

## **Accounting for global biomass and land flows embodied in trade – A comparison of approaches and a proposal for a way forward**

Topic: Environmental input-output modeling V

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Various approaches exist for quantifying the land embodied in international trade flows and consumption. These can be classified into a) economic accounting approaches, applying input-output analysis, and b) physical accounting approaches, using the available physical information on trade, processing and land intensity. The results of recent studies vary widely, thus hampering their application in policy making.

In order to study the disparities a literature review on recent land footprint studies was performed and differences in the applied methodologies and base data were identified. In order to empirically analyse these differences, a multi-regional input-output model was used to calculate global virtual land flows. The results were then compared to results generated with a comprehensive physical accounting model.

The literature review has shown that the two approaches have evolved strictly separated during the past decade within various research communities. Differences in the base data and methodologies have wide impacts on the results. The greatest divergences result from variations in the coverage of crops, processed products and supply chains. The choice of monetary or physical allocation procedures and the use of differing land use data in some cases may also result in deviations up to an order of magnitude. Variations in the handling of re-exports still cause differences of more than 100% for some crops and commodities. Furthermore, also the technology assumption applied at deriving input-output tables from supply-use tables as well as the regional and sectoral detail of the tables play a crucial role.

A hybrid accounting approach combining the advantages of both methodologies could provide a framework for the robust and transparent assessment of land footprints associated with global biomass flows. Such an accounting framework should be based on international agricultural statistics in physical units supplemented by monetary data for the commodities and supply chains otherwise not covered.