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"Solidarity in a competing world — fair use of resources"

Biodiversity Assessment in Rubber Plantations – A Comparison of Different Species' Requests

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Abstract

Solidarity in a competing world can be seen from different perspectives. Looking from an intergenerational viewpoint, declining biodiversity may hamper potential options of future generations. Under intensive agricultural activities biodiversity is often declining rapidly, heating up the "sharing or sparing" discussion. Our study shows the impact of large-scale rubber plantations on biodiversity, represented by different plant and animal species. We used genuine data derived from up to eight years of multidisciplinary field research. Primary data on the distribution of vascular plants, pollinator species, ground beetles, ungulates and other selected mammals were collected in two study sites in Southwest China and Southern Thailand. The two sites shared similarities in land use and included intensively cultivated rubber plantations bordering protected areas. We supplemented these data with literature studies on the impact of rubber cultivation on the diversity of amphibians, reptiles and birds (all along mainland South East Asia). Based on this combination, we developed a classification scheme that enables the integration of different facets of biodiversity: 1) diversity of red list species representing a conservation approach (red list), 2) diversity as such representing intrinsic values of biodiversity (aggregated biodiversity), and 3) diversity of species with human use value (medicinal plants and bees) representing an anthropocentric approach (human use). Species diversity was normalised to show the impact rubber cultivation has on multiple levels of biodiversity. This resulted in a matrix of different land use types and their suitability as habitat for the respective species groups. The process presented allows for an application in the habitat quality model of InVEST (integrated valuation of ecosystem services and tradeoffs), using aggregated indices. Our results show that, compared with forest, the suitability of rubber plantations as habitat is 50–60 % less for red list species, 40–50 % less for aggregated biodiversity and 10–20 % less for species with human use values. The concept itself can be applied to a variety of land use systems and case studies, as well as to different magnitudes of data availability or spatial scales. Our approach will enable researchers and land use planners to estimate the impact that land use decisions can have on biodiversity.

Keywords: Ecosystem function, ecosystem services, Greater Mekong Subregion

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