

Influence of Street Tree Canopy on the Microclimate of Urban Eco-Space**Bandara R.^{1*}, Rupasinghe H.², Halwatura R.², Jayasinghe G.¹**¹*Faculty of Agriculture, University of Ruhuna, Matara, Sri Lanka*²*Faculty of Engineering, University of Moratuwa, Katubadda, Sri Lanka***ranahansibandara@gmail.com***Abstract**

Rapid population and urban growth increase the vulnerability of tropical cities to climate change. Substantial modifications in urban eco-space with current development trends and urbanisation create Urban Heat Island (UHI) effect. UHIs represent dense urban areas within cities where the temperature is recorded to be higher than those located in suburbia. UHI induces through low albedo surfaces, building geometry and loss of green infrastructure in urban setting, causes a huge influence on the quality of life of urban dwellers. Expanding urban forest through street tree planting is considered as one of the most cost-effective means of mitigating the urban heat island effect and associated expenditures for air conditioning. This study evaluates (a) the relationship between the radiation cut off by street tree canopy and the changes in ambient temperature and the RH in Colombo Metropolitan Region (CMR) (b) the street tree species with the highest thermal and RH benefit from the abundant street trees in CMR (c) the average ambient temperature and RH benefit to the urban environment from street trees through a simulation study using ENVI-met 4.4 software version. Hence, the study comprises with a field assessment along six main selected streets in Colombo city and a computer-based simulation study using ENVI-met 4.4. The ambient temperature change and the RH change under the street tree canopies in the CMR has a positive correlation with the amount of radiation cut off from the tree canopy. From the studied street tree species *Mesua ferrea* recorded the highest thermal and RH benefits and those were 3.8° C and 7.2%, respectively. Simulation study indicated that by increasing the street tree canopy by 2,3 and 4 folds than existing, the modelled area of CMR (Wellawatta city) can receive a thermal benefit of 1.280° C, 1.37° C, 1.63° C and a RH benefit of 1.99%, 2.77%, 3.94%, respectively. Hence, the average ambient temperature drop and RH increase from a single tree to a wider area (Wellawatta city) was 0.53° C and 1.34%, respectively. Consequently, by enhancing urban forest cover through strategic establishment of street trees urban environment and outdoor thermal comfort of tropical Sri Lanka can be enhanced effectively.

Keywords: ENVI-Met, Street trees, Urbanisation, Urban Heat Island (UHI).