EVALUATION OF SOIL ORGANIC CARBON AND NITROGEN FOR EFFECTIVE FOREST MANAGEMENT SYSTEMS

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ABSTRACT

Forest soils and the nutrients are determined by spatial activities such as agricultural systems, forest resources management and plant exploitation. SOC and N concentration were evaluated in different forest management sites at a regional scale in relation to forest site history and management regimes. This evaluation study presents SOC, SOM, N, P, K balances in different plant stand and forest history along a regional scale of tropical – subtropical climatic gradient along South China. Forest soils were collected from five different and distinct locations of regional forest and agricultural soils under 0-25 and 25-50cm profiles. Nutrient studied were Soil Organic Carbon (SOC), Soil Organic Matter (SOM), Nitrogen (N), Phosphorous (P), Potassium (K) as well as Available nutrients and TotN and TotP. Associated chemical factors including Available nutrients (AvN, AvK and AvP) and Total Nutrients (TotN and TotP) as well as SOC densities were measured in the laboratory. Soil Organic carbon evaluation showed a unique trend where Deqing (Nature reserve) - Pine and evergreen broadleaved mixed forest soil), Changtan (National nature reserve) - Secondary forest, protected and less disturbance) and Nanling forest soil (National Nature Reserves) - Secondary forest and protected) at 0-25cm depth recorded 30.00g.kg, 27.00g.kg and 27.00g.kg respectively. In the same vein, at 25-50cm depth Deqing was highest at 27.0g.kg, Nanling was 20.00g.kg and Changtan soil recorded 15.00g.kg. Available nutrients evaluated showed that Available Potassium in all forest soil recorded very high, Available Nitrogen recorded highest in Changtan (National nature reserve) - Secondary forest, protected and less disturbance) and Deqing (Nature reserve) - Pine and evergreen broadleaved mixed forest soil) respectively while Available Phosphorous consistently comparatively recorded very low in all the forest soils. The soil carbon store dominates the carbon budget at all sites and in particular at the site with a cold and wet climate where soil C constitutes 95% of the total carbon in the ecosystem. Vegetation diversity management and plant species is attributed to high SOM. This study thereby supports that soil stores and dominate the overall budget of carbon fluxes while consolidating that the changes in climate and natural forest/soil ecosystem influences C and N in soils whereby good management and less disturbance of natural ecosystems should be encouraged

Keywords: SOC, Agricultural systems, SOC, Nitrogen, regional forest management history and plant stand types.