# CONTENT

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Declaration</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Certificate from the Research Guide</td>
<td>ii</td>
</tr>
<tr>
<td></td>
<td>Acknowledgement</td>
<td>iii</td>
</tr>
<tr>
<td></td>
<td>List of Tables</td>
<td>v</td>
</tr>
<tr>
<td></td>
<td>List of Figures</td>
<td>viii</td>
</tr>
<tr>
<td></td>
<td>List of Plates</td>
<td>xii</td>
</tr>
</tbody>
</table>

## CHAPTER I: INTRODUCTION  1-21

1.1 Statement of the problem  1
1.2 Review of literature  5
1.3 The study area  12
1.4 Objectives  13
1.5 Hypotheses  13
1.6 Methodology and data base  15
1.7 Organization of the study  20
1.8 Significance of the study  21

## CHAPTER II: GEOGRAPHICAL BACKGROUND OF THE STUDY AREA  22-38

2.1 The Noa-Mangaldoi River system  22
2.2 Relief and slope  25
2.3 Geology and geomorphology  27
2.4 Climatic characteristics  29
2.5 Soils  31
2.6 Vegetation  32
2.7 Population and settlements  33
2.8 Landuse and land cover  35
2.9 Transport and communication  37
### CHAPTER III: MORPHOMETRIC ANALYSIS OF THE NOA-MANGALDOI RIVER SYSTEM

3.1 Analysis of linear aspects
   3.1.1 Stream ordering
   3.1.2 Bifurcation ratio
   3.1.3 Law of stream numbers
   3.1.4 Law of stream length
   3.1.5 Stream length ratio
   3.1.6 Sinuosity index

3.2 Analysis of areal aspects
   3.2.1 Form factor
   3.2.2 Circulatory ratio
   3.2.3 Elongation ratio
   3.2.4 Stream frequency
   3.2.5 Drainage density
   3.2.6 Constant of channel maintenance
   3.2.7 Length of overland flow

3.3 Analysis of relief aspects
   3.3.1 Absolute relief
   3.3.2 Relative relief
   3.3.3 Dissection index
   3.3.4 Hypsometric analysis

### CHAPTER IV: FLOW ANALYSIS

4.1 Flows in Noa and Mangaldoi river
   4.1.1 Hydrograph analysis
      4.1.1.1 Stage-discharge hydrograph
      4.1.1.2 Flow duration analysis
      4.1.1.3 Sediment rating curve
   4.2 Low-flow hydrology
      4.2.1 Low-flow variation
      4.2.2 Ground water regime and fluctuation
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.2.1</td>
<td>Locational occurrences of ground water</td>
<td>94</td>
</tr>
<tr>
<td>4.2.2.2</td>
<td>Present status of ground water</td>
<td>95</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Low-flow frequency and probability analysis</td>
<td>98</td>
</tr>
<tr>
<td>4.2.3.1</td>
<td>Plotting Position Method</td>
<td>99</td>
</tr>
<tr>
<td>4.2.3.2</td>
<td>Log Pearson Type-III Method</td>
<td>100</td>
</tr>
<tr>
<td>4.2.3.3</td>
<td>Gumbel’s Extreme Value Distribution</td>
<td>102</td>
</tr>
<tr>
<td>4.3</td>
<td>High flow hydrology</td>
<td>105</td>
</tr>
<tr>
<td>4.3.1</td>
<td>High flow variation</td>
<td>106</td>
</tr>
<tr>
<td>4.3.2</td>
<td>High flow frequency and probability analysis</td>
<td>114</td>
</tr>
<tr>
<td>4.3.2.1</td>
<td>Plotting Position Method</td>
<td>114</td>
</tr>
<tr>
<td>4.3.2.2</td>
<td>Log Pearson Type-III Method</td>
<td>116</td>
</tr>
<tr>
<td>4.3.2.3</td>
<td>Gumbel’s Extreme Value Distribution</td>
<td>117</td>
</tr>
</tbody>
</table>

**CHAPTER V:** CHANNEL CHANGES: PATTERN AND PROCESSES

5.1 Spatio-Temporal Changes  
5.1.1 Nature and types of channel changes  
5.1.2 Magnitude of channel changes  
5.1.3 Changes in channel morphology  
5.1.4 Channel hydraulic geometry  
5.2 Processes of channel changes

**CHAPTER VI:** FLUVIO-GEOMORPHIC HAZARDS: CAUSES AND EFFECTS

6.1 Types of fluvio-geomorphic hazards  
6.1.1 Flood as a fluvio-geomorphic hazard  
6.1.2 Bank Erosion as a fluvio-geomorphic hazard  
6.2 Flood plain zones and hazards  
6.3 Magnitude of hazards and their damages
6.4 Causes of hazards  171
6.5 Impacts of hazards  175

CHAPTER VII:  HUMAN RESPONSES TO HAZARDS AND THEIR MANAGEMENT  178-195
7.1 Modes of human responses  178
7.2 Institutional support towards human responses  181
7.3 Measures taken for human adjustment  189
7.4 Suggestive measures and strategies for flood and associated hazard management  191

CHAPTER VIII:  SUMMARY AND CONCLUSION  196-201
8.1 Summary  196
8.2 Conclusion  197
8.3 Suggestions  200

REFERENCES  207-225
APPENDICES  226-230