringe near-Amiria.

The study was carried out to identify the chemical and physical properties of the soils located in the western part of the Nile Delta and their soil taxonomic ones as well as the natural constraints of the environmental factors, then the role of land evaluation system as a guide parameter for economical land use for the agricultural utilizations in the western part of the Nile Delta of Egypt.

MATERIALS AND METHODS

The regions where the study was performed lie west of the Nile Delta and extends from Roseetta branch to the Cairo-Alexandria desert road. On its northern border lie Idko and Mariuot lakes. Ten soil profiles were taken to represent the main gyeomorphic units located in the western side of the Nile Delta fig (1). The profiles was dug deep down to 150cm depth or depth of water table or impenetrable layers whichever came first. The soil profiles are examined and described according to Soil Survey Manaul (USDA2003) (Table 1).

About thirty two soil samples representing the different morphological variation throughout the entire profiles were collected, air- dried, crushed and sieved through a 2 mm sieve. Laboratory analyses were carried out for particle size distribution by the method using sodium hexametaphosphate as a dispersing agent (Piper, 1950). Calcium carbonate was using volumetrically colin's calcimeter (Richards, 1954). Gypsum was determined as precipitation with acetone. Organic matter was determined according modified Walkly and Black method (Page et al., 1982). pH, total salinity and soluble cations and anions in the saturated extracts were determined according to the methods out line by Page et al., (1982).

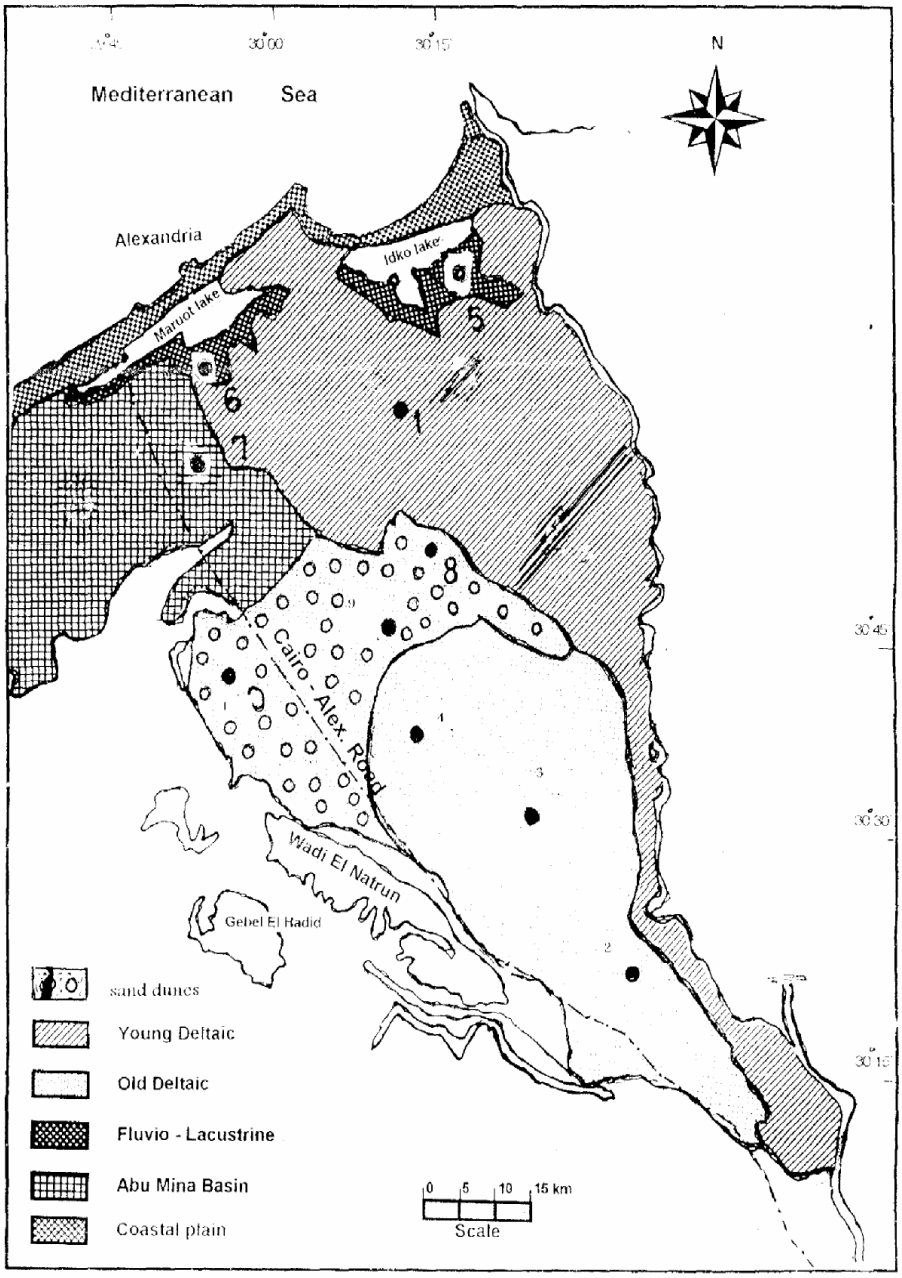

Fig. 1. Geomorphic units and profiles site of the investigated area.

Table (1): Morphological description of the studied soil profiles.

Geomor-phic units	Profile No.	Depth (cm)	Color		Texture	Structure	Consistence			Lower boundaries	Relief
			Dry	Moist			Dry	Slick-iness	Plasticity		
Young deltaic plain	1	0-30	10YR4/2	10YR34/2	C	wcsb	sh	vs	vp	cs	AF
		30-50	10YR4/2	10YR3/2	C	mmsb	fi	vs	vp	cs	
		50-85	10YR5/3	10YR4/2	C	smsb	fi	vs	vp	cs	
		85-150	10YR5/2	10YR4/2	C	sfAb	sh	vs	vp	-	
Old deltaic plain	2	0-35	10YR6/4	10YR5/3	LS	mss	so	ns	vp	cs	AF
		35-65	10YR6/4	10YR5/3	S	mss	so	ns	vp	As	
		65-140	10YR6/4	10YR5/3	S	mss	so	ns	np	-	
	3	0-20	10YR5/8	10YR4/6	LS	sg	lo	ns	np	cs	Un
		20-80	10YR5/8	10YR4/6	S	mss	so	ns	np	cs	
		80-150	10YR8/2	10YR7/1	SL	mss	so	ss	sp	-	
	4	0-30	10YR6/4	10YR5/3	LS	sg	lo	ns	np	cs	AF
		30-80	10YR6/4	10YR5/3	S	mmAb	so	ns	np	cs	
		80-150	10YR8/2	10YR7/1	LS	mmAb	so	ns	np	-	
Fluvio marine plain	5	0-35	10YR4/3	10YR3/2	C	wcsb	fr	vs	vp	cs	AF
		37-75	10YR4/2	10YR3/1	C	mmsb	fi	vs	vp	cs	
		75-150	10YR4/4	10YR3/3	C	sFAb	fi	vs	vp	-	
	6	0-25	10YR5/3	10YR4/2	C	wcsb	h	vs	vp	cs	AF
		25-80	10YR6/2	10YR5/1	C	mmsb	fi	vs	vp	cs	
		80-150	10YR6/2	10YR5/1	C	smAb	fi	vs	vp	-	
Alluvial deposits desert wadi	7	0-30	10YR8/6	10YR7/6	SCL	mss	so	ms	mp	cs	AF
		30-70	10YR4/2	10YR3/1	SCL	mss	so	ms	mp	cs	
		70-150	10YR3/3	10YR4/2	CSL	mss	so	ms	mp	-	
Inland dunes	8	0-35	10YR7/3	10YR6/2	SCL	mss	fr	ms	mp	cs	AF
		35-75	10YR8/8	10YR8/6	SCL	mss	so	ms	mp	cs	
		75-150	10YR8/8	10YR8/6	LS	mss	so	ns	np	-	
	9	0-35	10YR8/4	10YR7/3	S	sg	lo	ns	np	cs	AF
		35-85	10YR8/4	10YR7/3	S	mss	so	ns	np	cs	
		38-150	10YR8/4	10YR7/3	S	mss	so	ns	np	-	
	10	0-30	10YR8/8	10YR7/6	LS	mss	so	ns	np	cs	AF
		30-70	10YR8/8	10YR7/6	S	mss	so	ns	np	cs	
		70-150	10YR8/8	10YR7/6	S	mss	so	ns	np	-	

Soil texture: S1 sand, C: clay, L: loam, SCL: sandy clay loam **structure**: mss: massive., sg: single grains, WCSb: weak coarse subangulare bloky, mmsh: medium subangular blocky; SmAb: strong medium angular blocky
Soil consistence: lo: loose. Sp: soft; sh: slightly hard, Fi: firm, Fr: friable, vs: very sticky, ss: slightly sticky, ns: non sticky, ms: moderately sticky, vp: very plastic, sp: slightly plastic, np: non plastic, mp: moderately plastic
Lower boundary: CS: clear smooth, As: Abrupt smooth
Relief: AF: Almost flat , Un: undulating

Data obtained were used for soil Taxonomy according the system of USDA(2010). Soil limitations as well as land suitability evaluation and its suitability for certain crops which were obtained by using the parametric systems of Sys and Verheye(1978) and Sys et al.(1993). The method aims to provide a method for suitable evaluation for irrigation purposed based on the standard physical and

chemical characteristics and their symbols used as follows: topography (t), wetness (W), soil texture(S_1), soil depth (S_2), $CaCO_3$(S_3), gypsum (S_4) and salinity and sodicity (n).

The irrigation suitability index (Ci) is calculated as follows:

$$Ci = \frac{t \times W}{100} \times \frac{S_1}{100} \times \frac{S^2}{100} \times \frac{S_3}{100} \times \frac{S_4}{100} \times \frac{n}{100}$$

The orders and classes as follows:

Order S: suitable for irrigation (Ci is more than 25).
Classes S_1: Ci is more than 75
S_2: Ci is between 50 and 75
S_3: Ci is between 25 and 50
Order N : not suitable for irrigation (Ci is less than 25)
Classes N_1: with limitation which can be corrected
N_2: with limitation which can be not corrected

RESULTS AND DISCUSSION

Soil characteristics

Table (2) shows some physical and chemical characteristies of the studied soil profiles. Soil reaction (pH) in the studied soil profiles ranged from slightly alkaline (pH=7.6) to strongly alkaline (pH=8.5). the lowest value was associated with the subsurface layer of profile 3 in the old deltaic plain. The greatest values were detected in the deepest layers of profiles 8 and 9 in the inland dunes.

Soil salinity (EC) displayed great variation in its contents, where EC values ranged widely from 0.4 to 17.1 dSm^{-1} EC values tend to decrease downward in most of soil profiles except for profiles Nos 5 and 6 that tend to increase downward, while profiles Nos. 3,7 and 8 did not show any specific pattern with depth.

CEC values ranged from 5.1 to 45.5 C mole kg^{-1} , the lowest value was detected in the deepest layers of profile 2 in the old deltaic plain soils, while the highest values was recorded in the subsurface layer of profile 5 representing the soils of fluvio marine plain.

The particle size distribution indicates the wide variation of soil texture within the studied area through certain trends can be depicted. The soils of young deltaic plain and fluvio marine plain are generally clay since the soils consist of heavier in texture as they are intermixed

with the alluvial deposits of the Nile. Going westward, the soils show coarser texture as a result of Aeolian sand particles ranging from sand to sandy clay loam.

Organic matter content was very low, it ranged between 0.2 and 2.9%. The low content of organic matter may be attributed to high temperature and moisture deficiency.

$CaCO_3$ content varies from 1.2 to 22.4% in the studied soil profiles. The lowest value was detected in the deepest layer of profile 4(old deltaic plain), while the highest value was associated with the deepest layer of profile 7 (alluvial deposits of desert wadi).

Gypsum content was externally low, being in the range 0.1 to 5.7%. The highest value was detected in the 20-80cm layer of profile 3 (old deltaic plain), whereas the lowest value was found in the subsurface layer of profile 9 (inland dunes).

Table (2) : physo-chemical properties of the studied soil profiles.

Phiso-graphic unit	Profile No.	Depth (cm)	pH	EC (dS/m)	CEC C mole kg^{-1}	Particle size distribution %				Texture	O.M %	$CaCO_3$ %	Gypsum %
						C. sand	F. sand	Silt	Clay				
Young deltaic plain	1	0-30	7.7	6.6	32.5	2.9	12.5	29.8	45.8	Clay	2.9	5.2	0.5
		30-50	7.8	4.1	36.3	1.4	12.1	30.1	56.4	Clay	1.7	5.6	0.5
		50-85	7.8	4.3	36.1	1.1	15.4	26.6	56.9	Clay	0.3	4.3	0.4
		85-150	7.8	4.5	35.2	1.3	11.5	34.3	52.9	Clay	0.5	4.7	1.4
Old deltaic plain	2	0-35	7.9	1.1	6.9	61.1	25.4	2.5	10.9	LS	0.3	5.2	1.2
		35-65	8.2	0.7	5.1	50.1	42.4	2.4	7.2	S	0.4	5.2	0.9
		65-140	8.1	0.7	5.1	57.9	33.6	1.9	6.5	S	0.5	4.3	0.7
	3	0-20	7.7	6.9	8.5	44.4	36.1	6.9	12.5	LS	0.5	5.2	0.8
		20-80	7.6	17.1	7.3	80.2	8.7	2.9	8.1	S	0.2	5.1	5.7
		80-150	8.3	13.1	9.8	30.4	46.2	7.4	16.1	LS	0.2	4.3	0.1
	4	0-30	7.8	3.4	8.7	42.4	40.4	3.2	13.9	LS	0.3	5.5	0.7
		30-80	8.1	3.2	6.5	62.1	26.6	3.8	7.5	S	0.3	5.5	0.6
		80-150	7.9	1.9	8.5	48.8	34.7	5.6	11.1	LS	0.3	1.2	0.9
Fluvio marine plain	5	0-35	7.8	3.2	43.1	6.7	10.9	16.1	66.2	Clay	2.1	10.7	0.7
		35-75	8.2	4.7	45.5	7.9	10.1	12.5	69.7	Clay	1.1	5.1	0.7
		75-150	8.0	8.7	44.2	3.7	6.6	14.4	75.3	Clay	0.5	9.2	2.3
	6	0-25	8.0	2.5	33.9	17.4	24.4	11.3	46.9	Clay	2.5	15.4	2.6
		25-80	7.9	2.6	32.5	15.3	27.7	10.8	46.2	Clay	0.9	15.4	2.1
		80-150	7.9	2.6	30.8	15.8	27.5	15.2	41.5	Clay	0.5	13.2	0.5
Alluvial deposits desert wadi	7	0-30	7.9	5.5	15.3	41.8	28.7	8.4	21.1	SCl	0.9	13.9	0.9
		30-70	7.8	7.4	16.5	23.9	40.1	10.9	25.2	SCL	0.7	19.1	1.6
		70-150	7.9	5.1	14.3	37.3	35.5	11.2	16.1	SCL	0.5	22.4	0.8
Inland dunes	8	0-35	7.8	0.4	14.9	38.4	35.5	4.8	21.4	SCL	0.7	7.9	0.8
		35-75	8.2	0.9	13.6	42.7	36.1	5.3	16.1	SCL	0.4	9.2	0.8
		75-150	8.5	0.5	9.1	42.9	38.6	5.5	13.1	LS	0.3	9.2	0.7
	9	0-35	7.7	1.2	5.5	44.9	45.6	2.1	7.5	S	0.5	4.3	1.0
		35-85	8.3	0.6	5.7	56.9	32.4	1.2	9.9	S	0.5	5.2	0.1
		85-150	8.5	0.6	5.3	55.8	34.7	2.4	7.2	S	0.3	5.2	0.6
	10	0-30	7.6	5.8	7.6	52.4	35.3	1.2	11.1	LS	0.5	5.2	0.5
		30-70	8.3	1.2	5.1	54.2	34.8	4.4	6.7	S	0.3	4.3	0.5
		70-150	8.2	0.5	5.2	54.8	35.6	1.9	7.7	S	0.2	4.7	0.5

S=sand C= clay LS= loamy sand SCL = sandy clay loam

Soil Taxonomy

Soil were classified according to the Taxonomy system (USDA, 1975), taking accurent of modifications by USDA(2010). The main criteria in soil taxonomy were:

1- Presence of absence of the diagnostic horizons and other characteristics (i.e., depth to lithic or paralithic content and mottling).
2- Soil texture.
3- Soil moisture and temperature regimes.
4- Characteristics such as particle size distribution, soil mineralogy and soil depth of the profile control section.

On the basis of morphological characteristics, physical and chemical analyses, the examined soils were classified to the family level. Classification 5 to the order level indicates identification of the three following order: *Vertisols, Aridisol* and *Entisols* (Table 3)

Table (3): Soil classification of the studied soil profile (according to Taxonomy 2010)

Order	Sub order	Great group	Sub-great group	Family	Profile No.
Vertisols	Aquerts	Endoaquerts	Typic Endoaquerts	Very fine, mntmorillontic, thermic	2
	Torrerts	Haplotorrerts	Typic Haplotorrerts	fine, mntmorillontic, thermic	1
Aridisols	Calcide	Halocalcids	Aquic Haplocaleids	Clayey, mixed, thermic	3
			Typic Haplocaliciids	Fine loamy, mixed, thermic	4
Entisols	Psamments	Torripsamments	Typic Torripsmments	Mixed, thermic	6,7 and
	Orthents	Torriothents	Typic Torriorthents	Coarse loamy, mixed, thermic	8
				Sandy, mixed, thermic	5
					9 and 10

1- Vertisols

Vertisols are mineral soils that have a mesic, isomesic or warmer soil temperature regime, that do not have Lithic or parlthic contact , have 30 percent or more clay in all horizons down to a depth of 50 cm or more and at some period (in most year) have cracks that are open to subsurface or to the base of a plough layer or surface crust).
These Vertisols were categorized to the family level as follows:

Typic Endoaquerts, very fine montomorillonitic, thermic (profile 2).

These Endoaquerts are the wet Vertisols. They have aquic conditions at or near the surface for extended periods during the year,

but they are alls dry for periods long enough in normal years for cracks to open, and do not have salic or calcic horizons, duripan within 100 cm of the soil surface, do not have an electrical conductivity of the saturation extract below 4.0 dSm^{-1} and do not have a deusic, lithic or paralthic contact.

Typic Haplotorrerts, fine montomorillonitic. **Thermic (profile 1)**

Torrerts are the soils which if not irrigated during the year, have cracks in 6 or more of 10 years that are 5 mm or more wide, through a thickness of 25 cm or more within 50 Cm of the mineral soil surface, for 90/ or more cumulative days per year, at a period when the soil temperature at a depth of 50 cm is continuously higher than 8 ˚C , do not have salic, gypsic and calecic or petrocalcic horizons and do not have a layer 25 cm or more thick that contains less than 27 percent clay in its fine-earth fraction and has its upper boundary within 100 cm of the soil surface.

2- Order "Aridisols"

These soils were developed under the aridic moisture regime and hyperthermic temperature regime. The include one or more of the diagnostic horizons as salic, petrogypsic, gypsic and calcic. These Aridisols were categorized to the family level as follows:

***-Aquic Haplocalcids, clayey, mixed, thermic (profile3)**

These soils have a calcic horizon within 100 cm of the surface and calcareous in all parts above the calcic horizon after the upper soil to a depth of 18 cm has been mixed unless the texture is as coarser than loamy sand; have aquic conditions for some time in normal year in one or more layers within 100 Cm of the soil surface and saturated within water in one or more layers within 100 Cm of the soil surface for 1month or more in normal years.

***Typic Haplocalcids, fine loamy, mixed, thermic (profile 4)**

These soils do not have a lithic contact within 50 cm of the soil surface, dry in all parts of the moisture control section for threefuther or more of the time, and have calcic horizon.

3- Order "Entisols"

Entisols are characterized by a mineral natural and they have no rvidence of development of pedologenic horizons, the diagnostic

horizons are absent. These characteristics qualify them to be classified into two sub order Psamments and Orthents.

Sub order Psamments are Entisols that have less than 35 percent rock fragments and texture of loamy fine sand or coarse in all layers within a control section for the familyparticle size class and that have atorric moisture regime.

For the family level, they are distinguished into the following:

*-Typic Torripasmments, mixed, thermic (profiles 6, 7 and 8)

*Sub order :Orthents"

Entisols that have loamy or sandy clay loam texture classes, low organic matter content, no lithic or partithic contact with 50 cm of the surface and atorric moisture regime. Thus they are placed in the sub order "Orthents". Great group Torriorthents and sub group Typic Torriorthents.

For the family level, they are distinguished into the following:

*Typic Torriorthents, coarse loamy, mixed, thermic(profile5)

*Typic Torriorthents, sandy, mixed, thermic (profiles 9 and 10).

Land evaluation

Land capability classification

Land capability is one of a number of interpretive groupings made primarily for agricultural purposes. The prime aim of the system is to asses the degree of limitation to land use or potentially imposed by land characteristics on the basis of permanent properties. In this respect, many systems have been suggested to evaluate the agricultural limitations affecting land capability under the prevailing conditions. All systems aim at gaining a better knowledge and of the soil properties and defining limitations affecting the agricultural potentials of soils.

Capability index for the studied soil profiles is presented in Table (4), the results reveal that the studied soil profiles are placed in grade (II) and grade (III)

Table (4): Land capability classification of the studied soil profiles.

Geomor-phic units	Profile No.	Irrigation water	Texture grad	Profile depth	Watness	Salinity dSm^{-1}	Sodicity %	$CaCO_3$ %	Gypsum %	Slop %	Erosin index	Capability index	Grade symbol	Indication
Young deltaic plain	1	100	100	100	100	93.2	90.2	96.6	95.0	100	100	77.1	II	Good
Old deltaic plain	2	100	79.4	100	100	100	81.9	95.9	95	100	100	59.3	III	Fair
	3	100	81.0	100	100	58.3	80.2	99.1	97.3	95	100	34.7	III	Fair
	4	100	79.5	100	100	100	79.3	100	95	100	100	59.9	III	Fair
Fluvio marine plain	5	100	100	100	100	94.6	80.1	90.1	95	100	100	64.9	II	Good
	6	100	100	100	100	100	74.7	85.2	95	100	100	60.4	II	Good
Alluvial deposits of desert wadi	7	100	100	100	100	91.9	93.5	79.1	95	100	100	64.6	II	Good
Inland dunes	8	100	98.5	100	100	100	80.8	92.5	95	100	100	69.9	II	Good
	9	100	65.0	100	100	100	76.6	97.2	95	100	100	45.9	I	Fair
	10	100	78.5	100	100	96.5	79.3	98.3	95	100	100	56.1	V	Fair

Soils of grade II

The soils of this grade are represented by five profiles as follows. Profile 1(Young deltaic plain), profiles 5 and 6 (fluvio marine plain) profile 7(Alluvial and deposits of desert wadi) and profile 8 (Inland dunes). These soils have moderate limitations which are different in kind and degree. In general, for major limitations are recognized: texture, salinity and alkalinity, sodicity and calcarersness.

Soils of grade (III)

The soils of this grade are represented by five profiles as follows: profiles 2, 3 and 4 (old deltaic plain) and profiles 9 and 10 (inland dunes). These soils are affected by moderate to severe limitation including limitation of sodicity with minor limitations a texture and calcareousesness.

Land suitability classification

Land suitability classification was done according the Sys system (Sys et al., 1991). Assessment is that in the light of the following crops and for capability grades II and III (Table 5).

The studied crops are

1- Field crops: Alfalfa, barley, cotton, groundnut, onion and wheat
2- Vegetables: Carrots, beans, green pepper, tomato, potatoes and green peas.
3- Fruit trees: citrus, guava, mango and olives

Suitability indexes were calculated and the essential crop requirements have been considered.

The young deltaic plain (profile 1)

Very suitable (S_1): for alfalfa, barley, cotton, wheat, potato and olives.
Moderately suitable (S_2): for green pepper, tomato, and peas.
Marginally suitable (S_3): for groundnut, onion, carrots, citrus, guava and mango
Non suitable (N): for beans.

The old deltaic plain (profiles 2, 3 and 4)

Very suitable (S_1): for carrots and olives (profile 2); olives (profile 3) and olives (profile 4)

Moderately suitable (S_2): for alfalfa, cotton and peas (profile2); alfalfa, cotton and potato (profile 4).

Marginally suitable (S_3): for barley, groundnut, onion, wheat, green pepper, tomato, potato, guava and mango (profile 2); alfalfa, barley and cotton (profile 3); barley, onion, wheat, carrots, green pepper, tomato and mango (profile 4)

Non suitable (N): for beans and citrus (profile 2); groundnut, onion, wheat, carrots, beans, green pepper, tomato, potato, peas, citrus; guava and mango(profile 3); groundnut, beans, peas, citrus and guava (profile 4).

The fluvio marine plain (profiles 5 and 6)

Very suitable (S_1):for barley, cotton and olives (profile 5); alfalfa, barley, cotton and olives (profile 6) .

Moderately suitable (S_2): for alfalfa, wheat, tomato and potato (profile5); wheat and potato (profile 6).

Marginally suitable (S_3): for onion, green pepper, peas and mango (profile 5); onion and tomato (profile 6).

Non suitable (N): for groundnut, carrots, beans, citrus and guava (profile 5); groundnut, carrots, beans, green pepper, peas, citrus; guava and mango(profile 6).

Alluvial deposits of desert wadi (profile 7)

Very suitable (S_1):for barley, cotton, and olives.

Moderately suitable (S_2): for alfalfa and wheat

Marginally suitable (S_3): for groundnut, onion, green pepper, tomato, potato, peas and mango

Non suitable (N): for carrots, beans, citrus and guava .

The inland dunes (profiles 8, 9 and 10)

Very suitable (S_1):for alfalfa, barley, cotton, potato and olives(profile 8); olives (profile 9); barley and olives (profile 10).

Moderately suitable (S_2): for alfalfa and cotton (profile 9); alfalfa, cotton and potato (profile 10).

Marginally suitable (S_3): for groundnut, onion, wheat, carrots, green pepper, tomato, peas, and guava (profile 8); onion, wheat, green

pepper, tomato and potato (profile 9); onion, wheat, carrots, green pepper, tomato, peas and mango (profile 10).

Non suitable (N): for beans, citrus and mango(profile 8); barley, groundnut, carrots, beans, peas, citrus, guava and mango(profile 9); groundnut, beans, citrus and guava (profile 10)..

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تصنيف وتقييم بعض الاراضى الواقعة غرب دلتا النيل- مصر

أسامة صادق جندى – ابراهيم عبد المنعم حجاب- نادية عبد العظيم محمد
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اختير عدد عشرة قطاعات أرضية لتمثل بعض أراضى الوحدات الجيومورفولوجية الرئسية فى غرب دلتا نهر النيل بغرض دراسة الخواص الطبيعية والكيميائية لهذه الاراضى واجريت عملية التقسيم لهذه الاراضى باستخدام الSoil Taxonomy 2010 وكذلك تقدير القدرة الانتاجية لهذه الاراضى واختيار مدى ملائمتها للزراعه بصفه عامة ولنمو بعض المحاصيل بصفة خاصة.

وطبقا لنظام التقسيم فان الاراضى تحت الدراسة تنتمى الى ثلاثه رتب اساسية هى Vertisols, Aridisols and Entisols وتحت الرتب الخمسة التالية Aquerts, Torrerts, Calcids, Psamments and Orthents وقد تدرج التقسيم حتى مستوى العائلات (7 عائلات)

وتوضح نتائج ادله ملائمه الاراضى الحالية فى مختلف الوحدات الجيومورفولوجية الى انتمائها الى رتبتى متوسطة الصلاحية (S_2) وهامشبة الصلاحية (S_3)حيث تعانى هذه الاراضى من بعض المحددات الارضية والتى تشتمل على القوام والملوحة والقلوية والجير ولكن بدرجات شده مختلفة.

وباجراء توافق بين تقييم الكمية المتحصل عليها من ادلة تقييم التربة وتلك الخاصة باحتياجات بعض المحاصيل المحددة فان نتائج مدى ملائمة التربة وبعض المحاصيل المختارة (16 محصول) حيث قدمت هذه الموائمات بين اراضى الوحدات الجيومورفولوجية تحت الدراسة والمحاصيل المختارة فى صورة جداول لتكون دليلا للاستخدام الامثل لاراضى منطقة الدراسة. فقد وجد أن التربة بظروفها الحالية تحتوى على الدرجات المختلفة للصلاحيه لهذ المحاصيل وهى:

1- جيدة الصلاحية (S_1) 2- متوسطة الصلاحية (S_2)
3- هامشية الصلاحية (S_3) 4- عديمة الصلاحية (N)