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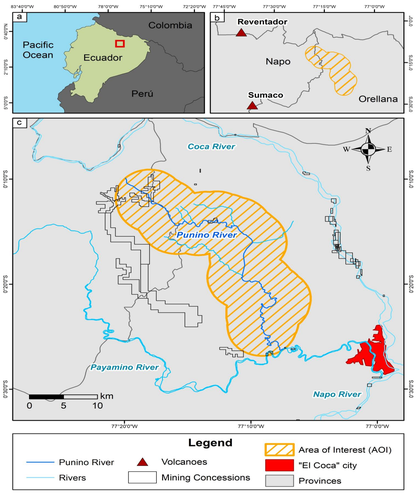
ASSESSMENT OF LAND USE/LAND COVER CHANGES DUE TO MINING ACTIVITY IN THE ECUADORIAN AMAZON

PROBLEM

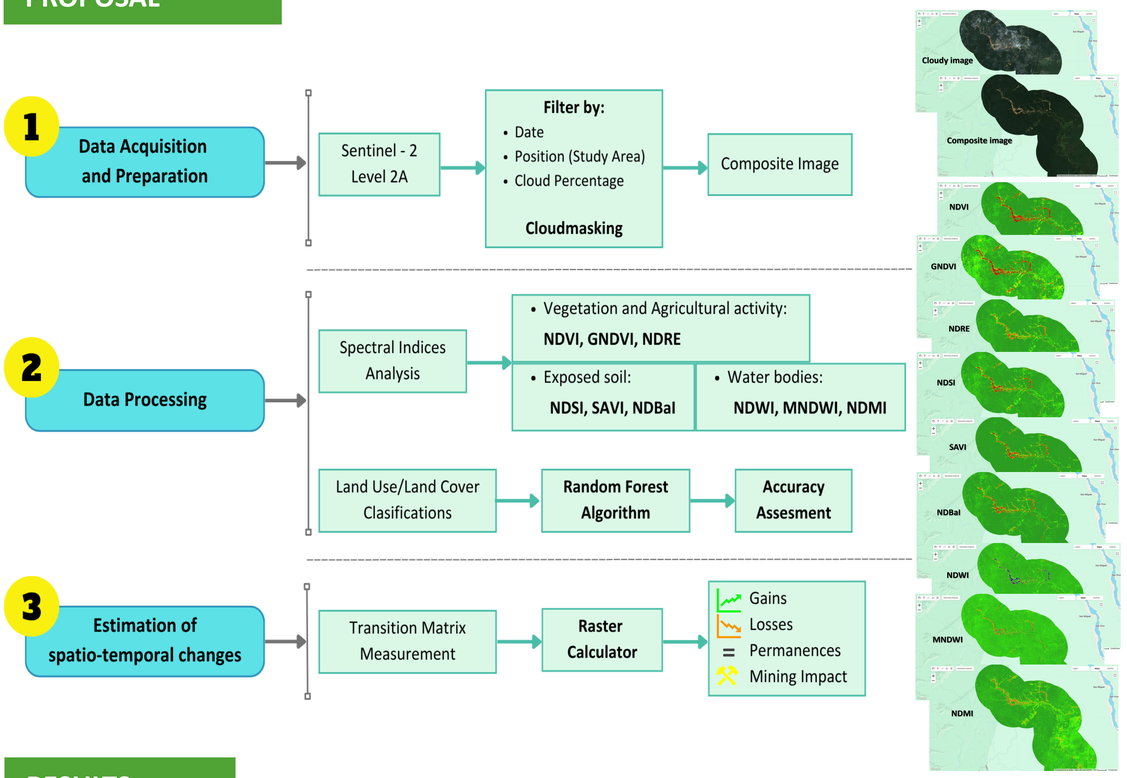
In 2023, mining was consolidated as the fastest growing sector in the Ecuadorian economy due to the high geological mining potential. But, between 2015 and 2021, the 82% of the increase in the mining activity area occurred outside mining concessions. And, since 2020, settlements of the illegal mining activity have been identified at the Punino river in the province of Orellana.



GENERAL OBJECTIVE

This study aims to evaluate Land Use Land Cover changes between 2019 and 2023 using Sentinel 2 satellite imagery to identify the impact of mining activities on the banks of the Punino river.

PROPOSAL



RESULTS

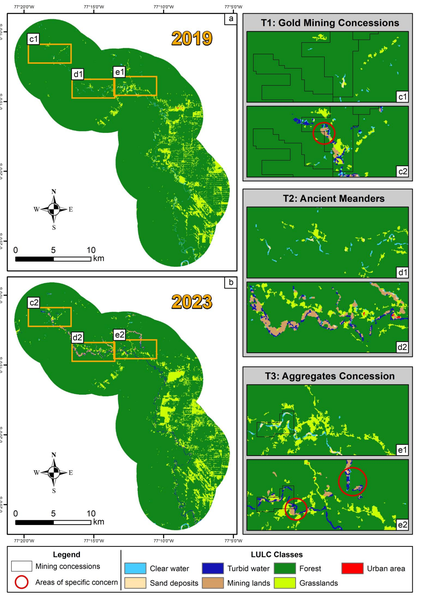
Overall accuracy: 0.90

Kappa Index: 1

Transition Matrix

LAND USE LAND COVER 2023 \ LAND USE LAND COVER 2019	Clear water	Sand deposits	Turbid water	Mining lands	Forest	Grasslands	Urban area	Total (b)	Variation (b-a)
Clear water	22.47	2.31	0.00	0.00	0.82	0.72	0.00	26.31	-169.12
Sand deposits	1.43	5.69	0.00	0.00	4.89	0.20	0.00	12.22	-9.95
Turbid water	150.16	7.44	0.00	0.00	159.90	13.89	0.00	331.38	331.38
Mining lands	10.90	5.29	0.00	0.00	192.96	7.48	0.00	216.63	216.63
Forest	4.42	0.00	0.00	0.00	39948.74	1344.39	0.00	41297.56	-835.87
Grasslands	6.04	1.23	0.00	0.00	1824.53	1661.73	0.00	3493.53	463.24
Urban area	0.00	0.20	0.00	0.00	1.59	1.91	9.28	12.98	3.70
Total (a)	195.43	22.17	0.00	0.00	42133.43	3030.29	9.28	45390.60	

Gains | Losses | Permanences | Mining Impact



T1: Monitoring of the main mining concession of the sector in the ***alluvial gold exploitation*** stage, with **1.16 ha outside the permitted limit**.

T2: ***Morphology changes*** and ***migration of the channel*** associated with the appearance of **98.40 ha mining lands**.

T3: Monitoring of the mining concession in the ***arid and stone exploitation stage***, with **2.84 ha outside the permitted limit**. To the northeast are concentrated the **changes from forest to mining lands and turbid water.**

CONCLUSIONS

The various **spectral indices** calculated made it possible to **distinguish** between **turbid and clear water bodies**, delimit **sand deposits, and mining lands**. Their integration as spectral bands to cloud-free mosaics **increased the effectiveness and efficiency of LULC mapping** with the **Random Forest algorithm** in GEE.

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