

A STUDY OF THE CHARACTERISTICS OF STREAMFLOW
IN HAPUWELA SUBCATCHMENT IN HANGURANKETA

BY

M.H.MEERA MOHIDEEN

A RESEARCH REPORT

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT

FOR THE

ADVANCED COURSE IN

AGRICULTURAL ENGINEERING

FOR THE DEGREE OF

BACHELOR OF SCIENCE IN AGRICULTURE

EASTERN UNIVERSITY, SRILANKA

CHENKALADY

1986

APPROVED



FAG04



Project Report
Library - EUSL

P. Krishnarajah

MR.P.KRISHNARAJAH

(SUPERVISOR)

HEAD/SOIL CONSERVATION DIVISION,

DEPARTMENT OF AGRICULTURE,

PERADENIYA,

SRILANKA.

S. Sivasubramaniam

DR.S.SIVASUBRAMANIAM

HEAD / DEPARTMENT OF AGRONOMY,

FACULTY OF AGRICULTURE,

EASTERN UNIVERSITY,

CHENKALADY,

SRILANKA.

27

42710

PROCESSED
Main Library, EUSL

ABSTRACT

Streamflow is that portion of the precipitation that makes its way towards stream channels, lakes or oceans as surface or subsurface flow. The flow of stream is controlled principally by variation in precipitation. Relationship between precipitation and streamflow characteristics are the basis for efficient forecasting for the operation of hydraulic projects and for water based creations and management.

The catchment streamflow as characterized by total discharge, peak discharge, time to peak and runoff duration was analysed for its cause and effect relationship with rainfall characteristics and area for Maha and Yala season. Streamflow data were obtained from four runoff recording stations located at the Napuwela subcatchment which lies in the mid country intermediate zone. Rainfall data were abstracted from the automatic daily rainfall chart. The average values on runoff and rainfall were calculated based on five years records available for the same catchment.

The study shows, total rainfall has positive and high correlation with streamflow characteristics except the runoff duration in which correlation is less. Considering the average intensity, positive correlation was observed with total discharge and peak discharge, whereas, negative correlation was obtained with time to peak and the correlation was negligible with runoff duration. The relationship between these two set of parameters seem to be high in Maha season than in Yala season. This indicates the influence of other soil and climatic variables is more in the Yala season. Area, too has a positive

CONTENTS

	Page
Abstract	i
Acknowledgement	iii
Contents	iv
List of figures and Tables	vi
1. INTRODUCTION	1
1.1. Streamflow and associated problems	1
1.2. Importance of streamflow studies	2
2. LITERATURE REVIEW	4
2.1. Precipitation	4
2.1.1 Measurement of precipitation	6
2.1.1.1. Precipitation gauges	6
2.1.1.2. Errors in measurement of precipitation	7
2.2. Runoff	7
2.2.1 Components of runoff	7
2.2.2 Factors affecting runoff	10
2.2.2.1 Climatic factors	10
2.2.2.2 Physiographic factors	12
2.3. Streamflow	13
2.3.1 Classification of streamflow	14
2.3.2 Measurement of streamflow	14
2.3.2.1 Discharge measurement	14
2.3.2.2 Measurement of streamflow velocity	16
2.4. Elementary relationship between precipitation and streamflow	17
2255. Hydrograph representation of streamflow	17

3. MATERIALS AND METHODS	20
3.1. Background of the study area	20
3.2. Data collection	23
3.2.1 Place	23
3.2.2 Source of data	23
3.2.3 Collection of data	24
4. RESULTS	32
5. DISCUSSION	37
5.1. Relationship between total rainfall and streamflow characteristics	37
5.2. Relationship between average intensity and streamflow characteristics	39
5.3. Relationship between area and streamflow characteristics	40
6. CONCLUSIONS	42
Appendix :1	44
:2	45
Bibliography	46