

## **Estimating the environmental impacts of EU's consumption from the global bioeconomy**

Level: Masters

Start: January/ February 2024

Project form: Desk study, literature review, multi-regional input output modelling

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**Description:** In order to reduce the environmental footprint of EU's bio-based consumption, it is not sufficient to only address the direct environmental impacts caused by EU's production of biomass and bio-based commodities. It is necessary to account for the impacts driven upstream of supply chains (within and beyond EU's borders) by the consumption of bio-based commodities in the EU region.

Economic sectors may be categorized into fully bio-based (e.g., agriculture and forestry, food products, and paper), partially bio-based (e.g., textiles, chemicals plastics, pharmaceuticals, and electricity), and non-bio-based sectors (e.g., manufacturing of metals and machinery, construction, and services).<sup>1</sup> The technique of environmentally extended multi-regional input-output (EE MRIO)<sup>2</sup> analysis will be used to estimate the direct and indirect environmental impacts of EU's consumption from the bio-based (including partially bio-based) sectors of the world. In case of partially bio-based sectors, their bio-based shares will be estimated. Treating region-wise sectoral environmental impact factors as the satellite account in the Leontief MRIO model, an EE-MRIO model will be constructed. We will estimate the environmental impacts associated with final demands of countries in the EU region from bio-based and partially bio-based sectors of all countries.

Finally, to bring the extent of the environmental impact of EU's consumption of bio-based commodities into a financial context, the monetary values of these impacts will be estimated using available monetary valuation methodologies<sup>3,4</sup>.

### **References**

1. Ronzon, T.; Piotrowski, S.; Tamosiunas, S.; Dammer, L.; Carus, M.; M'barek, R. Developments of Economic Growth and Employment in Bioeconomy Sectors across the EU. *Sustainability* 2020, 12 (11)
2. Miller, R. E.; Blair, P. D. *Input-Output Analysis: Foundations and Extensions*, 2nd ed.; Cambridge University Press: Cambridge, 2009
3. Smeets, B.; Schellekens, G.; Bauwens, T.; Wilting, H. *What's the Damage? Monetizing the Environmental Externalities of the Dutch Economy and Its Supply Chain*; Working paper 719; De Nederlandsche Bank, 2021.
4. Trucost. *Natural Capital at Risk: The Top 100 Externalities of Businesses*; 2013