



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies”

The Potential Carbon Sequestration Secondary Forests and Agricultural Land Covers in the Landscape of Eastern Amazonia, Brazil

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Abstract

The Bragantina region in the eastern of Amazonian region was former covered by moist tropical forest. During the last century, the area was transformed to an agricultural landscape with highly exploited remnants of the original forest restricted to flooded areas. Secondary forest regenerates mainly by re-sprouting from trunks and roots after a cropping period 1 to 2 years. The intensification of land use with mechanized land preparation and short fallow periods implies a progressive degradation of soil that affects the vitality of secondary forests and crop yields. Management of forest fallows among others activities represents an option to conserve the forest, to ensure nutrient storage and to increase the sequestration of atmospheric carbon.

This research assessed the potential of secondary forest and some land covers to accumulate atmospheric carbon. A significant linear equation with a R^2 of 0.92 represented the aboveground biomass of the carbon pools: live trees, litter and dead trees in relation to average height of highest canopy stratum. The carbon accumulation overpass 100 t C ha^{-1} when trees in the canopy reach 20 m. The potentialities of carbon uptake of different common land covers in the study area were calculated combining field data with Ikonos images and extrapolated to the Municipality of Igarapé Açu and Bragantina region using estimation area from agricultural census. The current extension and distribution of the secondary vegetation in the region only recovered the 5% of C released by replacement of the original forest.

Keywords: Amazonia, biomass, carbon sequestration, fallow vegetation, secondary forest