

Living Walls as an Approach for a Healthy Urban Environmental Quality

MASK Dias¹, HT Rupasinghe², GY Jayasinghe^{3#} and RU Halwatura⁴

^{1,3}Department of Agric.Engineering, Faculty of Agriculture, University of Ruhuna, Sri Lanka

^{2,4}Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka
#victorlion3000@gmail.com

The effect of metropolitan expansion on the natural environment creates inimitable challenges to architects and engineers pursuing innovative strategies to mitigate their negative consequences. Escalating building constructions, roads and vehicles by diminishing urban green spaces cause for urban heat island (UHI) effect. Therefore, implementation of living walls is an appropriate strategy to enhance the urban vegetation in cities. This study aimed (a) to quantify the benefits of the living walls to urban environment quality and (b) to evaluate the performances of an urban context by using ENVI-met 4.4 software simulation study. Fabricated modular greenery systems of *Rhoeo spathacea* and *Axonopus fissifolius* were established on an outer wall and selected microclimatic conditions were quantified by using modular greenery systems. Temperature data was collected from inner wall, outer wall, air gap, surface of the modules, 1m in front of the module and a direct wall was used as the control. RH and CO₂ were measured in front of the modules and the control and the simulation study was done for the Wallawatte area. The study revealed that living walls are highly contributed to the outdoor temperature reduction between 1000h to 1500h. *Axonopus fissifolius* accounted higher temperature reduction than *Rhoeo spathacea* (1.21°C -5.64°C). Average RH increment (2.48% and 2.76%) and CO₂ reduction (0.39% and 0.78%) were found near the modules compared to control. The averaged outdoor temperature for vertical greenery system were capable of reducing 1.29°C of outdoor compared to the existing conditions of the selected area with reference to the simulation study.

Keywords: CO₂ concentration, ENVI-met, Living wall, Outdoor thermal comfort, Relative humidity