Global Carbon Footprints account for international emissions

Product carbon footprinting (PCF) methods should account for international supply chains, according to a new Japanese study. The researchers used an ‘input-output’ analysis to develop Global Carbon Footprints for a range of food and drink products and suggest that this approach can help guide data-collection and calculations for PCF.

Under its ‘Disclosure of CO₂ emissions’ programme, Japan has developed guidelines for calculating the carbon footprints of consumer products. These propose a bottom-up approach in which the actual processes associated with the product are analysed one-by-one and the CO₂ emissions from each process are calculated. A committee has been established to provide Product Category Rules, which provide guidance for collecting information and performing calculations, such as the cut-offs and boundaries for when emissions are included in a product’s footprint and regional and seasonal variations.

However, there is a more top-down approach called input-output analysis where CO₂ emissions are not calculated from the actual technologies used to make the product, but from statistical data from industry sectors. The input-output data table specifies the trade between the sectors, and environmental data are added per sector, which enables modelling the supplies to each sector. The sector data is often redefined in terms of commodity datasets; some commodities come from more than one sector. This type of data is rather generic, but is helpful as all impacts for all activities are modelled at once. There are no data gaps, but there can be a problem when modelling imports.

For instance, Japan does not produce fossil fuels, so there is therefore no statistical national data on the impacts of fossil fuel production available. The way to solve this is to create a global input-output dataset that can model all imports.

The study adopted the Global Link Input-Output (GLIO) Model to calculate the embodied emissions of Japanese food and consumables. This considers the CO₂ emissions from producing and importing the materials needed to make the product as well as from the transportation between Japan and overseas. This creates what the study referred to as a Global Carbon Footprint (GCF).

For example, it calculated that soft drinks have a GCF of 2.78 tonnes of CO₂ emissions per million yen spent. 28 per cent of this was emitted outside of Japan. The overseas share of the GCF varies with sector, from 16 per cent for vegetables, to 65 per cent for processed meat products. This indicates that it is more important to consider the international supply chain for some products than for others.

In conclusion, the study suggests that although the bottom-up approach is valuable for collecting data, it may be better to use a hybrid approach that applies an input-output analysis when creating Product Category Rules. The input-output analysis could inform the Product Category Rules about which products need to consider international supply chains and for which products the global aspect is relatively unimportant.


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