ABSTRACT

Title : Properties and Adsorption Capability of Coastal Lowland Soils in Changwat Narathiwat

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Soils from 8 soil series in the coastal lowland areas of Changwat Narathiwat were investigated. Field studies included site observation, pedon analysis and profile description. Laboratory studies included physical, chemical, mineralogical and adsorption characteristics of the soil samples. Adsorption curves and adsorption capabilities of the soils were determined and the results were employed to indicate the optimum level of plant nutrient required for each soils.

Bacho and Ban Thon had sandy textures, low water-holding capacity, moderately to extremely acid, very low extractable bases, low CEC value and low base saturation percentage. Their surface samples had low available P and K contents. Bacho had P adsorption capacities ranging from 1.5 to 2.5 mg kg^{-1} soil, Cu adsorption capacities ranging from 1.5 to 3.5 mg kg^{-1} soil, and Zn adsorption capacities ranging from 9.5 to 14.0 mg kg^{-1} soil. Ban Thon had P adsorption capacities ranging from 5.0 to 6.5 mg kg^{-1} soil, Cu

adsorption capacities ranging from 10.0 to 20.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 9.0 to 14.5 mg kg^{-1} soil.

Bang Nara and Tak Bai had loamy to clayey textures, moderately to extremely acid, low to medium organic matter contents, low to medium CEC values and low base saturation percentage. Tak Bai had higher Al and Fe oxides, and higher humic and fulvic acids contents than Bang Nara. Their surface samples had low available P and low to medium available K contents. Bang Nara had P adsorption capacities ranging from 25.0 to 32.5 mg kg^{-1} soil, Cu adsorption capacities ranging from 1.5 to 6.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 8.5 to 13.5 mg kg^{-1} soil. Tak Bai had P adsorption capacities ranging from 5.0 to 9.5 mg kg^{-1} soil, Cu adsorption capacities ranging from 12.5 to 31.5 mg kg^{-1} soil, and Zn adsorption capacities ranging from 8.5 to 14.0 mg kg^{-1} soil.

Rangae and Munoh had loamy to clayey textures, extremely acid, high organic matter content, medium to high CEC values and low base saturation percentage. Munoh had higher extractable acidity, higher Al saturation percentage and lower extractable bases than Ragae. Their surface samples had high available P and low available K contents. Ragae had P adsorption capacities ranging from 74.0 to 112.5 mg kg^{-1} soil, Cu adsorption capacities ranging from 20.0 to 51.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 12.0 to 17.0 mg kg^{-1} soil. Munoh had P adsorption capacities ranging from 45.0 to 83.0 mg kg^{-1} soil, Cu adsorption capacities ranging from 10.0 to 30.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 11.5 to 15.5 mg kg^{-1} soil.

Narathiwat-1 and Narathiwat-2 had dominant fibric soil materials, extremely acid, very high CEC value and low base saturation percentage. Narathiwat-1 had higher extractable acidity and higher Al saturation percentage than Narathiwat-2. Humic acid content was higher than fulvic acid in both soils. Their surface samples had high available P and low to high available K contents. Narathiwat-1 had P adsorption capacities ranging from 3.0 to 5.0 mg kg^{-1} soil, Cu adsorption capacities ranging from 30.0 to 74.5 mg kg^{-1} soil, and Zn adsorption capacities ranging from 18.0 to 21.5 mg kg^{-1} soil. Narathiwat-2 had P adsorption capacities ranging from 1.5 to 2.0 mg kg^{-1} soil, Cu adsorption capacities ranging from 20.0 to 50.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 4.5 to 16.5 mg kg^{-1} soil.

Kab Daeng had dominant hemic soil materials, extremely acid, high CEC value and low base saturation percentage. Kab Daeng had lower extractable acidity but higher Al saturation percentage than Narathiwat. The surface sample had high available P and very high available K contents. Kab Daeng had P adsorption capacities ranging from 9.0 to 18.5 mg kg^{-1} soil, Cu adsorption capacities ranging from 27.5 to 61.0 mg kg^{-1} soil, and Zn adsorption capacities ranging from 15.0 to 21.0 mg kg^{-1} soil.

The subsamples of some soils were also investigated. The results indicated that most soils had P, Cu and Zn adsorption capacities varying with their subsamples. Furthermore, it was also found that liming caused to increase, decrease or less affect the adsorption capabilities of the soils. In addition to evaluating the nutrient availability, the adsorption curves

could provide an estimate of the quantities of fertilizers required to adjust the soil nutrient status to appropriate levels. Other potential improvements base of the soil properties were also evaluated and suggested to provide an effective management on this area.