
Using the Biodiversity Intactness Index to evaluate biofuel production scenarios in the Eastern Cape, South Africa: towards better assessment of the impact of biofuel production on biodiversity

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Abstract

Biofuels have been identified as a priority issue in South Africa – to reduce the country's reliance on imported fossil fuel, and for catalysing social development. Many potential plant species (feedstocks) and a variety of spatial locations could be used for this purpose. This paper considers the potential biodiversity impacts of several scenarios for biofuel production in South Africa, focussing primarily on quantifying the impacts to biodiversity. The biodiversity intactness index (BII) was tested as a means to evaluate scenarios to quantify potential impacts. The indicator is an estimation of the average population size of a wide range of organisms under different land-use systems relative to their baseline populations. Land-use change scenarios were based on potential for conversion of available and suitable land. Impacts of potential feedstocks were categorised based their species traits. Results indicate that potential biodiversity losses can range between 0.5 - 25% as compared to current levels across the different scenarios developed depending on the land-use and species options chosen. Using the BII for analysing the difference in scenarios provides a useful step to better understanding the overall impacts on biodiversity. This research demonstrates that the traits of the species, features of the recipient environment, and the extent of plantings relative to areas with high conservation value must all be considered. We also highlight some key aspects of how scenarios and models can assist planners and managers in relation to biofuels, using the South African situation as a test case.

Keywords: biofuels, energy, biodiversity, tradeoffs, protected areas, land use

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