AN INTEGRATED ANALYSIS USING GIS AND REMOTE SENSING TO EVALUATE DEGRADATION OF MANGROVES AND LOSS OF ECOSYSTEM SERVICES:
CASE STUDY ONNEGOMBO LAGOON IN SRI LANKA

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ABSTRACT

Ecosystem system services generated through ecosystem functions by number of ecosystems in the biosphere are perceived to support human welfare. Mangrove ecosystems are widely recognized as providers of a great variety of ecosystem services to the global as well as to local communities. People living in adjacent mangrove ecosystems received number of direct benefits from fishing, a wide variety of forest products especially wood for fuel, tannins and medicines etc. Mangrove ecosystems provide optimal breeding sites, feeding and nursery grounds for number of ecologically and economically important fish and shellfish species as well as feeding and living habitats for residence and migratory birds. In addition, mangroves generate important regulatory services such as flood control, storm water stabilization and storm protection, sediment and nutrient retention, climate regulation and biodiversity protection. Mangrove habitats in Negombo Lagoon are having a long history of providing wide array of above mentioned ecosystem services to the local communities. Majority of the people directly or indirectly depend on mangrove ecosystem for their livelihoods. Despite the fact that all above mentioned ecosystem services being provided freely to the global as well as local communities throughout the world, mangrove ecosystems have been subjected to degradation in terms of their quality as well as quantity over the past decades. As a result communities depend on the mangrove ecosystem may suffer by losing the ecosystem services they depend for maintaining their living conditions and livelihoods. Therefore the first objective of this research was to quantify the spatial distribution of mangrove forest cover and to identify temporal changes, the second objective was to assess the biophysical and socio-economic factors affected for changes and the third objective was to identify ecosystems services lost due to degradation of Mangrove ecosystems in the Negombo Lagoon. Study area was based on villages adjacent to mangrove ecosystem in the Negombo Divisional Secretariat Division. An integrated approach was adopted combining Remote Sensing and GIS based spatial assessment with a socio-economic assessment. Remote Sensing data from images taken in 1995 and 2015 were used to assess the temporal and spatial changes of mangrove forest cover. A household survey was carried out to collect primary data from 90 households. The study reviled the changes of the extent of Mangrove forest cover over the last fifteen years including degraded areas. Major factors caused for the degradation of mangroves were anthropogenic oriented and impact of biophysical factors was less contributory factors. A set of ecosystem services loss and under threat due to degradation of Mangroves were identified. Finally, strategies were proposed by this study in order to restore the mangrove based ecosystem in the Negombo Lagoon.

Keywords: Mangroves, Ecosystem Services, Degradation, Lagoon