Leveraging Satellite Imagery and Terrestrial Laser Scanners for Assessing Carbon Sequestration in Para Rubber Plantation

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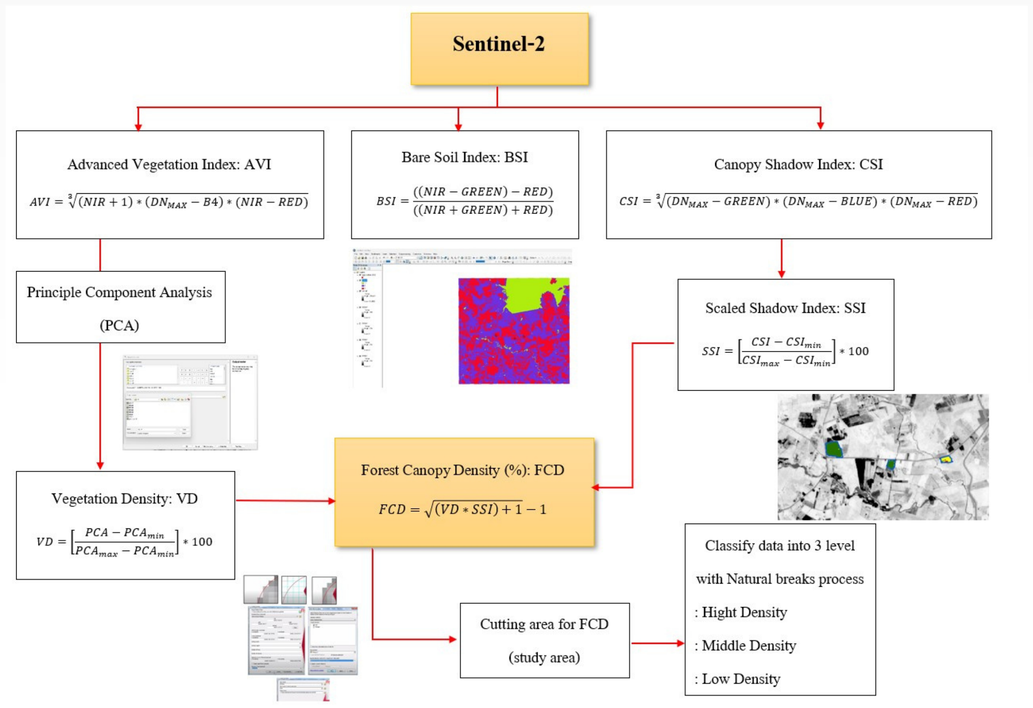
•• BACKGROUND ••

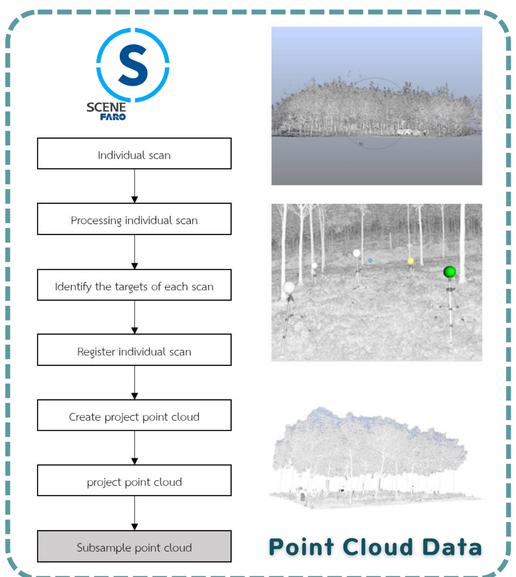
An accurate assessment of carbon sequestration in forests necessitates precise data on the age and **above-ground biomass (AGB)** of the constituent species. This study presents an innovative approach to estimating these parameters in Para rubber **(Hevea Brasiliense)** forests using satellite imagery and terrestrial laser scanner (TLS) technology

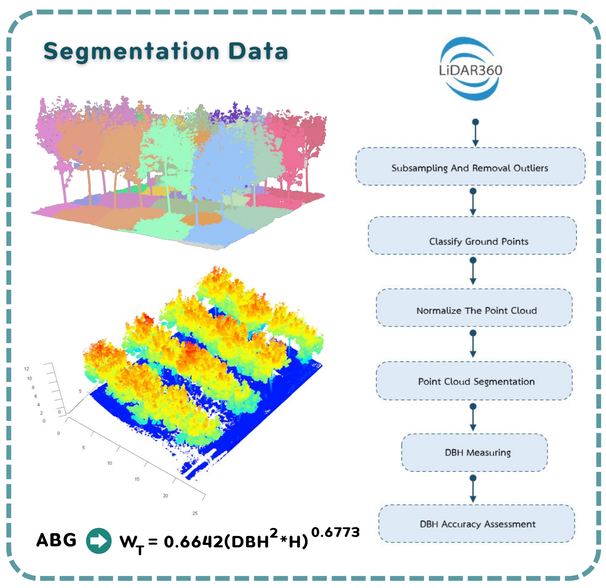
•• METHODOLOGY ••

Our methodology leverages the distinctive features reflected in satellite imagery, which can be attributed to Para rubber growth stages. This is supplemented supplemented by electromagnetic interaction signatures associated with varying canopy characteristics at different stages, combined with field surveys and other reliable data sources. The collected data were processed using the Lidar 360 program, revealing a significant correlation between the age of rubber trees and their carbon sequestration potential.

Procedure for FCD in Para Rubber forest growth stages



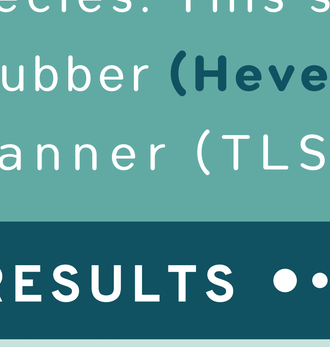




•• RESULTS ••

The canopy density was classified, and data from surveys revealed that trees aged 16 years were categorized as having middle density. The data were further divided into three levels using a natural breaks process, with rubber trees aged 36 years exhibiting the highest density and trees aged 6 years falling into the low-density category.

● Aged 6 years (FCD = 0-30%)

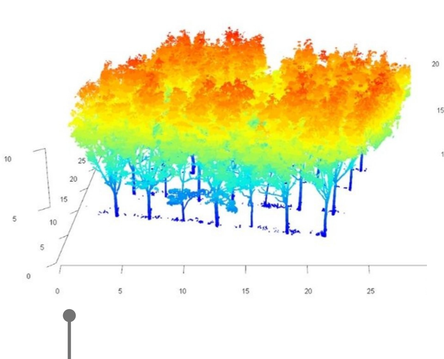


● Aged 16 years (FCD = 31-69%)

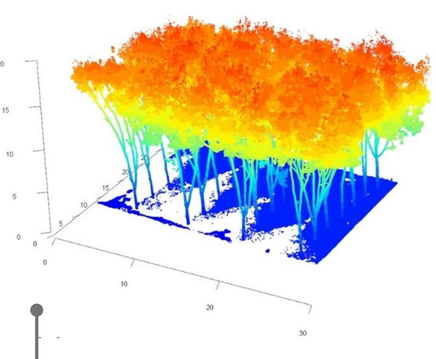
● Aged 36 years (FCD = 70-100%)

Highlighted an increase in carbon sequestration from 0.79 tCO_2e/ha for trees aged 6 years to 3.09 tCO_2e/ha for trees aged 16 years, and further to 4.52 tCO_2e/ha. for trees aged 36 years.

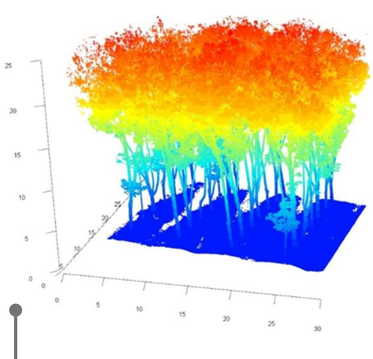
CARBON STOCK = ABG*0.47 (IPCC2006)



Rubber Age 6 year
Average 0.79 tCO_2e



Rubber Age 16 year
Average 3.09 tCO_2e



Rubber Age 36 year
Average 4.52 tCO_2e