# بسم الله الرحمن الرحيم


MONA MAGHRABY

# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

# جامعة عين شمس

# التوثيق الإلكتروني والميكروفيلم

# قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

# يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

***MONA MAGHRABY***

# EXTENDING THE APPLICATION OF SCS CURVE NUMBER METHOD TO BE USED WITH ANNUAL RAINFALL TO ESTIMATE ANNUAL DIRECT RUNOFF IN ARID REGIONS

By

**Ayman Mohamed Mokhtar Ahmed**

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
**MASTER OF SCIENCE**
In
**IRRIGATION AND HYDRAULICS ENGINEERING**

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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Under the Supervision of

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Approved by the
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**Title of Thesis:**

Extending The Application of SCS Curve Number Method To Be Used With Annual Rainfall To Estimate Annual Direct Runoff In Arid Regions

**Key Words:**

Hydrology; Rainfall-Runoff Transformation; Soil Conservation Service (SCS); Curve Number; Arid Regions

**Summary:**

The SCS-CN runoff curve number method is one of the most popular rainfall-runoff transformation method. However, it is considered an event-based method, which creates a problem when the daily rainfall records are not available, and the annual rainfall values are the only available rainfall information. In this respect, this study aimed to propose an approach to provide reasonable estimates of annual direct runoff when daily rainfall records are unavailable. This would be done by developing relationships to relate the total annual rainfall to the runoff depths, using the same SCS-CN methodology and parameters, provided that the difference with the event-based method is tolerable. Study area was divided to 13 regions with their associated rainfall stations, SCS-CN method was applied to calculate the runoff depths using daily and annual rainfall records, then correlation and regression analysis (Simple linear and nonlinear) were used to develop the relationships between the total annual rainfall to the runoff depths at different CN values for each region. Finally, the performance of the developed relationships was evaluated by checking regression coefficients and applying other statistical validation tests on developed relationships.

# 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.

Name: Ayman Mohamed Mokhtar Ahmed Date: / /2020

Signature:

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