

Mangrove carbon stock assessment by optical satellite imagery

ABSTRACT

Matang Mangrove Forest Reserve or known as Matang Mangroves is the largest single mangroves in Peninsular Malaysia. Covering an area of about 41,000 ha, majority of this area is forest reserve. Mangroves have long been known as extremely productive ecosystem that cycle carbon (C) rapidly, but studies related to carbon in this ecosystem are limited. This study was carried out to assess the carbon stock and quantify their changes following deforestation, wood extraction and forest degradation. Landsat-TM and SPOT-5 satellite images for 1991 and 2011 respectively were utilised to identify mangroves. Vegetation index generated from the images was used as a variable to indicate carbon stock and it was correlated to forest inventory information through regression. The study showed that carbon stocks of Matang Mangroves ranged from 1.03 to 263.65 t C ha⁻¹ and 1.01 to 259.68 t C ha⁻¹ for the years 1991 and 2011 respectively. Total carbon stock in Matang Mangroves was estimated at about 3.04 mil t C in year 1991 and 2.15 mil t C in 2011. The study suggested that the traditional use of vegetation index from optical imagery systems is still relevant and viable in vegetative studies.

Keyword: Landsat-TM; SPOT-5; Vegetation index; Aboveground carbon