

Quantifying Green Space Cooling Effects on the Urban Microclimate using Remote Sensing and GIS Techniques

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SUMMARY

Urban heat island (UHI) is a phenomenon where temperature distribution in the urban area is significantly warmer than its surrounding suburban areas. One of the main causes of UHI is the replacement of natural surfaces by built surfaces through urbanization. Trees and vegetation play vital role to mitigate the UHI effects especially by regulating high temperature in saturated urban areas and their surrounding. This study attempts to evaluate the urban green spaces (UGS) cooling effects on the microclimate of the surrounding areas especially in a hot and humid tropical climate like Malaysia. Shah Alam Lake Garden (Shah Alam), Bandaran Kelana Park (Kelana Jaya) and Subang Ria Recreational Park (Subang Jaya) which are located in the Petaling District, Selangor, Malaysia are selected as the study areas. UGS land cover profile and surface temperature distribution are derived from Landsat 5 Thematic Mapper (TM) image of 2009. Mono-window algorithm is used to generate temperature distribution map of the study areas. Land cover classification and land cover profile of the selected study areas are generated in the digital image processing software. Geographical Information System (GIS) is used to generate the land surface temperature (LST) map, measure the LST of selected points within specified buffer zones, perform overlay and buffer operations. The green space cooling effects intensity and the relationship between intensity and proximity from green space boundary are later determined. Results obtained have indicated that the cooling effects intensity of the surrounding urban areas largely depends on the green space profile and the distance from the park boundary. The introduction of green areas or parks in urban areas can be considered as a good initiative to replace the loss of natural greenery and can potentially reduce the effects of UHI.