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Influence of soil rehabilitation and land management on Soil Quality indicators in tea plantation in Galle districtS D Wanniarachchi^{1*}, M A C Dharshana¹ and A K N Zoysa²¹*Department of Agricultural Chemistry, Faculty of Agriculture, University of Ruhuna, Kamburupitiya*²*Soils & Plant Nutrition Division, Tea Research Institute of Sri Lanka, Talawakelle*

A significant extent of lands used for tea cultivation belongs to the low country wet zone of Sri Lanka. Most of these lands are situated in hilly areas and are subjected to erosion and gradual degradation due to intensive cultivation. Assessment of soil quality and making recommendations for remedial measures is of paramount importance for sustainable tea cultivation. The objective of this research was to identify soil quality indicators, which are responsive to land management practices adopted in tea lands. Soil samples for the study were taken from a tea plantation situated in Galle district representing a range of land management options viz. land under soil rehabilitation, fallowed, 3, 7 and 11 years old and forest site adjacent to the tea plantation. Each selected field was divided into blocks and 10 random soil samples/block taken from the 0-15 cm depth. Samples from each block were mixed to make composite samples for soil physical, chemical and biological analyses.

Soil samples were analyzed for selected parameters (bulk density, wet aggregate stability, organic C, total nitrogen, extractable P, exchangeable K, water soluble organic C, microbial biomass C, mineralizable C and N), which could potentially be used as soil quality indicators. Of the indicators assessed, soil bulk density and soil organic carbon (content and sequestration in the 0-15 cm layer) were the most sensitive to impact of land management. Soil wet aggregate stability can also be used as an indicator of soil quality with some further research. Results also revealed that plant nutrient levels are not ideal indicators to assess soil quality as frequent fertilizer applications in tea fields can mask the effects of soil degradation. Biological indicators such as soil microbial biomass and mineralizable C and N are requiring further work before being used as soil quality indicators. It appeared that physical indicators reveal more about land degradation in contrast to chemical and biological indicators. The length of tea cultivation after soil rehabilitation had a clear impact on the quality of soil in the tea fields studied. There has been a substantial loss of soil carbon from tea fields several years after the soil rehabilitation. Results of the study emphasize the need for an organized soil quality monitoring program to make recommendations for sustainable land management in tea cultivation.