With ever-increasing global consumption, the impacts of resource depletion, land use change and pollution are being felt worldwide. A new study reveals how international trade is shifting the environmental burden from the consuming nation to other parts of the world, and calls for changes in the way national material use is accounted for.

In Europe, using natural resources sustainably is central to the European Commission’s goal of a secure, equitable and resource-efficient future. Using a technique called material flow analysis (MFA) and a multiregional model based on OECD data, the new study calculated, for the first time, trading patterns for 53 countries between 1995 and 2005. The analysis covered four main categories: biomass; fossil fuels; metals and industrial minerals; and construction minerals.

The results revealed a significant increase in global extraction of raw materials between 1995 and 2005: up 24% from 46.4 to 57.4 billion tonnes. Extraction of materials grew the most in emerging and developing countries and the largest increase was for metals and industrial minerals, up by 36%.

In addition to the actual materials contained in a traded product, indirect material flows accumulate along the production chain, from extraction through to manufacturing and transportation. Such material flows are referred to as ‘materials embodied in trade’. Associated with the increase in material extraction between 1995 and 2005 was an almost 50% increase in materials embodied in trade, growing from 10.1 to 14.9 billion tonnes. This implies that about a quarter of materials extracted and consumed globally were directly or indirectly traded across international borders.

The researchers compared two different indicators of resource use: the ‘raw material consumption’ (RMC) indicator (as used above), which accounts for materials directly consumed (extracted domestically or imported) as well as indirectly consumed via imported products, and the ‘domestic material consumption’ (DMC) indicator, currently used in EU and OECD policies, which only accounts for material directly consumed not indirectly consumed through imported products.

The results show that the difference between RMC and DMC can be up to 200%. Compared with RMC, DMC underestimated the amount of raw materials consumed in most wealthier OECD countries, including most of Europe, the US and Japan, and overestimated raw material consumption in less developed countries that export heavily.

Continuing to base assessments of resource use on DMC rather than RMC could seriously misrepresent global trends. Using DMC allows industrialised nations to meet reduction targets by shifting more of the production process and associated environmental burden elsewhere, rather than reducing their demand for material-intensive products. To successfully improve sustainability at a global scale, targets and indicators of national resource use need to take embodied trade into account, the study concludes.