Spatial Variability of Soil Characteristics along a Landscape Gradient in Bellanwila-Attidiya Area

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Abstract : Wetlands are comprised of unique components of soil, water and biodiversity which are interconnected. Although water and biodiversity components of wetlands have been somewhat investigated, a very few research have been carried out to investigate soil properties. This study focused on spatial variability of soil chemical and physical parameters in a land use gradient around the Bellanwila-Attidiya Sanctuary, It was carried out for a period of 3 months and several random soil samples were obtained from all land use areas. Selected physical and chemical properties of soil were analyzed according to the standard methods and the GIS maps were developed using ArcView GIS 3.2.

The results indicated that selected chemical and physical parameters of soil varied across the land use gradient, except for temperature. According to the GIS maps there are apparent variations in distribution of soil properties. On the surface, the highest level of each parameter was found as follows: - NO3 - – industrial area, PO4 3- - functioning paddy fields, SO4 2- - residential area, Cl- - residential area, Fe3+ - functioning paddy fields, moisture content - wetland, pH, acidic – industrial area, salinity residential area, electrical conductivity – residential area. At a 1 m depth, the pattern was different: NO3 - – abandoned paddy fields, PO4 3- – functioning paddy fields, SO4 2- - wetland, Cl- - wetland, Fe3+ - residential area, moisture content - wetland, pH – industrial area, salinity - wetland, electrical conductivity - wetland. The findings clearly exhibit the increases in anthropogenic pressure have resulted in wide-scale alternation of soil properties, at least in the surface soil, across a land use gradient. Managing land use in the watershed of the wetland thus needs adequate attention to conserve this natural ecosystem.

Key words: soil, physical and chemical parameters, wetland, GIS