Project Update: August 2010

I tested the hypothesis that species distribution and abundance patterns of plant species (alpha-diversity) as well as do biological heterogeneity (beta-diversity) vary with respect to the spatial variability of ecological site conditions (e.g. soils, climate), land use and disturbance regimes.

Materials and Methods

- I conducted the study in protected areas of Bangladesh, where spatially explicit assessments of biodiversity patterns at the landscape level are lacking as in many tropical countries.

- I applied a representative, rapid, unbiased and systematic sampling procedure on plant species diversity combined with information on land use and soils.

- I used digital elevation models, satellite images, and systematic sampling techniques to locate the sampling sites throughout the study areas based on terrain attributes, land uses and land cover classes.

- I used multivariate statistics and geostatistics to the gathered bioinformation to find out the most prominent factors for biodiversity as well as to identify the major drivers of biodiversity loss.

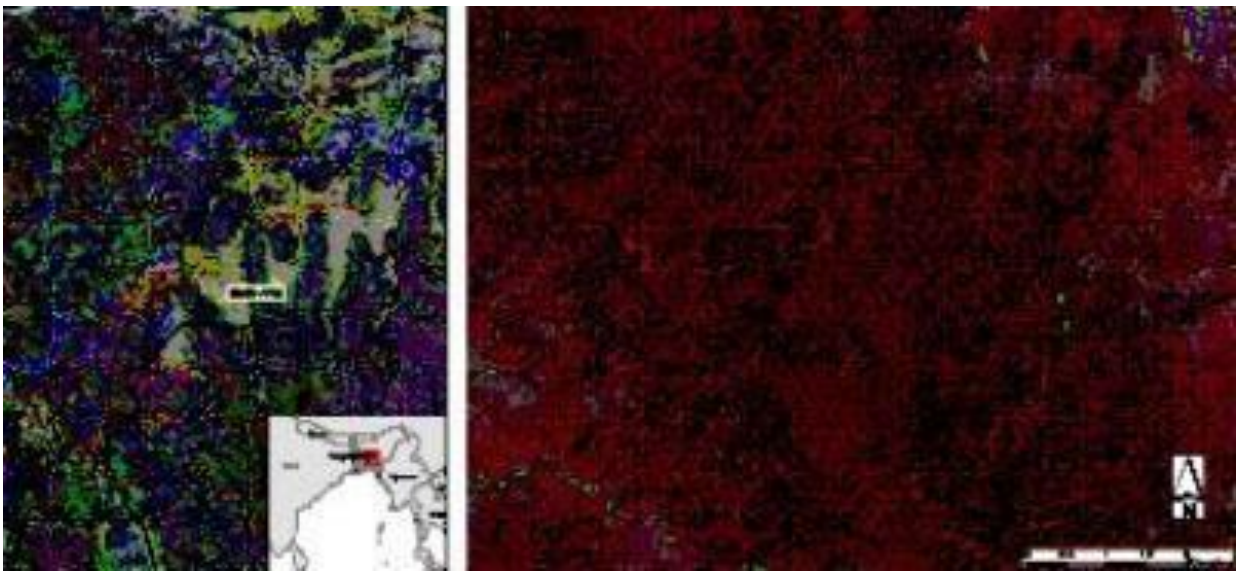
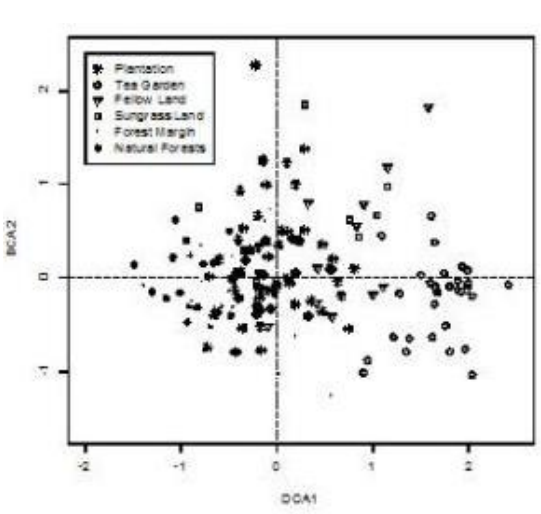


Fig. 1: Study area with mainly forested landscapes in eastern Bangladesh (a) and systematic spatial arrangement of plant records (b).

Results and Discussion

- Distribution and abundance patterns of plant species vary with land uses.
- The first DCA-axis reveals a similarity gradient from natural forest to human induced land uses, probably following land use intensity.

- The highest species diversity occurs in the natural forests and decreases in human induced land uses.
- The landscape pattern of increasing diversity form human-induced to natural ecosystems occurs from the sun grass land to the natural forests.
- This terrestrial pattern of increasing diversity does not seem to occur in tea garden and plantation where diversity is less due to the selection of certain tree species.
- Natural forests are more diverse than planted forests while the planted forests restore native biodiversity in productive landscapes).



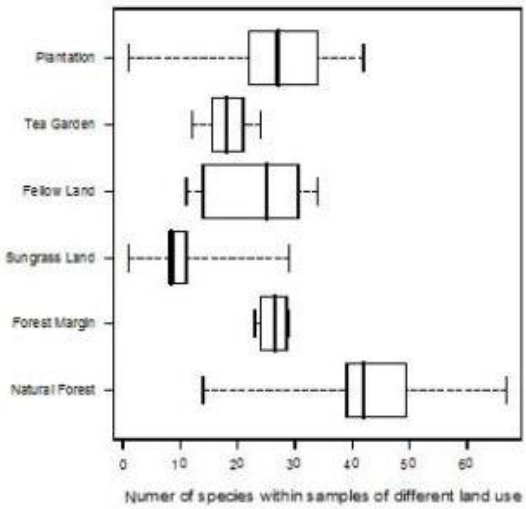


Fig. 2: Detrended correspondence analysis (DCA) relating land use to species distribution.
Fig. 3: Species diversity in different land uses

Conclusions

- The best way to conserve biodiversity in Bangladesh forest ecosystems is to conserve the natural forests and to develop a framework for biodiversity conservation as an integrated forest area management where one of the primary goals will be the sustainable use of forest biodiversity.
- My approach is appropriate for future comparisons and enables to identify major drivers for biodiversity within specific landscapes. Additionally, this approach refers to remote sensing applications and allows rapid assessment for future comparisons.

References

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