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## Soil Carbon Stocks Decrease after Conversion from Degraded Forest to Rubber Plantation - Southern Yunnan China

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### Abstract

Land use conversion from degraded forest patches into rubber plantations is taking place in a large area of Xishuangbanna (southern Yunnan, China), northern Laos and northern Thailand. These degraded forests consist of woodlots, village forests, and mature fallow fields. Due to the mountainous topography most of the established rubber plantations are terraced. In the present study we quantified the changes in soil carbon stocks after a conversion from degraded secondary forest to terraced rubber plantations. The study area has a size of 4200 ha and was located in Xishuangbanna. We selected plots in 11 rubber plantations ranging in age from 5 – 46 years. Each rubber plot was paired with a degraded secondary forest plot. Paired rubber and forest plots were located within short distance and have similar biophysical conditions. The selected rubber plantations were established immediately after deforestation. At each plot we measured soil carbon concentration and stocks in the top 120 cm of the soil. The specific questions addressed in this study are: i) What is the amount of change in soil carbon stocks after a conversion from forest to rubber? ii) Which predictor variables considering soil characteristics, biophysical factors and management related parameters can be used to predict the changes in soil carbon stocks following this land use conversion? iii) What is the impact of terracing in rubber plantations on soil carbon stocks and soil carbon dynamics? Preliminary results show that conversion from degraded secondary forests to rubber plantations result in a significant ( $p < 0.05$ ) decrease of soil carbon stock by  $40 \text{ Mg C ha}^{-1}$  in the top 120 cm of the soil. The strongest decrease in soil carbon stocks occurs in the first 5 years after land use conversion.

**Keywords:** China, deforestation, land-use conversion, rubber, soil carbon, terracing, Xishuangbanna