B – 29

The effect of edaphic factors on yield of tea in Sri Lanka

Apart from the weather factors, the productivity of tea is greatly affected by the edaphic factors. Hence, an in-depth study was undertaken to analyze the soil factors, which are connected with the productivity of tea in 15 selected tea estates representing major agro-ecological zones such as up country, mid country and low country. The yield data were collected from three fields (high, moderate and low yield categories) of each sample estate with varying soil conditions. Soil samples collected from the adjoining forests were compared with the soil conditions in tea fields. The soil physical and chemical properties, and water retention of tea and forest soils were measured according to the standard procedures. The relationships between different variables were established by regression analysis.

Results showed that the soil factors limiting tea yield were different for different tea growing regions in Sri Lanka. Of the soil factors, soil pH, nitrogen content, sand% and the moisture retention greatly influenced productivity of tea lands in the up country with r^2 = 0.46 ($p<0.05$), 0.35 ($p<0.05$), 0.34 (p,0.05) and 0.53 ($p<0.01$),respectively while soil depth, organic carbon content and moisture retention, were identified as the limiting factors for low grown tea with r^2 = 0.65 (p,0.01), 0.48 ($p<0.001$) and 0.39 ($p<0.05$), respectively.

Moreover, a strong negative correlation between tea yield and the loss of soil organic carbon from the fields (difference between forest and tea soils) in the low country (r^2 = 0.70, $p<0.05$) suggests that low country tea soils are highly deficient of soil organic carbon. These findings shown that the improvements of the organic carbon status of tea soils in the low country is of paramount importance for increasing the productivity of tea plantations. In contrast, more attention should be paid for improving the soil chemical properties (soil pH and nitrogen content) and moisture retention of up country tea lands.