

## **Effects of tea cultivation on the quality of water in selected perennial water bodies from different tea growing elevations in Sri Lanka**

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This study investigated the effects of tea garden activities on the quality of water in selected perennial water bodies from different tea grown elevations in Sri Lanka. Forty three sampling sites from eight tea estates under one plantation company in three elevational zones were selected and included springs (originating from tea gardens and secondary forests located within or at higher elevations) and streamlets (before and after flowing through the selected land use patterns ie. tea gardens, home gardens, Eucalyptus patches, marshy lands and secondary forest patches). The parameters measured were: the extent of the drainage basin and depth and width of the water body, light intensity and the flow rate, , temperature, pH, turbidity, conductivity, salinity, DO, BOD<sub>3</sub>, nitrate, ammonium, sulfate, phosphate, calcium, zinc of the water.

The DO ( $6.3 \pm 0.2$  mg/l), BOD<sub>3</sub> ( $2.6 \pm 0.1$ ), Nitrate ( $1.82 \pm 0.12$  mg/l), Ammonium ( $0.69 \pm 0.01$  mg/l), Sulfate ( $28.78 \pm 2.11$  mg/l), Phosphate ( $0.47 \pm 0.01$  mg/l), Calcium ( $1.33 \pm 0.13$  mg/l) & Zinc ( $0.11 \pm 0.01$  mg/l) in all the tea estates were within WHO potable water standards. No significant differences were evident among sampling sites with respect to some factors. In all the estates the tested parameters did not show a significant difference ( $p < 0.05$ ) in the quality of spring water originating from secondary forests at higher elevations. Except home gardens and some marshy lands, the other land use patterns did not significantly ( $p < 0.05$ ) contribute to changes in water quality at tested sites. Comparing chemical water quality parameters at entry and exit points to tea estates, significant differences ( $p < 0.05$ ) were evident only for low elevation tea estates.

The low pH even in the spring waters within forests indicates that the low level of pH found in other sampling sites could not be due to any anthropogenic activity but could be due to natural dissolution. Also this study revealed that the water bodies related to the low-country tea estates are in a vulnerable situation of pollution compared to the estates in higher elevations (mid & high) and this could be due to lack of natural habitats (secondary forest patches) through which the water flows among tea grown areas in the low country estates which contributes to natural purification process. As such, it is recommended to enhance natural forest habitats associated with water ways of low-country tea grown areas to minimize pollution.