CHAPETER-V CONCLUSIONS

- Of the total 30 sample plots studied in KNP, BNP and MNP, highest number of tree species were recorded in KNP (54spp.) followed by BNP (45spp.) and MNP (18spp.), respectively. Of all the species, *Shorea robusta* was found to be dominant in KNP (49.67% of the total tree population) and BNP (20.6%), and *Anogeissus pendula* (Kardhai) in MNP (29.44%). Among all the regions, stand density was maximum in KNP (767 trees ha^{-1}), followed by MNP (506 trees ha^{-1}) and BNP (466 trees ha^{-1}). Tallest trees (ave. height 15.76m) with largest girth (ave. DBH 23.36cm) were observed in KNP and shortest trees (average height 6.28m) with poor girth (ave. DBH 14.70cm) were recorded in MNP.
- Among all the regions, KNP hold maximum aboveground biomass (AGB) with an average of 332 Mg ha^{-1} followed by BNP (187.06 Mg ha^{-1}) and MNP (56 Mg ha^{-1}). *Shorea robusta* tree species in KNP and BNP and Anogeissus pendula in MNP contributed more than 50% of overall biomass increment by all the forest types in the regions. Mixed forests had comparatively higher biomass compared to forest dominated by single species.

- Field measurement based NPP showed the highest at moist deciduous forest in KNP (8.20 Mg ha^{-1} $year^{-1}$), followed by at deciduous forests in BNP (6.69 Mg ha^{-1} $year^{-1}$) and dry decious forests in MNP (3.22 Mg ha^{-1} $year^{-1}$).

- A temperature based radiation model was developed in this study using 75% of the measured radiation and temperature data for the year 2010-2011. The model explains 87% of the radiation variability in all the regions. Validation of the modelled radiation using 25% of the remaining measured radiation data showed good agreement (R^2=0.85) with an error of 14%.

- Atmospheric correction of Landsat images using FLAASH (Fast Line-of-sight Atmospheric Analysis of Hypercubes) module showed significant increase in contrast and greater improvement in image visualization in areas with high aerosol loading, occurring due to local forest management activities like burning of unpalatable grasses etc. Reduction in reflectance values was

observed in red band after atmospheric correction. On the otherhand, reflectance values in NIR band increased after the atmospheric correction.

- Medium spatial resolution satellite data with multi-temporal images acquired at key phenological phases improves forest type classification accuracy at regional scale. In the present context, Landsat derived NDVI of multi-season was used to achieve classification accuracy between 82% (MNP) and 90% (KNP).

- CASA siumulated NPP was found to be maximum in KNP (8.39 Mg ha^{-1} $year^{-1}$), followed by BNP (7.41 Mg ha^{-1} $year^{-1}$) and MNP (3.7 Mg ha^{-1} $year^{-1}$), showed a gradually decreasing trend from Southeast (KNP) to Northwest (MNP) part of Central India. NPP showed differences among different forest types. It appeared to be maximum in case of moist deciduous forest in KNP and minimum at dry deciduous forest in MNP.

- Validation of CASA simulated NPP using field measured NPP over KNP, BNP and MNP indicated good agreement with an average error (%RMSE from mean observed NPP) less than 20%, ranging from 9.43% (KNP) to 18% (MNP). The degree of agreement between both the data sets justifies the model's utility for estimating tropical deciduous forest NPP in KNP, BNP and MNP.

- The association between NPP and major climatic parameters (rainfall, temperature and radiation) indicated strong positive correlation with rainfall (r=0.88) and negative correlation with temperature (r=0.37) and radiation (r=0.37), respectively. High correlation with rainfall implies that rainfall was a major driving force of NPP variability in the study regions. This strong correlation also suggests that NPP may be the key biophysical parameter for determining rainfall effects on deciduous forest growth in these study regions.

- To conclude, it may be emphasized that RS data and RS data driven ecosystem models as technology tool are of paramount importance in the present scenario. Their relevance and use in sustainably managing forests needs no more elaboration. It has been reiterated time and again that in order to ensure

environmental sustainability, conservation and restoration have to be regarded as the two quintessential pillars to achieve the same. For the two processes to be effectively executed, the provision of near real time information becomes paramount. Remote sensing is thus, the means to this end. Therefore, it is imperative to suggest that at country level, all state forest departments should get acquainted with these modern, objective, cost effective and time saving techniques of remote sensing in order to attain the goals of environmental sustainability, human and natural resource management.