شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومـــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

"Desertification Impact on El- Minya area, South of Nile Valley, Egypt."

B1.٧١٦

By

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B.Sc. (Soils), UNIVERSITY OF CAIRO, 1993
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THESIS

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ABSTRACT

"Desertification Impact on EL-Minya area, south of Nile Valley, Egypt"

Physiographic-Soil map of the investigated area extended between latitude 27 30 N to 28 48 N and longitude 30 30 to 31 00 E was produced using aerial-photographs, scale 1:40.000 was taken in 1988 & 1992.

The studied area is characterized by different geomorphological feature as recent and sub-recent deposits (Islands and River Banks), flood plain (Alluvial deposits), interference zone deposits (East and West of flood plain) and Eastern and Western desertic deposits.

From the geological point of view, the area is covered by sedimentary materials belonging to Cretaceous, Eocene, Pliocene, Pleistocene, and Recent periods.

Testing augers were done in the field to check the accuracy of boundaries between the different mapping units. Seven samples areas were chosen to represent the different physiographic units.

83 soil profiles were dug and carefully described according to their morphological properties and 40 soil profiles were dug for monitoring the physical and chemical changes. Disturbed samples were collected for different physical and chemical analyses.

The obtained data in this study revealed that:

The soil texture of these soils is mainly affected by the distance from the River Nile, physiography and landform. Generally, the dominant soil texture classes of recent and sub-recent deposits are sand to loamy sand. While in the flood plain, the soil texture classes of the relatively high parts ranges between sandy loam and clay in the middle of flood plain. The texture ranges between clay loam and clay in the moderately high areas and between silty clay and clay in the relatively low areas. The dominant soil texture classes in the interferences zone soils range between sand and clay. The relatively high parts and the soils adjacent to the desertic deposits are coarser than those of the relatively low parts and the soils adjacent to the alluvial soils of the flood plain. The dominant soil texture classes in the desertic deposits range between sand and sand granules, while the cultivated desertic soils have modified soil texture, i.e., sandy clay loam.

The difference in the texture classes of desertic deposits are due to the differences in the parent material and physical weathering degrees.

The statistical size parameters data point to the role of water as a factor in the old time for transportation and deposition specially in the Eocene deposits in the Eastern and Western desert as well as some parts of the Upper Cretaceous deposits; while the wind is the dominant factor for transportation in the lower Cretaceous and Pliocene deposits in the Eastern Desert.

$CaCO_3$ content in the alluvial soils is the same as that of the suspended matter of the River Nile. (ranges between 0.3 and 4.5%). The content of $CaCO_3$ in the interference zone soils (alluvial-colluvial) and (alluvial-wind born) deposits is higher than in the alluvial soils and this is due to the origin of these deposits (5.0 and 11.0%). The $CaCO_3$ content in the desertic deposits differs due to the parent material, i.e., in the Eastern desertic deposits it ranges between 10.3 and 26.2%, and in the Western desertic deposits it ranges between 5.6 and 11.8%.

The organic matter content of the investigated soils is generally low and ranges in the alluvial soils between 0.1% in the lower layers and 2.0% in the upper layers, and decreases in the interference soils to be between 0.1% in the lower layers and 1.0% in the surface layers. In the desertic deposits, it is less as it ranges between 0.06% in the lower and 0.6% in the surface layers.

The total soluble salts values ranges between 0.30 and 3.0 ds/m in the recent and subrecent deposits and in relatively high and moderately high parts in the alluvial soils of the flood plain; these soils are non-saline and non-alkali, while in the relatively low parts, the soils are highly to very highly saline in some locations and the rest of the soils are non-saline. The soils of the interference zone are generally non-saline. The desertic deposits soils are classified as highly saline due to their high content of total soluble salts (10.0 and 22.0 ds/m) as inherited salts from the parent material.

The main soil sub-great groups of these physiographic units can be listed as follows:

Typic	Torrifluvent	Typic	Haplosalids
Vertic	Torrifluvent	Typic	Aquisalids
Typic	Paleargids	Typic	Haplocalcids
Typic	Natrargids	Aquic	Calcjargids
Aquic	Natrargids	Typic	Torripsamment
Aquic	Paleargids		

The monitoring of the changes in chemical properties of El-Minya Governorate depend on the comparing between the data extracted from RISW report, (1969), NIR report, (1991) and the data of the field work carried out in (2000) by the author for selective 40 profiles covered the investigated area.

Generally, the EC dS/m, water table level decreased in 96% of the studied areas with a slightly increase in ESP%.

The urban encroachment on the old cultivated areas between the year 1956 and the year 1992 ranges between (1.70 - 2.63) times as a result of horizontal extension of urbanization in different investigated districts of El-Minya Governorate.

The annual rate of sand dunes encroachment ranges between 4.66 - 21.27 m^2 in the period 1934 – 1992. The soil loss (kg) from the sand dunes by wind erosion estimating by wind tunnel expressed that at wind speed 5.9 m/s 2.1% was lost, at 7.5 m/s 5.2% was lost, at 10.1 m/s 19.44% was lost and at 13.6 m/s 41.52% was lost.

The soil erodibility of selected eastern dry-valley of the investigated area according to the soil loss equation ranges between 5.0 – 175.0 ton/fedd./year.

Generally, 96% of the studied area have no compaction hazard. Bulk density (*P*b) at the surface layers ranges between 1.2 and 1.5 gm/cm and ranges between 1.5 and 1.85 gm/cm at the lower layers.

The microbiological status expressed by microorganisms content of the investigated area ranges between 15 and 105 x 10^7/gm soil.

The land fragmentation owner-ship and the rate of land trespass in El-Minya Governorate indicated that, by the time year the land trespass problem appears and strongly affects fertile cultivated areas, our agriculture lands.

Monitoring of the water table level of the investigated area showed that 96% of the investigated area their water table level >150 cm. While, 4% of the investigated area have water table level ranges between 70 – 110 cm and improved in the year 1991 by tile drains installation.

The Geomorphological changes of River Nile island in the period 1934 – 1992 revealed that the river Nile area decreased, recent sand deposits of Island (I_1) area decreased while sub recent sand deposit area of Island (I_2) area slightly increase.

The actual soil productivity of the investigated area based on storie (1937), requirez et al (1970) and Mansour (1979) models rating pointed that most of the investigated profiles have been classified as grade II with Productivity Index (PI) value ranges between 70.0-84.0% while, there's a limited area has been classified as grade I with PI value ranges between (85.0-90.0%).

The monitoring of soil productivity in the studied area in the period (1969-2000) revealed that 96% of the studied profiles slightly decrease in its PI value without any change in productivity grade.

The soil desertification hazard of the investigated profiles based on author model rating showed that desertification index (DI) value ranges between 8-16 with desertification class ranges between $S_2 - S_4$. The main desertification hazard affected this area are land fragmentation, poverty, urban extension, sand dunes encroachment at the Western side of the Nile valley, water erosion at the Eastern side, salization and alkalization.

Finally, the total losses of cultivated area due to the above mentioned desertification hazard is about 49,265.9 fedd. represent about 7.97% of the flood plain.

(Cairo Univ. Press, 1524-1984-5000 ex.)

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Content

INTRODUCTION

Soil desertification defined as soil deterioration in arid, semi-arid and sub-humid zones due to various factors among which are climatic change and human activities.

Desertification problems are recently studied by many investigators, countries, and organizations.

Egypt is mainly a desertic country as the deserts cover more than 97% of its total area and the rest in Nile valley and Delta. 65 Million people are living in this narrow strip of land. This high pressure of population cause many environmental problems and accelerate desertification processes caused by either climatic or human factors.

Desertification phenomena is clearly observed in certain regions. El-Menyia governorate is one of these regions. This current study aims at:

- Using recent areial photos to produce physiographic soil map with publication scale 1 : 200,000 &1 : 650.000.
- Detecting salinization, alkalization and water table depth of El-Menyia soil during the last 50 years.
- Monitoring urban encroachment on the cultivated areas within this period as well as, the fragmentation of land ownership and the rate of land trespass.
- Calculating the rate of sand dunes encroachment at the western side, and assessing soil loss by wind tunnel test.
- Determination of the soil loss after the over - flooding in selected wadies at the eastern side.
- Follow up the changes in the productivity of El-Menyia soils.
- Follow up the geomorphological changes of the island inside the river Nile.
- Follow up the changes in the biomass of El-Menyia soils.
- Production of final map of the desertification hazards in El-Menyia governroate.

This study is one in a series of studies started in 1979 ans still going on in the soil department, Cairo University using the aerial photo-interpretation and other remote sensing techniques, **Fig (1) and Table (1).**