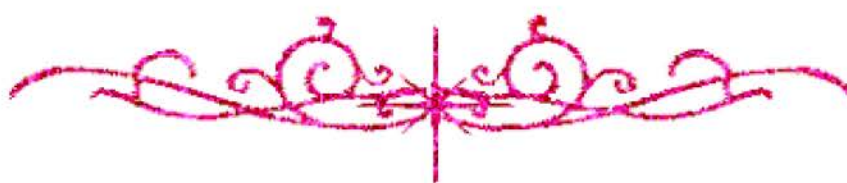


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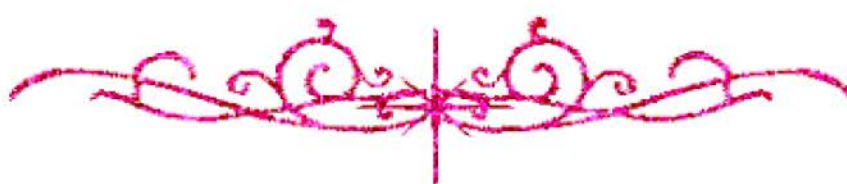
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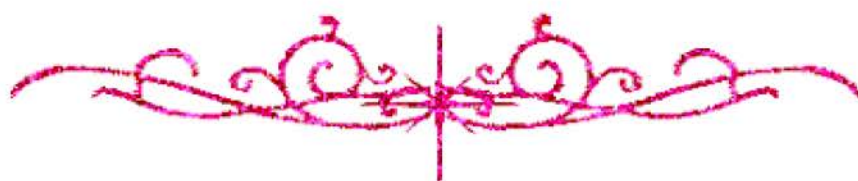
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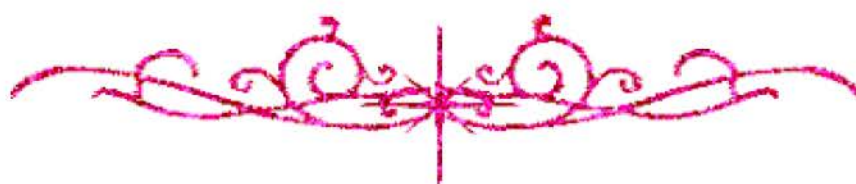
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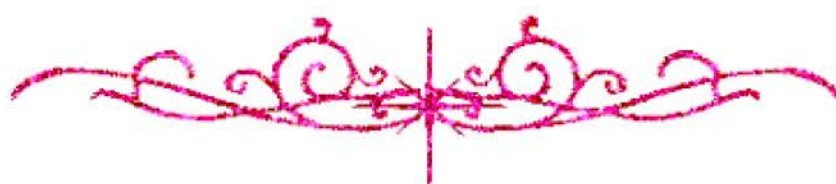
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IRRIGATION AND HYDRAULICS DEPARTMENT**
Mohsen M. Sherif

NUMERICAL SIMULATION OF WATER POLICIES IN MIDDLE NILE DELTA

BY

**Wael Mohamed Khairy Aly Gondia
B. Sc. in Civil Engineering
(1990)**

**A THESIS SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE
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IN CIVIL ENGINEERING**

SUPERVISED BY

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Head, Irrigation and Hydraulics
Department
Faculty of Engineering
Cairo University**

**Prof. Dr. Safwat Abdel Dayem
Director, Drainage Research Institute
National Water Research Center**

**Dr. Mohsen M. Sherif
Associate Prof., Irrigation and Hydraulics
Department
Faculty of Engineering
Cairo University**

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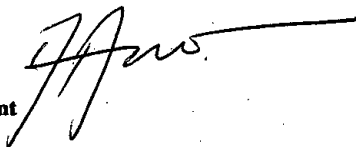
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BY

Prof. Dr. Abdel Wahab Amer
Head, Irrigation and Hydraulics Department
Faculty of Engineering, Cairo University



Prof. Dr. Ibrahim El-Assuoty
Irrigation and Hydraulics Department
Faculty of Engineering, Cairo University

Prof. Dr. Mohamed H. Amer
Ex. Director, Drainage Research Institute
National Water Research Center

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ABSTRACT

The present situation of the water availability for the different purposes in EGYPT is critical. So that, the future prospectives are alarming as a result of the rapidly increasing water requirements, while the water resources are limited. The water use must be subjected to strict rationalization strategies.

The numerical simulation model SIWARE had been calibrated and validated by the Drainage Research Institute of the National Water Research Center over the three Nile Delta regions during the period (1985-1990). The SIWARE is a powerful and a predictive tool for analyzing different water policies on regional scale. In other words, the SIWARE simulates and predicts short and long term effects of changes in: water supply, cropping pattern, irrigation processes, drainage water quantity and salinity, ...etc, in the Nile Delta regions.

In this thesis, the SIWARE model has been used successfully to simulate the actual irrigation, agriculture and drainage conditions of Middle Delta region during year 1991. Also, the regional water and salt balances for Middle Delta region, based on data of year 1991, have been analyzed. Then, three water policies have been carried out.

The Nile water supply reduction policy is to save considerable quantities of the Nile water at the Delta barrages to irrigate new reclamation projects in the Delta fringes. Besides, studying the effects of water shortage condition. Crop production and soil salinity are not allowed to be significantly infected. The results of that policy shows that, the Nile water supply can be reduced by 10% without

significant adverse effects on both crop production and soil salinity on the long term, providing that, the shortage of water would be compensated by improving the irrigation system efficiency and by reusing additional quantities of drainage water in irrigation.

Reducing the drainage water disposed to the Sea allows its use in irrigating new reclaimed areas in the northern parts directly or after mixing with fresh water. The results of that policy show that, the drainage water disposed to the Sea could be decreased by 30%. Moreover, about 43,000 feddan could be reclaimed in the northern area of Middle Delta.

Sharp shortage in the Nile water supply for one year has been simulated by the SIWARE model. This policy has differentiated between four different water management scenarios by a graphical method, on the small sub-area level. The result of that policy shows that, the actual water management, under practice now by the Ministry of Public Works and Water Resources, is the best with the least adverse effects under severe Nile water supply shortage for one year.

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92

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182
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184
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186
187
188
189
190
191
192
193
194
195
196
197
198
199
200

TABLE OF CONTENTS

Name

ABSTRACT	i
ACKNOWLEDGMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	xi
LIST OF FIGURES	xiv

CHAPTER 1 INTRODUCTION

1.1 Introduction	1
1.2 Problem Definition	5
1.3 Objectives of The Research	6
1.4 Methodology	8

CHAPTER 2 REVIEW OF LITERATURE

2.1 Introduction	9
2.2 Utilization of Simulation Models	10
2.3 Models Classification	11
2.3.1 Flow Models	11
2.3.2 Subsidence or Deformation Models	11
2.3.3 Mass Transport Models	12
2.3.4 Heat Transport Models	12
2.4 Methods of Solution	12
2.4.1 Analytical Methods	12
2.4.2 Stochastic Methods	13
2.4.3 Discretized Methods	13
2.4.4 Analog Methods	13
2.4.5 Numerical Methods	14
2.5 Previous Simulation Models in Irrigation, Hydraulics and Hydrology Fields	16

2.5.1	A Mathematical Model of Crop Yield-Irrigation Water Relationship	16
2.5.2	General Irrigation System Model	18
2.5.3	Mathematical Method For Design And Evaluation of Drainage Water Management System For Soils With High Water Table (DRAINMOD)	19
2.5.4	A Mathematical Model of The Irrigation Distribution System	22
2.5.5	A Planning Model For Irrigated Agricultural Expansion (El-Salam Canal Project)	23
2.5.6	Coordination of Regional Water Resources Supply And Planning Demands For New Lands	25
2.5.7	Optimization of Water Resources For Irrigation in East Jordan	26
2.5.8	Unit Command Area Model And Main System Hydraulic Model	26
2.5.9	Planning Distribution Model For Egyptian Irrigation Network	28
2.5.10	A Mathematical Model For Water Allocation in The Egyptian Network	29
2.6	Unsteady Flow Mathematical Modeling Techniques	30
2.6.1	Numerical Simulation of Water Management in The Arabic Republic of Egypt Using SIWARE Model	33
2.7	SIWARE Model Verification	38
2.7.1	Calibration of SIWARE Model on Middle Delta Region	41
2.7.2	Validation of SIWARE Model on Middle Delta Region	43
2.8	Disadvantages of SIWARE Model	44
2.9	Advantages of SIWARE Model	46
2.10	Final Comment	47