Data and methods for measuring consumption-related spillover effects

Measuring consumption-induced spillover effects is a complex and data-intensive exercise, requiring data on direct cross-border flows (such as imports and exports) and indirect cross-border flows (socio-economic and environmental impacts of specific products and sectors throughout the entire supply chain). Many of these indirect impacts cannot be directly observed and therefore quantifying them requires making assumptions and model-based estimates. Different international and national organisations and researchers have used different methods for calculating spillovers ([1]). The following methodologies are used for analysing spillover effects in the SDG monitoring reports:

1) **Multi-Regional Input–Output (MRIO) analysis** is a top-down approach looking at the entire supply chain, both in terms of direct (on-site) and of total (direct plus indirect) impacts ([2]). MRIO tables document the flow of money between various sectors in an economy and show the interconnections between industries located in different regions. MRIO data aim to estimate the 'real' impacts in the rest of the world linked to goods imported into a given country. The full international and global accounts for research in input–output analysis (FIGARO) ([3]) involving Eurostat and the European Commission's Joint Research Centre (JRC) aims to provide tools for analysing the socio-economic and environmental effects of globalisation for **CO_2 emissions** and **gross value added** in the EU ([4]). It constitutes a new statistical tool developed by Eurostat and the Joint Research Centre of the European Commission, using EU official data with complementary information on the main non-EU trading partners. The FIGARO inter-country input–output tables respect the same quality standards as official statistics and aspire to be the EU reference tool for policy-makers in the above-mentioned domains.

2) **Material footprints** quantify the worldwide demand for material extractions (biomass, metal ores, non-metallic minerals and fossil energy materials/carriers) triggered by consumption and investment by households, governments and businesses in the EU. Material footprints are estimated by Eurostat using data from national accounts and material flow accounts in a single-region input–output model based on the System of Economic Environmental Accounts (SEEA) standard. Material Flow Analysis (MFA) tracks material flows associated with commodities along (international) supply chains, primarily for raw or less processed commodities. It can be combined with resources embodied in trade serving as inputs for the commodity without physically flowing with the commodity ([5]).

3) The **land footprint** is the virtual amount of land, wherever it is in the world, needed to produce a final biomass-related product consumed within domestic borders. It is based on Eurostat's crop and trade statistics and applies land use coefficients to imports and exports of biomass related products.

Notes

([1]) See e.g. studies conducted by the French *Ministère de la transition écologique et solidaire* and *Statistics Sweden* as well as Palm, V., Wood, R., Berglund, M., Dawkins, E., Finnveden, G., Schmidt, S. and Steinbach, N. (2019), *Environmental pressures from Swedish consumption: A hybrid multi-regional input-output approach*, Journal of Cleaner Production, 228, p. 634–44.

([2]) Lenzen, M. (2000), *Errors in Conventional and Input–Output-based Life Cycle Inventories*, Journal of Industrial Ecology 4, 127–148.

([3]) European Commission, *ESA Supply, use and Input-output tables: FIGARO.*

([4]) Eurostat (2019), *European Union Inter-Country Supply, Use and Input–Output Tables — Full International and Global Accounts for Research in Input–Output Analysis (FIGARO)*.

([5]) Sustainable Development Solutions Network (SDSN), 2019, *Policy Brief: International Spillovers and the Sustainable Development Goals (SDGs). Measuring how a country's progress towards the SDGs is affected by actions in other countries*.