بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / منى مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

OPTIMIZING THE EFFICIENT USES OF RAINFALL AND FLASH FLOODS

(CASE STUDY ON SAINT CATHERINE AREA – SOUTHERN SINAI)

Submitted By

Eman Mahmoud Abdel Kader Mostafa

B.Sc. of Agricultural Science, Faculty of Agriculture, Cairo University, 2008

A Thesis Submitted in Partial Fulfillment
Of
The Requirement for the Master Degree
In
Environmental Sciences

Department of Environmental Agricultural Sciences

faculty of Graduate Studies and Environmental Research

Ain Shams University

2022

APPROVAL SHEET

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قَالوُاسُبحَانَك لاَعِلمَ لنَا إلا مَاعَلمتَنَا
إنكَ أَنتَ العَلِيمُ الحَكِيمُ

صدق الله العظيم
(سورة البقرة – الآية ٣٢)

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ABSTRACT

A Flash Flood is a flood that follows the causative event (excessive rain, dam or level failure..etc) within a few hours. It can be mitigated by managing and controlling the water movement by redirecting flood run-off through the use of flood walls and flood gates. The current study aims at investigating the Environmental Impact Assessment of the flash flood and the construction of walls to reduce the movement of water and harvesting it in constructed mountainous lake. The harvested water used in cultivation Tomato and cucumber in green houses. The EIA reveal the positive impact of constructing lake and using the harvested water in cultivation on the social. economy and biodiversity items.

Key words: flood mitigation, constructed mountainous, cultivation in green house, Environmental Impact Assessment (EIA).

Table of symbols

Shortcuts	
EIA	Environmental Impact Assessment
WMS	Watershed Modeling System
SCS	Soil Conservation Service
amsl	above mean sea level
m^3	Cubic meter
Kg/ m^3	Kilogram per Cubic meter
Kg/ m^2	Kilogram per meter square
dS/m	Decisimens per meter
BCM	Bellion Cubic meter
Ca	Calcium
Mg	Magnesium
Na	Sodium
K	potassium
CO_3	Carbonate
HCO_3	Bicarbonate
SO_4	Sulfate
Cl	Chloride
$CaCO_3$	Calcium Carbonate
Ec	Electrical Conductivity
TDS	Total Dissolved Solids
HEC	Hydrologic Engineering Center’s

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1-Introduction

1.1 Background

Storms and floods are a normal and inevitable part of climate variability that must be managed. We cannot always control floods. Therefore, we must learn how we can live with them while minimizing risks to human lives and infrastructure. Flash floods are especially common in mountainous areas where rapid snowmelt or heavy rainfalls are quickly transformed into runoff.

Rainfall-runoff relationships play a vital role in many aspects of watershed management. For example, determining the availability and sustainability of water resources, design of flood protection works. However, one of the main hydrologic problems is the derivation of the rainfall-runoff relationship.

A Hydrograph is the variation of stage or other water property with respect to time, taken at a particular point on a stream, usually an outlet from the watershed.

The main applications of hydrologic modeling are for planning purposes, management practices, and rainfall-runoff prediction (Singh, 1995). Each of these applications starts with a certain amount of rainfall over the watershed region, then excess runoff is determined after all other abstractions are accounted for, and finally the desired hydrologic model is applied in order to simulate the runoff hydrograph.

1.2 Classifications of hydrological models

From the historical development of the hydrological models, modeling approaches can be classified, into two major types:

Stochastic Models

These models are black box systems, based on available data it uses mathematical and statistical concepts to link a certain input (for instance rainfall) to the model output (for instance runoff).

- **Deterministic hydrology models**

These models try to represent the physical processes observed in the real world. Hence, the results produced by these models display the average watershed conditions. These models are usually based on the concept of the unit hydrograph, UH. These models try to describe three basic processes within any watershed, namely,

Despite lumped hydrologic models gained widespread due to their low computational requirements and the minimal amount of information required to generate reasonable results. However, the advent of high powered, low cost computers and the growing amount of GIS information that is available online has somewhat negated these original advantages. This has led to the relatively recent development of an alternate hydrologic modeling as gridded hydrologic models.

- **Distributed models**

The distributed models are well suited for:

a) Evaluating the effects of land-use change within a watershed,

b) Evaluating the effects of spatially variable inputs and outputs,

c) Simulating the water quality and sediment yield on a watershed basis.