

Table1. Soil physical, chemical, and biological characteristic for organic farming and conventional cultivation site, Belbes area

Pro. No.	Farming type & Age	Dep. cm	T.S ¹	Silt %	Clay %	Tex ² .	O.M.%	B.D ³	Porosity % ⁴	0.1 bar ⁵	Avail. W ⁶	T.Agg ⁷	MWD ⁸	P.R Mpa ⁹	CEC ¹⁰	Ec dS/m	Total bact. count	I _{bas} ¹¹
Organic farming (Galvina area)																		
1	Annual crops 25 year	0: 25	76.06	3.37	20.57	S.C.L.	2.67	1.44	44.40	33.17	17.50	28.04	0.49	1.50	16.30	2.40	24*10 ⁶	11.03
		25:45	80.38	2.74	16.88	S.L.	0.73	1.53	42.06	24.86	11.05	24.12	0.35	2.11	7.88	2.48	12*10 ⁶	
		45:68	86.01	0.20	13.79	L.S.	0.40	1.59	39.77	20.56	9.51			2.61	7.34	2.03		
		68:120	85.8	1.46	12.74	L.S.	0.14	1.63	38.26	25.69	11.16				7.17	1.78		
		120:150	56.83	6.42	36.75	S.C.	0.16	1.32	50.19	42.18	18.09				33.70	2.03		
2	orchards 25 year	0 : 15	71.65	9.87	18.48	S.L.	2.51	1.41	45.98	27.34	14.79	27.65	0.49	1.999	16.74	8.85	17*10 ⁶	7.48
		15 :50	78.32	8.95	12.73	S.L.	0.61	1.56	40.68	25.24	12.30	27.36	0.43	2.24	8.70	2.81	15*10 ⁶	
		50:110	85.32	4.22	10.46	L.S.	0.95	1.59	39.77	17.44	10.17			3.099	8.42	3.79		
		110:135	88.11	3.25	8.64	S:L.S	0.94	1.59	39.77	16.82	9.32				16.30	2.41		
		135:160	45.57	19.47	34.96	S.C.L	0.98	1.38	48.31	36.58	15.88				35.65	2.33		
Conventional cultivation (Galvina area)																		
3	Annual crops 25 year	0: 20	78.37	8.46	13.18	S.L	2.04	1.49	43.35	24.66	14.19	23.08	0.33	2.44	8.26	3.82	98*10 ⁵	3.91
		20 :70	81.2	4.36	14.44	L.S.	0.60	1.58	39.69	18.07	10.08	14.16	0.26	2.996	9.89	3.13	15*10 ⁶	
		70:135	78.2	6.59	15.21	S.L.	0.29	1.62	38.40	22.70	11.29			2.55	7.17	5.79		
		135:160	63.38	15.61	21.00	S.C.L.	0.52	1.46	44.70	28.78	16.45				10.87	6.23		
Organic farming (El-Adliya area)																		
4	Annual crops 7 tear	0: 15	71.75	11.15	17.10	S.L.	2.04	1.49	43.35	31.88	14.59	25.47	0.34	2.25	11.30	2.50	133*10 ⁵	6.76
		15: 42	73.6	11.69	14.71	S.L.	0.41	1.52	41.31	22.45	10.07	19.11	0.30	3.11	2.61	4.00	149*10 ⁴	
		42: 80	74.14	11.89	13.98	S.L.	0.13	1.52	42.64	26.10	12.19			2.71	3.48	3.22		
		80:130	87.48	4.76	7.76	S:L.S	0.06	1.65	36.54	16.89	7.81				2.61	3.08		
5	orchards 7 years	0 :15	73.4	10.59	16.01	S.L	1.22	1.45	44.23	23.52	12.99	22.59	0.32	2.42	9.78	4.65	113*10 ⁵	6.898
		15: 60	73.65	10.47	15.89	S.L.	0.23	1.5	42.08	22.94	12.97	20.73	0.26	2.56	5.22	1.21	84*10 ⁴	
		60:115	69.4	13.42	17.17	S.L.	0.17	1.52	41.98	17.61	9.98			2.996	5.22	3.08		
6	Annual crops one year	115:140	75.53	10.40	14.07	S.L	0.06	1.65	37.02	21.16	13.34				4.35	2.91		
		0 : 10	76.45	10.88	12.68	S.L	1.04	1.58	40.15	22.78	12.50	22.30	0.22	2.62	8.26	9.42	100*10 ⁵	
		10: 47	79.71	8.30	11.99	S.L	0.39	1.61	39.25	16.55	8.92	13.31	0.14	3.10	5.87	2.73	64*10 ⁴	
		47 :65	74.4	7.49	18.11	S.L	0.09	1.61	39.02	22.35	11.38			2.59	5.87	2.56		
		65 :90	74.9	7.07	18.03	S.L	0.09	1.65	37.50	20.03	10.43			2.84	5.22	3.37		
		90:135	74.00	6.67	19.33	S.L	0.19	1.54	41.89	21.98	10.24				9.13	3.09		

1= total sand 2 = texture 3= bulk density (Mg/m³) 4 = porosity % 5= moisture content at 0.1 bar 6= available water
 7 = total aggregate 8 = mean weight diameter 9= penetration resistance 10 = CEC meq/100 gm soil 11 = Basic infiltration rate (cm/hr.)

Table 2. Soil physical, chemical, and biological characteristic for organic farming and conventional cultivation site, El-Manayef area

Pro. No.	Farming type & Age	Depth cm	T.S % ¹	Silt%	Clay%	Tex. ²	O.M.%	B.D. ³ Mg/m ³	Poro. % ⁴	0.1 bar ⁵	Avai. W. ⁶	T.Agg ⁷	MWD ⁸	P.R Mpa ⁹	CEC ¹⁰	Ec dS/m	Total bact count	I _{bas} ¹¹
Organic farming																		
7	Annual crops 12 year	0: 15	82.88	3.76	13.36	S.L.	2.82	1.49	40.87	26.23	14.18	36.72	0.29	1.37	9.78	7.66	153*10 ⁵	8.44
		15:30	79.45	4.66	15.89	S.L.	3.03	1.45	42.69	25.68	11.68	21.41	0.22	1.09	11.30	2.99	104*10 ⁴	
		30:67	91.19	4.34	4.47	S	0.57	1.76	33.08	15.93	9.70	21.41	0.22	2.54	6.30	2.15		
		67:130	88.4	2.91	8.69	L.S.	1.52	1.65	36.54	18.28	10.20			2.11	8.26	4.88		
8	orchards 12 year	0:15	79.55	4.29	16.16	S.L.	3.09	1.45	42.46	25.23	12.77	33.63	0.28	1.29	9.78	0.99	220*10 ⁵	7.14
		15:35	88.79	1.56	9.65	L.S	1.47	1.68	35.88	22.05	11.13	23.08	0.25	1.84	5.87	0.69	90*10 ⁴	
		35:60	84.98	2.67	12.35	L.S.	0.55	1.64	37.40	22.72	10.28	23.08	0.25	1.62	8.69	0.71		
		60:120	87.62	2.43	9.95	L.S.	0.53	1.74	33.33	17.27	8.49			2.24	7.83	0.60		
Conventional cultivation																		
9	Annual crops	0: 15	88.52	2.47	9.01	L.S	1.79	1.59	38.37	22.14	11.30	30.97	0.25	1.75	7.98	3.84	99*10 ⁵	15.89
		15:38	95.96	0.52	3.52	S	0.52	1.74	33.59	19.49	8.18	21.21	0.23	1.93	2.17	0.85	80*10 ⁴	
		38:70	82.44	3.44	14.12	S.L	0.92	1.7	34.62	20.15	10.48	21.21	0.23	2.04	6.30	2.65		
		70:85	92.32	1.28	6.40	S	1.33	1.68	35.63	15.29	8.07			2.04	5.22	2.68		
		85:135	95.47	0.40	4.13	S	0.61	1.79	32.45	15.12	8.38				2.61	2.87		
10	Orchards	0:15	84.58	4.71	10.71	L.S	1.06	1.59	40.00	21.14	11.02	30.62	0.24	1.86	3.91	0.79	142*10 ⁵	10.51
		15:35	94.96	0.35	4.69	S	0.59	1.66	37.12	17.38	9.21	17.74	0.20	2.24	3.04	0.62	31*10 ⁴	
		35:50	88.92	2.14	8.94	L.S	1.08	1.66	36.64	16.10	9.21	17.74	0.20	2.4	6.30	1.24		
		50:64	88.72	2.56	8.72	L.S	1.56	1.67	36.02	17.40	9.47			2.28	6.74	0.74		
		64:84	90.41	0.99	8.60	S	1.08	1.71	34.23	17.97	8.25			2.10	5.87	1.24		
		84:135	85.78	3.98	10.24	L.S	0.76	1.75	32.95	19.68	10.64			5.22	0.82			

1 = total sand

2 = texture

3 = bulk density (Mg/m³)

4 = porosity %

5 = moisture content at 0.1 bar

6= available water

7 = total aggregate

8 = mean weight diameter

9 = penetration resistance

10 = CEC meq/100 gm soil

11 = Basic infiltration rate (cm/hr.)

Table 3. Soil physical, chemical, and biological characteristic for organic farming and conventional cultivation site, El-Fayoum area

Pro. No.	Farming Type& age	Depth cm	T. S. ¹ %	Silt%	Clay%	Text ²	O.M.%	B.D ³ Mg/m ³	Poro % ⁴	0.1 bar ⁵	Avai W. ⁶	T.Ag ⁷	MWD ⁸	P.R Mpa ⁹	CEC ¹⁰	Ec dS/m	Total bact. count	I _{bas} ¹¹
Organic farming																		
11	Annual crops (15year)	0 : 30	46.23	19.09	34.68	S.C.L.	3.12	1.17	53.75	41.11	20.08	51.03	0.59	2.43	49.56	0.89	176*10 ⁵	7.28
		30 : 60	61.13	14.51	24.36	S.C.L.	1.30	1.36	47.29	38.61	18.01	31.31	0.34	2.94	35.87	1.73	156*10 ⁵	
		60 : 140	80.19	7.51	12.30	L.S.	0.30	1.55	39.69	39.55	21.07				20.43	1.63		
12	orchards (15 year)	0 :21	47.01	20.32	32.67	S.C.L.	4.58	1.19	52.59	41.44	20.51	54.33	0.63	2.45	44.35	1.15	197*10 ⁵	3.03
		21 : 50	50.68	18.92	30.40	S.C.L.	2.44	1.23	50.85	38.24	16.08	32.75	0.48	2.79	34.78	3.24	175*10 ⁵	
		50 : 70	62.92	17.37	19.71	S.L.	0.65	1.48	42.41	39.68	20.82	30.13	0.19	3.11	29.56	6.30		
		70 : 140	66.41	15.31	18.28	S.L.	0.50	1.52	39.68	35.87	16.01				23.50	6.53		
Conventional cultivation																		
13	Annual crops	0 : 25	55.85	14.74	29.41	S.C.L.	2.56	1.28	49.61	40.92	20.29	42.6	0.51	2.71	31.52	1.69	158*10 ⁵	2.16
		25 : 50	76.22	10.13	13.65	S.L.	0.59	1.47	41.90	41.06	18.40	14.11	0.27	2.98	21.74	1.81	91*10 ⁴	
		50 : 57	59.36	15.86	24.78	S.C.L.	0.65	1.26	48.78	40.57	17.70	19.52	0.24	2.68	32.60	1.77		
		57 : 80	79.28	8.24	12.48	S.L.	0.53	1.28	50.58	30.17	15.12			3.78	19.57	1.68		
		80 : 95	48.81	21.45	29.74	S.C.L.	1.02	1.25	50.00	38.12	16.06				34.78	1.19		
		95 : 150	77.8	8.19	14.01	S.L.	0.59	1.54	40.54	39.97	23.34			20.65	2.38			
14	orchards	0 : 35	55.2	18.86	25.94	S.C.L.	2.87	1.24	50.40	42.09	19.29	40.72	0.43	2.81	38.26	2.08	162*10 ⁵	1.495
		35 : 67	56.15	14.77	29.08	S.C.L.	1.02	1.20	51.61	33.99	16.25	19.35	0.21	2.96	28.26	1.45	110*10 ⁵	
		67 : 90	72.03	8.47	19.50	S.L.	0.45	1.24	52.49	32.21	15.73			3.62	23.69	4.51		
		90 : 140	80.12	8.00	11.88	S.L.	0.33	1.60	39.62	37.18	19.02				20.00	6.29		

1 = total sand

2 = texture

3 = bulk density (Mg/m³)

4 = porosity %

5 = moisture content at 0.1 bar

6 = available water

7 = total aggregate

8 = mean weight diameter

9 = penetration resistance

10 = CEC meq/100 gm soil

11 = Basic infiltration rate (cm/hr.)

Table 4. Soil physical, chemical, and biological characteristic of an organic farming and conventional cultivation profiles of El-Behera area

Pro. No.	Farming Type & age	Depth cm	T. S.% ¹	Silt %	Clay %	Tex. ²	O.M% ³	B.D. ³ Mg/m ³	Por.% ⁴	0.1 bar ⁵	Ava. W ⁶	T.Agg ⁷	MWD ⁸	P.R Mpa ⁹	CEC ¹⁰	Ec dS/m	Total bact. count	I _{bas} ¹¹
Organic farm (Abo El-Matameer area)																		
15	Annual crops (10 years)	0:30	26.67	27.22	46.11	C.	3.89	1.11	55.78	51.38	23.38	55.86	0.76	2.49	45.28	3.15	170*10 ⁶	2.757
		30:50	21.1	29.18	49.72	C.	1.48	1.14	52.72	50.12	24.18	57.62	0.64	2.70	55.22	4.29	212*10 ⁴	
		50:68	42.72	35.00	22.28	L.	0.90	1.08	55.93	54.85	24.24	54.02	0.54	2.59	32.39	4.50	104*10 ⁴	
		68:105	30.57	36.12	33.31	C.L.	0.90	1.12	53.63	53.10	23.68			2.53	35.65	4.46		
		105:135	42.41	27.61	29.98	C.L.	0.84	1.24	50.88	48.16	21.62				14.78	4.83		
Conventional cultivation(Abo El-Matameer area)																		
16	Annual crops	0:10	29.16	17.86	52.98	C.	2.64	1.14	54.31	52.02	22.53	50.73	0.55	2.62	44.16	6.97	128*10 ⁵	1.667
		10:25	33.44	25.24	41.32	C.	1.48	1.16	52.24	49.13	24.84	47.78	0.57	2.94	31.52	8.22	180*10 ⁴	
		25:65	26.44	27.97	45.59	C.	0.90	1.11	54.25	51.40	25.14	60.06	0.50	2.59	44.57	9.47		
		65:95	24.71	27.05	48.24	C.	0.58	1.09	56.09	54.46	22.52			2.29	46.09	8.81		
		95:135	52.33	29.96	17.71	L.:S.L	0.81	1.24	50.93	47.02	21.12				14.13	7.84		
Organic farm (Etai El- Barood area)																		
17	Annual crops (10 years)	0:30	35.86	24.44	39.70	C.L	3.92	1.13	54.78	50.04	21.81	50.77	0.71	2.47	49.26	0.90	182.*10 ⁵	5.888
		30:60	43.3	26.40	30.30	C.L.	0.99	1.16	52.40	49.78	19.25	60.08	0.55	2.57	67.39	1.05	196*10 ⁴	
		60:80	22.36	27.16	50.48	C.	0.96	1.12	52.54	44.45	20.48			2.88	67.39	0.71		
		80::135	46.99	28.01	25.00	L:SCL	0.49	1.24	50.25	44.65	20.50				75.00	0.76		
Conventional cultivation (Etai El- Barood area)																		
18	Annual crops	0:35	37.53	20.03	42.44	C	2.32	1.20	50.95	48.91	19.19	46.21	0.62	2.79	44.57	0.58	139*10 ⁵	1.994
		35:55	61.05	13.30	25.65	S.C.L	0.96	1.27	50.49	47.81	17.21	33.77	0.43	2.96	48.91	0.66	141*10 ⁴	
		55:85	67.83	12.97	19.20	S.L.	0.32	1.48	42.80	40.90	15.07			3.67	19.57	0.93		
		85:135	83.58	5.41	11.01	L.S	0.17	1.61	38.74	30.94	17.30				10.87	0.80		

1= total sand
7 = total aggregate

2 = texture
8 = mean weight diameter

3 = bulk density (Mg/m³)
9 = penetration resistance

4 = porosity %
10 = CEC meq/100 gm soil

5 = moisture content at 0.1 bar
11 = Basic infiltration rate (cm/hr.)

6= available water

Table 7. Formula of calculated soil quality index (SQI) using weighting factors for each scored of minimum data set (MDS) variable

Soil depth	Farming system	Equation
0-50 cm	Organic cultiva.	$SQI = \sum [0.89(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{Pene.Resis.} + S_{MWD} + S_{CEC} + S_{silt+clay} - S_{IR}) + (0.11 \times S_{Total\ count})]$
0-100 cm	Organic cultiva.	$SQI = \sum [0.81(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{Pene.Resis.} + S_{MWD} + S_{CEC} + S_{silt+clay} - S_{IR}) + (0.116 \times S_{Total\ count})]$
0-50 cm	Conven. Cultiva	$SQI = \sum [0.836(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{Pene.Resis.} + S_{MWD} + S_{CEC} + S_{silt+clay} - S_{IR}) + (0.16 \times S_{Total\ count})]$
0-100 cm	Conven. Cultiva	$SQI = \sum [0.76(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{Pene.Resis.} + S_{MWD} + S_{CEC} + S_{silt+clay} - S_{IR}) + (0.175 \times S_{Total\ count})]$
0-50 cm	Total areas	$SQI = \sum [0.833(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{Pene.Resis.} + S_{MWD} + S_{CEC} + S_{silt+clay} - S_{IR}) + (0.166 \times S_{Total\ count})]$
0-100 cm	Total areas	$SQI = \sum [0.75(S_{OM\%} - S_{BD} + S_{poros. \%} + S_{CEC} + S_{MWD} + S_{silt+clay} - S_{IR}) + (0.15 \times S_{Total\ count}) + (0.09 \times S_{Pene. Resis.})]$

S is the score for the subscript variable and the coefficients is the weighting factors derived from the PCA

Table 8. Soil quality and their weights and classes for evaluating studied areas soil qualities

Indicators	Weight (organic)		Weight (conven.)		Scores (S)					The weights *the marks of the indicator (W _i x S)			
	0-50cm	0-100cm	0-50 cm	0-100cm	I	II	III	IV	V	0-50 cm	0-100 cm	0-50 cm	0-100 cm
OM%	2.24	1.47	1.47	1.08	>1.5	1.5-1	1-0.5	.5-0.25	<0.25	11.20	5.90	5.88	4.33
B.D. (Mg/m ³)	1.37	1.43	1.40	1.43	<1.3	1.3-1.8	1.8-2.1	>2.1		4.10	4.28	4.21	4.29
Porosity %	46.63	44.32	45.04	44.21	50	50-60;50-40	60-80;40-20			93.26	88.64	90.07	88.41
A.W	16.48	15.87	16.00	15.35	>18	18-14	14-10	10-6	<6	65.93	63.50	64.00	61.40
T. Aggre	36.71	35.66	32.49	29.43	>60	60-45	45-30	<30		73.41	71.32	64.99	29.43
CEC meq/100g soil	28.57	25.88	23.82	21.34	>30	30-15	15-10	10-5	<5	114.27	103.53	95.29	85.34
Silt+Clay %	38.78	34.37	34.89	32.27	<35	35-50	50-60	60-80	>80	155.12	137.47	139.57	129.07
Soil quality index										517.27	474.64	464.01	402.27
Relative soil quality index										73.90	67.81	66.29	57.47

