

PREFACE

Floods are one of the most catastrophic natural disasters, claiming many lives, causing major property damage, and disrupting livelihoods around the world. Morigaon District in Assam, India, is especially prone to flooding due to its unique topographical and hydrological features. This vulnerability needs a thorough and precise assessment of flood risk before implementing effective mitigation and management techniques.

This study provides a detailed assessment of flood susceptibility in Morigaon District, using ten major thematic layers that include a wide variety of flood conditioning or susceptibility factors. These layers consist of drainage density, elevation, slope, stream network, land use and land cover (LULC), vegetation density (NDVI), proximity to roads and rivers, temperature fluctuations, rainfall patterns, topographic wetness index (TWI), and soil type and composition. Together, these elements provide a comprehensive and complete picture of the region's flood risk profile.

This study uses NASA's 30-meter resolution ASTER Global Digital Elevation Model (GDEM) and sophisticated geographic information system (GIS) techniques for data pretreatment and analysis. Sink-filling, flow direction and accumulation analysis, drainage density mapping, and TWI formation are all key activities. Additional soil characteristics data are obtained from the Geological Survey of India (GSI) and the FAO Soils Portal, while Landsat 8 OLI imagery is obtained through the US Geological Survey's Earth Explorer platform. The study's goal is to improve the accuracy and comprehensiveness of flood risk mapping in Morigaon District by carefully integrating and analyzing these varied data sets.

The findings not only contribute to a better knowledge of the elements that influence flood vulnerability but also help to build more effective flood risk reduction and management measures.

This study is motivated by the urgent need to protect the people and infrastructure of Morigaon District from the destructive effects of flooding. Its goal is to support improved decision-making and promote resilient and sustainable development in the region by providing a strong framework for flood risk assessment.

We are grateful to the different organisations and professionals who donated the data and insights required for this study. Their efforts have been crucial in developing a complete and