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Trade Liberalisation and Forest Protection Policies: Leakage Effects of Deforestation and CO₂ Emissions

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Abstract

Forests contain large carbon stocks, storing 20 to 100 times more carbon per unit area than agricultural land. It is estimated that 247 Gt (GtC) carbons were stored in over 2.5 billion ha of forest in the early 2000s in Asia, Latin America and sub-Saharan Africa. Deforestation caused agricultural expansion renders the increase of greenhouse gas emissions. With implementation of bilateral trade in the global land-use model, MAgPIE (“Model of Agricultural Production and its Impact on the Environment”), we are able to present a comprehensive picture of trade effects on deforestation and the consequential CO₂ emissions. We analyse future trade liberalisation scenarios in terms of reduction of import tariffs over the period of 2005–2050 with 5-years interval. It turns out that trade liberalisation could slow the pace of deforestation and CO₂ emissions, but the distribution of deforestation is unequal between regions. China, sub-Saharan African, and Latin America that have comparative advantage in food production will face severe deforestation. If a region such as Latin America implements forest protection policies, it will reduce the deforestation in region, but leaks the deforestation through trade of crop products to other regions which have relative comparative advantages but a lack of forest protection policies. Thus liberalisation could not address the shifts of deforestation, although the total deforestation area is reduced. In addition to the trade liberalisation and forest protection policies, we add scenarios of food demand by assuming different food demand pathways. We find that due to the reduction of consumption of livestock products, the leakage effects of trade liberalisation on deforestation will reduce.

Keywords: CO₂ emissions, deforestation, food demand, leakage effects, trade liberalisation