

16. Biodiversity Characterization at Community level in India using Earth Observation data

Aim and Scope

One of the recommendations of the National Space Meet held in September 2015 was biodiversity mapping at high resolution to be taken up to contribute to India's biodiversity conservation. This project on 'Biodiversity Characterisation at Community Level' is a joint initiative of the Department of Biotechnology and the Department of Space, Government of India. Recent advances in remote sensing technology provide a wide range of observational capabilities in terms of spatial, spectral, and temporal resolutions. The approach is to develop a fine-grained description of vegetation composition, structure, and pattern from detailed field studies and Earth Observation data. The study is to be carried out to cover different forest landscapes of biogeographic zones across India. Phase I is to cover 9 study sites in three biogeographic zones (Western Ghats, Eastern Ghats, and the Himalayas). The study involves multi-institutional participation to study and spatially describe changes to the forest landscape over ten years, develop community-level maps and describe vegetation characteristics using high-resolution multispectral satellite data. A network of field plots is to be established to gather observations on species distribution using large and small plots.

Present status

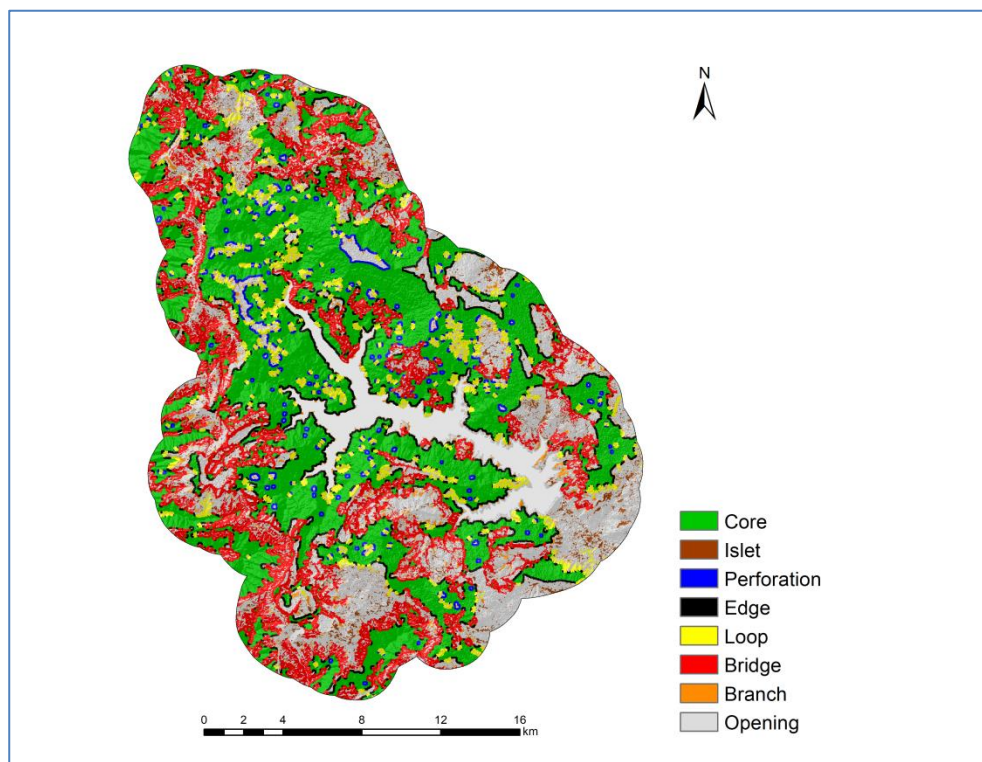
Prepared technical project manual (contributed by 39 experts from 15 institutions). Developed methodology for community-level vegetation mapping using multi-sensor satellite data and machine learning algorithms and Prepared forest fragmentation maps for 2008 and 2018. Generated vegetation type maps and leaf phenological metrics data. Generated Dynamic Habitat Indices maps using high temporal satellite data. Field inventory of about 800 plots (9 sites) completed for 0.1 ha plots. Provided customized RS/GIS training programs to partner institutions.

Current constraints/challenges

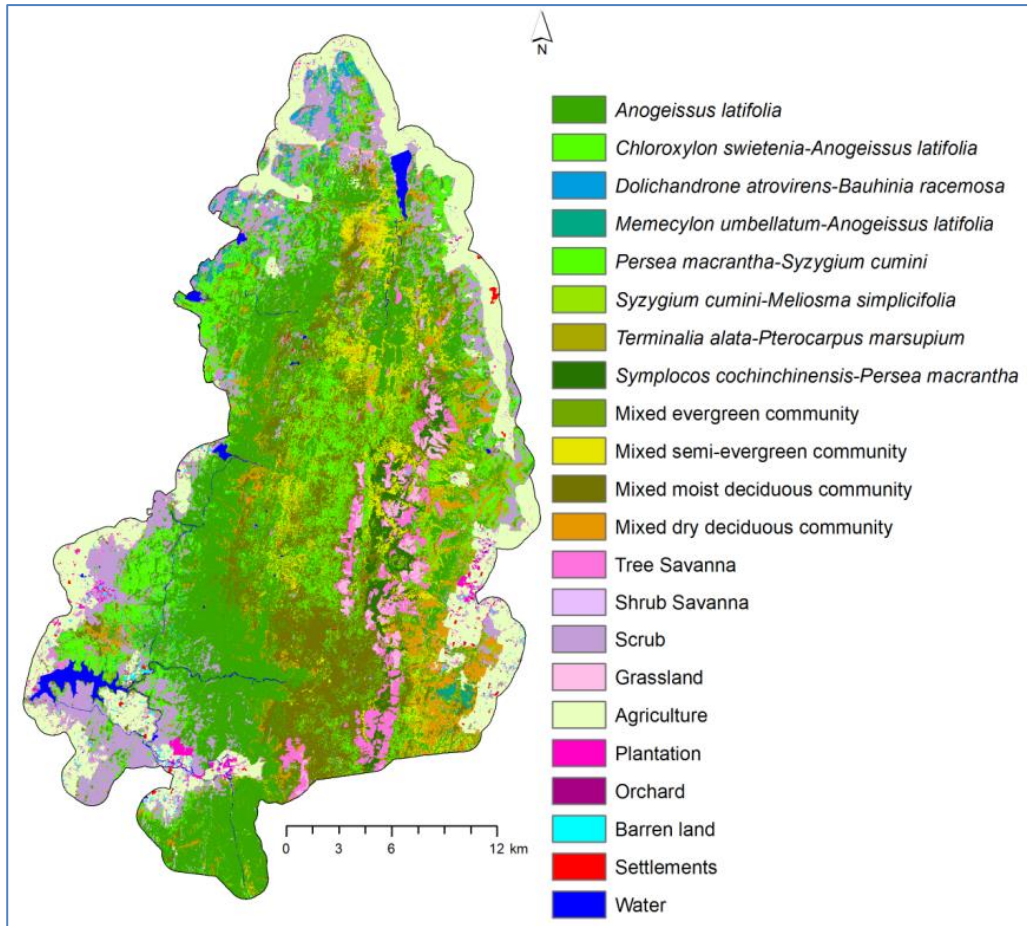
The major challenges for reliable use of Earth Observation data are habitat type and community definitions, selection of ecological level and mapping scale, monitoring procedures for essential biodiversity variables, uncertainties inherent in quantifying biodiversity, botanical knowledge integration, and analysis of the landscape and community structure). Direct mapping of biodiversity and changes in biodiversity using remote sensing data remains a constraint in tropical forests.

Expected outcome

This project is targeted at developing an Earth Observation-based strategy for monitoring biodiversity at the community level in India. The project outcomes will improve our understanding of biodiversity at the vegetation community level. The study would lead to the identification of Earth Observation variables that are essential for monitoring biodiversity. This, in turn, will lead to the development of an earth observation-based biodiversity monitoring system that will benefit both national imperatives and reporting to international commitments on biodiversity goals. Spatial and attribute data generated by the study will be organized as a data repository and information system by integrating Bhuvan with IBIN and Biodiversity Information System.



Forest fragmentation map of Chandoli wildlife sanctuary, Maharashtra



Community level classified vegetation map of BiligiriranganathaSwamy Tiger Reserve, Karnataka.