Applicability of RapidEye Satellite Imagery in Mapping Mangrove Vegetation Species at Matang Mangrove Forest Reserve, Perak, Malaysia

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ABSTRACT

Mangroves are typically made up of salt tolerant species of vegetation with great diversity of flora and fauna which is mainly found in tropical and subtropical climate country. However, these forest ecosystems have been declining over time due to the various kinds of direct and indirect pressure. Thus, there is increasing need and efforts to monitor and assess this ecosystem for better conservation and management. In this study, multispectral RapidEye satellite image was analysed to identify the mangrove vegetation species within the Matang Mangrove Forest Reserve in Perak, Malaysia. The Maximum Likelihood Classifier (MLC) was used to classify the mangrove vegetation species with integration of Normalized Difference Vegetation Index (NDVI) using $NDVI_{Red}$ and $NDVI_{Red\ Edge}$ data. Eleven species of mangrove vegetation were found within the study area including from the genus of *Rhizophora, Avicennia, Bruguiera, Sonneratia* and *Xylocarpus*. The overall classification accuracy assessment of RapidEye multispectral image integrated with $NDVI_{Red\ Edge}$ was higher at 87.5% with overall kappa statistics recorded of 0.85 compared to with employment of $NDVI_{Red}$ at 85% and kappa statistics of 0.80. The results indicated the applicability of red edge band in the RapidEye satellite imagery in combination with ancillary and field data to classify the mangrove species within the study area. It also helps for better management and conservation process to ensure the sustainability of these valuable resources.

Key words: Classification, Normalized Difference Vegetation Index, red edge, RapidEye satellite imagery, Matang Mangrove Forest Reserve

INTRODUCTION

Mangroves are forest that form forest intertidal ecosystems represented by a variety of tree species which mainly occurs worldwide along tropical and subtropical coasts (Conchedda *et al.*, 2008; Kovacs *et al.*, 2011). Mangrove forests are essential for economic, ecological, scientific and also culture resources which make them as one of the most valuable coastal resources for current and upcoming generations (Jusoff, 2008a). They offer a habitat for a wide variety of species with some occurring in high densities (Nagelkerken *et al.*, 2008). This ecosystem also functions as shelter and sanctuary for fauna and also provides spawning and breeding ground for marine life (Jusoff, 2008a). Furthermore, they also act as natural coastline protection such as protecting the coasts