شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

Ain Shams University Information Network
جامعة عين شمس
شبكة المعلومات الجامعية
@ ASUNET

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

Ain Shams University Information Network
جامعة عين شمس
شبكة المعلومات الجامعية
ASUNET

بعض الوثائق الاصلية تالفة

Ain Shams University Information Network
جامعة عين شمس
شبكة المعلومات الجامعية
@ ASUNET

بالرسالة صفحات لم ترد بالاصل

DRAINAGE, WATER AND SALT BALANCES IN EASTERN DELTA SOILS AS AFFECTED BY NON-UNIFORM IRRIGATION

By

NABIL MOHAMED BADR

A thesis submitted in partial fulfilment

of

the requirements for the degree of
DOCTOR OF PHILOSOPHY

IN

Agricultural Science
(Soil Science)

Department of Soils
Faculty of Agriculture
Ain Shams University

1995

APPROVAL SHEET

DRAINAGE , WATER AND SALT BALANCES IN EASTERN DELTA SOILS AS AFFECTED BY NON - UNIFORM IRRIGATION.

BY

NABIL MOHAMED BADR

B.Sc. Agr. (Soil Science) Ain Shams University, 1974.
M.Sc. Agr. (Soil Science) Ain Shams University 1985.

This thesis for Ph.D degree has been approved by:

Prof. Dr. Azmy Mahmoud EL-Berry ...A. El berry...

Prof. of Agric. Eng., Fac. Agric. Cairo Univ.

Prof.Dr. Mahamed Samir Fouda ...M. S. Foda...

Prof. of Soil Science, Fac. Agric. Ain Shams Univ.

Prof.Dr. Moneer Abdo Aziz ...M. A. Aziz...

Prof. of Soil Science, Fac. Agric. Ain Shams Univ.

Date of Examination: 27/2/1995

DRAINAGE , WATER AND SALT BALANCES IN EASTERN DELTA SOILS AS AFFECTED BY NON - UNIFORM IRRIGATION.

BY

NABIL MOHAMED BADR

B.Sc. Agr. (Soil Science) Ain Shams University, 1974.
M.Sc. Agr. (Soil Science) Ain Shams University 1985.

Under the supervision of

Prof .Dr. Moneer Abdo Aziz
Prof. of Soil Science, Fac. of Agr. Ain Shams . Univ.

Prof .Dr. Abdel-Ghany Mohamed El-Gindy
Prof. of Agr. Eng., Fac. of Agr. Ain Shams. Univ.

Dr. Mohamed Safwat Abdel-Dayem
Director of Drainage Research Institute, Water Research Center, Min. of Pub. Works & Water Resources.

Abstract

A field experiment was conducted in Mashtul Pilot Area , Eastern Delta , Egypt to study the effect of irrigation uniformity on different drainage parameters, water and salt balances and crop yields . The experiment included two growth seasons to represent the summer and winter seasons and included also two types of irrigation , i.e. uniform and non-uniform irrigation .

The obtained results revealed that, the ground water table was below the layer of the root zone when the uniform irrigation was applied. The values of discharged water through lateral drains did not exceed the design discharg (1.00 mm /day). The application of the water and salt balance equations showed that, the highest values of evapotranspiration and stored water in soil profil were obtained when the uniform irrigation was applied and the values of calculated

discharges were higher than the measured ones, but there was an increas in these values under non-uniform irrigation . The amounts of removed salts by drainage water under non-uniform irrigation were higher than that under uniform irrigation and salts were accumulated in the soil profile only under the condition of uniform irrigation .

Concerning the yields of maize and clover , it was found that the use of non-uniform irrigation caused a noticeable decrease in these yields comparing with the uniform one . On the other hand , the amount of consumed water needed to produce 1 Kg of dry matter was higher when non-uniform irrigation was applied .

The effect of irrigation type on soil chemical properties was clear, while the soil physical properties were slightly or not affected by irrigation type .

Key words :
Mashtul Pilot Area , Irrigation type, Irrigation uniformity, Drain discharge, Ground water table, Water balance , Salt balance , Soil physical properties, Soil chemical properties , Maize yield , Clover yield,

ACKNOWLEDGEMENT

The author wishes to express his deepest thanaks and appreciation to **Prof. Dr. Moneer Abdo Aziz**, Professor of Soil Science, Faculty of Agriculture, Ain Shams Univ., for suggesting this research and for his supervision. He also wishes to express his sincere thanks to **Prof. Dr. Abdel Ghany Mohamed El-Gindy**, Prof. of Agricultural Engineering, Faculty of Agriculture, Ain Shams Univ., for his valuable guidnce, assistance and supervision. Grateful thanks are due to **Prof. Dr. Mohamed Safwat Abdel-Dayem**, Director of Drainage Research Institute, for valuable assistance and supervision.

Special thanks are also extended to **Prof. Dr. Nabil Mohamed El-Mowelhi**, Director of The Soil and Water Research Institute. Agric. Research Center, Ministry of Agric., for his help and valuable remarks during this study.

Sincer thanks are also, forwarded to all staff members of Soil and Water Research Institute, specially **Prof. Dr. Somaye Ahmed Hassanein, Dr. Mohamed Amin Abu Sinna and Dr. Nabil Kandil** for their assistance throughout this work.

Acknowledgement should be also extended to all staff members of Drainage Research Institute, for their help and providing facilities during this work.

Grateful thanks also to my wife **Dr. Shadia Abu Seada**, for her kind encouragement which made this study possible.

CONTENTS

LIST OF TABLES