**Assessment of aboveground biomass using data from Unmanned Aerial Vehicles (UAVs) and Terrestrial Laser Scanning (TLS) in the Ban Nong Hai community forest project area in Chiang Mai Province.**

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***ABSTRACT***

Due to the problem of climate change affecting all life on earth. Thailand has realized and prepared to reduce this impact. Therefore, the goal is to increase forest areas and green areas. The objective of the research is to develop an aboveground biomass model in the Ban Nong Hai Community Forest Project area in Chiang Mai Province, using the Machine learning Model method from the application of unmanned aerial vehicle (UAV) data that is equipped with various sensors such as multispectral and processed together with data obtained from LiDAR cameras. Including comparison the model developed using data for training the model is made between data derived from conventional survey methods and measurements obtained via Terrestrial Laser Scanning (TLS) from 6 sampling plots, size 40 x 40 meters, which are then utilized to develop a machine learning model. The model's accuracy is compared under two scenarios: one using manual labor for model development and the other employing TLS data. The model's accuracy is quantified using the coefficient of determination (R²), Root Mean Square Error (RMSE), and Relative Root Mean Square Error (rRMSE). For the manual labor approach, the R², RMSE, and rRMSE values are 0.56, 114.7 kg/100 m², and 8.8%, respectively. In contrast, utilizing TLS data yields values of 0.61, 79.8 kg/100 m², and 4.5%. Both models demonstrate satisfactory accuracy, given that the rRMSE is below 10%. The above-ground biomass model derived from the TLS instrument estimates biomass accumulation at 2,825.4 tons, equivalent to 4,868.9 tCO2e in carbon dioxide absorption. The manually obtained estimate is 2,805.4 tons, corresponding to 4,834.5 tCO2e.

**Keywords:** Aboveground Biomass, Machine learning Model, Terrestrial laser scanner (TLS), Unmanned Aerial Vehicle (UAV)