

Characterization of soil physical properties on an undulating terrain of reddish brown earth (Rhodustalfs) and low humic gley (Endoaqualfs) soils

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Abstract

Reddish Brown Earth (RBE) and Low Humic Gley (LHG) association extends great part of the dry zone, Sri Lanka in the dominant landform appearing in the command area of the tank based irrigation scheme. Reddish Brown Earth (RBE) occupies the upper and the middle slope of the landscape where as Low Humic Gley (LHG) occupies the lower part of the catenary sequence. Soil physical properties play a significant role in effective nutrient and water management practices in both uplands and lowlands. The physical properties largely determine the stability of a soil and they usually control the suitability of the soil as growth medium.

At present most of the annual crops cultivated in the university farm showed poor performance especially in the *maha* season due to water logging condition. Therefore, this study was carried out in the Agriculture Faculty farm of *Rajarata* University at *Pulliyankulama* to determine the drainage classes by characterizing soil physical properties along the undulating terrain. The physical properties studied included texture, structure, colour, bulk density and infiltration of the soil. Structure and colour of the soil were determined by *in situ* observations. Texture was analyzed by sedimentation and decantation method in the laboratory. Bulk density was determined from an undisturbed soil sample using a core sampler. Double ring infiltrometer was used to measure the infiltration rates of different points along the slope.

It was observed that soil colour varies from reddish brown to dark brown from top to bottom along the slope. When considering textural classes, the upper slope of the land consists of sandy loam soils whereas lower part of the land is occupied by sandy clay loam soils. There was a significant difference in bulk density values between the soils associated with upper and lower part of the catena (1.86 g cm^{-3} vs. 1.16 g cm^{-3}). Higher organic matter content of 2.8% was reported for soils in the down slope compare to the 1.7% of organic matter content in the upper slope soils. At the same time a considerable difference was observed in steady infiltration rates: 27.7 mm hr^{-1} in the upper slope soils versus 16.6 mm hr^{-1} in the soils at the down slope of the catena.

The results of the study clearly revealed that well drained soils occupied the upper slopes of the university farm where as lower part was associated with poorly drained soils. Therefore water management and other cultural practices presently adopted in the farm have to be revised according to the findings of the study.

Keywords: Physical characteristics of RBE and LHG soils