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QUANTIFICATION OF CARBON STOCK FOR RUBBER TREES FROM AIRBORNE LIDAR DATA

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BACHELORS IN SURVEYING SCIENCE AND GEOMATICS (HONOURS) - AP220

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Thesis submitted in fulfilment
of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under - Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

In response to climate change mitigation efforts, methods for accurately estimating above-ground carbon stock are in high demand. In recent years, there has been an increase in the use of (LiDAR) in the measurement and extraction of forest biophysical parameters, features, and quantification of aboveground biomass (AGB) and carbon stock. Hence, Airborne LIDAR data become useful to provide tree height information for large areas. The aim of this study is to quantify the amount of carbon stock stored in cropland area specifically for rubber tree estate using allometric equations towards Airborne LiDAR data. The methodology involves the process to acquire trees information, which was then used to estimate the rubber trees aboveground biomass and carbon stock. The number of tree samples used in this study were about 10 trees with diameter range between 30-40 cm width located at Pauh, Perlis. The Canopy Height Model (CHM) was created, and individual tree crown areas were extracted through multi-resolution segmentation technique. Lastly, carbon stock was determined by applying an allometric equations available from previous researchers using canopy height estimated from Airborne LiDAR data. The study discovered a good relationship between LiDAR-derived canopy height and aboveground biomass by using one of the allometric equations chosen, showing that it is a helpful method for measuring carbon stock for rubber tree. The correlation between LiDAR height estimated from the data and aboveground biomass as well as the carbon stock is 0.97 and 0.95 respectively. The estimated result of aboveground biomass and carbon stock showed reliable accuracy according to the data taken at site location. The research in this paper can help to the contribution of carbon stock estimations in Malaysia, which is crucial for the country's forest resource management and contributions to climate change mitigation efforts by using another approach.

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