Land Cover and NDBI analysis to map built up area in Iskandar Malaysia

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Abstract. The growth of Iskandar Malaysia as a regional development corridor is inescapable large and rapid. The study area has been transformed from predominantly agricultural and forest land prior to 1990s into the second largest and third most urbanized area in peninsular Malaysia. The aim of this paper is to map Iskandar land cover change from 1991 to 2019 using sequential Landsat multi-spectral images with Normalized Difference Building Index (NDBI) analysis to assess spatio-temporal urban built up and its pattern. Accuracy assessment of kappa coefficient is used to measure the accuracy of classification. Research has proved a significant rapid land cover change and a vast transformation of agricultural and forest land into low density urbanized area scattered in Iskandar. A rapid land cover change of regional development corridor has significant influence on urban expansion especially to their periphery.

1. Introduction
The study area has been transformed from predominantly agricultural and forest land prior to 1990s [1] into second largest and third most urbanized area in peninsular Malaysia. The Johor state capital is Johor Bahru, located within Iskandar region with a population of 704,471 in 1991 increased to 1,159,079 in 2001 [2]. Iskandar region and Johor Bahru were seemingly suitable as a research area particularly pertaining to urban growth because of its considerable transformation rate in term of economic growth and population number besides being the neighbour to island city-state of Singapore.

The aim of this paper is to map Iskandar land cover changes from 1991 to 2019 using Normalized Difference Building Index (NDBI) analysis. The scope is to observe the density classes of its area. The urban rapid development of Iskandar has unlocked plenty of new urbanized areas and change much of its green landscape into low density urban built up area. The economic agglomeration and spatial externalities have created new growth onto many parts of Iskandar with rising population and plentiful businesses [3].

The growth of Iskandar is inescapable large and rapid. However, efforts can be made to manage and contain growth from negative consequences such as intrusion into agricultural and fragile environmental land to the low-density urbanized area. This effort eventually can improve the livelihoods of not only the rural population, but urban population will obtain the benefit as well. To