

**Table S1.** Scores of all parameters

Indicator	Description	Threshold	Score		
pH	Neutral	6.6-7.3	1.0		
	Slightly alkaline	7.3-7.8	0.8		
	Moderately alkaline	7.8-8.4	0.6		
	Strongly alkaline	8.4-9	0.4		
	Very strongly alkaline	>9	0.2		
EC (dS/m)	Non-saline	<2	1.0		
	Very slightly saline	2-4	0.8		
	Slightly saline	4-8	0.6		
	Moderately saline	8-16	0.4		
	Strongly saline	>16	0.2		
CaCO <sub>3</sub> (%)	Non-calcareous	0	0.2		
	Slightly calcareous	0-2	1.0		
	Moderately calcareous	2-10	0.8		
	Strongly calcareous	10-25	0.6		
	Extremely calcareous	>25	0.4		
ESP	Non-sodic	<10	1.0		
	Slightly sodic	10-15	0.8		
	Moderately sodic	15-30	0.6		
	Strongly sodic	30-50	0.4		
	Very strongly sodic	>50	0.2		
CEC	Very high	< 6	1.0		
	High	6-12	0.8		
	Moderate	12-25	0.6		
	Low	25-40	0.4		
	Very low	>40	0.2		
N	Very high	>120	1.0		
	High	120-100	0.8		
	Moderate	100-75	0.6		
	Low	75-30	0.4		
	Very low	<30	0.2		
P	Soil texture	Light	Medium	Heavy	
	Very high	>15	>8	>5	1
	High	15-10	8-5	5-3	0.75
	Medium	10-5	5-3	3-2	0.50
	Low	<5	<3	<2	0.25
K	Very high	>180			1.00
	High	180-120			0.75
	Medium	120-60			0.50
	Low	<60			0.25
OM	Very high	>2			1.00
	High	2-1			0.75
	Medium	1-0.5			0.50
	Low	<0.5			0.25
Depth	Very deep	>150			1.0
	Deep	150-100			0.8
	Moderately deep	100-50			0.6
	Shallow	50-30			0.4
	Very shallow	<30			0.2
IWQI	High suitability	>37			1.00
	Medium suitability	37-22			0.66
	Low suitability	<22			0.33

<sup>1</sup>Soil science division (2017); <sup>2</sup>Yao et al. (2013); <sup>3</sup>FAO (2006); <sup>4</sup>FAO (1988); <sup>5</sup>Hazelton and Murphy (2016); <sup>6</sup>Soltanpour (1991); <sup>7</sup>Mohamed et al. (2020); <sup>8</sup>Simsek and Gunduz (2007) and El Behairy et al. (2021).

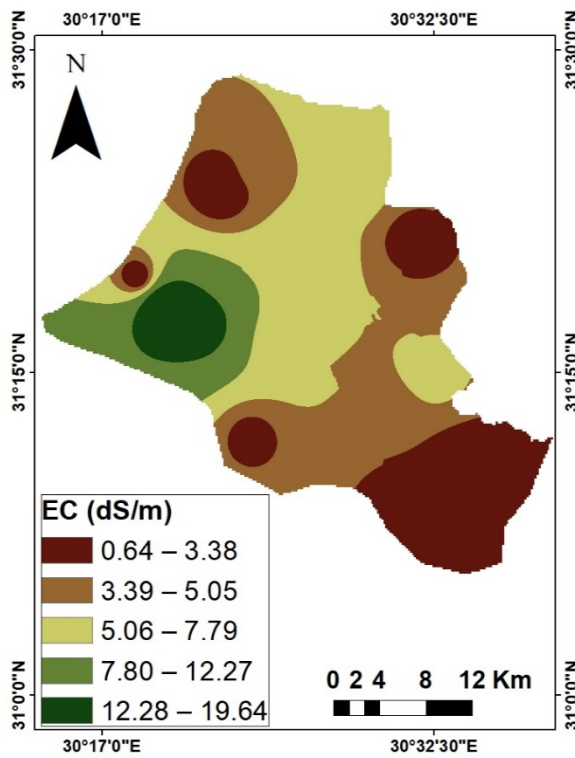
**Table S2.** Final SC range of study area

Index	Values	Symbol	Classes
Final SC	$\geq 0.71$	C1	Highly capable
	0.65 – 0.70	C2	Moderately high capable
	0.59 – 0.64	C3	Moderate capable
	$\leq 0.58$	C4	Low capable

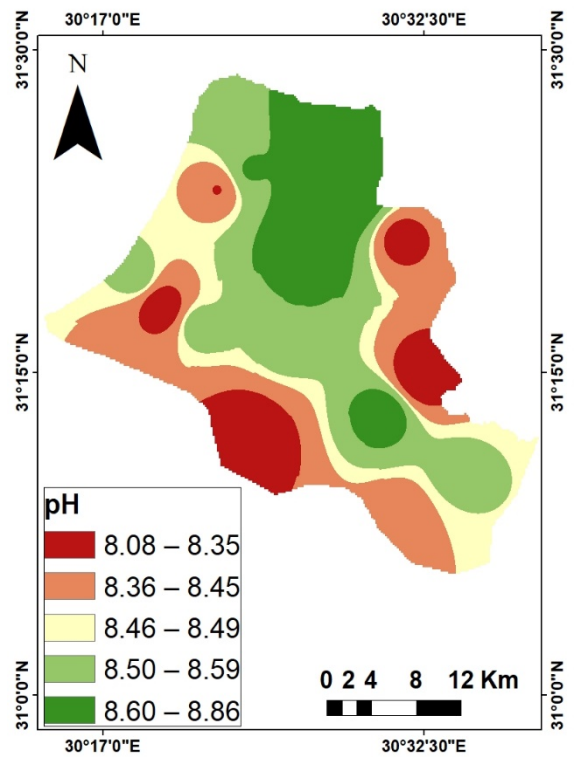
**Table S3.** Statistical characterization of the weighted mean of the studied soil profiles properties (n= 61)

Soil Property	Statistical parameters						
	Min.	Max.	Mean	St. Dev.	C.V.	Skewness	Kurtosis
Depth (cm)	80.00	150.00	128.67	26.42	21.00	-0.80	-0.76
EC (dS/m)	0.64	19.64	5.45	5.31	97.48	1.89	3.83
pH	8.08	8.86	8.49	0.25	2.93	-4.03	16.46
ESP	3.22	24.94	11.27	6.06	53.80	0.77	0.46
CaCO <sub>3</sub> (%)	0.75	9.04	3.90	2.03	51.89	0.95	2.34
AN (ppm)	7.50	81.00	48.34	24.53	50.74	-0.38	-1.12
AP (ppm)	6.30	22.30	14.97	5.10	34.03	-0.25	-1.11
AK (ppm)	9.30	457.10	277.00	173.91	62.78	-0.71	-1.04
CEC (cmolc/kg)	5.82	42.24	29.80	13.74	46.12	-0.99	-0.66
OM (%)	0.24	1.22	0.82	0.33	39.89	-0.59	-0.81
IWQI	26.50	37.80	33.42	3.87	11.57	-2.82	9.62
Texture class	Clay, Silty Clay, Silty Clay Loam, Sand and Sandy Loam						

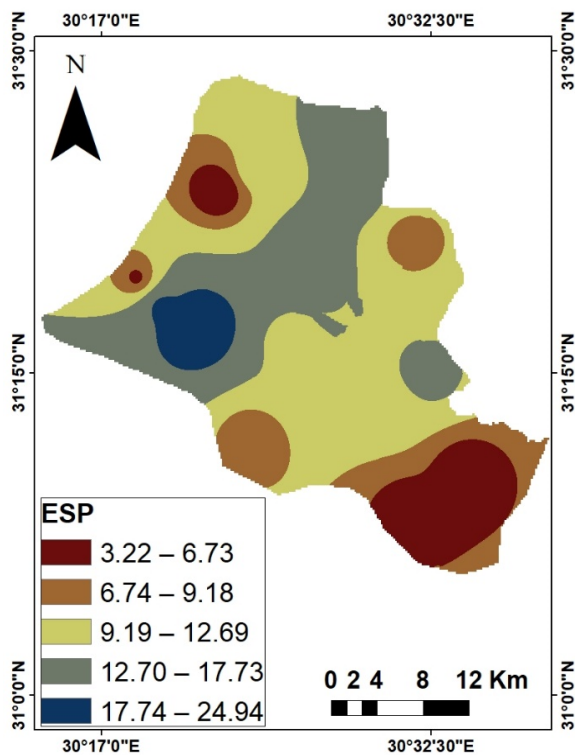
n = number of soil samples; Min = Minimum; Max = Maximum; SD = standard deviation; CV = coefficient of variation; EC= electrical conductivity; ESP = exchangeable sodium percentage; AN = available nitrogen; AP = available phosphorous; AK = available potassium; CEC = cation exchange capacity; OM = organic matter; IWQI = irrigation water quality index



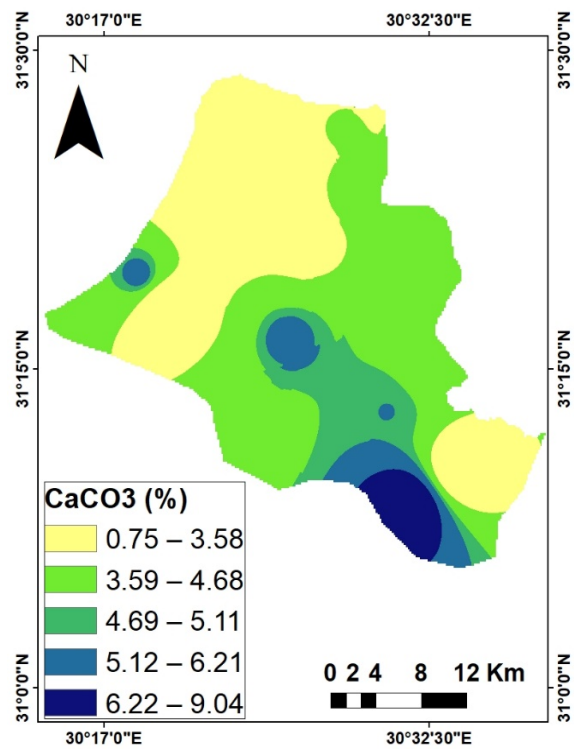
(a)



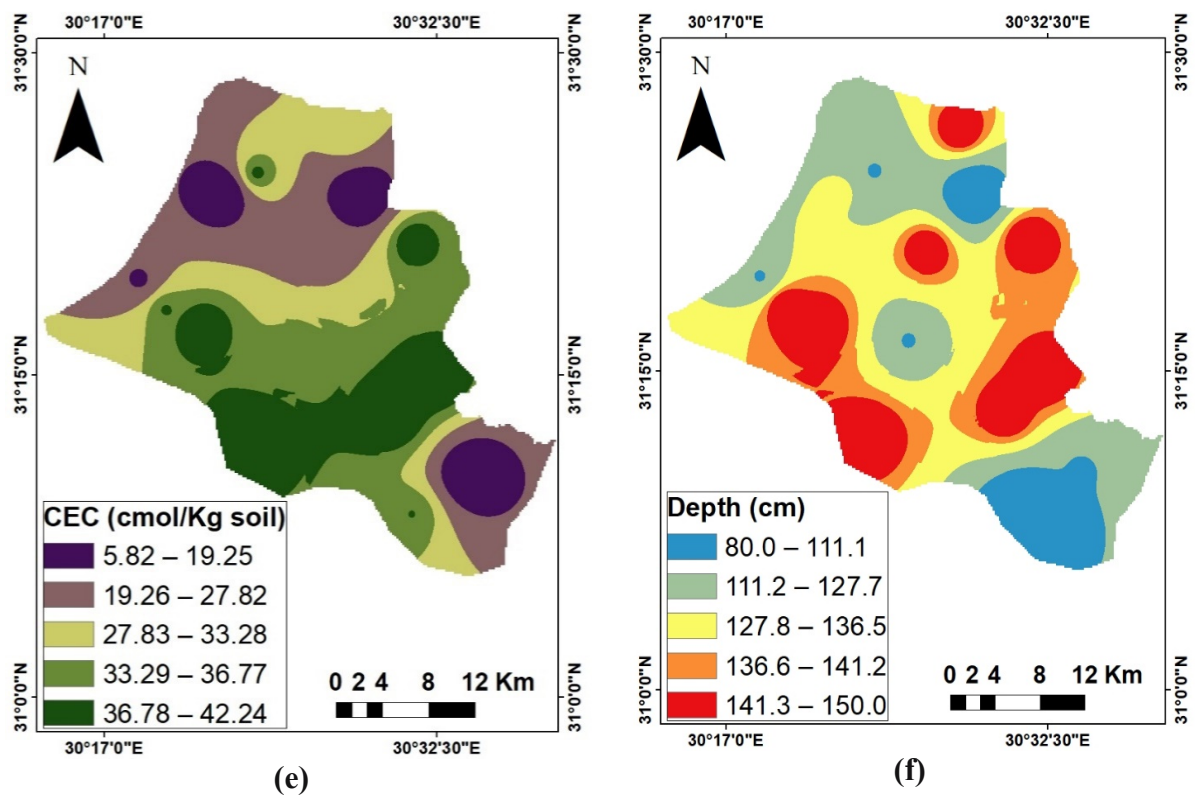
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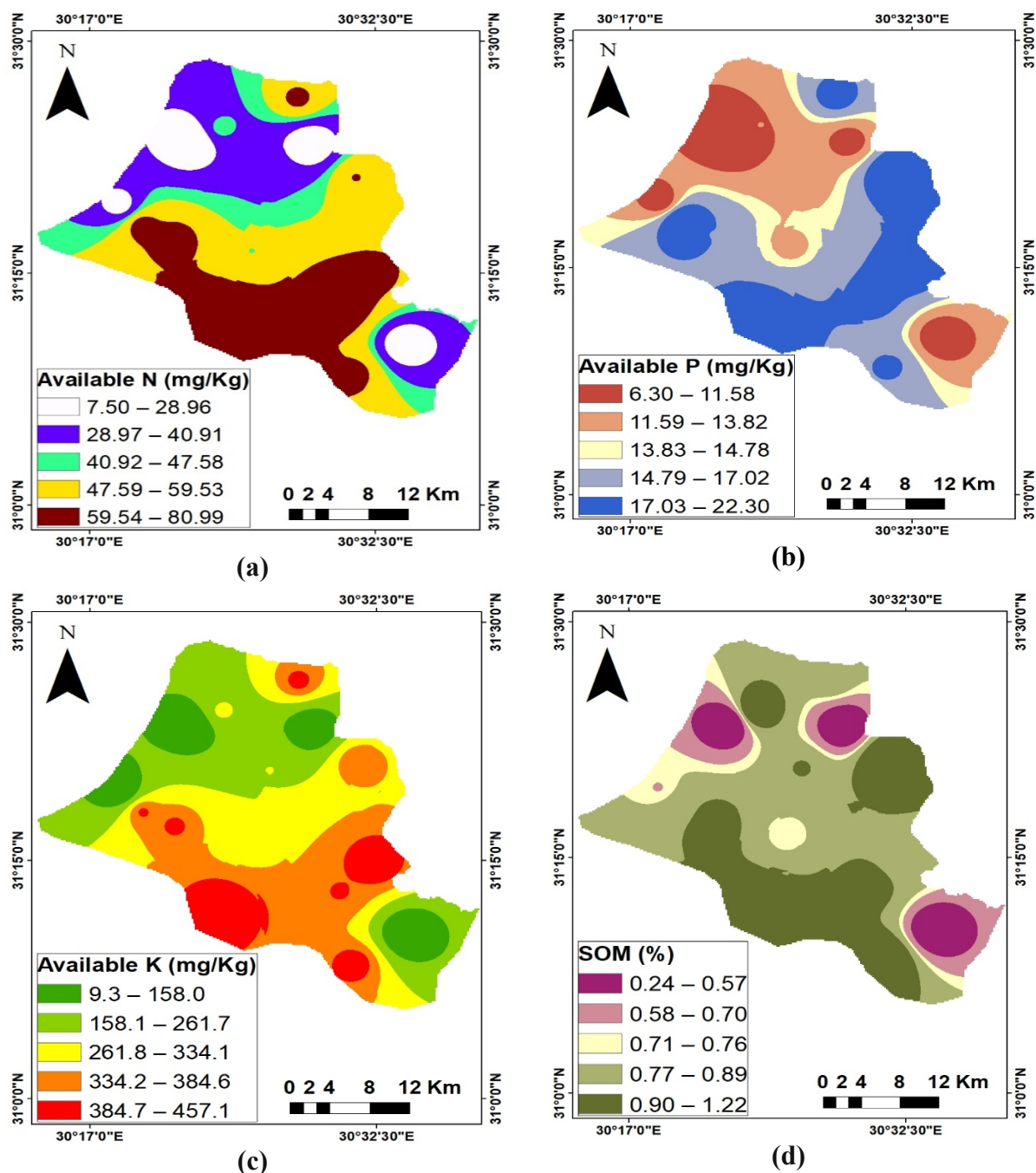
(c)



(d)

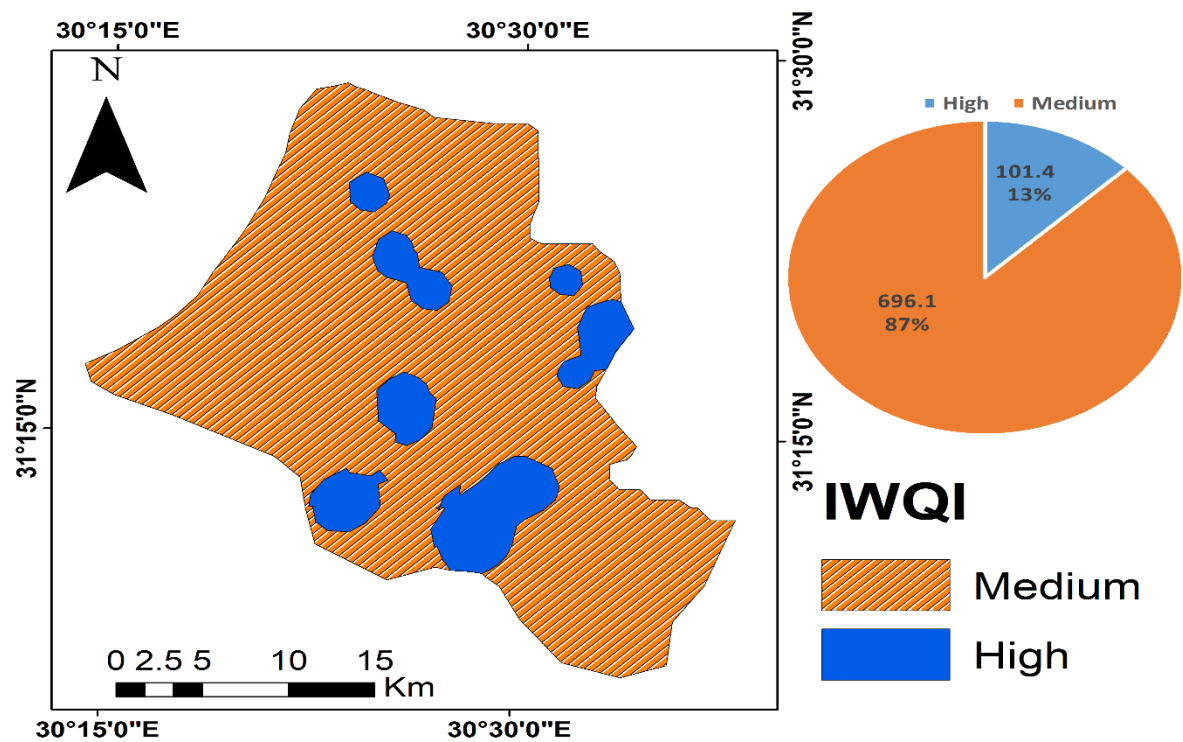


**Figure S1.** Spatial distribution of some chemical and physical soil properties (a) electric conductivity (EC: dS/m), (b) soil reaction (pH), (c) exchangeable sodium percent (ESP), (d) calcium carbonate percentage ( $\text{CaCO}_3$ : %), (e) cation exchange capacity (CEC: cmolc/Kg) and (f) depth (cm)



**Figure S2.** Spatial distribution of some fertility soil properties (a) (Available N: mg/kg), (b) (Available P: mg/kg), (c) (Available K: mg/kg), (d) Soil Organic Matter (SOM %)





**Figure S3.** The IWQ index map of the study area



**Figure S4.** The cultivated orchards (a) Mango and (b) Orange growth in the study area



**Figure S5.** The saline soils near the fish bonds in the southern of Idku lake in the studied area



**Figure.S6.** Very poorly drained soil in the study area