

Methods for Monitoring Emissions and Removals from Forest Harvesting for Timber and Fuelwood: Lessons from Guyana

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Abstract

Two methodologies for estimating net emissions from forest harvesting practices (for timber and possibly fuel) are presented: (1) a standard approach of using medium resolution imagery to monitor the expansion of logging infrastructure into non-logged areas for activity data combined with ground plots and the stock-change method for emission factors; and (2) a combination of data sources (timber extraction rates, management plans, very high resolution imagery) for activity data combined with ground measurements in active logging gaps/concessions and the gain-loss method for emission factors. For methodology 1, the carbon stock of logged forests is likely to be extremely variable and it will likely be difficult to meet a reasonable precision level without stratification by year of harvest and timber extraction rates and by intensive ground sampling using plots. Although logging roads and log landings can be identified and their area obtained from the medium resolution imagery, skid trails, which also cause damage and emissions, cannot be unambiguously identified in the imagery. For methodology 2, the emissions are estimated directly in the gaps, using the concept of change detection, in active timber concessions—the loss in live biomass is caused by felling the trees and the collateral damage caused as the tree falls and the emissions are then linked to the unit of timber removed (e.g. cubic meters). The emissions from skid trails can be obtained from ground measurements by mapping and measuring the area of a sample of skid rails using GPS and measuring the damaged trees along the trails—such data can be linked to timber extraction rates. The emissions from infrastructure such as roads and landings can be obtained in a manner similar to methodology 1. Carbon removals during regrowth after logging (the gains) can be estimated by collecting data in a chronosequence of logging gaps. The steps described for methodology 2 were implemented for the period 2001 to 2010 in Guyana as a case study, and the results for the net annual emissions from timber extraction, including an uncertainty analysis, are presented.

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