

**LONG-TERM EFFECT OF IRRIGATION BY LOW-WATER  
QUALITIES ON SOIL PROPERTIES AND PRODUCTIVITY**

BY



**ADEL ABDEL RASHEED SOLIMAN MOHAMED**  
*B.Sc. Agr. (Soil Science), Ain Shams University, 1976*

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**ADEL ABDEL RASHEED SOLIMAN MOHAMED**  
*B.Sc. Agr. (Soil Science), Ain Shams University, 1976*

This thesis for master degree has been approved by:

**Prof. Dr. Fahmey Mohamed Habib**

*Prof. of Soil Sci. Fac. of Agr. Mashtohor, Zagazig Univ.*

*F. Habib*

**Prof. Dr. Hasnaa Abu-Gabal Mohamed**

*Prof. of Soil Sci. Fac. of Agr., Ain Shams Univ.*

*E. Abugabal*

**Prof. Dr. Moneer Abdo Aziz**

*Prof. of Soil Sci. Fac. of Agr., Ain Shams Univ.*

*A. Aziz*

Date of examination : 1 / 7 / 1996



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**ADEL ABDEL RASHEED SOLIMAN MOHAMED**

*B.Sc. Agr. (Soil Science). Ain Shams University, 1976*

Under the supervision of

**Prof.Dr. Moneer Abdo Aziz**

*Prof of Soil Sci. Fac. of Agr. Ain Shams Univ.*

**Prof.Dr. El-Tony Mohamed Ali**

*Prof of Soil Sci. Fac. of Agr. Ain Shams Univ.*

**Prof.Dr. Dia El-Din El-Quosy**

*Director of water management Ins.*

### *Abstract*

**Adel Abdel Racheed Soliman, long-term effect of irrigation by low-water qualities on soil properties and productivity. Unpublished Master of science, University of Ain Shams, Faculty of Agriculture, Department of Soil Science, 1996.**

The present work was conducted to evaluate the long term effect of using low water qualities (Drainage water) on soil properties and productivity of different cultivated crops. The study was carried out in two areas, El-Hamul and San El-Hagar areas in Kafr El-Sheikh and Sharkia Governorates, respectively , Egypt

The obtained results reveal that, the long-term use of drainage water for irrigation purposes increased soil salinity, and TDS especially in San El-Hagar area. Exchangeable calcium was the dominant cation as compared with the other cations and there was a marked increase in ESP in the areas irrigated with drainage water and this increase reached about double values in El Hamul area. Consequently, the values of DSA and WSA and structure parameters were influenced negatively by increasing ESP values and low aggregation stability was obtained. The correlation coefficients between both ESP and soluble sodium with aggregate sizes and structure parameters showed that ESP affected markedly on structure parameters more than soluble sodium in both areas.

On the other hand, soil bulk density was slightly decreased when drainage water was used for irrigation in both areas, while total soil porosity was increased and also the values of retained soil moisture. The values of field capacity, wilting percentage and available water capacity were increased when drainage water was used for irrigation compared with conventional one. The mean values of total effective pores was decreased when drainage water was used in San El-Hagar area as compared with El-Hamul one, while



the mean value of quickly drainable pores were decreased when drainage water was used for irrigation in San El-Hagar and El Hamul areas. The values of infiltration rate were increased in El-Hamul area as compared with San El-Hagar one under the conditions of irrigation with drainage water. The data of crop yields in both studied areas indicated to a decrease in the productivity when carried out by drainage water.

The amount of decrease in yields per one unit increase in  $EC_{ex}$  are 2.29, 0.776, 0.642 and 0.695 units crop for Clover, Wheat, Rice and Maize, respectively in El Haul area while, the decrease was 1.887, 0.469, 1.50 and 0.419 for the same crops, respectively in San El-Hagar area.

**Keywords :**

El-Hamul area, San El-Hagar area, Irrigation water quality, Drainage water, Conventional water, Soil chemical properties, Soil physical properties, Soil productivity

the 1990s, the number of people in the world who are undernourished has increased from 600 million to 800 million (FAO 1996).

There are a number of reasons for this increase. First, the world population has increased from 5 billion in 1987 to 6 billion in 1999, and is projected to reach 8 billion by 2025 (UNEP 1999). Second, the world population is ageing, and the number of people aged 65 and over is projected to increase from 200 million in 1990 to 500 million in 2025 (UNEP 1999). Third, the world population is becoming more urban, and the number of people living in urban areas is projected to increase from 1 billion in 1990 to 2 billion in 2025 (UNEP 1999).

Fourth, the world population is becoming more mobile, and the number of people who are mobile is projected to increase from 1 billion in 1990 to 2 billion in 2025 (UNEP 1999). Fifth, the world population is becoming more educated, and the number of people who are educated is projected to increase from 1 billion in 1990 to 2 billion in 2025 (UNEP 1999). Sixth, the world population is becoming more affluent, and the number of people who are affluent is projected to increase from 1 billion in 1990 to 2 billion in 2025 (UNEP 1999).

These factors are all contributing to the increase in the number of people who are undernourished. However, there are also a number of factors that are contributing to the decrease in the number of people who are undernourished. These factors include:

- The increase in the number of people who are employed in the agricultural sector.
- The increase in the number of people who are employed in the manufacturing sector.
- The increase in the number of people who are employed in the service sector.
- The increase in the number of people who are employed in the public sector.

These factors are all contributing to the decrease in the number of people who are undernourished. However, there are also a number of factors that are contributing to the increase in the number of people who are undernourished. These factors include:

- The increase in the number of people who are unemployed.
- The increase in the number of people who are employed in the informal sector.
- The increase in the number of people who are employed in the agricultural sector.
- The increase in the number of people who are employed in the manufacturing sector.

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