

Meta Srithongkum 2009: Intrinsic Soil Characteristics and their Potential for Agriculture in Nakhon Nayok Province. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Saowanuch Tawornpruek, Ph.D. 185 pages.

A study of the intrinsic soil characteristics and their potential for agriculture in Nakhon Nayok province, Thailand was carried out on 7 representative areas. Results of the study revealed that the soil characteristics, soil properties and their development are varied depending on landforms and parent materials. These soils are Kandic Paleustalf (Pedon 1), Typic Paleustults (Pedon 2, 3), Plinthic and Aeric Paleaquults (Pedon 4, 5), and Sulfic Endoaquepts (Pedon 6, 7). Pedon 1 formed from colluvium over residuum derived from andesitic tuff on middle part of footslope. Pedons 2 and 3 formed from old alluvium on middle part of dissected and erosional surfaces. Pedons 4 and 5 formed from semi-recent alluvium on low terrace. Pedons 6 and 7 formed from riverine alluvium over brackish and marine deposits with jarosite mottles occurring in Pedon 7 which is shallower than Pedon 6. Their texture ranges from loam to clay and their bulk density ranges from low to moderately high ($1.38-1.84 \text{ Mg m}^{-3}$). Chemical analysis of soils indicates that they are extremely acid to neutral (pH 3.5-6.5) being extremely acid to very strongly acid (pH 3.5-4.6) in Pedons 6 and 7. They have very low to high organic matter content ($0.01-42 \text{ g kg}^{-1}$), very low to medium total nitrogen ($0.01-8 \text{ g kg}^{-1}$), very low to high available phosphorus ($0.87-25.3 \text{ mg kg}^{-1}$), very low to very high available potassium ($7.6-413 \text{ mg kg}^{-1}$). The soils have very low to very high values of cation exchange capacity ($2.5-40 \text{ cmol kg}^{-1}$) being very high in Pedons 6 and 7. Their sum of extractable bases are in the range of low to medium ($0.29-4.49 \text{ cmol kg}^{-1}$). Extractable acidity in these soils ranges from very low to very high ($0.75-109 \text{ cmol kg}^{-1}$) and base saturation percentage varies from 1-74%. Their electrical conductivity ranges from $0.03-4.52 \text{ dS m}^{-1}$. Kaolin is the dominant mineral in the clay fraction of these soils except Pedon 6 which contains kaolin, illite and smectite, while Pedon 7 has kaolin and illite as the dominant minerals. Quartz is the dominant mineral in silt and sand fraction of all pedons. Fertility assessment results indicate that Pedons 1, 6 and 7 have moderate fertility status whereas Pedons 2, 3, 4 and 5 have low fertility. Their potential based on suitability assessment indicates that Pedon 1 is suitable for fruit trees and pasture. Pedon 2 is moderately suited for field crops, fruit trees and pasture with the limitations of drought and gravelly texture at the depth of 25-50 cm. Pedon 3 is well suited for fruit trees and pasture with the limitation of very low soil fertility status. Pedons 4, 5, 6 and 7 are moderately suited for paddy field with the limitation of drought for Pedon 4 and 5 and acidity associated with jarosite for Pedons 6 and 7.

Student's signature

Thesis Advisor's signature