

USE OF GEOTECHNOLOGY FOR MONITORING LAND USE AND COVERAGE IN BRAZILIAN AMAZON’S MAIN COFFEE GROWING REGION

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Introduction

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 (Figure 1), which covers 15 municipalities, 4.2 million hectares (ha) [1].

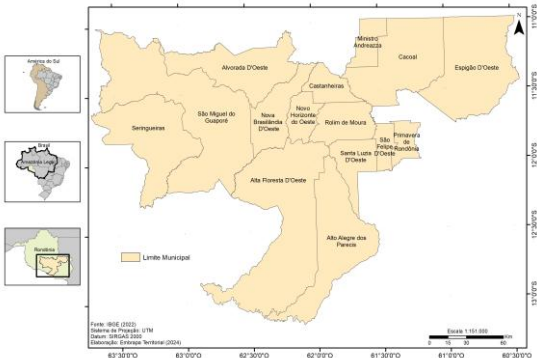


Figure 1: Map showing the “Matas de Rondônia” region.

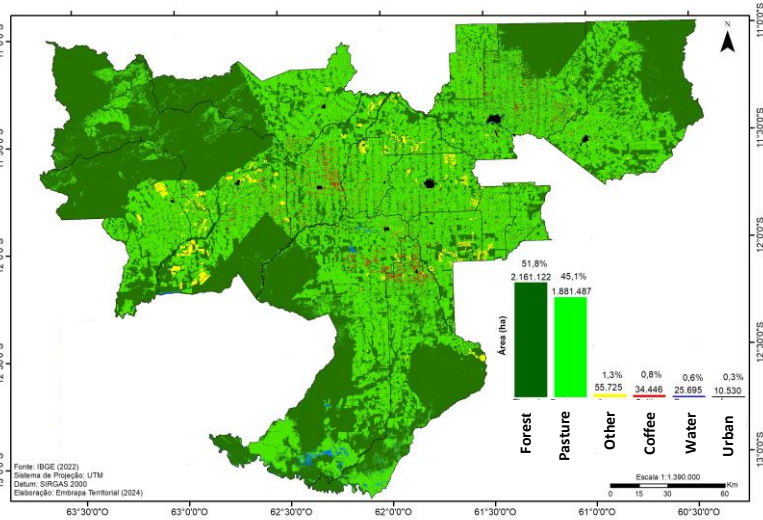


Figure 2: Map of land use and coverage, of the “Matas de Rondônia” region.

Table 1: Number, area and percentage (%) of rural properties declared in the Brazilian Rural Environmental Registry (CAR) and separated by size of fiscal modules (MFs) in the “Matas de Rondônia” region.

Tax module	Total Number Rural Properties	Number Rural Properties with Coffee	Average Coffee Area	CAR		Coffee	
				ha	%	ha	%
0 – 0.2	8,848	2,908	2.3	57,785.9	2.5	6,667.7	24.1
0.2 – 1	20,868	4,701	3.5	659,192.6	28.1	16,666.7	60.2
1 - 4	6,580	687	4.6	714,690.5	30.5	3,164.2	11.4
4 - 10	835	34	8.5	303,975.4	13.0	290.3	1.1
> 10	463	27	34.0	607,602.2	25.9	918.7	3.3
Total	37,594	8,357	3.3	2,343,246.6	100	27,707.6	100

Materials/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/Discussion

Matas de Rondonia’s coffee areas encompass 34.4 thousand hectares (ha) 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 (Figure 2). Of the 37 thousand rural properties registered in CAR, 8.4 thousand (22.4%) are dedicated to coffee cultivation (Table 1), 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.

Conclusion/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 Brazilian Amazon.

References:

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