

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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Cairo University

**DECISION TOOL DEVELOPMENT FOR
DESALINATION TECHNOLOGY SELECTION AT
MENA AND GCC REGIONS USING HYBRID FUZZY**

By

Amjad Ezeddeen Salah Jarada

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
IN
IRRIGATION AND HYDRAULICS ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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Title of Thesis:

**Decision Tool Development For Desalination Technology Selection at
MENA and GCC Regions Using Hybrid Fuzzy**

Key Words:

Desalination technology, Fuzzy, desalination cost, TOPSIS, AHP

Summary:

Seawater desalination technologies have been used extensively in Middle East and North Africa (MENA) and Gulf Countries Council (GCC). These technologies have its own advantages, challenges, development trend and applicability. This research aims to develop an application as a decision support for selection the feasible seawater desalination technology using a hybrid fuzzy technique as Multi-Criteria Decision Making (MCDM) approach. This hybrid technique integrates Fuzzy -AHP to model the linguistic vagueness, ambiguity, and incomplete knowledge with TOPSIS to rank the technologies upon their overall performance. Four main criteria are adopted which are: technical, economic, environmental and technology trend with total of 28 sub-criteria developed. Finally, the developed application (named as: DESAL-MCDM) provides more accurate, effective and objective decision tool for selection feasible desalination technology.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Date:/...../ 2019

Signature:

Dedication

This PhD thesis is dedicated to my father, mother, sisters,
brothers and my lovely wife and children

For their endless love and support

