Comparative assessment of soil moisture behaviour of Red Yellow Podzolic soils under forest tree species (*Alstonia macrophylla wall)* and Tea (*Camellia sinensis)* in relation to bare soil

K D N Weerasinghe[1*] and P W Ranawaka[1]
[1]*Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna, Kamburupitiya*

A comparative assessment of soil moisture behaviour under tea (*Camellia sinensis*) and forest tree species (*Alstonia macrophylla wall*) in relation to bare soil was done in the Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka, during June to August 2004. Diviner 2000, which is a safe, portable and accurate soil moisture monitoring device based on dielectric capacitance was used to assess the soil moisture in 100 cm depth in different sites.

The experiment had two sites with replicates having same topography and soil conditions. First site was a well managed 15 years old tea plantation and the second site was a site with 3 year old well grown *Alstonia* plants, bare spots were also maintained in the research site to measure bare land evaporation.

Average moisture content in top 30 cm layer in all crops highly varied compared to bare soil. In tea soil, moisture retention ability in 0 – 100 cm layer was high compared to bare soil, but *Alstonia* soil had lower moisture retention ability. In surface 100 cm depth soil moisture highly fluctuate due to high soil moisture extraction and evapotranspiration by the *Alstonia* cover. Prior to saturation, soil moisture depletion rate in first 20 cm depth were recorded as 0.54 mm day^{-1}, 0.72 mm day^{-1} and 0.94 mm day^{-1} for Tea, *Alstonia* and bare soil, respectively.
After considerable rain due to saturation, average soil moisture in tea was 1.29 mm day^{-1}, which was low compared to *Alstonia* and bare soil. *Alstonia* soil showed highest replenish rate of 2.27 mm day^{-1} due to high shortage of moisture in top layer. Bare soil had intermediate rate of soil moisture replenish. (1.40 mm day^{-1} in top 20 cm depth.)

The highest evapotranspiration of 5.29 mm day^{-1} was observed in bare soil, it was remarkably low in tea with an average of 4.8 mm day^{-1} which was a 10 % reduction over the bare soil evaporation. The evapotranspiration of Alstonia was 4.86 mm day^{-1}, which was 8 % lower than that of the bare soil. Well established and well managed canopy cover of tea plantation helps to reduce surface evaporation from tea plantation.