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Land Suitability Scale in Terms of Actual and Potential Suitability and its Application for the Recently Reclaimed Area, Egypt

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IT was essentially to create a new scale for land suitability compatible with the local conditions. Thus, 82 crop select according to the environmental conditions in Egypt such as soil types, climate and other conditions.

The new system suggests calculation of land suitability considering twenty Factors affecting crops selection grouping into five catigories.
1. From crop (agronomic) pointview.
2. From management pointview.
3. From land development pointview.
4. From environement pointview .
5. From socio – economic pointview.

Each factor is sum by each other to calculate the total points. The highest rating for each factor indicates the highest preference for the evaluated crop. The highest rated crops for each group are those with the highest points for the actual suitability.

This study was carried out to evaluate the efficiency of using the new land suitability scale in the recently reclaimed regions as follows;

" El- Bustan Extention – North of Metobes- South of port said, Wadi Sayaada- El- Sir & El – Quarir, maryout and Toschky projects"

Moreover, 35 representative soil profiles were examined and soil samples were subjected to some physical and chemical analysis.

Besides, actual and potential suitability calculated by using the newland suitability scale. Finally, the obtained results confirmed the applicability of the new land suitability system to recommend the most promising crop rotation can be applied in the studied areas.

Keywords: Soil parameters, Land evaluation, New land suitability criteria, Recent reclaimed areas.

Suitability evaluation involves relating land mapping units to specific use considered are limited to those which appear to be relevant under gen conditions prevailing in an area. These kinds of land use serve as the consist of major kinds of land use or utilization types.

According to Beek & Benmma (1972), the land quality is a complex attribute of land which acts in a district manner in its influence on the suitability of land for the specific kind of use. Land qualities may be expressed in a positive or negative way. Examples are moisture availability, erosion, resistance, Flooding hazard nutritive value of pastures. Accessibility where data are available, aggegate land qualities may also be employed, *e.g.*, crop yields, mean annual increments of timber species. Land qulaities can sometimes be estimated or measured direcily, but are frequnly described by means of land characteristics. Qualities or characteristics employed to determine limits of land suitability classes or subclasses are known as diagnostic criteria.

FAO (1976), mentioned that the framework of the land suitability structure was classified as orders, calsses, sub-calsses and units which described as the following:

Land suitability orders:	Reflecting kinds of suitability
Land suitability classes	Reflecting degree of suitability within orders
Land suitability subclasses	Reflecting kinds of limitation or main kinds of imporvements measures required, within classes
Land suitability units:	Reflecting minor differences in required management within subclasses.

Abdel Rahman (1989) concluded that the most effective soil parameters that influences the suitability classification in his studied area of the Western Desert of Egypt are:
Soil texture, soil depth and salinity status

Other internal land qulaities as availability of oxygen and water (drainage conditions), nutrients status, resistance to structural degradation and alkalinity are independent characteristics which found to be of minor influece on land suitability under these conditions.

According to Siderius (1989), moisture availability to plants is a land quality that is relevant in a wide variety of circumstances. It can apply to arable cropping, animal productivity (via its influence on growth of pastures) and forest production. It can affect both productivity, *e.g.*, crop yields and inputs, *e.g.*, mulching measures necessary, or amounts of irrigation water required. Among the land characteristics which affect the moisture availability are: amount of rainfall, its seasonal distribution and variability; potential evapotranspiration. and hence the characteristics which themselves affect it (temperature, humidity, wind speed..., etc.) and available water capacity of the soil and the characteristics which affect it – effective soil depth (depth to which roots penetrate) and field capacity and wilting point of each soil horizon, the latter being in turn influenced by texture, organic matter content ..., etc.

Material and Methods

- 82 Crop select according to the environmental conditions in Egypt, such as soil types, climate and other conditions.
- The system suggest calculation of land suitability considering twenty factors affecting crop selection, as follows:

I- From crop (agrnomic point view) (AP_{ind})

1. Growing period ®, after Cocheme & Franquin (1967).
2. Soil type adaptability (A), after Sys & Riquire, (1980).
3. Soil salinity adaptability (B), after Bernstein (1964&1965).
4. Soil Alkalinity tolerance (C), After Crescimanno *et al.* (1995).
5. Effective depth of soil (D), after Eavis & Payne (1968).
6. Gravel content % (E), after Christain & Stewart (1968)
7. Slope % (F), after FAO, (1990).
8. Water requirement (I), after FAO (1977).
9. Water quality limitation (S), after FAO (1985).
10. Nutritional requirement (NPK) (T), after FAO (1980).

II- From management point view (Mp_{ind})

11- Machanisability (O) after Yang (1965).

III – From Land development point view (Dp_{ind})

12. Water use efficiency (J), after Carruthers & Clark (1981)

IV- From environement point view (EP_{ind}):

13. Long term wind erosion hazard (G), after Gary (1988).

V- From Socio – economic point view (Sp_{ind})

14. Crop Economy (H), after J.A.P.M.S (2005).
15. Local Demand (K), after J.A.P.M.S (2005).
16. Possibility of Export (L), after J.A.P.M.S (2005).
17. Agro Industrial Potential (M), after J.A.P.M.S (2005).
18. By Product usable (N), after J.A.P.M.S (2005).
19. Labour demand (P), after J.A.P.M.S (2005).
20. Experience and tradition (Q), after J.A.P.M.S (2005).

The decision tree of the suggested land suitability criteria shown in Table 1. Each Factor in rated on a scale from (0-3).

The acutial rate of each factor is sum by each other to calculate the total points

Total Points = $\sum Ap_{ind} + \sum Mp_{ind} + \sum Dp_{ind} + \sum Ep_{ind} + \sum SP_{ind}$

The highest rating for each factor indicates the highest suitability and preference for the evaluated crop.

The highest rated crops for each group are those with the high points for the actual suitability as show in Table 2 .

TABLE 1. Decision tree of the suggested land suitability criteria.

A) Soil type adaptability	B) Soil salinity (EC)
3→ Highly suitable for crops. 2 → Suitable for crops 1→ Fairly suitable for crops. 0→ Not suitable for crops.	3→ species with high tolerance (8-16) dS/m. 2→ species with mod. Tolerance (4-8) dS/m. 1→ species slightly tolerance (<4) dS/m 0→ very high conc. of salts.
c) soil alkaline (ESP)%	**D) effective depth in CM:**
3→ species with high tolerance (20-40%) 2→ species with mod. tolerance (15-20%) 1→ species with slightly tolerance (<15%) 0→ very high ESP %	3→ species need high effective depth >150 cm 2→ species need mod. effective depth 90-150 cm 1→ species need low effective depth <90 cm 0→ very limited effective soil depth by hard pan or water table level.
E) Gravel content %	**F) Slope %**
3 → species grow with high percent (25-40%) 2→ species grow with mod. percent (10-25%) 1→ species grow with low percent (<10) 0→ very high percentage of gravel >40%	3→ species grow without leveling (>15%) 2→ species grow with slightly leveling (6-15) % 1→ species grow in flat area (2-6%). 0→ Not suitable slope (>25%).
G) Tolerance of crops wind erosion (Wind speed m/s)	**H) Crop Economy (profitability per LE)**
3 → species with high tolerance (6-8m/s) 2→ species with mod. Tolerance (4-6) m/s) 1→ species with slightly tolerance (<4m/s) 0→ very high wind speed (>8m/s)	3 → crops with groos margin (>6000 LE) 2→ crops with gross margin (3000-6000 LE) 1→ crops with gross margin (1000-3000 LE) 0→ crops with gross margin (<1000 LE).
I) Water requirement (ETC):	**J) Water use efficiency**
3 → for crops with (ETC) of 300 mm 2→ for crops with (ETC) of of (300-600 mm) 1→ for crops with (ETC) of (600-1200mm) 0→ for crops with (ETC) of (>1200mm)	3 → for drip irrigation system 2→ for sprinkle irrigation system 1→ for furrow irrigation system 0→ for surface irrigation system.
K) Local demand :	**L) Possibility of Export**
3 → local demand is very high 2→ moderate local demand 1→ poor or limited demand 0→ no demand	3 → high demand in Foreign marke 2→ moderately exportable 1→ limited possibility for export 0→ not for export
M) Agro – industrial potential	**N) By – product usable:**
3 → processing in necessary 2→ processing is probably required 1→ possibility of processing is limited 0→ no processing is required	3 → highly valuable by – product 2→ moderate demand by – product 1→ slightly demand by – product 0→ no – by products or ecomically usable
O) Machanisability	**P) labour demand (Man / day/fedd)**
3 → crop can be full mechanized 2→ crop can be partly mechanized 1→ mechanization potential limited 0→ no mecharization potentiality	3 → low demand (15 man/day/fedd) 2→ mod. Demand (15-25 man/ day/ fedd) 1→ high demand (25-35 man / day / fedd) 0→ V. high demand (>35 man/ day / fedd)
Q) Experience and tradition	**R) Crop life (duration per month)**
3 → highly recommended crops 2→ moderately recommended crops. 1→ poorly recommended crops 0→ not recommended crops	3 → crop life ranges between (1-4) month 2→ croplife ranges between (4-8) month 1→ crop life ranges between (8-12) month
S) Water quality limitation (EC)	**T) Nutritional requirement (NPK)**
3 → crops with high tolerance (1000-1500 ppm) 2→ crops with mod. tolerane (500-1000pm) 1→ crops with slightly tolerance (<500ppm) 0→ very high saline water (>1500 ppm)	3 → crops need low input of fertilizers 2→ crop need mod. input of fertilizers 1→ crops need high input of fertilizers 0→ crops need very high input of fertilizers

* all LE values based on 2004 economic prices.

TABLE 2. Structure of the suitability classification .

Order	Categories class	Total points
S, suitable	S1, highly suitable	(50-60)
	S2, Moderately suitable	(30-50)
	S3, Marginally suitable	(20-30)
N, Not suitable	N1, marginally not suitable	<20
	N2, permanently not suitable	Zero

If zero rating exists for permanent factor affecting crop selection, then the total points should be zero.

Potential suitability of the study area depend on land development (Improving) availability such as:

[Land clearing – wind erosion protection – drainage – land grading – physical, chemical, organic aid and amendments - leaching – reclamation period – irrigation engineering].

Field observation and determination results

1- Seven area were selected to represent the main reclamation regions after Shokry (1996) as follows:

- West Delta → El-Bustan Extention .
- Middle Delta → North of Metobes.
- East Delta → South of port said.
- Upper Egypt → Wadi Sayaada
- North Sinai Area → El- Sir & El- Quarir .
- The North Western Coast → Maryout .
- South of the Wadi → Toschky (Fig .1).

2- Thirty-Five profiles representing the different area (5 profiles for each) were described according to the system reported by USDA staff* (1951) and the guidelines for soil profile description (FAO 1990).

3- The representative soil profiles (2, 9, 13, 17, 23, 29&32) were sampled and subjected to the determination of pH, EC of (1:1) extract; soluble cations and anions, cation exchange capacity and exchangeable cations (Richard, 1954). Organic matter was determined according to (Black, 1982). Total carbonates were determined volumetrically (Piper, 1950). Particle size distribution of fine soils determined with pipette method (Kilmer & Alexander, 1949). Dry sieving of sandy soils was carried out according to (Richard, 1954).

4- Actual and potential suitability calculated by using the new land suitability criteria. To evaluate the applicability of the new system in the recently reclaimed areas, Egypt.

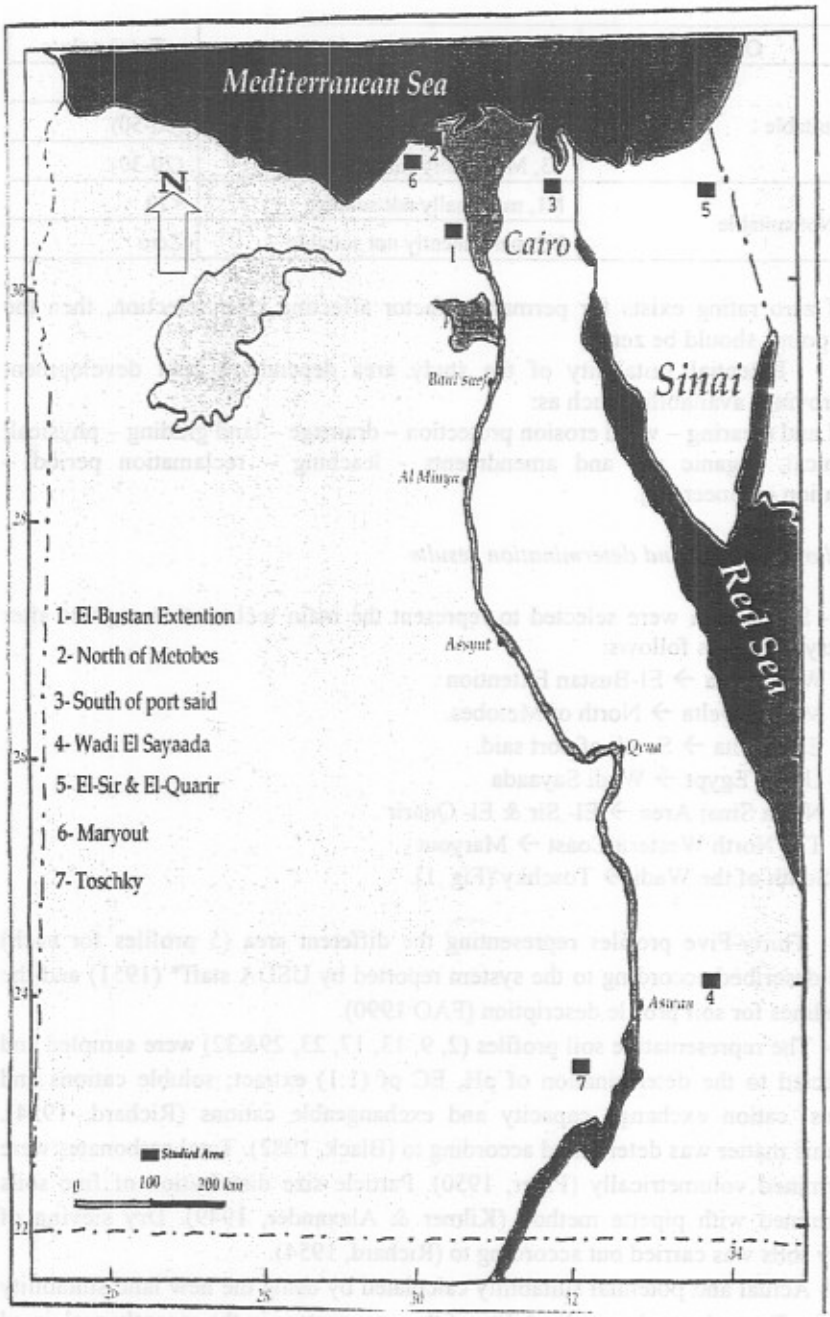

Fig.1. The location of the studied areas.

Results and Discussion

The summary of morphological features of the soils of the studied area as shown in Table 3. Bedises, the main charcteristics of the representation areas as shown in Table 4.

Moreover, total points for actual and potential suitability of the studied areas as shown in Table 5.

Finally, the most recommended crops for each area can be mentioned as follows:

1- El-Busan Extention → (Cowpea – Barley – Graounnut – Sesame - Onions – Green beans – Potato – Balm tree – Olive)
2- North Metobes → " Clover – Barley – Groundnut – Lettuce – Green beans – Lime".
3- South port said → "Clover – Rice – Sunflower – Couregett – Carrot – Spinch".
4- Maryout → " Sudan grass – Barley – Sugar beet – Water melon – Balm tree – Olive"
5- El-sir & El Quarir → " Cowpea – Groundnut – Soybean – Potato - Olive".
6- Wadii – Sayaada → " Sudan grass - Groundnut – Potato – Strawberry – Water melon – Sweet melon"
7- Toschky → Sudan grass – Water melon – Sweet melon – Potato – Spices".

Conclusion

The new land suitability scale showing high applicability for calculate the actual and potential suitability in the recently reclaimed areas, Egypt such as; "West Delta, Middle Delta, East Delta, North Sinia Project, Toschky project and The North Western Coast projects".

And, the author recommend to use this new system to deiced which crop rotation is more promising in the new reclaimed areas.

TABLE 3. Summary of morphological Features of the soils at the studied areas.

Profile No	Area	Slope	Depth in (cm)	Colour		Texture class	Structure	Consistency	Stickiness	Plasticity	Carbonates	Boundary	Cementation	Other Features	Soil taxonomy
				Dry	Moist										
2	El-Bustan Extention	G	0-15	10YR 8/6	10YR 7/8	S	SG	LO	NST	NPL	O	D	O	Shells	ESP
			15-60	10YR 8/4	10YR 6/8	S	SG	LO	NST	NPL	O	D	O	Shells	
			60-130	10YR 8/6	10YR 6/8	S	SG	LO	NST	NPL	O	-	O	Shells	
9	North metobes	F	0-35	10YR 8/6	10YR 6/8	S	SG	LO	NST	NPL	O	G	O	-	ESP
			35-100	10YR 8/4	10YR 7/6	S	SG	LO	NST	NPL	O	G	O	-	
			+100	Water table level.										WT	
13	South port said	F	0-15	10YR 3/1	10YR 4/1	C	MS	SHA	VST	PL	O	C	O	Salts	EQW
			15-50	10YR 3/1	10YR 5/1	C	MS	SHA	VST	PL	SL	-	B	Cutans	
			+50	Water table level										WT	
17	Maryout	G	0-30	10YR 2/3	10YT 2/2	S	SG	HA	ST	SPL	ST	D	D	Shells	DOK
			30-100	10YR 3/3	10YR 2/2	S	SG	HA	ST	SPL	ST	-	D	Lime cons	
			+100	CEMENTED HORIZON (Hardpan)									-	Lime pans	

TABLE 3. Contd .

23	El-Sir&El-Quarir	U	0-30	10YR 7/6	10YR 6/4	S	SG	LO	NST	NPL	O	D	O	-	ESP
			30-90	10YR 7/4	10YR 6/4	S	SG	LO	NST	NPL	O	D	O	-	
			90-140	10YR 7/6	10YR 6/4	S	SG	LO	NST	NPL	O	-	O	-	
29	Wadi sayaada	G	0-30	10YR 6/4	10YR 7/4	S	SG	LO	NST	NPL	SL	D	O	Lime conc	ESP
			30-80	10yr6/4	10YR 7/4	S	SG		NST	NPL	SL	-	B	Lime pans	
			+80	Cemented horizon (hard pan)									-	Lime pans	
32	Toschky	G	0-35	7.5YR 5/6	7.5YR 4/6	S	SG	LO	NST	NPL	O	D	O	M rocks	ESP
			35-85	7.5YR 5/4	7.5YR 4/4	S	SG	LO	NST	NPL	SL	-	B	Lime nodules	
			+85	Strongly cemented horizons									-	Lime pans	

- All abreviation according to FAO (1990). & ISRIC (1991).

*** Texture class:**
S – Sandy
C – Clayley

*** Structure :**
SG – Single grains
MS – Moderate to strong

*** Consistency:**
Lo – Loose
SHA – slightly hard
HA – Hard

*** Stickiness**
NST – nonstick
ST – Sticky
VST – Very sticky

*** Plasticity**
NPL – nonplastic
SPL – Slightly plastic
PL – Plastic

*** Carbonates:**
O – noncalcareous
SL – Slightly calcareous
ST – Strongly calcareous

*** Boundary:**
D – Diffuse
G – Gradual
C - Diffuse

*** Cementation**
O – Nil
B – Broken
D – Discontiuous

*** Soil Taxonomy:**
ESP – Torripsamment
E QW – Hydraquent
DOK - Calciorthid

TABLE 4. The main characteristics of the representative area.

Profile No	Area	Soil * type	Soil ** salinity (EC dS/m)	Soil ** Al.Kalinity (ESP%)	Effective soil depth in (cm)	Gravel * %	Slope %	Wind speed m/s	Water quality (EC (P.P.M)	Natureitn content	Water table levels
2	El-Bustan extention	Sand	0.59	10.1	130	2.7	Gently sloping	4.8	310	Low	>130
		A3	B1	C1	D1	E1	F2	G2	W.Q.1		W1
9	North mctobes	Sand	7.8	17.2	100	1.8	Flat	3.8	430	Low	<100
		A3	B2	C2	D2	E1	F2	G1	W.Q.1		W2
13	South port said	Clayley	30.7	20.5	50	0.6	Flat	4.1	740	Low	<50
		A1	B3	C3	D3	E1	F2	G2	W.Q.2		W3
17	Maryout	Clacareous	21.2	14.0	100	3.6	Gently sloping	5.1	512	Low	+100
		A2	B3	C	D2	E1	F2	G2	W.Q.2		W2
23	El-Sir & El-Quarir	Sand	2.6	13.2	140	2.7	Sloping	7.3	870	V.low	>140
		A3	B1	C1	D1	E1	F3	G3	W.Q.2		W1
29	Wadi sayaada	Sand	3.9	12.4	80	3.1	G. sloping	4.6	276	Low	>80
		A3	B1	C1	D3	E1	F2	G2	W.Q.1		W2
32	Toschky	Sand	2.8	13.8	85	28.7	G. Sloping	5.6	289	V.low	>85
		A3	B1	C1	D3	E3	F2	G3	W.Q.1		W2

* Calculated at the surface layer.
** Calculated till depth 120 cm

TABLE 5. Total points for actual and potential suitability of the studied areas.

No.	Crops	El-Bustan extention				North Metobes				South port said				Maryout				El-Sir&El-Quarir				Wadi Sayaada				Toschky			
		TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2
A-	Fodder crops																												
1-	Amshoutt	O	A	-	O	O	H	-	O	O	H	-	O	O	A	-	O	O	A	-	O	O	A	-	O	O	A	-	O
2-	Alfalfa	O	I	q	37	O	I	q	37	O	I	q	34	O	I	q	35	O	I	q	36	O	I	q	36	O	I		36
3-	Clover	45	G	F,I,w	46	44	B,C,D	d,g,l	45	41	B,C,D	l,g,d	42	43	B,D	l,d	44	43	G,F	w,v	44	36	D2	s	37	35	D,L,E	s	36
4-	Cowpea	46	G	F,I,w	47	41	B,C,D	d,g,l	44	39	B,C,D	l,g,d	40	40	B,D	l,d	41	44	G,F	w,v	45	39	D2	s	40	38	D,L,E	s	39
5-	Chloris gayan	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
6-	Napier grass	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
7-	Mangel	38	G	F,I,w	39	37	B,C,D	d,g,l	39	33	B,C,D	l,g,d	34	34	B	l	35	36	G,F	w,v	37	35	D2	s	36	34	D,L,E	s	35
8-	udan gra	43	G	F,I,w	40	41	B,C,D	d,g,l	43	38	B,C,D	l,g,d	40	39	B	l	42	41	G,F	w,v	42	38	D2	s	39	40	D,L,E	s	O
9-	Sorghym	39	G	F,I,w	40	38	B,C,D	d,g,l	40	35	B,C,D	l,g,d	36	36	B	l	38	37	G,F	w,v	38	37	D2	s	38	33	D,L,E	s	37
10-	Millet	38	G	F,I,w	39	37	B,C,D	D,g,l	38	34	B,C,D	l,g,d	36	35	B	l	36	36	G	w,v	37	36	D2	s	37	35	D,L,E	s	36

TABLE 5. Contd.

B-	Cereal crops																											
11-	Barley	47	G	F,I,w	48	45	B,C,D	d,g,l	47	41	B,C,D	l,g,d	43	43	B	I	44	O	G,F	w,v	45	38	D2	-	39	O	E	-	O
12	Wheat	43	G	F,I,w	45	42	B,C,D	d,g,l	44	39	B,C,D	l,g,d	41	39	B	I	42	O	G,F	w,v	41	36	D2	-	38	O	E	-	O
13	Rice	O	A	-	O	O	A	-	O	44	-	-	44	O	B	I	40	O	A	-	O	O	A	-	O	O	E	-	O
14	Maize	37	G	F,I,w	39	38	B,C,D	d,g,l	39	O	B,C,D	l,g,d	36	O	B	I	37	35	G,F	w,v	36	37	D2	-	37	O	E	-	O
C	Pulse crops																											
15	Broadbeon	41	G	F,I,w	42	41	B,C,D	d,g,l	42	38	B,C,D	l,g,d	40	39	B	I	41	39	G	w,v	40	40	D2	s	41	O	E	-	O
16	Chickpea	41	G	F,I,w	42	41	B,C,D	d,g,l	42	37	B,C,D	l,g,d	39	38	B	I	40	39	G	w,v	40	40	D2	s	41	O	E	-	O
17	Lupin	40	G	F,I,w	41	39	B,C,D	d,g,l	40	34	B,C,D	l,g,d	36	35	B	I	37	O	G	w,v	33	39	D2	s	40	O	E	-	O
18	Lentile	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O

TABLE 5. Contd.

No.	Crops	El-Bustan extention				North Metobes				South port said				Maryout				El-Sir&El-Quarir				Wadi Sayaada				Toschky			
		TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2
19	Fenugreek	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
D	Bit crops																												
20	Cotton	O	A	-	O	O	A	-	O	O	I	-	O	O	A	-	O	O	A	-	O	O	A	-	O	O	A	-	O
21	Flax	43	G	F,I,w	44	40	B,C,D	d,g,l	43	O	D	d	38	38	B	1	40	40	G	w,v	41	41	D2	s	42	O	E	-	O
22	Safflower	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
23	Rapeseed	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
24	Ground no	45	G	F,I,w	46	43	B,C,D	d,g,l	46	O	B,C,D	l,g,d	40	O	B	1	41	43	G	w,v	44	44	D2	s	43	O	E	-	O
25	Sunflower	40	G	F,I,w	41	40	B,C,D	d,g,l	41	37	B,C,D	l,g,d	38	38	B	1	40	O	G,	w,v	39	39	D2	s	40	O	E	-	O
26	Soybeon	41	G	F,I,w	42	40	B,C,D	d,g,l	41	O	B,C,D	l,g,d	39	O	B	1	39	39	G	w,v	40	40	D2	s	41	O	E	-	O
27	Sesome	44	G	f,i,w	45	43	B,C,D	d,g,l	44	36	B,C,D	l,g,d	37	41	B	1	42	O	G	w,v	43	43	D2	s	44	O	E	-	O
28	Castor bean	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
29	Oil lettuce	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O
E-	Other crops																												
30	Sugarbect	39	G	f,i,w	42	40	B,C,D	d,g,l	41	O	D	d	38	38	-	-	42	37	G,F	w,v	39	O	D2	s	37	36	E	-	36
F-	Vegetable																												
31	Tomato	40	G	f,i,w	41	41	B,C,D	d,g,l	41	O	B,C,D	l,g,d	38	O	B	1	39	O	G,F	w,v	38	39	D2	s	40	O	E	-	O
32	Cucumber	41	G	f,i,w	42	41	B,C,D	d,g,l	42	O	B,D	l,d	39	39	B	1	43	40	G,F	w,v	38	40	D2	s	41	O	E	-	O
33	Onions	43	G	f,i,w	44	43	B,C,D	d,g,l	44	O	B,D	l,d	40	O	B	1	42	42	G,F	w,v	43	42	D2	s	43	O	E	-	O
34	Water melon	43	G	f,i,w	44	42	B,C,D	d,g,l	44	O	D	d	40	41	B	1	43	40	G,F	w,v	41	44	D2	s	45	40	E	-	40
35	Sweet melon	40	G	f,i,w	41	39	B,C,D	d,g,l	40	O	D	d	37	38	B	1	39	39	G,F	w,v	40	43	D2	s	44	37	E	-	37
36	Sweet pepper	41	G	f,i,w	42	40	B,C,D	d,g,l	41	O	C,D	g,d	38	38	B	1	41	O	G,F	w,v	40	40	D2	s	41	O	E	-	O
37	Green peas	45	G	f,i,w	46	42	B,C,D	d,g,l	43	O	B,C,D	l,g,d	40	41	B	1	42	O	G,F	w,v	42	44	D2	s	45	41	E	-	O

TABLE 5. Contd.

No.	Crops	El-Bustan extention				North Metobes				South port said				Maryout				El-Sir&El-Quarir				Wadi Sayaada				Toschky			
		TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2
38	Green beans	43	G	f,i,w	44	42	B,C,D	d,g,l	43	35	B,C,D	l,g,d	38	40	B	l	41	42	G,F	w,v	43	42	D2	s	43	O	E	-	O
39	Couregett	40	G	f,i,w	41	40	B,C,D	d,g,l	41	35	B,C,D	l,g,d	38	39	B	l	40	O	G,F	w,v	40	39	D2	s	40	O	E	-	O
40	Carrot	41	G	f,i,w	42	41	B,C,D	d,g,l	42	37	B,C,D	l,g,d	38	38	B	l	39	O	G,F	w,v	41	40	D2	s	41	O	E	-	O
41	Cabbage	35	G	f,i,w	36	35	B,C,D	d,g,l	36	O	B,D	l,d	34	O	B	l	36	34	G,F	w,v	35	34	D2	s	35	33	E	-	O
42	Cauliflower	36	G	f,i,w	37	36	B,C,D	d,g,l	37	O	C,D	g,d	34	34	B	l	36	O	G,F	w,v	36	35	D2	s	36	O	E	-	O
43	Artichoke	36	G	f,i,w	37	30	B,C,D	d,g,l	34	O	C,D	g,d	30	31	B	l	32	35	G,F	w,v	36	35	D2	s	36	O	E	-	O
44	Garlic	40	G	f,i,w	41	40	B,C,D	d,g,l	41	37	B,C,D	l,g,d	39	38	B	l	40	39	G,F	w,v	40	39	D2	s	40	O	E	-	O
45	Potato	43	G	f,i,w	44	41	B,C,D	d,g,l	44	O	B,D	l,d	37	O	B	l	38	42	G,F	w,v	43	42	D2	s	43	40	E	-	40
46	Sweet potato	O	I	q	41	O	I		39	O	I	I	36	O	I	q	37	O	I		40	39	D2	s	40	37	E	-	37
47	Okra	38	G	f,i,w	39	37	B,C,D	d,g,l	38	33	B,C,D	l,g,d	35	34	B	l	36	36	G,F	w,v	38	37	D2	s	38	O	E	-	O
48	Chillipepper	33	G	f,i,w	35	33	B,C,D	d,g,l	34	29	B,C,D	l,g,d	31	31	B	l	32	32	G,F	w,v	33	32	D2	s	33	O	E	-	O
49	Lettuce	37	G	f,i,w	39	38	B,C,D	d,g,l	39	O	B,D	l,d	36	O	B	l	38	O	G,F	w,v	37	36	D2	s	37	O	E	-	O
50	Dasheen	O	A	-	O	O	A	-	O	O	I	q	30	O	A	-	O	O	A	-	O	O	A	-	O	O	A	-	O
51	Eggplant	33	G	f,i,w	34	32	B,C,D	d,g,l	33	28	B,C,D	l,g,d	29	30	B	l	31	O	G,F	w,v	33	32	D2	s	33	30	E		O
52	Molokhia	`37	G	f,i,w	38	36	B,C,D	d,g,l	38	O	C,D	zg,d	33	34	B	l	35	O	G,F	w,v	36	36	D2	s	37	O	E	-	O

TABLE 5. Contd.

53	Celeray	35	G	f,i,w	37	34	B,C,D	d,g,l	37	31	B,D	l,d	30	31	B	l	32	O	G,F	w,v	35	31	D2	s	32	O	E	-	O
54	Spinash	37	G	f,i,w	38	35	B,C,D	d,g,l	35	O	B,D	l,d	32	O	B	l	33	O	G,F	w,v	37	36	D2	s	37	O	E	-	O
55	Radish	35	G	f,i,w	36	34	B,C,D	d,g,l	35	O	B,D	l,d	31	O	B	l	32	O	G,F	w,v	35	34	D1	s	35	O	E	-	O
56	Strawberry	41	G	f,i,w	42	39	B,C,D	d,g,l	41	O	B,d	L,d	37	O	B	l	38	O	G,F	w,v	40	40	D1	s	41	38	E	-	38
57	Cumin	37	G	f,i,w	38	36	B,C,D	d,g,l	37	32	D	d	33	33	B	l	35	36	G,F	w,v	37	36	D2	s	37	34	E	-	34
58	Corindre	35	G	f,i,w	36	34	B,C,D	d,g,l	36	O	B,D	l,d	31	O	B	l	32	33	G,F	w,v	35	34	D2	s	35	32	E	-	32
59	Caraway	33	G	f,i,w	34	31	B,C,D	d,g,l	32	O	C,D	g,d	27	28	B	l	29	32	G,F	w,v	33	32	D2	s	33	30	E	30	30
60	Anis	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	-	O	O	H	O	O
61	Mint	38	G	f,i,w	39	36	B,C,D	d,g,l	38	O	C,D	g,d	33	33	B	l	36	36	G,F	w,v	37	37	D2	s	38	35	E	35	35
62	Romet	O	I	q	36	O	I		35	O	C,D	g,d	33	31	B	l	34	O	I		35	O	I	q	35	O	I	34	34

TABLE 5. Contd.

H	Fruit tree																											
63	Apple	39	G	f,i,w	40	38	B,C,D	d,g,l	39	O	B,D	l,d	36	O	B	l	37	38	G,F	w,v	39	O	D2	s	38	O	D2	s	37
64	Apricot	39	G	f,i,w	40	37	B,C,D	d,g,l	40	O	C,D	g,d	37	37	B	l	38	38	G,F	w,v	39	O	D2	s	38	O	D2	s	37
65	Almond	38	G	f,i,w	39	36	B,C,D	d,g,l	38	O	B,C,D	g,l,d	34	O	B	l	35	36	G,F	w,v	38	O	D2	s	37	O	D2	s	36
66	Bananas	31	G	f,i,w	32	30	B,C,D	d,g,l	31	O	D	d	26	27	B	l	28	30	G,W	w,v	32	O	D2	s	30	O	D2	s	29
67	Balm tree	45	G	f,i,w	46	42	B,C,D	d,g,l	44	O	D	d	40	39	B	l	42	33	G,F	w,v	34	O	D2	S	44	O	D2	s	43
68	Fig	38	G	f,i,w	39	37	B,C,D	d,g,l	39	O	C,D	g,d	36	35	B	l	36	37	G,F	w,v	38	O	D2	s	37	O	D2	s	36
69	Guava	42	G	f,i,w	43	40	B,C,D	d,g,l	41	O	C,D	g,d	37	37	B	l	39	40	G,F	w,v	41	O	D2	s	41	O	D2	s	40
70	Grape	40	G	f,i,w	41	38	B,C,D	d,g,l	40	O	D	d	36	37	B	l	38	38	G,F	w,v	39		D2	s	39	O	D2	s	38
71	Lime	40	G	f,i,w	41	39	B,C,D	d,g,l	40	O	D	d	37	O	A	-	O	38	G,F	w,v	40	O	D2	s	39	O	D2	s	38
72	Mango	38	G	f,i,w	39	36	B,C,D	d,g,l	37	O	D	d	33	O	B	-	O	37	G,F	w,v	38	O	D2	s	37	O	D2	s	36
73	Mulbery	34	G	f,i,w	35	33	B,C,D	d,g,l	34	O	D	d	31	O	A	-	O	32	G,F	w,v	34	O	D2	s	33	O	D2	s	32
74	Orange	39	G	f,i,w	40	37	B,C,D	d,g,l	39	O	B,D	l,d	35	O	A	-	O	37	G,F	w,v	38	O	D2	s	38	O	D2	s	37
75	Olive	44	G	f,i,w	45	41	B,C,D	d,g,l	43	O	D	d	40	39	B	l	40	43	G,F	w,v	41	O	D2	s	42	O	D2	s	41
76	Pear	41	G	f,i,w	42	40	B,C,D	d,g,l	41	O	D	d	37	37	B	l	38	40	G,F	w,v	41	O	D2	s	40	O	D2	s	39

TABLE 5. Contd.

Serial No.	Crops	El-Bustan extention				North Metobes				South port said				Maryout				El-Sir&El-Quarir				Wadi Sayaada				Toschky			
		TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2	TP1	LF	LI	TP2
77	Peach	37	G	f,i,w	38	35	B,C,D	d,g,l	37	O	B,D	kl	32	31	B	l	33	35	G,F	w,v	36	O	D2	s	36	O	D2	s	35
78	Pearuss	36	G	f,i,w	37	34	B,C,D	d,g,l	36	O	B,C,D	l,g,d	32	31	B	l	34	35	G,F	w,v	38	O	D2	s	35	O	D2	s	37
79	Tanagarine	39	G	f,i,w	40	38	B,C,D	d,g,l	39	O	D	d	36	O	B	l	37	37	G,F	w,v	34	O	D2	s	38	O	D2	s	33
80	Preakely pea	35	G	f,i,w	36	33	B,C,D	d,g,l	35	O	D	d	32	31	B	l	33	33	G,F	w,v	34	O	D2	s	34	O	D2	s	33
81	Grap fruit	34	G	f,i,w	35	32	B,C,D	d,g,l	34	O	B,D	l,d	30	O	B	l	31	32	G,F	w,v	33	O	D2	s	33	O	D2	s	32
82	Pomegranate	37	G	f,i,w	38	35	B,C,D	d,g,l	36	O	C,D	g,d	32	33	B	l	34	35	G,F	w,v	36	O	D2	s	[illegible]	O	D2	s	35

<u>Code:</u>
TP1 → total points for acutal suitability
LF → limiting factors
LI → land improvement
TP2 → total points for potential suitability

<u>Land innorvements factors</u>
* Drainage → d
* controlled fertilizing system → f
* sub - soiling → s
* gypsum requirement → g
* special method for irrigation → i
* establish windbreaks → w
* Sufficent water → g
* leaching salts → l

<u>Limiting factors</u>
* soil type → A
* soil salinity → B
* soil alkalinity → C
* effective depth → D

Limiting by water table D1

Limiting by hard pan D2
* gravel content % → E
* slope % → F
* wind erosion hazard → G
* Water quality → S
* nutrients availability → T
* Low profit → H
* High water requirement → a

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مقياس للملائمة من وجهة الصلاحية الحالية و الكامنة لأراضى حديثة الاستصلاح – بمصر وتطبيقاته

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كان من الضروري ابتكار نظام جديد لملائمة الأراضي متوافقاً مع الظروف المحلية. لذا اختير ٨٢ محصول تبعاً لظروف البيئة المصرية مثل نوع التربة، المناخ وظروف أخرى.

والنظام الجديد يعمل على حساب صلاحية التربة واضعاً من الاعتبار عشرون عاملا يؤثروا على اختيار المحاصيل يمكن إجمالهم في ٥ مجاميع كما يلي:

١. تبعاً لوجهة النظر المحصولية.
٢. تبعاً لوجهة النظر الخدمية.
٣. تبعاً لوجهة النظر البيئية.
٤. تبعاً لوجهة النظر النوعية.
٥. تبعاً لوجهة النظر الاجتماعية الاقتصادية.

كل عامل يجمع بالأخر لحساب إجمالي النقاط. أعلى درجة لكن عامل توضح أعلى أفضلية لمحصول المقيم. والمحاصيل التي تحصل على أعلى نقاط بالنسبة لأرضى المدروسة هي المحاصيل التي لها الأفضلية الحالية.

وقد تم إجراء هذه الدراسة لتقييم مدى فعالية استخدام نظام الملائمة الجديد في المناطق المستصلحة حديثاً في مصر. ولوصول لذلك الهدف تم اختيار ٧ مناطق تمثل نطاقات الاستصلاح الرئيسية بجمهورية مصر العربية كما يلي:

"منطقة امتداد البستان – شمال مطوبس – جنوب بورسعيد – وادى الصعايدة – السرو والقوارير – مريوط – مشروع توشكى"

وعلى هذا تم حفر ٣٥ قطاع ممثلين وجمعت العينات التي تم إجراء بعض التحاليل الطبيعية والكيميائية عليها وفى النهاية حسبت الملائمة الحالية والكامنة باستخدام النظام الحديث.

فكانت النتائج المتحصل عليها مؤكدة لأهمية التطبيقية لهذا النظام الجديد في التوصية بالدورات الزراعية الواعدة التي يمكن تطبيقها بالمناطق المدروسة.