**Estimation of precise and accurate soil porosity with respect to spatial variability of particle density in different textured soil in catena**

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**ABSTRACT**

Insight on the spatial variability of soil physical properties remains at different locations on a catena is required to formulate appropriate management strategies on crop production. Therefore, the objective of this research is to assess the effect of the variability in particle density and its interrelationships on soil porosity of different textured soil in a catena of faculty farm of Sabaragamuwa University of Sri Lanka. The particle density of soil is commonly assumed to be 2.65 g cm-3. Thus, with different soil textures is vital to interpret precise and accurate total porosity of different textured soil. Else ways, it would mislead the interpret of the true porosity and aeration conditions at different locations within the land catena. Randomly collected samples from two depths (0-15 cm and 15-30 cm) of well drained, moderately drained and poorly drained soils in a soil catena, beach sand, river sand, grinded boulder was used to examine for soil particle density, soil bulk density, soil texture (%) and soil porosity. Results showed that the particle density in well drained, moderately drained, and poorly drained is varied from 1.7 to 2.1gcm-3. However, the particle density of beach sand, river sand and grinded boulder (2.562 $\pm $0.333, 2.61 ±0.0101, 2.50 ±0.0112) were almost to assumed particle density ((P<0.05). Moreover, calculated values of the total porosity were significantly differed along the soil catena (P<0.05). A strong negative correlation was observed among clay and silt and the soil particle density (r= -0.9054 and -0.9006). Sand content was positively correlated with the soil particle density (r= 0.9371). Evident from results that the particle density indicated a significance difference from assumed values related to well drain, poor drain, moderate drain soil samples. Thus, the calculated true values of the total porosity within the soil catena of faculty farm were significantly varied (42.972% ±1.25) and true values of the total porosity will be extremely useful to formulate precise and accurate management strategies for sustainable crop production.

**Keywords**: *Bulk density, particle density, Soil catena, total porosity, correlation analysis*