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Masterarbeit

*Das Potential radiometrischer Daten zur Bestimmung
der verfügbaren Kaliumvorräte in Böden Nordthailands*

*Diese Arbeit wurde gefördert aus Mitteln der Stiftung
fiat panis.*

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Abstract: The Potential of radiometric data to determinate the plant available potassium pool in soils of Norththailand

In the mountainous regions in the northwestern part of Thailand, clay illuviation soils dominate with distinctly different properties concerning cation exchange capacity (CEC) and base saturation, which are essential for soil fertility. However, until now a differentiation can only be made by costly laboratory investigations. Now radiometric measurements of the elements thorium and potassium shall allow a soil classification already in the field or by remote sensing, because of their different behavior during soil development. The measurements of radiometric potassium additionally offer information on the total potassium concentration in the soil.

The objective of the present work was to test, whether there is a connection between the radiometrically measurable total potassium content and the plant-available potassium in order to enable to give a fertilizer recommendation for potassium. Moreover, a prediction map, based on radiometric data should be validated.

For the investigation a mapping area of 8 km² in the northwest of Thailand in the province Mae Hong Son close to the village Luk Khao Lam was mapped based on transects. 151 augers, 6 radiometric rock measurements and 7 profiles were obtained. Radiometric surface measurements were recorded to each auger. Radiometric measurements have been conducted for each horizon. The field data were calibrated by laboratory measurements of the profiles with special focus on the different forms of potassium in the soil as well as their plant availability.

The soil map produced in this work showed with about 56 % a relatively low correlation to the areas of the prediction map, due to an unexpected claystone occurrence. However the thorium-potassium-ratio of 16 as distinguishing feature of clay illuviation soils could be approved by the laboratory values. The fertilizer recommendation established for the present work shows a demand of the different fields from 64-194 kg ha⁻¹ in the area.

Hence, radiometric measurements constitute an efficient way both to differentiate the clay illuviation soils and to estimate the potassium available to the plants.

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