



## **Observed Two-Year Urban Greenspaces Evolution in Inner Hanoi City by Sentinel 2 Imagery**

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Hanoi is the capital city of Vietnam. Its government has been implementing a City Master 2030 Plan in order to develop Hanoi to become an internationalized city since 2011. Under the Hanoi Master 2030 Plan, the city has been greatly reconstructed and reshaped in the recent 18 years with a continuously changing trend in the foreseeable future. Among the changes, the decrease in the area of greenspaces is evident. In this paper, we utilize the Sentinel 2 data to examine the evolution of urban greenspaces of the inner Hanoi City that covers an area of 160 Km<sup>2</sup> during the timeframe from Oct. 2016 to Oct. 2018. Accuracy assessment is conducted by using Google Earth imagery and field survey data. Results show that urban greenspaces in the inner Hanoi City were significantly declined in the recent two years of concern from 24 km<sup>2</sup> to 11.1 km<sup>2</sup>, 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. The statistical analysis shows the detailed fast declining in urban greenspaces in each district of the city. The reduced accessibility and availability of urban greenspaces in inner Hanoi City reveal that the city citizens are urgently in need of more greenspaces. It is advised that the Hanoi City Government and decision makers should take serious measures to enhance the greenness and effectiveness of urban greenspaces for the benefits of citizens' health and well-beings. 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 city scale.

Index Terms: urban greenspaces; Hanoi Master Plan; Sentinel 2; urban environment