Estimation of Above Ground Biomass in Horton Plains National Park, Sri Lanka Using Optical, Thermal and RADAR Remote Sensing Data

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ABSTRACT: *Terrestrial carbon sequestration in above ground woody biomass has received greater attention as one of the immediate attempts to mitigate global warming. A variety of approaches have been developed to estimate above ground biomass, however, methods differ in procedure, complexity and time requirement depending on the specific aim of these estimations. Use of Remote Sensing (RS) is popular as a nondestructive approach of biomass estimation since it can reduce the measurements and monitoring in the field to a considerable extent. This study focused to estimate above ground biomass of Horton Plains National Park of Sri Lanka using ALOS PALSAR, IRS LISS III sensors and Thermal bands of Landsat OLI images. There were 55 field sampling plots used and diameter at breast height, total tree height, and canopy cover percentage of all trees (dbh >10cm), and GPS locations of each sampling plots were collected. Previously developed relevant allometric equations were used to estimate biomass using DBH and height in each plot. The relationship between backscatter coefficient of the ALOS PALSAR image, Normalized Difference Vegetation Index derived from IRS LISS III image and surface temperature generated form Landsat OLI thermal images were correlated with field estimated biomass to observe possible relationships. It was not possible to obtain very strong correlations between these variables and AGB. However, the positive linear correlation between AGB and NDVI was relatively stronger compared to other vegetation indices. A weak positive linear correlation was observed between backscattering coefficient and AGB and a weak negative linear correlation was observed between AGB and land surface temperature. Estimated biomass using NDVI, Backscattering coefficient HH and HV, and land surface temperature are 41.76 t/ha, 38.9 t/ha, 32.5t/ha and 62.72 t/ha respectively. The correlation between the calculated and estimated biomass was highest in NDVI (0.712) confirming that it is the most suitable vegetation index though further studies are needed to improve its use in AGB estimation in this area.*

Keywords*: Above ground biomass, remote sensing, forest, satellite images, carbon sequestration*

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