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Predicting the variability of copper and zinc in leaf and soil of oil palm planted on a 12 ha land using geospatial information system technology

(Article)

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Abstract

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Oil palm (Elaeis guineensis) is an important economic tree crops in the tropic. However, more than 95 % of oil palms grown in Southeast Asia are on acid, low fertility and highly weathered soils. Optimum value of micronutrients in the soil was required to enhance the efficiency of use of macro-nutrients. Hence, to observe and predict the fertility status of the oil palm plantation area, a 12 hectare study site was used and a total of 60 geo-referenced soil and leaf samples were collected for determinations of pH and selected micronutrients of Cu and Zn content. The data were explored and mapped using geostatistic and Geographic Information System (GIS). The study area had acidic type of soil with pH ranged from 3.25-5.85. The analysis showed that almost 78% of the study area had high content of Cu in soil, while another 22% of area was low to moderate in Cu. However, Cu content in leaf were categorized as insufficient as 100% of the area was observed to have Cu less than 3 ppm. About 80% of the study area showed a low to moderate content of Zn in soil, while another 20% of area showed a high content of Zn. Zinc content in leaf ranged from optimum to high categories. However, this value did not reach the excess level of Zn (50 ppm). These results suggest that, this plantation area need a site specific management approach in order to increase its crop productivity in regards to nutrient management. As a preliminary recommendation, a zone management practice would be applied in future as it is beneficial in term of protecting the environment from excessive fertilizer. © 2015 Penerbit UTM Press. All rights reserved.

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