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Does production of oil palm, soybean, or jatropha change biodiversity and ecosystem functions in tropical forests

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Summary

Biofuels, or fuels derived from transformation of biological matter, are hailed by some as a promising source of renewable energy potentially reducing greenhouse gas emissions. A widespread adoption of biofuels will however present its own set of challenges and consequences. Direct or indirect land use change due to expansion of feedstock cultivation can cause deforestation and forest degradation leading to biodiversity losses and other environmental concerns like soil degradation and erosion, water pollution and scarcity, and the risk of crop species invading natural ecosystems.

Although biofuel production is currently not the main use of palm oil and soybean and hence, has so far contributed only little to the land-use change patterns, it has been predicted to grow. Therefore, it is important to know the potential consequences of the expansion of biofuel cultivation may have for biodiversity in order to provide policy guidance.

In this review, we will assess the current state of knowledge of the impact of three first generation biofuel crops - oil palm, soybean, and jatropha - on the biodiversity and ecosystem functions of the tropical forests. We will look at the additional comparison of impacts from industrial versus smallholder plantations, and will compare the mitigation potential of different standards related to biofuel production. We will consider both qualitative and quantitative primary studies as well as descriptive reports that compare land conversion for target crop production with other land uses or land cover types. Both before/after and site comparison studies will be included, and biodiversity indicators to be assessed are species richness, abundance, and plant and animal community composition. If there is enough data, quantitative meta-analysis will be performed. Otherwise results will be summarized narratively.

Authors

Savilaakso, S.
Laumonier, Y.
Guariguata, M.R.
Nasi, R.

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