National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Vegetation degradation and regrowth analysis in Rajmahal coal mines (India) using time series Landsat satellite data
Speaker	: Prof. Amit Kumar Gorai
Supervisor	: Dr. Sahendra Ram
Venue	: Seminar Hall, Department of Mining Engineering
Date and Time	: 19 Feb 2025 (12:00 Noon)
Abstract	: Vegetation degradation caused by mining activities is a significant environmental issue, particularly in coal mining regions. The present study aims to analyse vegetation degradation and regrowth in the Rajmahal coal mine region (India) from 1988 to 2020 using time-series Landsat satellite data. The Normalized Difference Vegetation Index (NDVI) was used along with Sens slope (SS) test to assess changes in vegetation trends over two periods: 1988–2000 and 2000–2020. The results of the study indicated distinct changes in vegetation trends across the study periods. From 1988 to 2000, a smaller area (3.32 km²) showed positive NDVI trends, while a larger area (2.3 km²) exhibited negative trends, indicating vegetation degradation due to the expansion of coal mining. During the 2000–2020 period, there was a marked increase in both positive (8.25 km²) and negative trends (5.82 km²), reflecting a complex pattern of degradation in active mining areas and regrowth in regions undergoing reclamation. The analysis shows that reclamation efforts have led to significant vegetation recovery, particularly after 2011. However, despite the observed regrowth, persistent environmental pressures continue to impact the region's vegetation health, as indicated by the expanded areas of negative NDVI trends. This study highlights the need for sustained and improved reclamation strategies to ensure long-term ecological recovery in mining-affected regions. Future work should focus on monitoring vegetation changes over longer periods and refining rehabilitation methods to better address ongoing degradation. These findings contribute to understanding the dynamics of vegetation loss and recovery in mining areas and offer insights for environmental management and policy-making.