

Remote Sensing and Infectious Disease Epidemiology: Responses of Land Use and Surface Temperature on Tuberculosis in Malaysia

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Abstract: Tuberculosis (TB) is a disease caused by the bacteria called Mycobacterium tuberculosis. This disease affects the people that suffer to their lung that are spread through the air. Previous studies have revealed that human factors are more likely to affect TB than environmental factors, but in a reality, local spatial environmental factors can also dynamically affect the disease occurrences and pattern. The purpose of this paper is to exploratory investigate the capabilities of remote sensing (RS) and Geographical Information System (GIS) to determine the correlation between TB cases, land use (LU) and land surface temperature (LST) in Selangor, Malaysia for 2017. Landsat 8 image of Selangor was processed using Supervised Classification method in ERDAS software to map the LU and LST, while ArcGIS software was then used to estimate the areas of these variables and to show the TB distribution pattern. Spatial overlay and correlation analysis were conducted to determine the strength of connection between TB, LU, and LST. The interesting findings have revealed in this study that each variable has a positive relationship with each other, defining that more urban ($r=0.815$) and normal-heat areas (0.132) will more influence the incidence of TB in the state. This study has also demonstrated the combination of RS and statistical GIS technology could be used to explicitly detect the potential risk areas of the disease by referring to the localised environmental risk variables that are related to the TB scenario.

Keywords: Remote Sensing, Disease Epidemiology, Land Use, Land Surface Temperature, Tuberculosis.