

Tree growth and aboveground biomass in a tropical mountain forest thirty years after selective logging in Sarawak, Borneo

ABSTRACT

Tropical mountain forests are vital components of global floristic diversity as well as the hydrological cycle but have been extensively exploited. However, the impacts of human disturbances on changes in biomass and regional forest variation are not well documented in tropical mountainous regions. This study was conducted on the Payeh Maga Highland, Sarawak, Malaysia thirty years after logging at three elevational zones namely upper dipterocarp forest (UDF), lower-montane oak-laurel forest (LOF), and upper montane forest (UMF). Stand and growth dynamics were assessed for 12 months to estimate the tree growth rate and the aboveground biomass (AGB) of logged and unlogged forests at various elevations. Significant differences between logged-over and primary plots were observed in diameter at breast height (dbh) and basal area growth in the UMF. AGB recovery in the LOF plots was significantly slower than in other plot types. After three decades, the UDF and the UMF plots had AGB values similar to those of their primary plots. This study indicated that selective logging practices need to be improved to enhance the sustainability of timber production. Long-term monitoring, along with the establishment of more plots and the measurement of additional tree-competition parameters, is needed to clarify outstanding uncertainties.

Keyword: Aboveground biomass; Mountain highland; Selective logging; Stand dynamics; Tree growth