CHAPTER I  INTRODUCTION

1.1 PROLOGUE .......................... 1
1.2 SCOPE OF THE STUDY ............... 3
1.3 LOCATION .......................... 4
1.4 HYPOTHESIS AND OBJECTIVES ...... 4
1.5 REGIONAL PHYSIOGRAPHY .......... 7
1.6 GEOLOGY ........................... 8
1.7 STRATIGRAPHY ....................... 9
1.8 STRUCTURE .......................... 11
1.9 ORIGIN ............................. 11
1.10 REGIONAL GEOMORPHOLOGY ......... 12
1.11 CLIMATE ........................... 13
1.12 SEISMICITY AND TECTONICS ...... 14
1.13 METHODOLOGY AND SOURCES OF DATA 16
1.15 FIELD INVESTIGATIONS .......... 16
1.16 PREVIOUS WORK ................... 17

CHAPTER II  REMOTE SENSING ANALYSIS

2.1 INTRODUCTION ....................... 21
2.2 REMOTE SENSING DATA USED ......... 22
  2.2.1 Multispectral Image .............. 24
  2.2.2 Air Photographs ................ 25
2.3 METHODS OF REMOTE SENSING DATA ANALYSIS 26
2.3.1 Digital Image Process 26
2.3.2 Visual Image Interpretation of Images 27
2.3.3 Lineaments 30
2.3.4 Drainage 31
2.3.5 Landforms 32

2.4 REGIONAL LINEAMENTS AND GEOMORPHOLOGICAL ANALYSIS BASED ON IMAGERY 32

2.5 DRAINAGE ANALYSIS BASED ON LANDSAT TM BAND 6 IMAGERY 36

2.6 DETAILED GEOMORPHOLOGICAL MAPPING BASED ON SATELLITE IMAGES 37

2.7 GEOMORPHOLOGICAL STUDIES BASED ON AIRPHOTO INTERPRETATION 41

2.7.1 General Geomorphological Map 46
2.7.2 Detailed Geomorphological Map Around Naldurg 48

CHAPTER III BASIN MORPHOMETRY

3.1 INTRODUCTION 52
3.2 METHODOLOGY 53
3.3 LINEAR ASPECTS 53

3.3.1 Stream Orders and Stream Numbers 56
3.3.2 Bifurcation Ratio (Rb) 59
3.3.3 Stream length and length ratio 63
3.3.4 Orientation of Stream Channels 66

3.4 AREAL ASPECT 75
3.4.1 Geometry of Basin Shape

3.4.1.1 Circularity Index *C* 75

3.4.1.2 Elongation Ratio (Re) 76

3.4.2 Drainage Frequency (df) 78

3.4.3 Drainage Density (Dd) 80

3.5 RELIEF ASPECT

3.5.1 Basin relief properties 85

3.5.2 Altimetric Analysis 86

3.5.3 Absolute Relief (Ar) 90

3.5.4 Relative Relief (rr) 92

3.5.5 Slope Analysis 96

3.5.5.1 Average Slope Method 97

3.5.6 Dissection Index (DI) 100

3.5.7 Profiles:

3.5.7.1 Terrain Profiles: 103

3.5.7.2 River Profiles: 106

CHAPTER IV GEOMORPHIC INDICES

4.1 INTRODUCTION 113

4.2 HYPSOMETRIC CURVE AND HYPSOMETRIC INTEGRAL 114

4.3 DRAINAGE BASIN ASYMMETRY 120

4.3.1 Asymmetry Factor (AF) 120

4.3.2 Transverse Topographic Symmetry Factor (T) 124

4.4 STREAM LENGTH GRADIENT INDEX (SL) 127

4.5 SINUOSITY INDICES 129
CHAPTER V FIELD INVESTIGATION

5.1 INTRODUCTION 136

5.2 APPROACHES 136

5.3 GEOLOGY 137

5.3.1 Types of basaltic lava flows 137

5.3.1.1 Vesicular to amygdaloidal lava flows 138

5.3.1.2 Compact or aa lava flows 138

5.3.2 Structure of Lava Flows 139

5.3.3 Distribution of Lava Flows 140

5.4 LANDSCAPE 140

5.4.1 Terrain Types from the bori river basin 142

5.4.1.1 Landforms of high relief 143

5.4.1.2 Plateau and Scarp 143

5.4.1.3 Step like topography 143

5.4.1.4 Mesa & Butte 143

5.4.1.5 Hills 144

5.4.2 Slopes 144

5.4.2.1 Methodology 145

5.4.2.2 Slope Profiles in the study area 15

5.4.2.3 Channels Slopes 149

5.5 WEATHERED PRODUCT 149

5.5.1 Laterites 151

5.5.2 Calcrete 151
5.5.3 Spheroidal weathering 151
5.5.4 Soils 152

5.6 FLUVIAL LANDFORMS 153
5.6.1 Valley types 153
5.6.2 Water falls, rapids, potholes 157
5.6.3 Depositional landforms 158
5.6.4 River terraces 161

CHAPTER VI DISCUSSION AND CONCLUSION

6.1 GENERAL 174

6.2 RESULTS OF REMOTE SENSING ANALYSIS 174
6.2.1 Regional Image Analysis 174
6.2.2 Detailed image analysis 176

6.3 RESULTS OF BASIN MORPHOLOGY 176
6.3.1 Linear Characteristic of Drainage Network 177
6.3.2 Shape Of The Basin 178
6.3.3 Areal Distribution of Drainage, Relief and Slope 178
6.3.4 Analysis of Altimetric Frequency and Profiles 180

6.4 ANALYSIS OF GEOMORPHIC INDICES 180
6.4.1 Landscape of the Study Area 181
6.4.2 uplift and asymmetry drainage of the bori river basin 182

6.5 FIELD OBSERVATIONS 183

6.6 RIVER CAPTURE 184

6.7 LANDSCAPE AND GEOMORPHOLOGICAL MAP 187

6.8 DURICRUSTS AND FLOOD PLAIN DEPOSITS 191
6.9 GEOMORPHIC EVENTS OF LANDSCAPE EVOLUTION 195

6.10 SUMMARY AND CONCLUSION 196

6.10.1 Suitability of Techniques 196

6.10.2 Conclusions 199