

Abstract

Lake Idku is the third largest coastal water body northwest of the Nile delta located within El Beheira Governorate. The study area is located south of Lake Idku. The main objectives of this study are to evaluate the changes of soil quality in the studied area relative to the available analytical data, chemical composition of irrigation water used and cultivated crops during the fall (2010/2011) and monitoring and detecting the changes of soil salinity in 1960 and 2011.

Seventeen soil profiles and twenty eight augers were collected. The main physical and chemical characteristics of the collected soil samples were determined according to standard methods.

According to the clustering strategy, it may be concluded that the dominant salts present within irrigation water applied at these profiles were $\text{Ca}(\text{HCO}_3)_2$, MgCl_2 , Na_2SO_4 and K_2SO_4 . The data also revealed that the pH was dependent more on the concentration of bicarbonates in water while the salinity of water, indicated by EC, was dependent upon the increase in Na^+ primarily and on K^+ and sulfate ions.

Generally, the micronutrients content in the studied soil samples indicated the dominance of Fe ions between (2.2-40.50 mg/kg) followed in most of the profiles by Cu ions ranged between (1.0-3.46 mg/kg) then Mn ions ranged between (1.0-8.0 mg/kg) ions. The value for Zn content was the least within these soil profiles ranging between (0.11- 0.70 mg/kg).

The impact of different land uses and activities upon the soil quality in the study area was determined using multivariate analysis to identify similarity in patterns and dynamics. Statistical analysis of data was carried out using 'StatistiXL

1.8' incorporated within the Microsoft Excel 2007 (Microsoft ® Windows 2007) software program. As well symmetrical difference analysis tools in ARC GIS were used to monitor and detect the changes of soil salinity within the study area from 1960 to 2011.

Generally, the results of HC analysis of the physical parameters (SP, Clay %, Coarse sand (CS)%, Fine Sand (FS) %, Silt%, CaCO₃%, OM%, gypsum %) and the chemical parameters (soil ionic content, micronutrients, SAR, pH and EC) obtained for the 17 profiles of the study area were divided up into 13 clusters that were grouped into two main groups.

Results of using symmetrical difference analysis tools in ARC / GIS to monitoring and detecting the changes of soil salinity of the study area from 1960 to 2011 showed that the studied area was classified into 3 classes : improved, degraded, and no change area where these area are 56774, 57454 and 48096 fed., respectively.

Key words:

Lake Idku, Soil monitoring , MVA , ARC/GIS.

Name: Waleed Abd Elzaher Abdo

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TABLE OF CONTENTS

		Page No.
	TABLE OF CONTENTS	i
	LIST OF TABLES	iv
	LIST OF FIGURES	v
	ABBREVIATIONS	ix
	ABSTRACT	x
1	INTRODUCTION	1
	1.1. Climate	3
	1.1.1. Temperature	6
	1.1.2. Rainfall	7
	1.1.3. Humidity	8
	1.1.4. Wind	9
	1.2. Some chemical and physical soil properties affect on soil quality	10
	1.2.1. Particle size distribution	10
	1.2.2. Calcium carbonate content	11
	1.2.3. Organic matter	12
	1.2.4. Soil reaction (pH)	14
	1.2.5. Soil salinity	15
	1.2.6. Micronutrients content	16
	• Iron	17
	• Manganese	19
	• Zinc	20
	• Copper	21
	1.3. Human and land use activities	22
	1.4. Geographic Information System (GIS) for detecting and monitoring the change of soil salinity	24

		Page No.
	Aim of the study	29
2	Materials and Methods	30
	2.1. Location of the study area	30
	2.2. Field work	31
	2.3. Methods of Soil samples analysis	31
	2.3.1. Chemical analysis	31
	2.3.1.1. Preparation of Saturation Paste	31
	2.3.1.2. Calculation of Saturation Percentage	34
	2.3.1.3 Determination of Soil pH	35
	2.3.1.4. Preparation of Saturation Extract	36
	2.3.1.5. Determination of Soil Salinity	37
	2.3.1.6. Determination of soluble cations	38
	2.3.1.6.1. Determination of Soluble Calcium and Magnesium	38
	2.3.1.6.2. Determination of Soluble Sodium and Potassium	41
	2.3.1.7. Determination of soluble anions	42
	2.3.1.7.1. Determination of Carbonate and Bicarbonate	42
	2.3.1.7.2. Determination of Chloride	43
	2.3.1.7.3. Determination of sulfate	44
	2.3.1.8. Determination of organic matter content	45
	2.3.1.9. Determination of Total Calcium Carbonate	47
	2.3.1.10. Determination of soil gypsum	48
	2.3.1.11. Determination of micro nutrients by ICP	50

		Page No.
	2.3.2. Mechanical analysis	51
	2.3.3. Equipment &Apparatus	55
	2.4. Methods of water samples analysis	56
	2.5. Statistical Analysis	56
	2.6. Production of salinity map	56
3	Results and Discussion	58
	3.1. Soil Characterization	58
	3.1.1. Inland Profiles: 1, 2, 10-17	59
	3.1.2. Coastal Profiles: 3-9	70
	3.2 .Water resources and its effect on soil quality	73
	3.3. Land Activities and soil characteristics	79
	3.4. Micronutrients and soil additives	84
	3.5. Statistical Analysis Of Data	90
	3.5.1. HC of physical data (SP, Clay %, Coarse sand (CS)%, Fine Sand (FS) %, Silt%, CaCO ₃ %, OM%, gypsum % , EC and pH)	91
	3.5.2. HC of chemical parameters (soil ionic content, micronutrients, SAR, pH and EC)	103
	3.5.3. HC of the 17 Profiles characteristics	115
	3.6. Monitoring and Detecting the Changes of Soil Salinity in the Study Area in 1960 and 2011	117
	3.6.1 Geographic information system for detecting the impact of changes of soil salinity on land improvment in the Study Area in 1960 and 2011	120
	SUMMRY AND CONCOLUSION	125-129
	REFERNCES	130-152

ABBREVIATIONS

CEC	Cation Exchange Capacity	IDW	Inverse Distance Weighted
CS	Coarse Sand	MVA	Multivariate Analysis
DTPA	Diethylene Triamine Penta Acetic Acid	OM	Organic Matter
EDTA	Ethylene Diamine Tetra Acetic Acid	PSP	Precision Spectral Pyranometers
ESA	Egyptian Survey Authority	PWP	Permanent Wilting Point
ETM	Egyptian Transverse Mercator	SAR	Sodium adsorbed Ratio
FC	Field Capacity	SP	Saturation Past
FS	Fine Sand	SWRI	Soil and Water Research Institute
GCPs	Ground Control Points	TDS	Total Dissolved Salts
GIS	Geographic Information System	USDA	United States Department of Agriculture
HC	Hierarchal Clustering		
ICP	Inductively Coupled Plasma		