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## The Impacts of Tropical Biofuel Production on Land Use

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### Abstract

In the context of climate change and global dependence on fossil fuels, the importance of biofuels as a sustainable alternative has been increasing in recent years. Targets for biofuels have been introduced all over the world. Meanwhile, the pressure on agricultural land increases. Due to favourable natural conditions, in the future, the largest percentage of biofuels will be produced in tropical countries. The production increase of biofuel feedstock can threaten forests as deforestation is one possible way out of agricultural land scarcity. The question arises if it is possible to increase tropical biofuel production without leading to increased deforestation. Further interests are through which channels the increasing biofuel demand affects the forest and what the direct and indirect effects of the increased production are. The research focus lies on Indonesia, producing mainly palm oil based biodiesel.

The research questions are examined with a two level approach. First, the application of a scenario analysis highlights the effects the increased palm oil production has at the household level. This method is based on literature research and results gained by the application of the economic household model for perfect markets described by Sadoulet and de Janvry (1995). Second, the impacts of increased biofuel production are considered at the national level. This analysis is conducted with a system analysis adapted from Vester (2002).

The results show that increasing demand for land and increasing prices for agricultural products and palm oil are the most important direct effects. Palm oil production area, prices of agricultural products, revenue from palm oil production and the education level are channels that influence deforestation most directly. Under the current political, institutional and economic circumstances in Indonesia, palm oil production encourages deforestation what refutes the main research question. If, in the long term, Indonesia could create more stable conditions with strictly limited forest conversion, plantation establishment on fallow land and compulsory sustainable production, the approval of the research question rises. The short- to medium- term impacts show the need for internationally binding policies between biofuel producing and consuming countries to avoid further major social, environmental and economic long-term problems in biofuel producing countries.

**Keywords:** Biofuels, palm oil, Indonesia, land-use, system analysis, scenario analysis, household model