

Woranan Sonkanha 2011: Soil Properties and Carbon Storage under Different Types of Forest in Sakaerat Environmental Research Station. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Somchai Anusontpornperm, Ph.D. 135 pages.

A study on the relationship between soil properties and carbon storage under different types of forest in Sakaerat Environmental Research Station, Nakhon Ratchasima province was carried out on eight representative soils located from upper lower foodslope to upper middle foodslope. The selected soils comprised an area of secondary mixed deciduous forest, two sites of dry dipterocarp forest, an ecotone zone, three secondary dry evergreen forests and an undisturbed dry evergreen forest. The objective of the study was to establish the relationship between soil properties and carbon storage capacity of these forest soils by evaluating the data of field soil morphological properties, physical and chemical, which were conducted based on standard methods.

Results revealed that these soils under different forest conditions are shallow to very deep, all derived from colluvium of sandstone. They are highly developed, having moderately coarse to fine texture and subangular blocky structure. Bulk density of the soils increases with increasing depth within soil profiles. They are very strongly acid to slightly acid (pH 4.5-6.3). Organic matter content ranges between very low to moderately high (3.44-31.30 g kg<sup>-1</sup>), while total nitrogen content being very low to low (0.21-1.75 g kg<sup>-1</sup>). Phosphorus availability is very low (1.45-11.31 mg kg<sup>-1</sup>) whereas available potassium content varies between very low to very high (12.09-174.51 mg kg<sup>-1</sup>). Cation exchange capacity and extractable acidity are low to very high with the values ranging between 4.8-38.5 and 1-23 cmol<sub>c</sub> kg<sup>-1</sup>, respectively. A wide range of base saturation percentage (3-81%) is found. Most soils are classified as Ultisols, except for secondary dry evergreen forest area (Skr-7) where the soil is an Altiisol.

Undisturbed dry evergreen forest (Skr-8) tends to store, to the depth of 50 cm from the mineral soil surface, the highest amount of organic carbon (103.73 tonne ha<sup>-1</sup>) with the contents between 68.03-90.84 and 68.36 tonne ha<sup>-1</sup> being found in secondary dry evergreen forests (Skr-5, 6 and 7) and ecotone (Skr-4), respectively. Soils under dry dipterocarp forests (Skr-2 and 3) contain 57.89-66.71 tonne ha<sup>-1</sup> soil organic carbon whereas the lowest content of 49.26 tonne ha<sup>-1</sup> is found in the soil under secondary mixed deciduous forest (Skr-1). Variability of organic carbon at the top 0-5 cm depth is high under secondary mixed deciduous forest. Factors influencing the ability of soil to store carbon are type of forest, soil depth, a presence of parent rocks and surface slope. C:N ratio values in these forest soils were in the range of 9.2-12.7 and the values in all soils decrease with depth within soil profile.

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