STUDIES THE SOILS OF EL GABAL EL ASFAR AREA WHICH IRRIGATED BY SEWAGE SLUDGE AND EVALUATED

By

MAGDY MOHAMED MEKKAWI ODA

B. Sc. Agric. Sci. (Technology Reclamation And Desert Soil Cultivation), Open Education Center, Fac. Agric., Cairo Univ., Egypt, 2003

THESIS

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In

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(Soil Sciences)

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APPROVAL SHEET

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SUPERVISION SHEET

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Title of Thesis: Studies the Soils of El Gabal El Asfar Area Which Irrigated by Sewage Sludge and Evaluated
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Dr. Rafat Ramdan Ali
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ABSTRACT

The investigated area locates to the east of the Nile Delta; it is bounded by latitudes 30° 11' 15" & 30° 14' 10" N and longitudes 31° 22' 05" & 31° 24' 20" E. According to the period of irrigation by sewage effluents, the soils of the area were divided into four grades. These include i) non-irrigated and barren, ii) irrigated for (24 years), iii) irrigated for (49 years) and iv) irrigated for 82 years until 2009 and after this the all area changed to irrigate by ground water.

Fifteen soil profiles were taken to represent the soils of the area. Morphological description and soil sampling were conducted during the field work. The soil properties including texture, depth, organic matter (O.M), EC, $CaCO_3$, pH, CEC, and ESP have been determined.

The soils were classified as: Typic Torripsamments and Typic Torrifluvents according to the American soil taxonomy. The soil capability classes ranged between (2) good and (5) very poor. The soil suitability ranged between S_1 and S_3. The soils of the area are suitable for field crops (Wheat, Barley, Faba bean, Sugar beat, Sun flower, Maize, Soya bean, Peanut, Cotton, Sugar Cane), vegetable (Tomato, Pepper, Watermelon, Alfalfa, Sorghum), and fruit (Citrus, Grape, Olive, Apple, Pear, Figs, Date palm). The soils are in general not suitable for Cabbage, Onion, Rice and Banana.

Key words: Soil taxonomy, Soil evaluation, Remote sensing, GIS, El Gabal El Asfar, Egypt

DEDICATION

I dedicate this work to whom my heart felt thanks; to my ***mother*** *and my late* ***father*** *for their patience and help, as well as to my* ***brother Dr. Nasser*** *and his wife* ***Dr. Dalia****, as well as to my wife, my sons and my daughters.*

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INTRODUCTION

Agriculture plays a main role in the growing and stability of the national economy. Egypt's area extends to million km^2, 94% of this area is classified as a desert while habited area is about 6%. There is a shortage in per capita of the agricultural area.

The Nile River is the main source of water supplying Egypt with 55.5 billion m^3 of water. Egypt is classified as an arid area characterized by rain shortage and high temperature which is considered a hinder of development and expansion in agriculture area.

Since 1900, Egypt began to apply the use of sewage water in farming as unconventional source of water to reduce the water shortage and achieve the block of the food gap between the product and the overpopulation. Sewage water contains useful nutrients for soil fertility and plants nutrition. The benefits of these nutrients depend on the concentrations of the nutrients in wastewater, the quantities of wastewater applied, the times of application, the type and the target yield of the crop grown, and the fertility of the soil. (Janssen et al. 2005). On the other hand it contains high percentage of heavy metals which cause toxicity of plant and a harmful effect on humans.

El Gabal El Asfar farm is one of these areas which has started to use sewage water in irrigation since 1911. It is located in the Eastern desert in the southeastern edge of Al Qaliobia governorate.

Soil evaluation is one of the methods which can be inferred from the productive capacity of the land and its ability for different uses.

Geographic information system (GIS) and remote sensing (RS) techniques were used in order to implement this study. Remote sensing (RS) and geographic information system (GIS) techniques proved to be effective in management, detection, prediction and planning studies. Remote Sensing is the science of acquiring, processing and interoperating images that record the interaction between electromagnetic energy and matter. GIS is considered as organized collection of computer hardware, software, spatial and non-spatial data that can help users for the efficient capture, storage, update, manipulation, analysis and management of all geographically referenced information. The present study aims to achieve the following objectives:

1. Physiographic map of the studied area.
2. Soil map of the studied area.
3. Land capability map of the studied area.
4. Land suitability map of the studied area.