Urban Expansion Analysis Using Semi- Supervised Classification (SSIC) of Landsat-5 Image: A Case Study in Kuantan, Malaysia.

Syeda Maria Zaidi*[a], Abolghasem Akbari[a]

[a]Faculty of Civil Engineering & Earth Resources, University Malaysia Pahang, Gambang, Malaysia

*Corresponding author (Email: mariazaidi26@gmail.com)

Abstract:

The Information of Land use/Land cover (LULC) modification is an important component for the sustainable environmental planning and management. It is required to monitor the changes of LULC under the diverse demographic conditions. Kuantan the city of East Coast part peninsular Malaysia, has been going to experience changes in LULC since the majority of population started migrating from rural to urban areas for economic and social cause. Therefore, changes in land use accompanying with deplantantation, removal of soil, and degrading land surface fluctuating the rainfall runoff relationship follow-on peak discharge and increased flood frequencies. This study has attempted to evaluate and investigate the dynamics of urban growth in Kuantan, based on the technique of Semi- supervised classification using Landsat-5. The methodology is purposed for SSIC by incorporating high resolution of Google Earth images, offers high resolution satellite imageries in different date and times for many places. Land-5 (TM) colour composite Images of 1993, 1999 and 2010 were employed for calibration and correction for atmospheric noise to ensure accuracy of LULC analysis. The images were then categorized into distinguished feature classes for locating training samples areas for SSIC classification. The Integrated technique of Remote Sensing (RS) and Geographic Information System (GIS) helped to analyse the changes in LULC in Kuantan using well accepted method of maximum likelihood classification (MLC). The accuracy assessment of each classification was done from reference data consist of per feature class. The level of accuracy between the referenced values and classified values of the same image were described by fundamental of error metrics producer accuracy (PA), user accuracy (UA) and Kappa statistic (Kc) . The overall accuracy of each classification were estimated to be 82% in 1993, 1999 and 80% in the year 2010, which reveal SSIC provide a good level of agreement with the kappa coefficient values ranged from 0.789 to 0.761.However, obtained result also revealed the notable increased urban pattern in the study area. The growth trend over the last decades has produced over all 15.96 % north-easterly during the 17 years. The proposed method of assessing Urban expansion in Kuantan based on semi- supervised method were validate with freely online source i-e Google Earth. The acquired results show the virtuous accuracy agreement. Therefore, it consider to be a rise tool for reliable approach of data verification as an alternative of some other assessment techniques such as field survey, topographic maps. The study found, SSIC approach as the reliable, cost effective and time saving techniques. It also enhances the online sources as an alternative for verification of images classification when there is the lack of financial assistance to arrange field survey or and sparse availability of referenced maps.