Mapping mangrove species diversity of Pichavaram mangroves, India using hyper spectral remote sensing data

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Mangrove wetlands are prominent features of the tropical coastlines. They perform a number of protective and productive functions and thereby ensuring livelihood security of millions of poor fishing families. In recent times it has been postulated that mangrove plants can be donors of salt-tolerant genes that can be used to develop saline-tolerant crop varieties, which is considered as one of the strategies to mitigate the effects of sea level rise. Thus, mapping of mangrove species diversity is important from conservation as well as utilization points of view. However, due to their location in remote areas and due to marshy nature of soil and other environmental factors conventional methods could not be followed for mapping species diversity of mangrove plants. In these circumstances, attempts are being made to use remote sensing data as an effective tool to classify the mangrove plants both at community and species level. Earlier attempts indicated that sensors with low spectral resolution could not be used to map the diversity at species level. In the present study, multispectral remote sensing data of two sensors namely, Indian Remote Sensing Satellite (IRS) Linear Image Self-scanning System (LISS) IV data of 5.8 m spatial resolution with four bands spectral resolution and Advanced Space-borne Thermal Emission and Reflection Radiometer (ASTER) data of 15m/30m spatial resolution with 14 bands spectral resolution are taken for mapping the diversity at species level as well as for comparative study. Analysis of data indicates the following pattern of distribution: Rhizophora species distributed exclusively along the banks of creeks and canals, Avicennia marina towards landward side and Suaeda species in hypersaline areas. Details of the results of the analysis of remote sensing data and the application of the present methodology for mangrove species mapping is discussed in the paper.