

**GEO-ENVIRONMENTAL STUDY OF THE AREA  
BETWEEN INCHAS AND ABU ZAABL, EAST CAIRO,  
EGYPT**

**Submitted By**

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B.Sc. of Science (Geology), Faculty of Science, Cairo University, 1982  
Master in Environmental Sciences, Institute of Environmental Studies and Research,  
Ain Shams University, 2013

A Thesis Submitted in Partial Fulfillment  
Of  
The Requirement for the Doctor of Philosophy Degree  
In  
Environmental Sciences

Department of Environmental Basic Sciences  
Institute of Environmental Studies and Research  
Ain Shams University

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**APPROVAL SHEET**  
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## **ABSTRACT**

The study area lies around Ismailia Canal which is one of the most important branches of the Nile River in Egypt. It is the main source of drinking and irrigation water for many cities. This canal was constructed in 1862 to supply drinking water to the villages on the Suez Canal zones and to the workers during digging the Suez Canal Navigation Route.

Twenty three groundwater samples were collected from the area east and west of Ismailia Canal. The collected samples represent regions of Mashtool El Souq, Abu Zaabal, Shebeen El Qanater, Al Monier, Salamant, Inchas, Inchas El Raml, Belbees and Al Obour.

Fifteen surface water samples were collected from Ismailia Canal along Cairo - Ismailia agricultural road, in addition to, Abu Zaabal lake which characterized by high salinity. Each surface water sample was labeled and identified according to its location. TDS, EC and pH were measured in the field.

Twenty one soil samples were studied from the cultivated and reclaimed lands east and west of Ismailia Canal. The soil samples were selected close to the sites of water samples, whether it is groundwater or surface water and labeled accordingly. The samples were collected from five different points and mixed together to represent the location of sampling.

The objective of the study is to discuss the chemical and physicochemical characteristics of groundwater and surface water of the study area. The chemical and physicochemical characteristics comprise the abundance and distribution of major ions, heavy metals, Hydrogen

Ion Concentration (pH), Total Dissolved Salts (TDS), Total Hardness (TH) and Electrical Conductivity (EC).

Spatial distribution maps of chemical constituents and heavy metals of groundwater in the study area were provided by using Arc GIS technique Ver. 10.1 to explain the areal distribution of these constituents.

The study showed that many concentrations of heavy metals in groundwater, surface water and soil exceed the proportions allowed by international standards, whether in drinking, irrigation or household uses.

# TABLE OF CONTENTS

Content		Page
ACKNOWLEDEMENT		I
ABSTRACT		II
TABLE OF CONTENTS		IV
LIST OF FIGURES		VIII
LIST OF TABLES		XII
LIST OF PHOTOS		XIV
LIST OF ABBREVIATIONS		XV
<b>CHAPTER 1: INTRODUCTION</b>		<b>1</b>
1.1	Background	1
1.2	Location and accessibility	4
1.3	Climate	5
1.4	Aims and Objectives	17
1.5	Structure of the thesis	18
<b>CHAPTER 2: LITERATURE REVIEW</b>		<b>20</b>
<b>CHAPTER 3: GEOLOGY AND HYDROGEOLOGY</b>		<b>30</b>
3.1	Geology	30
3.2	Hydrogeology	37
<b>CHAPTER 4: MATERIALS AND METHODS</b>		<b>54</b>
4.1	Sampling Techniques	54
4.1.1	Designing a Sampling Plan	55
4.1.2	Sampling Criteria	55
4.1.3	Sampling frequency	55

4.1.4	Groundwater Sampling Equipment	56
4.1.5	Suitability of sampling equipment	56
4.1.6	Sampling Containers	56
4.1.7	Sample Identification, Transport and Storage	56
4.2	Field Sampling	57
4.2.1	Groundwater Samples	58
4.2.2	Surface water samples	60
4.2.3	Soil Sampling	62
4.3.1	Geochemical Analysis	64
4.3.1.1	pH measuring	64
4.3.1.2	Measuring of Electrical Conductivity (EC)	65
4.3.1.3	Measuring of Total Dissolved Solids (TDS)	65
4.3.1.4	Major Cations and Anions Analysis	66
4.3.1.5	Heavy Metals Analyses	67
4.3.2	Soil Analysis	67
4.4	Statistical Treatment of data	69
<b>CHAPTER 5: HYDROGEOCHEMISTRY OF GROUNDWATER AND SURFACE WATER</b>		<b>70</b>
5.1	Hydrogeochemistry of Groundwater	70
5.1.1	Physicochemical parameters of groundwater	71
5.1.2	Chemical Composition of groundwater	77
5.1.2.1	Major Cations	77
5.1.2.2	Major Anions	83
5.1.2.3	Toxic or heavy Metals	87
5.1.2.4	Comparison of heavy metals with different parts of the Nile Delta	98



5.1.2.5	Potential Sources of Pollution with Heavy Metals	99
5.1.2.6	Statistical analysis	100
5.2	Geochemical classification of groundwater	101
5.2.1	Schoeller's (1955) Geochemical Classification	101
5.2.2	Durov's Geochemical Classification	103
5.2.3	Piper's Geochemical Classification	104
5.3	Hydrogeochemistry of Surface Water	106
5.3.1	Physicochemical Parameters	106
5.3.2	Chemical Composition	107
5.3.2.1	Major Cations	107
5.3.2.2	Major Anions	109
5.3.2.3	Heavy Metals	111
5.3.3	Geochemistry of surface water	111
<b>CHAPTER 6: GEOCHEMISTRY OF SOILS</b>		114
6.1	Physicochemical Properties	114
6.2	Metal Distribution	116
6.3	Heavy metals interaction and sources	124
<b>CHAPTER 7: GEOENVIRONMENTAL ASSESSMENT OF WATER AND SOILS</b>		127
7.1	Assessment of Water Quality	127
7.1.1	Water quality for irrigation	128
7.1.1.1	Electrical Conductivity (EC)	132
7.1.1.2	Total Dissolved Solids (TDS)	133
7.1.1.3	Soluble Sodium Percentages (SSP)	134
7.1.1.4	Sodium Adsorption Ratio (SAR)	135
7.1.1.5	Residual Sodium Carbonate (RSC)	136

5.1.1.6	Magnesium Adsorption Ratio (MAR)	137
7.1.1.7	Chloride Content (Cl <sup>-</sup> )	138
7.1.1.8	Toxic Metals Content	140
7.1.2	Water quality for domestic purposes	141
7.1.2.1	Total dissolved solids (TDS)	142
7.1.2.2	Total Hardness (TH)	143
7.1.2.3	Corrosively Ratio (CR)	144
7.1.3	Water quality for drinking based on heavy metals	145
7.2	Assessment of Soils Quality	147
7.3.1	Soil contamination by toxic metals	148
<b>CHAPTER 8: SUMMARY AND CONCLUSION</b>		149
<b>REFERENCES</b>		158
المستخلص		١
ملخص الرسالة باللغة العربية		٣

## LIST OF FIGUERS

	<b>Figure</b>	<b>Page</b>
<b>Figure (1.1)</b>	Location map of the Study Area	6
<b>Figure (1.2)</b>	Digital elevation model of the Eastern Nile Delta region, Egypt (after Ezzeldin et al., 2016)	7
<b>Figure (1.3)</b>	Land-use map produced by the supervised classification of Landsat image 2015 (after Ezzeldin, 2016)	8
<b>Figure (1.4)</b>	Relative humidity (%) at Inchas and Belbees	10
<b>Figure (1.5)</b>	Mean of day temperature at Inchas and Belbees	10
<b>Figure (1.6)</b>	Total Monthly Rainfall at Inchas and Belbees	11
<b>Figure (1.7)</b>	Maximum rainfall per day at Inchas and Belbees	11
<b>Figure (1.8)</b>	Evaporation per day at Inchas and Belbees	12
<b>Figure (1.9)</b>	Average temperature and precipitation at Abu Zaabal during the last 30 years (meteoblue.com, 2016)	14
<b>Figure (1.10)</b>	Cloudy, sunny, and precipitation days of Abu Zaabal (meteoblue.com, 2016)	15
<b>Figure (1.11)</b>	Maximum temperatures of Abu Zaabal (meteoblue.com, 2016)	15
<b>Figure (1.12)</b>	Average temperatures and precipitation of Inchas area (meteoblue.com, 2016)	15
<b>Figure (1.13)</b>	Cloudy, sunny, and precipitation days of Inchas area (meteoblue.com, 2016)	16
<b>Figure (1.14)</b>	Maximum temperatures of Inchas area (meteoblue.com, 2016)	16
<b>Figure (3.1)</b>	Isopach map of the Quaternary aquifer in the eastern Nile Delta region (after Geriesh, 1994)	31
<b>Figure (3.2)</b>	Nile Delta Structural Zone (Shata and El Fayoumy, 1966)	32
<b>Figure (3.3)</b>	Nile Delta Physiography (Shata and El Fayoumy, 1966)	33
<b>Figure (3.4)</b>	Desert Wadies in Nile Delta Vicinity (Shata and El Fayoumy, 1966)	34
<b>Figure (3.5)</b>	Geological Cross Section at Cairo (Shata and El Fayoumy, 1966)	34

<b>Figure (3.6)</b>	Geologic map of the study area (after RIGW, 1989)	36
<b>Figure (3.7)</b>	Configuration of aquifer systems in the Nile Delta region (after Sakr, 2005)	39
<b>Figure (3.8)</b>	Depth to groundwater of the Nile Delta region in 2008 (Morsy, 2009)	41
<b>Figure (3.9)</b>	Piezometric head of the Nile Delta region in 2008 (Morsy, 2009)	42
<b>Figure (3.10)</b>	Hydrogeological Map of East Cairo (modified after RIGW, 1992)	44
<b>Figure (3.11)</b>	Isothickness Map of the Holocene Aquitard (After RIGW, 1989)	45
<b>Figure (3.12)</b>	The difference of groundwater contour map from year 2000 to 2030 (The first Scenario) (After El-Fakharany et al., 2013)	48
<b>Figure (3.13)</b>	The difference of groundwater contour map from year 2000 to 2030 (The Second Scenario) (After El-Fakharany et al., 2013)	49
<b>Figure (3.14)</b>	The difference of groundwater contour map from year 2000 to 2030 (The Third Scenario) (After El-Fakharany et al., 2013)	50
<b>Figure (3.15)</b>	Base map of the study area containing cross sections (modified after RIGW, 1980)	51
<b>Figure (3.16)</b>	cross section 2-2 of the study area (modified after RIGW, 1980)	52
<b>Figure (3.17)</b>	Hydrogeological cross section 5-5 of the study area (modified after RIGW, 1980)	53
<b>Figure (4.1)</b>	Location of groundwater samples in the study area	59
<b>Figure (4.2)</b>	Location map of surface water samples in the study area	61
<b>Figure (4.3)</b>	Location map of the soil samples in the study area	63
<b>Figure (5.1)</b>	Spatial distribution of pH of groundwater samples	73
<b>Figure (5.2)</b>	Spatial distribution of EC of groundwater samples in the study area	74
<b>Figure (5.3)</b>	Spatial distribution of TDS of groundwater samples	75

<b>Figure (5.4)</b>	Percentages of the studied groundwater samples in each class according to Chebotarev's (1955a)	76
<b>Figure (5.5)</b>	Spatial distribution of $\text{Na}^+$ in groundwater of the study area	79
<b>Figure (5.6)</b>	Spatial distribution of $\text{K}^+$ of the groundwater samples	80
<b>Figure (5.7)</b>	Spatial distribution of $\text{Ca}^{2+}$ in the groundwater samples	81
<b>Figure (5.8)</b>	Spatial distribution of $\text{Mg}^{2+}$ of the groundwater samples	82
<b>Figure (5.9)</b>	Spatial distribution of $\text{Cl}^-$ in the groundwater of the study area	85
<b>Figure (5.10)</b>	Spatial distribution of $\text{HCO}_3^-$ in the groundwater of the study area	86
<b>Figure (5.11)</b>	Spatial distribution of Sulphate ( $\text{SO}_4^{2-}$ ) in the groundwater of the study area	87
<b>Figure (5.12)</b>	Spatial distribution of (Cr) in the groundwater of the study area	90
<b>Figure (5.13)</b>	Spatial distribution of (Cu) in the groundwater samples	91
<b>Figure (5.14)</b>	Spatial distribution of (Fe) in the groundwater samples	93
<b>Figure (5.15)</b>	Spatial distribution of (Mn) in the groundwater samples	94
<b>Figure (5.16)</b>	Spatial distribution of (Ni) in the groundwater samples	95
<b>Figure (5.17)</b>	Spatial distribution of (Pb) in the groundwater samples	96
<b>Figure (5.18)</b>	Spatial distribution of (Zn) in the groundwater samples	97
<b>Figure (5.19)</b>	Dendrogram for 8 variables from cluster analysis in R-mode	101
<b>Figure (5.20)</b>	Schoeller diagram of groundwater samples	102
<b>Figure (5.21)</b>	Durov diagram of groundwater samples	104
<b>Figure (5.22)</b>	Piper diagram of groundwater samples	105
<b>Figure (5.23)</b>	Major cations concentrations of surface water	107
<b>Figure (5.24)</b>	Major anions concentrations of surface water	109
<b>Figure (6.1)</b>	Spatial distribution of (Cd) in the study area	118

<b>Figure (6.2)</b>	Spatial distribution of (Co) in the study area	120
<b>Figure (6.3)</b>	Spatial distribution of (Cr) in the soils	120
<b>Figure (6.4)</b>	Spatial distribution of (Cu) in soils	121
<b>Figure (6.5)</b>	Spatial distribution of (Ni) in soils	122
<b>Figure (6.6)</b>	Spatial distribution of (Pb) in the soils	123
<b>Figure (6.7)</b>	Spatial distribution of (Zn) in the study area	124
<b>Figure (6.8)</b>	Dendrogram in R-mode of the studied soil samples	126

# LIST OF TABLES

	<b>Table</b>	<b>Page</b>
<b>Table (1.1)</b>	Meteorological report of Inchas station from 1976 to 2005	9
<b>Table (1.2)</b>	Meteorological report of Belbees station from 1976 to 2005	9
<b>Table (1.3)</b>	Aridity degrees ( <b>Emberger, 1955</b> )	13
<b>Table (1.4)</b>	Degree of aridity for Inshas and Belbees stations	14
<b>Table (5.1)</b>	Physicochemical parameters of the groundwater of the study area	72
<b>Table (5.2)</b>	Percentages of the studied groundwater samples in each class of <b>Chebotarev's (1955a)</b>	76
<b>Table (5.3)</b>	Concentrations of major cations of groundwater of the studied area	78
<b>Table (5.4)</b>	Concentrations of major cations of groundwater of the studied area	84
<b>Table (5.5)</b>	Concentration of heavy metals in groundwater of the study area (ppm)	88
<b>Table (5.6)</b>	A Comparison between maximum concentrations of heavy metals in the study area and those in different parts of the Nile Delta	98
<b>Table (5.7)</b>	Metal concentrations related to industrial activities in the study area	99
<b>Table (5.8)</b>	Correlation matrix of the heavy metals for the study area	100
<b>Table (5.9)</b>	Physicochemical parameters of surface water	106
<b>Table (5.10)</b>	Concentrations of major cations of surface water	108
<b>Table (5.11)</b>	Concentrations of major anions of surface water of the study area	110
<b>Table (5.12)</b>	Concentrations of heavy metals in surface water of the study area	111