

**SPATIAL VARIABILITY OF SELECTED SOIL PHYSICAL AND
CHEMICAL PROPERTIES OF HARUMANIS MANGO
ORCHARD IN ARAU, PERLIS**

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DECLARATION

This Final Year Project is a partial fulfilment of the requirements for a Degree of Bachelor of Science in Agrotechnology (Hons.) Horticulture Technology in the Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

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ABSTRACT

SPATIAL VARIABILITY OF SELECTED SOIL PHYSICAL AND CHEMICAL PROPERTIES OF HARUMANIS MANGO ORCHARD IN ARAU, PERLIS

Spatial heterogeneity of the soil properties which is not taken into account in the agricultural practices can result in imbalanced application of agricultural inputs below or above the real need of the crop field and thus, leads to increased production cost. This study was conducted in order to determine the spatial variability of the selected soil physical and chemical properties and to produce maps of the selected soil properties of Harumanis mango orchard (6.4469162N, 100.2731349E) by utilizing Geographic Information System (GIS). A total of 25 soil samples were collected from the orchard by using soil auger at a depth of 15 cm using systematic sampling design. The collected soil samples were labelled accordingly and handheld GPS was used to record the coordinates of each sampling points. Soil samples were air-dried, sieved using a 2mm mesh soil sieve and analysed for soil pH, electrical conductivity (EC), organic matter content, bulk density (BD), porosity and texture. Normality of data obtained were analysed using SPSS and the geostatistical analysis were done using GS+ software version 10 to obtained semivariogram that illustrated the spatial variability in the experimental site. Semivariogram indicate that soil pH, EC, sand and clay content have strong spatial dependency. SOM has moderate spatial dependency whereas BD, porosity and silt content has weak spatial dependency. Based on the results, it was found that soil texture of the experimental site can be classified as sandy loam which consist of 55.25% sand, 34.75% silt and 7.58% clay. The soil pH was acidic, ranging between 4.28 to 6.33. The soil of the experimental site is non-saline (<2 dS/m) and most of the area have high SOM content (5.08%). Correlation between each of the soil physical and chemical properties were analysed using Spearman correlation in SPSS software version 20. Strong negative correlation was indicated between BD and porosity ($p \leq 0.01$). Meanwhile, clay content shows positive correlation with BD and OM and negatively correlated with soil porosity ($p \leq 0.05$). The maps produced illustrate that the experimental site was totally covered with non-saline soil. The selected soil properties maps produced in this study provide a new perspective on farming practices such as accurate application of fertilizers in specific area.

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