Conservation gap analysis of dipterocarp hotspots in Sarawak using GIS, remote sensing and herbarium data

Abstract

Dipterocarpaceae is the dominant tree family in the tropical rain forests of Southeast Asia. Borneo is the centre of diversity for the dipterocarps. Identification of hotspots is important for forest and biodiversity conservation efforts. Species Occurrence Models (SOMs) were generated for all 247 species of dipterocarps recorded in Sarawak using herbarium occurrence data and based on the best model selected. The species occurrence density map for each genus and category (endemic and non endemic) was generated by overlaying the SOMs of all species in each genus or category. The species occurrence density maps were analyzed with land cover map from Landsat 7-EMT+ images and protected forest areas for identifying hotspots for conservation in Sarawak. Overlaying the SOM maps revealed that areas in central Sarawak and the southwest region (northwest Borneo around Kuching) are the main hotspots of dipterocarp diversity in Sarawak while the coastal lowland areas in the lower Rejang and Baram River which are mainly peat swamp forest are poorer in species occurrence density. In terms of endemism, as with dipterocarp diversity, the mixed diptercarp forest of central Sarawak is also the most important hotspot. Gap analysis revealed that most protected forest areas are in southwest Sarawak (Bako, Kubah, Tanjung Datu and Gunung Gading National Parks) and in the northern part of Sarawak (Niah, Lambir Hills and Mt Mulu National Parks). This leaves the hotspot in the central part of Sarawak least protected. Protected areas only cover between 2 and 4% of the total areas for the different hotspots (75% species density) while majority of the hotspots that are still forested are outside the protected areas.