CHAPTER 5

Conclusions

- Structural and floristic dynamics of the study area showed that the study area supports a mosaic of vegetation covers successional stages. Variation in Normalized Difference Vegetation Index (NDVI) values in different successional stages point out the future role of hyperspectral remote sensing in monitoring of various succssional changes of tropical vegetation covers.
- The study concludes that Hyperion (EO-1) reflectance spectra acquired from two distinct phenological stages of vegetation showed marked difference in pattern and shape. Phenological events of the tropical vegetation covers were clearly illustrated in space borne reflectance spectra. Hyperion reflectance spectra are very useful in monitoring changes in phenological conditions of the tropical deciduous forests. The study reaffirms the findings of earlier researchers where change in phenological conditions showed clear variation in reflectance of visible (400-700 nm) region.
- The study showed that it is possible to recognize variation in vegetation density (number of trees per quadrat) using Hyperion reflectance spectra.
- Present study has compared the performance of three different classifiers Spectral Angle Mapper (SAM), Support Vector Machine (SVM), Artificial Neural Network (ANN) for species level classification of tropical vegetation. Accuracy levels obtained in this study by ANN and SVM classifiers identify the suitability of these classifiers for tropical vegetation discrimination. Present study has also concluded that SVM classifier can be used directly for species level classification of tropical vegetation without dimensionality reduction. The study showed that Stepwise Discriminant Analysis (SDA) would be better option for dimensionality reduction of Hyperion (EO-1) reflectance spectra. SDA results clearly depict importance of SWIR region for the discrimination of tropical deciduous forest.
- This study confirmed the capability of Hyperion (EO-1) data for estimation of forest biophysical and biochemical parameter estimation. Partial Least Square (PLS) regression showed the ability for accurate estimation of forest biophysical and biochemical parameters at stand level. Results of present study emphasize the importance of spectral and temporal variations in quantifying biophysical and biochemical attributes of a tropical dry forest. PLS regression analysis using full Hyperion reflectance spectra (all 165 bands) gave better results for biophysical parameters. PLS regression analysis using spectral subset gave better results for biochemical parameters.

- The study has also been able to developed indices for the estimation of chlorophyll and LAI at stand level. Simple ratio 743/692 gave better results for chlorophyll and Normalized difference ratio 1457/1084 worked better for LAI. Chlorophyll and LAI estimates developed here are simple markers for evaluating the healthy status of two important tropical vegetation covers (teak and bamboo). Above indices were prepared using extensive range of chlorophyll (0.77 to 2.64 g m^{-2} for teak and 1.22 to 2.55 g m^{-2} for bamboo) and LAI (2.38 -6.63 for teak and 3.27-6.41 for bamboo). This is an indication that ratios developed here can be tested for teak and bamboo in tropical regions with similar environmental conditions.