Preface

Deforestation, an escalating environmental crisis, has dire implications for the ecological balance, biodiversity, and climate stability of our planet. This phenomenon, driven by human activities such as agriculture, logging, infrastructure development, and urbanization, leads to significant forest cover loss, impacting local and global ecosystems. Nainital, a scenic region in the Uttarakhand hills of India, has not been immune to these effects. Over the past century, Nainital has transformed from a pristine natural landscape to a bustling urban center, with rapid urbanization and population growth exerting immense pressure on its forests.

This case study aims to assess the extent and dynamics of deforestation in Nainital, focusing on the period from 2015 to 2022. Using advanced remote sensing technology and the Google Earth Engine (GEE) platform, this study classifies forest and non-forest areas and predicts patches based on training points. Sentinel-2 imagery, known for its high spatial resolution and multiple spectral bands, serves as the primary data source. The study employs buffer and overlay analyses to evaluate the impact of settlements, roads, agricultural areas, and forest fires on forest cover. Additionally, statistical analysis is performed to interpret data and identify deforestation trends across the study area.

The findings highlight a significant decrease in forest cover in Nainital, underscoring the urgency for effective conservation strategies. By understanding the underlying drivers and consequences of deforestation, this study seeks to inform targeted interventions that can mitigate its impacts and promote sustainable development in the region. Through collaborative efforts and innovative solutions, the goal is to preserve Nainital's forests for future generations, ensuring they remain a source of beauty, biodiversity, and prosperity.