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3s3 Supply chain transition: managing tools and sustainability assessment of innovations

Macro-economic approach to monitor bio-based material flows in a circular economy

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In recent years, both the circular economy and the biobased economy have gained traction in policy as means of transition to a more sustainable economy. These developments require new monitoring systems. Therefore, the Bio Flow Monitor (BFM) was developed.

The BFM is an extension of the Material Flow Monitor (MFM). The MFM was developed to support the monitoring of Dutch circular economy policy targets. The MFM integrates regular statistics on national accounts, trade, harvest, energy, waste and CO₂ emissions into a consistent macro-economic framework of supply and use tables. To do this in a consistent manner, the principles of the System of Economic and Environmental Accounts were applied. Products and materials are allocated to different material categories, namely biomass, fossil, metals and minerals. However, many product categories, like plastics, can be fossil-based or bio-based or combine different materials. As products such as plastics are allocated to a single material category, the MFM does not allow to survey the entire bio-based economy.

In order to monitor the bio-based economy, the BFM was developed. In the BFM, biomass coefficients are used to divide plastics and other relevant products categories into bio-based and non-bio-based shares. From the BFM several indicators for the bio-based economy can be derived. For example, bio-based production, substitution, cascading, use of secondary biomass and biomass dependency of the Netherlands. Information about the use of biomass in specific industries can also be obtained from the BFM.

Currently, we investigate to what extent the macro-economic BFM can be used to support Dutch CE policy. In order to do this, we are testing the validity of several indicators at different aggregation levels with experts in the field of the bio-based economy in the Netherlands. Challenges will be the usability of macro-economic derived indicators for a bio-based economy that is in its initial phase and future collection of plausible, consistent data by Statistics Netherlands.

Overall, the BFM integrates existing statistics in order to obtain a better understanding of the use of biomass in the economy. One limitation is that the coefficients used were developed generically for the European Union and are thus not specific to the Netherlands. In order to monitor the development of the bio-based economy these shares need to be developed per country and periodically updated. Alternatively, other data sources for the use of biomass or the content of biomass of products need to be developed.

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