بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

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

SAND DUNES IN NORTH SINAI, THEIR CHARACTERISTICS AND EFFECT ON AGRICULTURAL DEVELOPMENT

BY

Mostafa Mohamed Kotb Mohamed Khedr

B.Sc. in Agric. (Soil Science) Cairo Univ., 1985

M. Sc. in (Eremology), Ghent Univ., Belgium, 1993

A thesis submitted in partial fulfillment

of

the requirements for the degree of

Doctor of Philosophy

in

Agricultural Science

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Faculty of Agriculture

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2000

APPROVAL SHEET

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Abstract

Mostafa Mohamed Kotb Mohamed Khedr. Sand Dunes In North Sinai; Their Characteristics And Effect On Agricultural Development. Unpublished Ph.D. Thesis, Univ. of Ain Shams, Faculty of Agriculture, Department of Soil Sciences, 2000.

In North Sinai, a sand sea extends from the Mediterranean Coast to the northern slopes of El-Maghara and Halal Mountains in the south, and from the eastern borders of Egypt to Suez Canal. The area of sand dunes is about 12200 km^2. It is characterized by the presence of various types of sand dunes such as; barchan, linear, star, parabolic and transverse dunes. Sand dunes have been identified and investigated in the field and further by remote sensing technique. Sand dunes represent a serious problem for the development of any agricultural project.

The main objectives of this work are: 1- Identifying the characteristics of sand dunes in the studied area (form, size, movement, direction, some chemical and physical properties of sand dunes); 2- Produce landform map of two pilot areas using satellite and aerial photographs; 3- Establishing sand dune distribution map of North Sinai and 4- Produce erosion hazard map of North Sinai.

Three sites have been selected as pilot areas namely south El-Bardawil Lake, El-Rawafaa and south Gabal El-Maghara areas. Sand dunes have been studied in the field in the three areas and land resources have been studied in the first two sites. The obtained results show that; the area south El-Bardawil Lake could be classified into 5 land units namely; salt marshes, wet sabkha, dry sabkha, flat sand and sand dune areas.

The interpretation of aerial photos (1956 & 1994) of the area south El-Bardawil Lake and El-Rawafaa area (1985) reveal that the density of dunes had increased in the main wind direction during this period. Sand dunes characteristics have been studied. The result refers that sand dunes had been redistributed and reformed with time in the same area.

Field measurements on sand dunes movement had been carried out. Thirteen sand dunes have been selected to measure the rate of movement

in the period (20/ 6/ 1998 - 9/ 8/ 1999). The average rate of dune movement was found to be 11.16, 15.7 and 18.66 m/year in the area south El-Bardawil Lake, El-Rawafaa area and south El-Maghara areas, respectively. The variation may be due to the presence of some obstacle elements on the surface, dune size, texture, wind speed and vegetation cover of the dune surfaces.

The aeolian sand deposits which form sand dune areas are non-saline, non-calcareous (< 1.0%), have fine sandy texture. The color is dominated by very pale brown (10YR7/4, dry) to light yellowish brown (10YR6/4, moist). Total soluble salts are low, and soil reaction is mild alkaline (pH ranging from 7.5 to < 8.0). Sodium and calcium dominate the cationic composition, while chloride and sulfate are the dominant anions.

The interpretation of remote sensing data (Landsat TM images FCC, 1985) enabled to produce sand dunes distribution map of North Sinai. This map is subdivided into 26 units, 17 of them represent the dune types in the North Sinai study area. This map shows: 1- The main types of dunes occupy the different areas. 2- The topographic maps combined with wind data as layers were used to introduce sand dunes migration hazard map.

The migration hazard could be classified as following: **S1,** (no migration hazard), **S2,** (slight migration hazard), **S3,** (moderate migration hazard), **S4,** (severe migration hazard), **S5,** (very severe migration hazard). The results obtained reveal that: The total reclaimed area of El-Salam Reclamation Project is to be 400,000 feddans. An area about 124,169 feddan (31.0%) is not affected by dune migration hazard. An area about 275,831 feddan (69.0%) is affected by dune migration hazard. It is estimated that areas about 127,556 fed. (31.89%), 41,426 fed. (10.36%), 74.391 fed. (18.60%) and 32,458 fed. (8.11%) are suffering from slightly, moderately, severe and very severe dune migration hazard, respectively.

Key words: North Sinai, sand dunes, remote sensing, sand dunes migration hazard map, change detection assessment.

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