

Declaration by the candidate :

I declare that the work included in this dissertation in part or whole, has not been previously presented for any other academic qualification at any institution for a higher degree.

Eng. I. D. S. Samarasinghe.

April 2002.



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Acknowledgement :

The study for this project was carried out as an integral part of the Master of Engineering course in Water Resources Engineering and Management, at the University of Moratuwa, Sri Lanka.

I would like to express my heartfelt gratitude to Eng.(Dr.) S. S. Wickramasuriya, my wonderful supervisor, for his valuable guidance and constant encouragement throughout this study. The successful completion of this project was possible because of his precious advises and support.

My deepest gratitude goes to my employer, the Department of Irrigation, Sri Lanka, which gave me the opportunity to pursue higher studies. I must specially thank Eng. W. P. Jinadasa- the Director General, Eng V Regunathan – former Director (Regional Development & Construction), Eng S. Jayawarna -Deputy Director (Training) and Eng. G.V. Ratnasara – Deputy Director (Planning) for their support, guidance and encouragement.

I must specially thank my mother because, when my father passed away when I was seven years old, she single handedly brought up my two brothers and myself and educated us. Without her courage and commitment, which laid the foundation for my professional carrier, this study would not have been possible.

Finally, I thank my husband Keerthi Sirisinghe who is a tower of strength to me and my adorable son Bhasara who constantly reminded me that I have spent so much time on this work than with him.

IDSS/2002

Contents:

	Page
Acknowledgement.	
Summary	
Chapter 1.0 : Introduction.	1
The changing climate.	1
Problems due to climate change.	2
Chapter 2.0 : The objectives of the research.	9
Data & methodology.	9
	10
	10
Chapter 3.0 : General Background	12
Sri Lanka ; Location, topography and climate.	12
Influence of rainfall on agriculture in Sri Lanka.	15
Chapter 4.0 : Statistical Techniques Adopted.	17
Statistical characteristics	17
Mean annual precipitation	17
Standard Deviation.	18
Variance;	18
Coefficient of variation	18
Test of hypothesis and significance;	
“Student’s” t distribution test.	19
Moving average of precipitation.	20
Moving standard deviation of precipitation.	20
Moving coefficient of variation of precipitation.	20
Generating normally distributed precipitation data using pseudo-random numbers, for simulation.	21
Chapter 5.0 : Results and Discussion	22
Normality of the annual & seasonal precipitation.	22
Visual observations.	23
Annual Rainfall	23
Seasonal Rainfall	24
Statistical calculations.	26
Tests of Hypothesis & significance.	26
Observations of Moving Standard Deviation & Moving Coefficient of Variation.	27
Observations of Meteorological station at Nuwara-Eliya.	27
Chapter 6.0 : Conclusions	28
Bibliography:	31

List of Tables :

Table 1 - District wise paddy production in Sri Lanka.

Table 2 – Statistical characteristics of Annual and Seasonal Rainfall for 100 years. (1899-1998)

Table 2a – Statistical characteristics of Monthly Rainfall for 100 years.(1899-1998)

Table 3 - Statistical characteristics of Annual rainfall for 30 years.

Table 3a- Statistical characteristics of Seasonal rainfall –Anuradhapura-for 30 years.

Table 3b- Statistical characteristics of Seasonal rainfall –Hambantota-for 30 years.

Table 3c- Statistical characteristics of Seasonal rainfall –Puttalam-for 30 years.

Table 3d- Statistical characteristics of Seasonal rainfall –Galle-for 30 years.

Table 3e- Statistical characteristics of Seasonal rainfall –Ratnapura-for 30 years.

Table 3f- Statistical characteristics of Seasonal rainfall –Kurunegala-for 30 years.

Table 4- Annual rainfall-30 year Moving Average.

Table 5- Annual rainfall-30 year Moving Standard Deviation & Moving Coefficient of Variation.

Table 6- Seasonal rainfall-30 year Moving Average.

Table 7- Seasonal rainfall-30 year Moving Standard Deviation

Table 8- Seasonal rainfall-30 year Moving Coefficient of Variation.

Table 9- Observations for the meteorological station at Nuwara-Eliya.

List of Annexes :

- Annex 1** -Normality of the Annual and Seasonal rainfall.
- Annex 2** -Monthly Average of rainfall for the six meteorological stations.
- Annex 3** -30 year Moving Average of Annual rainfall
- Annex 4** -30 year Moving Average of Seasonal rainfall.
- Annex 5** -Moving Average of generated annual rainfall-5000 years
- Annex 6** -“Student’s” t-Distribution test results.
- Annex 7** -Moving Standard Deviation and Moving Co-efficient of Variation of Annual & Seasonal rainfall.
- Annex 8** -Moving Average, Moving Standard Deviation & Moving Co-efficient of Variation plots of Nuwara-Eliya .



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk