Tropentag, October 6-8, 2009, Hamburg

"Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources"

Biomass and Carbon Stocks Inventory of Perennial Vegetation in the Chieng Khoi Watershed, Northwest Viet Nam

Oliver Zemek[1], Thomas Hilger[1], Carsten Marohn[1], M.H. Hoang[2], V.D. Tuan[3], N.T. Lam[4], Georg Cadisch[1]

[1] *University of Hohenheim, Institute for Plant Production and Agroecology in the Tropics and Subtropics, Germany*

[2] *The International Centre for Research in Agroforestry (ICRAF), Viet Nam*

[3] *The Institute for Agricultural Environment, Viet Nam*

[4] *Hanoi University of Agriculture, Center for Agricultural Research and Ecological Studies (CARES), Viet Nam*

Abstract

With climate change being unequivocal, reducing CO_2 in our atmosphere has become a primary goal of international efforts. Scientific evidence shows that terrestrial vegetation can be a source or sink of carbon. In order to assist local and international stakeholders in decision-making precise primary data is needed to validate and further develop tools to quantify carbon stocks in various landuse systems. The overall goal of this study therefore is to fill the gap of lacking accurate primary data needed for model parameterisation in order to improve estimates of biomass and carbon stocks of perennial vegetation. Representative perennial landuse systems in the mountainous Chieng Khoi watershed Son La province, North West Viet Nam will be evaluated. For direct measurements within each selected area, a nested plot design according to Hairiah *et al.* (2001) will be used. For follow-up studies each plot will be mapped using GPS. Aboveground biomass parameters of trees will be measured non-destructively according to the allometric based fractal branch analysis. Parameters of shrubs and perennial grasses will be sampled destructively aiming to develop generic allometric equations for subsequent biomass estimation models. Belowground biomass of grass and shrub vegetation will be sampled destructively taking soil core samples with a root corer estimating root weight densities. In addition leaf area and ground cover will be measured with a LAI 2000 to estimate the potential of different landuses to reduce soil erosion. For information on landuse type and management, local farmers will be interviewed and local cadastral maps will be reviewed. The main objective of the study will be to establish a biomass and carbon stock inventory of the perennial vegetation in the Chieng Khoi watershed. In addition, allometric equations based on stem diameter or stem area shall be generic and applicable in twinned watersheds of the SFB 564 Uplands Program. Thus this study helps to improve modelling approaches to estimate biomass and carbon stocks of the terrestrial vegetation, and contributes to identify land use types as well as management recommendations, that concurrently lead to ecological and economical benefits for local farmers and international stakeholders, seeking possibilities to reduce CO_2 emissions.

Contact Address: Carsten Marohn, University of Hohenheim, Institute for Plant Production and Agroecology in the Tropics and Subtropics, Stuttgart, Germany, e-mail: marohn@uni-hohenheim.de

Keywords: Carbon stocks, fractal branch analysis, inventory, land cover change, land use change, perennial vegetation