

Urban greenspace spatial patterns and eco-function by using Sentinel 2 imagery

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Urbanization is the process of land transformation and area growth to fulfill the needs of accommodating the increased population, infrastructure and facility in the urban area. Hanoi is the capital city of Vietnam. Its government currently has a great ambition to develop it to become an internationalized city. Under Hanoi Master Plan to 2030 and vision to 2050 by Decision 1259/QD-TTg, Hanoi has been reconstructing and reshaping greatly. Its population in 2020 is expected to reach 15 million inhabitants with green public transport system Metro and a huge increased demand on land transformation from natural spaces to dense concreted infrastructure. This current process poses multi-challenges for the current Hanoi City in terms of greening, urban microclimate and urban environment as well as social and physical impacts on its residents. In the recent few years, Hanoi has dynamically changed in particular by reducing the areas of urban greenspaces that play a vital role in maintaining good ecological and environmental characteristics of the city. Sentinel 2 data are used to investigate the change of urban greenspaces in inner Hanoi City during the timeframe from Oct. 2016 - Oct. 2018. Accuracy assessment is conducted by using Google Earth map and field survey data. Results show that urban greenspaces in inner Hanoi City were significantly declined in recent two years from 24 km² to 11.1 km², or equivalent to percentages of tree-coverage reduced from 15% to 7%, respectively, and with overall accuracies of 97% and 95% and Kappa coefficients of 0.94 and 0.92, respectively. Spatial patterns of eco-function services of urban greenspace are then investigated. Hotspots of risk heat areas are also highlighted in the map. The reduced accessibility and availability of urban greenspaces in inner Hanoi City reveal that the Hanoi citizens are urgently in needs of more greenspaces. It is advised that the Hanoi City Government and decision makers should take serious measures to enhance the greenness and the effectiveness of urban greenspaces for the benefits of citizen' s health. Also, it is indicated that Sentinel 2 data are well suitable for not only visualizing the urban greenspaces, but also offering the guidance for landscape planning and management at a city scale.

Keywords: urban greenspaces, Hanoi Master Plan, Sentinel 2, urban environment