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Google Earth Engine for an analyze of Land Use and Land Cover within an Oil Block in the Ecuadorian Amazon

PROBLEM

The significant land use and land cover (LULC) changes in Ecuador's Amazon due to oil industry activities, agricultural expansion, and urban sprawl, leading to deforestation, ecosystem fragmentation, and socioenvironmental impacts, intensified by infrastructure development and river erosion.

MAIN OBJETIVE

This study aims to evaluate LULC changes in Oil Block 47 (Ecuadorian Amazon) with GEE to quantify disturbances from oil operations, agriculture, and urbanization, providing insights for mitigating environmental degradation and guiding policy decisions

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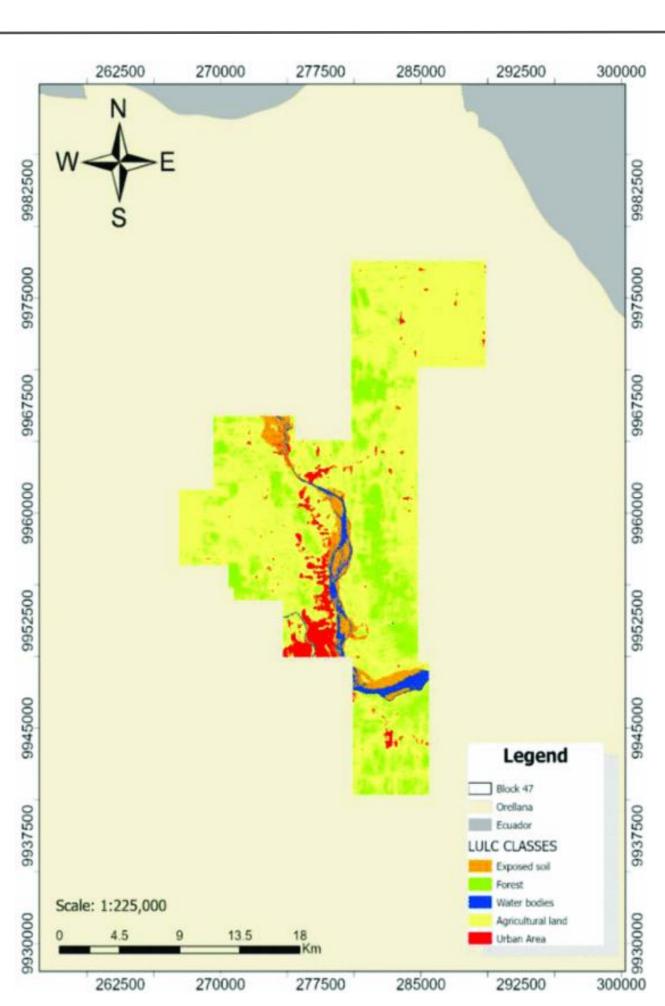
METHODOLOGY

Sentinel-2 data (2022) was processed in GEE using Random Forest classification to map LULC (forest, agriculture, urban, water, soil). Areas were quantified in ArcGIS Pro to assess oil block impacts.



RESULTS

Class	Area [ha]	Relative share [%]
Forest	6845.09	17.75
Agricultural Land	26,846.09	69.62
Urban Area	1655.517	4.29
Water Bodies	1141.55	2.96
Exposed soil	2072.65	5.37
Total Block 47	38,560.91	100



CONCLUSIONS

- Agricultural lands cover 69.62% of Oil Block 47, reflecting the region's economic reliance on farming, which contributes to deforestation and ecosystem fragmentation.
- Urban areas (4.29%) and exposed soil (5.37%) are linked to oil infrastructure and river erosion, highlighting the environmental footprint of extractive activities.
- The study demonstrates the effectiveness of GEE for LULC analysis, advocating for its use in ongoing environmental assessments to guide sustainable landuse policies in the Amazon.





Link DOI