

C o n t e n t s

List of Tables	viii
List of Figures	x
List of Maps	xi
List of Appendices	xii
List of Photos	xiii
Abbreviations	xiv
 PREFACE	 xv
 I. INTRODUCTION	
A. The Objectives Defined	1
B. The 'Area' Defined	5
 II. THE INDIAN MONSOON	 13
 III. PREREQUISITES FOR A DETAILED CLIMATOLOGICAL ANALYSIS OF THE NILGIRIS AREA	
A. General Approach	24
B. History of Meteorological Observations	25
1. Period of Isolated Local Observations (before 1865)	25
2. Period of Provincial Systems of Meteorological Observations (1865 - 1875)	27
3. Period of the India Meteorological Department (after 1875)	28
C. Data Accessibility	33
D. Data Collection	35
E. Data Processing	37
F. Existing Climatological Studies	40
 IV. ELEMENTS OF WEATHER AND CLIMATE - THEIR SPATIAL AND TEMPORAL DIFFERENTIATION	
A. Method of Presentation	41
B. Atmospheric Pressure	42
1. Introduction	42
2. Periodic Variations	42
a) Diurnal Variations	42
b) Annual Variations	43
c) Vertical Pressure Gradients	45
d) Horizontal Pressure Gradients	45
3. Non-Periodic Variations	47
C. Surface Winds	49
1. Introduction	49
2. Wind Direction	50
3. Wind Velocity	57
a) Instrumental Observations	57
b) Field Observations	62

D. Atmospheric Moisture	66
1. Introduction	66
2. Annual Variations	66
3. Diurnal Variations	69
E. Cloudiness, Fog, and Visibility	72
1. Introduction	72
2. Annual Variations	73
3. Diurnal Variations	76
F. Solar Radiation	79
1. Introduction	79
2. Global Radiation	79
3. Sunshine	81
G. Temperature	87
1. Introduction	87
2. Annual Temperature	89
3. Monthly Temperature	91
4. Diurnal Temperature	94
5. Frost	101
a) Introduction	101
b) Distribution of Frost	104
c) 'Frost Season' and Frequency of Frost	105
d) Intensity of Frost	110
e) Micro-climatic Aspects of Frost	115
ea) Dunsandle Estate: A Case Study	118
H. Rainfall	130
1. Introduction	130
2. Average Rainfall Amounts	133
a) Annual	133
b) Monthly	137
c) Seasonal	152
3. Average Rainfall Frequency	161
a) Annual	161
b) Monthly and Seasonal	163
4. Average Rainfall Intensity	166
a) Annual	166
b) Monthly and Seasonal	167
5. Rainfall Variability and Extremes	171
a) Annual	172
b) Monthly and Seasonal	176
c) Daily and Hourly	186
6. Rainfall Probability and Predictability	190
a) Constant Percentage Probability	190
b) Constant Rainfall Amount Probability	193
c) Rainfall Predictability	196
I. Other Forms of Precipitation	203
1. Hail	203
2. Mist and Fog	204
3. Dew	205
J. Cyclonic Disturbances	206
1. Introduction	206
2. India and Adjacent Ocean Areas	207
3. The 'Cuddalore Cyclone' in 1972: A Case Study	209

V. HYDROLOGY AND THE WATER BALANCE - THE DROUGHT PHENOMENON	
A. Introduction	215
B. Precipitation Drought	216
1. Dry Months and Periods	216
2. Dry Spells	219
C. Atmospheric Drought	222
1. Aridity Index	223
2. Potential (Pan) Evaporation	225
3. Potential Evapotranspiration and Water Balance	230
D. Hydrological Drought	236
1. Introduction - Data Position	236
2. Annual Runoff	239
3. Runoff Regimen and Water Balance	241
4. Water Storage Schemes	245
a) Irrigation	245
b) Hydro-Electric Power Generation	248
VI. SUMMARY	250
Selected Bibliography	254
Maps	276
Aerial Photographs	276
Appendices	277
Photos	313
Index Map (in pocket of back cover)	