

Land Use Change Greenhouse Gas Emissions of

European Biofuel Policies Utilizing the Global Trade Analysis Project (GTAP) Model

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Publication Synopsis

Since the adoption of Renewable Energy Directive (RED), setting a 10% obligatory targets for biofuels consumption a debate has been opened among policy makers and researchers questioning the potential impact of large scale of biofuels on land use at a global level. Various studies have been performed in this field with changeable results. The European Commission also launched research in this area and commissioned the International Food Policy Research Institute (IFPRI) to calculate the Land Use Change (LUC) impacts of European Biofuels Policy. IFPRI used a trade policy scenario model, also known as MIRAGE, based on GTAP models, to estimate the effects of regional agriculture and energy policy.

The conclusions of the IFPRI report led the European Commission to believe that most of biofuels are not environmentally beneficial, but this study was acknowledged also by its authors for containing a large number of uncertainties and statistical errors which have raised important doubt about its conclusions. Among others, the assumptions of the IFPRI are found outdated, misprojecting the yield potential of crops, not using the most recent land database and wrongly representing the substitution between different vegetable oils.

Analysing these systemic errors in the IFPRI study, US and Canadian researchers of this study used the GTAP model to project potential LUC emissions of EU biofuels consumption. GTAP model is currently used by the Californian Low Carbon Fuel Standard¹ and updated regularly to include most recent scientific developments and global databases. The use of GTAP model allowed this study to:

- Include cropland pasture in the USA and Brazil to the land database, as this type of land will be the first to be converted to respond to increased demand;
- Improve the production and role of co-products of vegetable oils;
- Measure yield improvement projections on new land; and
- Project more realistic forest conversion/deforestation linked to biofuels production.
- Include fallow and idle land to the land database, as this type of land is readily available for agricultural expansion;

For the topic of indirect land use change, researchers highlight that more focus and resources should be directed to further improve the model and to include updated land data from the EU and Canada, in order to better project iLUC estimates, and result in more realistic GHG emission figures for biofuels.

These corrections represent a first step towards better accuracy. In addition, the Commission study's emissions rates are also outdate and need further scrutiny. Using the GTAP model, based on the Commission study's emission rates for land types, this study found ILUC estimates results down by 65% in the updated model and down to more than 95% when compared to the IFPRI with an upated scenario including more intense fallow land use and no deforestation in EU, US and Canada.

Since ILUC science is still in its infancy, there is no agreed methodology or databases. Different methodologies deliver findings with high degree of discrepancy. Thus, today, there is still the need for further verification and data to have a clear view on ILUC factors figures, since the studies show today in some cases discrepancy of up to 90/95%.

¹ *The State of California has developed its Low Carbon Fuel Standards which included estimates for land use change (LUC) emissions. As indirect land use change (iLUC) cannot be observed or measured, the State of California uses GTAP modelling for quantifying potential impacts of Californian Biofuels Policy.*