

## **List of Figures**

### **Chapter 1**

**Figure 1.1.** Electromagnetic Spectrum.....07

**Figure 1.2.** The general shape of reflectance curves for green vegetation.....16

### **Chapter 2**

**Figure 2.1.** Location of the study area.....26

**Figure 2.2.** Map showing study area.....27

**Figure 2.3.** SWS in the month of October.....27

**Figure 2.4.** SWS in the month of April.....28

**Figure 2.5.** Two dominant vegetation covers in SWS.....34

**Figure 2.6.** Mixed vegetation covers in SWS.....35

**Figure 2.7.** *Mangifera* and *Madhuca* vegetation covers.....36

**Figure 2.8.** EO-1 along with Hyperion instrument.....39

**Figure 2.9.** Overlap in surface area coverage of the ALI, Hyperion, and LAC sensors.....39

**Figure 2.10.** False colour composite (FCC) of acquired Hyperion image for two different seasons.....40

**Figure 2.11.** Principal absorption features of different gases present in Earth's atmosphere.....44

**Figure 2.12.** False colour composite of October Hyperion image subset.....45

**Figure 2.13.** False colour composite of April Hyperion image subset.....45

**Figure 2.14.** Distribution pattern of teak and bamboo quadrats in the image subset .....46

**Figure 2.15.** Performance of SVM classifier for different Kernel types.....54

**Chapter 3**

**Figure 3.1a.** Spectral signature of major vegetation covers of SWS (Octeber)..... 61

**Figure 3.1b.** Spectral signature of major vegetation covers of SWS (April)..... 61

**Figure 3.2a.** Teak density Hyperion reflectance spectra..... 62

**Figure 3.2b.** Bamboo density Hyperion reflectance spectra.....62

**Figure 3.3.** Hyperion reflectance spectra of three vegetation covers of SWS....63

**Figure 3.4a.** Regression model prepared between BA and HCl.....65

**Figure 3.4b.** Regression model prepared between BA and H'.....65

**Figure 3.5.** Average reflectance spectra (October) for the three mixed vegetation classes.....66

**Figure 3.6a.** NDVI image subset (October).....71

**Figure 3.6b.** NDVI mask image prepared for exclusion of non vegetation cover during classification.....71

**Figure 3.7.** Images classified with (a) ANN, (b) SAM, and (c) SVM classifiers (22 isolated bands).....72

**Figure 3.8.** Images classified with (a) SAM and (b) SVM classifiers (all 165 bands).....75

**Figure 3.9.** Percentage area occupied by 8 tropical vegetation classes in the image subset classified with different classifiers.....75

**Figure 3.10.** Measured and predicted biophysical attributes through PLS regression of full reflectance spectra.....83

**Figure 3.11.** Measured and predicted biophysical attributes through PLS regression of spectral subset.....84

**Figure 3.12.** Measured and predicted biochemical attributes through PLS regression of full reflectance spectra.....87

**Figure 3.13.** Measured and predicted biochemical attributes through PLS regression of spectral subset.....90

**Figure 3.14.** Cross-validated prediction of Chlorophyll and LAI by leave one out method using best performing developed indices. (a.) LOO-CV for developed vegetation index 743/692 for Teak (b.) LOO-CV for developed vegetation index 743/692 for Bamboo (c.) LOO-CV for developed vegetation index 1457/1084.....93

**Figure 3.15.** Average Laboratory reflectance spectra for selected species.....100

**Figure 3.16.** Comparison between laboratory spectra with Hyperion reflectance spectra of same species..... 103

**Figure 3.17.** Leaf anatomical structures for species selected for Laboratory spectra acquisition .....104