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Assessment of the feasibility of using Landsat 8 images for estimating biomass of floating aquatic plants (*Eichhornia crassipes*) in the Batticaloa lagoon, Sri Lanka

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The Batticaloa Lagoon is abundant with floating aquatic plants of *Eichhornia crassipes* as the dominant species. The overabundance of these plants seems to be an indicator of lagoon pollution. This study was aimed to estimate and map the spatial distribution of green and dry biomass of the floating aquatic plants in the lagoon by developing suitable regression models between band ratios and indices derived from Landsat 8/OLI images and field measurements. Cloud free images of Landsat 8/OLI were acquired for the period of 2017-2018 representing dry (May and August 2017) and wet (October 2017 and February 2018) seasons of the study area. Field biomass of the floating aquatic plants of *Eichhornia crassipes* were collected as near real time data in order to coincide with the images from March 2017 to February 2018 at 12 locations in the lagoon. All possible band ratios and indices were used to explore the relationship between the reflectance of plants and *in situ* data. Multiple linear regression analysis was carried out to find the strongly correlated models to estimate the green and dry biomass with field data. The best fit regression models with small standard error were used in the development of estimated biomass maps for both seasons. The temporal distribution of aquatic plants for the period of 2017/2018 reveals that the coverage of the floating aquatic plants vary from 5 to 14 km^2 and highly vary with the seasonal changes during dry and wet period, respectively. Among 19 tested band ratios and indices, B3/B5 (Green/NIR) for green biomass ($r^2 = 0.72$ in dry season and $r^2 = 0.62$ in wet season) and B4/B5 (Red/NIR) for dry biomass ($r^2 = 0.69$ in dry season and $r^2 = 0.82$ in wet season) showed a strong correlation between Landsat 8/OLI and *in situ* data. The temporal distribution of the estimated biomass maps also reveal that the above band combinations can be used for monitoring floating aquatic plants in the lagoon. More field samples and repetitive measurements can be used to improve the accuracy of the estimated biomass maps. These estimated biomass maps can be used to identify the locations, which are affected by aquatic plants, in order to take proper spatial and temporal control measures.