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Carbon Stock Changes Evaluation in Naban River National Nature Reserve using Rapid Carbon Stock Appraisal

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Abstract

Terrestrial carbon pools play an important role in global carbon cycle. The measurement of biomass and productivity of vegetation is considered as one of the goals of the International Geosphere – Biosphere Programme (IGBP). In most tropical countries, the largest source of green house gas emissions is from deforestation and forest degradation. Therefore, the monitoring of land use change induced carbon stock variation could serve as a good indicator for carbon sink and source identification. In the context of Xishuangbanna (China), the largest land use change is the transition of tropical rainforest and fallow land to rubber (*Hevea brasiliensis*). A lot of studies have been conducted in Xishuangbanna to evaluate forest carbon stock change induced by rubber plantations' intensification. The available protocols include process based modelling, forest inventory survey, Eddy covariance and remote sensing. However, few of them are easily practical in a cost-effective and time-efficient matter for guiding local resources management. Therefore, a case study was conducted in Naban River National Nature Reserve (NRNNR), Xishuangbanna to evaluate the impact of land use change on carbon stock by using RaCSA method (Rapid Carbon Stock Appraisal). Within NRNNR, six land use systems are surveyed, namely secondary forest, young rubber, mid-aged rubber, old rubber, rubber intercropping and crop land. Time series of land use and land cover maps (2002, 2007 and 2012) were prepared from IKONOS, SPOT, RapidEye and Landsat data. The time averaged carbon stock value was used for upscaling plot level measurement to landscape level carbon density and carbon emission map. The result of this study could be used for guiding sustainable land use management on a regional scale.

Keywords: Carbon stock change, land use change, rapid carbon stock appraisal, rubber, time averaged carbon stock