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التوثيق الالكتروني والميكروفيلم



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# جامعة عين شمس

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١٤٠٢

**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

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**Abstract**

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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 increase 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,

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