

Calculating comprehensive material use and productivity indicators: a review of MRIO-MFA and other methodological approaches (for special session on MFA & IO modelling)

Topic: Material Flow/Stock Analysis and Input-Output Modelling I

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The scientific discussion on the further development of material use and efficiency indicators has to be seen against the background of increasing political demand for comprehensive and robust indicators – especially in the context of the “Roadmap to a resource efficient Europe” by DG Environment or the German resource efficiency programme ProgRes. But also in the context of international discussions around the topic of a “green economy”, as pursued by UNEP, OECD and other international organisations, this demand further increases.

This paper presents the results of a comprehensive review of currently applied approaches to calculate material use and productivity indicators. The review was carried out in the course of a project which aims at supporting the German government in the further development of comprehensive material use and efficiency indicators on the national and European level. Focus is put on indicators, which consider indirect material flows related to international trade (Raw Material Input and Consumption: RMI/RMC) as well as unused material extraction (Total Material Requirement and Consumption: TMR/TMC).

The review covers the three main approaches to calculate such indicators: input-output analysis extended by MFA data (in particular various MRIO-MFA models), coefficient approaches based on process analysis, and hybrid approaches. For each approach the main existing models were identified, for each of them all major scientific publications of the last six years reviewed, and for each publication the applied methodologies as well as the data sources in use analysed in detail. As a result, the study identifies main areas of strengths and limitations of each of the methodological approaches and derives needs for methodological and data harmonisation and the main areas for improvement. Increased harmonization levels as well as more robust methodologies will help increase confidence of policy makers and civil society with the indicators in use to design goal-oriented resource use policies.