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Use of geotechnology for monitoring land use and coverage in Brazilian Amazon's main coffee growing region

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Rationale:

The use of geotechnology along with satellite images and data from the Brazilian Rural Environmental Registry (CAR) facilitates the understanding of the relationships between agricultural areas and native forest vegetation. These technologies and tools were used to study the "Matas de Rondônia" region, which covers 15 municipalities, 4.2 million hectares (ha) [1].

Methods:

The mapping of coffee and other crop areas was performed manually. In contrast, the mapping of other land use classes was performed automatically using Sentinel-2 images and the Random Forest classifier [2]. After validation, the data were processed and integrated. To assess rural properties registered in CAR, a municipal boundary framework was used, and properties involved in coffee cultivation were selected.

Results:

Matas de Rondônia's coffee areas encompass 34.4 thousand hectares and convey social and economic importance to the region, which is the largest and most important coffee producer in the Brazilian Amazon, while occupying just 0.8% of the region's total area. Of the 37 thousand rural properties registered in CAR, 8.4 thousand (22.4%) are dedicated to coffee cultivation, 95.5% of which are small family farms featuring coffee areas of 3.5 ha on average. Coffee crops may still expand to occupy vast pasture areas [3] that currently cover 1.9 million ha. Another part of the area, slightly more than half of the region (56%) or 2.2 million ha, is still occupied by primary native forests. The region's coffee areas comply almost completely to the European Union's Deforestation-Free Products Act (EUDR), and feature 194.8 ha or 0.57% of deforested areas within the region's total coffee area. Of the 15 municipalities in the region, 7 have zero deforestation linked to coffee growing.

Conclusions & Perspectives:

The results obtained may serve as a reference to evaluate agricultural commodities, such as coffee, and their relationship with deforestation or forest manipulation, and provide valuable information for the discussion and understanding of changes in land use and cover. They may also be made available to land holders, to support decisions and public policies for the state of Rondônia, and contribute to increase investments, negotiations and consumption of coffees produced in the Brazilian Amazon.

References:
1. Volsi, et al. 2019. The dynamics of coffee production in Brazil. PloS One, v. 14, n. 7, e0219742.
2. Neves, et al. 2021. Amazon rainforest deforestation influenced by clandestine and regular roadway network. Land Use Policy, v. 108, p. 105510.
3. Bolfe, et al. 2024. Potential for Agricultural Expansion in Degraded Pas-ture Lands in Brazil Based on Geospatial Databases. Land, v. 13, n. 2, p. 200.