Choice of method for measuring carbon footprint can affect the result

When calculating the carbon footprint of products, the methods and assumptions used should be made clear, according to a recent study, as the choice of assessment method can have a large effect on the final result of a carbon footprint.

Policy makers and businesses use product carbon footprints (PCFs) to help understand where emissions can be reduced along the supply chain and businesses increasingly include the carbon footprint on product labels as an information tool for consumers.

A number of methods to calculate PCFs continue to be developed around the world. This can make it difficult to compare the carbon footprint between different products and between similar products from different countries. Assumptions made when calculating the PCF can affect the results, particularly where there is a lack of specific information relating to the actual production of the products and average values are used instead. Supply chains are often global, and data for products from developing countries are often scarce and of poor quality.

This study calculated the PCFs of sugar cane in Zambia and Mauritius, taking into account greenhouse gas (GHG) emissions from cultivation, processing and transport to a European port, using the PAS 2050 carbon footprinting methodology, whilst highlighting key issues relating to the calculation of PCFs. For PCFs to be of value to businesses, consumers and policy makers, the researchers recommend that the method of calculation, data used and uncertainties are made clear.

According to PAS 2050, the PCFs for sugar cane from different farms delivered to the sugar refineries in both countries varied between 0.03 and 0.2 kilograms of carbon dioxide equivalents per kilogram of sugar cane (kg CO₂e/kg). The biggest contribution to the PCF for the farms in Zambia came from emissions due to land use change, which according to the accounting method used in the study, have to be included if land use change occurred during the past 20 years. Land use change emissions can dominate the PCF for products from many tropical countries.

For non-industrialised regions in the tropics, barriers to determining accurate PCFs for local products include getting the detailed information needed for the calculations and having the necessary skills to estimate the emissions of GHGs associated with change in land use. A global worst case scenario for emissions from land use change, based on clearing tropical forests, is sometimes used where the origin of a product is unknown, which may lead to large over-estimations of actual emissions.

For example, assuming the global worst case scenario for one farm in Mauritius (which had not converted land to agricultural use in the last 20 years) would have increased the PCF by 1900 per cent. In cases where the country of origin of a product is not known or where the original vegetation type of the agricultural land is undetermined, the researchers suggest that a regional or crop specific rather than a global worst case scenario would be a better choice for the PCF calculations.

Other values, called emission factors, which are used in the PCF calculations for emissions relating to the production process, should be specific for the countries of origin. For example, in Zambia, where electricity is largely generated from hydropower, emission factors are low, whereas electricity emission factors in Mauritius are high, as electricity is derived mainly from coal and fuel oil. Using an average emission factor for Africa instead, for example, would reduce the PCF of sugar cane from one farm in Mauritius, delivered to the refinery, by 10 per cent.


Contact: katharina.plassmann@vti.bund.de, katrinplassmann@web.de

Theme(s): Climate change and energy, Sustainable consumption and production