

C O N T E N T S

	<u>Page No.</u>
Preface	i-IV
List of Tables	XI-XIV
List of Figures	XV-XVII
List of Plates	XVIII-XIX
<u>Introduction</u>	1-3
A. The Problem	1
B. The Area of Study	4
C. Methodology	5
<u>Chapter I : The Physical Background of the Area of Study</u>	9-33
A. Regional Geology	9
B. Climate	16
C. Soil	23
D. Natural Vegetation	26
E. Conclusions	29
<u>Chapter II : Geomorphology of the Basins</u>	34-98
Introduction	34
A. Slope Analysis	37-47
a. Average slope of the Lish basin	37
b. Average slope of the Gish basin	42
c. Conclusion	46

	<u>Page No.</u>
B. Relative Relief	46-55
a. Relative Relief of the Lish basin	48
b. Relative Relief of the Gish basin	52
c. Conclusion	55
C. Drainage Density	55-53
a. Drainage Density of the Lish basin	56
b. Drainage Density of the Gish basin	60
c. Conclusion	63
D. Drainage Frequency	64-71
a. Drainage Frequency of the Lish basin	64
b. Drainage Frequency of the Gish basin	68
c. Conclusions	71
E. Dissection Index	72-79
a. Dissection Index of the Lish basin	72
b. Dissection Index of the Gish basin	76
c. Conclusions	78
F. Roughness Index	80-83
a. Roughness Index of the Lish basin	80
b. Roughness Index of the Gish basin	84
c. Conclusions	87

	<u>Page No.</u>
G. Correlation among different Morphometric attributes	89-98
(i) Drainage Density & Roughness Index	89
(ii) Slope & Roughness Index	90
(iii) Relative Relief & Drainage Density	93
(iv) Relative Relief & Slope	94
 <u>Chapter III</u> Morphometric Analysis of the Sub-basins	 99-158
Introduction	99
A. Relationship of Stream order to Number, Length, Area, Gradient, etc.	105
a. Stream order and number	112
b. Stream order and stream length	115
c. Stream order and mean stream length	117
d. Stream order and cumulative stream length	119
e. Stream order and total area	121
f. Stream order and Mean area	126
g. Stream order and Gradient	129
B. Bifurcation ratio	130
C. Length ratio	131
D. Sinuosity index	132
E. Relief ratio	134
F. Elongation ratio and circularity ratio	137
G. Mean channel gradient	138

	<u>Page No.</u>
H. Drainage density	141
I. Correlation of relief ratio with elongation ratio, channel gradient and drainage density	141
J. Percentage hypsometric curves	144
K. Correlation of mass removed with relief ratio, elongation ratio, channel gradient and drainage density	150
L. Conclusions	153
<u>Chapter IV</u> Quantitative study of Longitudinal Profiles	159-91
Introduction	159
A. The effects of epeirogenic movements on the longitudinal profiles of the Lish & the Gish rivers	160-167
a. Methodology	160
b. Case studies	163-165
c. A comparative analysis of the long-profiles of the Lish and the Gish	166
d. Conclusions	167
B. A comparative study of the long-profiles of the lower courses of the rivers Lish and the Gish for the years 1981-84	168
a. The Most variable reach	171
b. The Moderately variable reach	171
c. The slightly variable reach	171
C. Conclusions	175

	<u>Page No.</u>
<u>Chapter V</u> Progressive Changes in Channel Forms & Associated Processes	192-228
A. Introduction	192
B. Characteristics of the Cross-profiles	194
C. Progressive changes in the Cross-sectional areas	204
D. Progressive changes in Wetted-Perimeter	214
E. Progressive changes in Discharge	217
F. Progressive changes in Hydraulic-Radii	219
G. Co-relation among different drainage parameters	224
 <u>Chapter VI</u> Landslides And Floods : Their Impact on Ecology	 229-264
A. Introduction	229
B. Instability Factors of slopes	232
a. The Darjeeling Gneiss	232
b. The Daling series	238
c. The Damuda series	243
d. The Nahan of the Siwalik series	244
C. Siltation of River Beds and Floods	254
D. Remedial Measures for Soil and water conservation	261

	<u>Page No.</u>
<u>Chapter VII</u> Mining And Environment	
A. Introduction	295
B. Exploration of Darjeeling Coal	298
C. Geological Background of Coal	299
D. History of Coal-Mining	292
E. Quarry Operation and their Effects	293
F. Concluding Remarks	
<u>Chapter VIII</u> Water Resource : Its Problems & Prospects	301-20
A. Introduction	301
B. Rainfall-Run-off correlation	303
C. Water Resources	307
D. <i>Some ideas regarding the conservation of water</i>	311
Abstract	321-23
Bibliography	324-52
List of Toposheets	353