IMPACT ASSESSMENT OF LAND USE AND LAND COVER (LULC) CHANGES ON LAND SURFACE TEMPERATURE IN KUANTAN, PAHANG

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LIST OF ABBREVIATIONS

LULC	Land Use and Land Cover
LST	Land Surface Temperature
BH	Berita Harian
UM	Utusan Malaysia
USGS	The U.S. Geological Survey's

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ABSTRACT

Pahang state has experienced a rapidly developed. The land use and land cover (LULC) is changed to accommodate the demand for many purposes such as residential, industrial, institutional and commercial purposes. The changes will make the increasing land surface temperature (LST) which contributes to the urban heat island (UHI) phenomenon. The coupling relationship between LULC changes and LST had been done on the previous study. The result obtained showed that the LST of different LULC use are differ significantly. The main objective of this study was to assess the impact of land use and land cover (LULC) changes on land surface temperature (LST) in Pahang state. This study uses the data satellite from public domain database to obtain the status of LULC and LST. Remote sensing and Geographical Information System (GIS) technique were used to detect the variation of LST based on LULC changes. The statistical analysis were performed to retrieve the relationship between LULC and LST. This study demonstrates the positive relationship between LULC changes and LST. The rapid development makes the LULC changes and makes the increasing LST.

ABSTRAK

Negeri Pahang telah mengalami pembangunan yang pesat. Penggunaan tanah dan jenis penutupan tanah (LULC) diubah untuk menampung permintaan bagi pelbagai tujuan seperti tujuan kediaman, industri, institusi dan komersial. Perubahan ini akan menyebabkan suhu permukaan tanah (LST) semakin meningkat yang menyumbang kepada fenomena pulau haba (UHI). Hubungan antara perubahan LULC dan LST telah banyak dilakukan berdasarkan kajian- kajian sebelum ini. Keputusan yang diperolehi menunjukkan bahawa LST adalah berbeza bergantung kepada LULC yang juga berbeza. Objektif utama kajian ini adalah untuk mengenalpasti kesan perubahan penggunaan tanah dan jenis penutupan tanah (LULC) terhadap suhu permukaan tanah (LST). Kajian ini menggunakan data satelit daripada pangkalan data awam untuk menunjukkan status LULC dan LST. Satelit dan Sistem Informasi Geografi (GIS) digunakan untuk mengesan perubahan LST berdasarkan perubahan LULC. Analisis statistikal dilakukan untuk menunjukkan hubungan antara LULC dan LST. Kajian ini menunjukkan hubungan positif antara perubahan LULC dan LST. Pembangunan yang pesat menyebabkan perubahan LULC dan serta meningkatkan LST.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Land is definitely one of the most important natural resources where life and developmental activities depend on it. Land use refers to the type of utilization in which man has put the land in order to use it for some specific purpose. Land also refers to evaluation of the land respect to the various natural characteristics. Land cover describes the vegetal attributes of the land (Ifeka Adolphus 2014). Land use and land cover (LULC) reflects the importance as a key finite resources for mostly human activities whether agriculture, industry, recreation.

Malaysia has experienced a rapidly development led to the decreasing of green areas in the city. These developments are used to accommodate the demand of many purposes such as residential, industrial, commercial and institutional purposes. Rapid urbanization also has led to a significant increase in the number of urban citizens worldwide. Recently, research reported about 65 % of the world's population will live in urban areas by 2025 (Walailak J Sci and Tech, 2015). Currently, more green space, forest and unused land have been converted into commercial and business centre, government offices, residential areas and public amenities (Takeuchi 2010). These circumstances initiate to clear most of vegetated areas in the city.

Recently, the development of urban areas as well as the reduction of greenery areas will transform the natural landscape resulting in the changes in land use and land

cover (LULC). When the LULC is changed, consequently exposing to the increasing the land surface temperature (LST).

Previous studies have focused primarily on biophysical and meteorological factors, such as built-up area and height (Bottyan and Unger, 2003), urban and street geometry (Eliasson, 1996), LULC (Dousset and Gourmelon, 2003), and vegetation (Weng 2004). Based on the previous studies, it is clearly demonstrated that the change in LULC increase land surface temperature and thus modified the urban microclimate.

The average temperature in Malaysia is typically 27°C, but in the past few weeks, temperatures have increasing up into the 30°C. Recently, it has been even hotter up in the northern states of Peninsular Malaysia, with officials saying temperatures there could reach up to 40°C, just 0.1°C short of the highest temperature ever recorded in Malaysia (Malaysian Times, March). Pahang on the other hand is one of the top three state that has higher surface temperature over several past years and its vulnerability to these resulted from the rapid urban development of the Pahang. In other words, Pahang is one of the states consequently expose to the increasing land surface temperature. The impacts of high land surface temperature are even more damaging and interrupt economic activities and the livelihoods of people in the area.

1.2 PROBLEM STATEMENT

Pahang state is vulnerable to the increasing land surface temperature (LST). The vegetated landscape in Pahang undergoing unwanted changes because it is heading towards a rapid development. Urban growth altered the biophysical environment. Rapid urbanization has significant influenced on different aspect of the quality of life and research in determining the patterns of urbanization in quantifying their impact. The changes in biophysical attributes of the earth surface raised the land surface temperature.

The average temperature in Malaysia is typically 27°C, but in the past few weeks, temperatures have soared into the 30°C. It has been worst because in the northern states of Peninsular Malaysia, it has been even hotter up with officials saying

temperatures there could reach up to 40°C, just 0.1°C short of the highest temperature ever recorded in Malaysia. Four states in Peninsular record the highest temperature reading on 19 March 2016 which is Perlis, Kedah, Perak and Pahang. Figure 1.1, Figure 1.2, Figure 1.3 and also Figure 1.4 are some of the articles from the local newspaper about an increasing land surface temperature. The article shows that the effect of lower green areas on the environmental is contribution to the rise of global temperature. The greenhouse effect also could change the world geographical structure which might cause flood and draughts. The disaster such as floods, landslides and extreme heat might destroy many things and it can even cause death.

An increasing LST will become worst and can contribute to the UHI phenomenon in the urban centre. An UHI is a climatic phenomenon in which urban areas have higher air temperature than their rural surroundings (Shahmohamadi, 2011). In order to mitigate the effect of UHI phenomenon, therefore, this study aim to see the impact of LULC changes on LST.