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

# Management of Modern Irrigation Systems

# Under Arid Climate Conditions

By
Mohamed Ali Ahmed Rafeet
B. Sc. (Agricultural Mechanization) Faculty of Agriculture,
Ain Shams University, 1988

A thesis submitted in partial fulfillment
of
the requirements for the degree of

MASTER of SCIENCE
in
Agriculture
( Agricultural Mechanization )

Department of Agricultural Mechanization
Faculty of Agriculture
Ain - Shams University

1995

B 0 C 9

Approval Sheet

Management of Modern Irrigation Systems Under Arid Climate Conditions

by
Mohamed Ali Ahmed Rafeet
B . Sc . Ag . Mech (Department of Agriculture Mech.)
Ain-Shams University , 1988

This thesis for M . Sc . dgree has been approved by.

Prof . Dr . Azmy . M . EL - Berry ., ---------
Ag .Eng . Dept ,
Fac . of Ag.,
Cairo University .

Prof . Dr . Moneer Abdo .Aziz., ----------
Soils . Dept.,
Fac . of Ag.
Ain-Shams University .

Prof . Dr .Abdel Ghany M . EL Gindy., ----------
Ag . Mech . Dept.,
Fac . of Ag.
Ain-Shams University .(supervisor)

Date of examination : ٣٥/٨/1995

# Management of Modern Irrigation Systems Under Arid Climate Conditions

By

Mohamed Ali Ahmed Rafeet

B . Sc Ag . Mech . (Depatment of Ag . Mech .)
Ain- Shams University , 1988

Under Supervision of :

Dr . Abdel Ghany M . El - Gindy , Prof of Ag . Eng .
Ag . Mech . Dept ., Fac . of .Ag .Ain-Shams University ,

Dr . Ahmed M . El Araby , Prof of Soil Sci .,
Soil Dept ., Fac of Ag .Ain-Shams University ,

Dr . Mahmoud M . Hegazi , . Prof ., of Ag .Eng.,
Ag . Mech . Dept ., Fac .Of Ag .Ain - Shams University .

# ABSTRACT

**Mohamed Ali Ahmed Rafeet . Management of modern Irrigation Systems Under Climate Conditione. Unpublished Master of Science , University of Ain Shams , Faculty of Agriculture , Department of Agriculture Mechanization, 1995 .**

The aim of this study was to investigate the efficiency of different irrigation systems used in the reclaimed areas in the Egyptian desert .Besidses salinity , soil moisture and potassium distributions were studed under different irrigation management schemes . Crop yield and water use efficiency were also studied . Four cases were considered in order to elaborate modern irrigation systems management under arid climate conditions . These studies were performed in the calcareous soils at Maryut zone and sandy soil of Bustan area . The obtained results were as follows :
In the 1st experiment ; in case of the surface drip system soil moisture content was decreased with increasing distance from emitters up 60 cm while, it decreased with increasing soil depth up to 40 cm. At soil depth more than 40 cm soil moisture increased , because of shallow water table . Under subsurface, drip soil moisture distribution was more uniform comparing with that of surface drip . EC values and soluble potassium content were increased with increasing distance from emitter and increased with increasing soil depth in all treatments . More salt and potassium were accumulated on the top soil , particularly after removing the crop .
In the 2nd experiment ; soil moisture contents at flowering and harvesting stages were decreased with increasing distance in both horizontal and vertical directions from the emitters in all treatments . In the control treatment (no mulch ) EC, values were increased with increasing distances from emitters in vertical and horizontal directions. Under plastic mulch ,EC, values was more uniform distance and soil depths than that of the control (no mulch ) .
Soluble potassium was increased with increasing lateral and vertical distances from emitters at both flowering and harvesting stages , when black plastic mulch was used ,while in the control treatments (no mulch) it was increased with increasing distances from laterals and soil depths at the same stages .
Tomato yield increased under black plastic mulch with 19% and 16% comparing with white plastic mulch and control ,respectively . Consequently WUE was better upon black plastic mulch , and reached 6.95 kg/m3 , while under control and white plastic

under control and white plastic mulch treatment they reached 6.0 and 5.85 kg/m3 respectively .

In the 3ed experiment ; soil moisture was decreased with increasing distance from bubbler and microjet in horizontal and vertical directions . In the root zone ,soil moisture content under bubbler was more than that under microjet . Bubbler irrigation system was succeeded to remove salt out of the root zone as compared with microjet . Soluble potassium was increased with increasing lateral distance and soil depths under both bubbler and microjet . In the 4th experiment; soil moisture content in the root zone more under surface drip than sprinkler and subsurface drip in sandy soil profile . Water use efficiency were 4.97 , 5.11 and 3.19 Kg/m3 for sprinkler , surface and subsurface drip, respectively .

Keywords :
irrigation management , surface and subsurface drip , plastic mulch ,bubbler and microjet , water use efficiency , moisture distribution ,salt distribution , soluble K .

## ACKNOWLEDGMENT

The author wishes to express his deepest gratitude to prof . Dr . A . M . EL -Gindy , Professor of Agricultural Engineering , Dept. of Mechanization , Faculty of Agriculture,Ain-Shams University , prof . Dr . A .M .EL -Araby , Professor of Soil Science , Dept. of Soils , Faculty of Agriculture . Ain-Shams University, and . Prof Dr M . M . Hegazi , . Professor of Agricultural Engineering , Dept. of Mechanization , Faculty of Agriculture , Ain Shams-University, forthier planning , supervising and advising throughout the work and writing the manuscript .

The author wishes also to thank dewan of Royal Court in Sultanate of Oman,and Ministry of High Adduction , Sultanate of Oman for preducing this chance to me, and complete my high education .