

Science for Environment Policy

Limited resource efficiency achievements for international trade, with concerns over material use

International trade has increasingly relied on material resources since the 1990s, according to a new study. The research used the most detailed global computer model available for capturing the effects of international trade on the environment and on the efficiency of resource use between 1995–2011. Sharp increases in the trade of cheap 'fast fashion' and mass market electronics are highlighted as two of the fastest growing drivers of this change in material inefficiency.

To achieve the UN Sustainable Development Goals (SDGs), we urgently need to 'decouple', or break the link between economic development and environmental impact. When viewed individually, most countries indeed appear to have *relatively* decoupled, in that environmental pressure is rising at a slower rate than economic growth.

However, the true picture may be different when the effects of trade are considered. Trade distorts a country's environmental record by shifting, or displacing, the burden of producing the goods it consumes to other parts of the world.

The new study, conducted under the EU [DESIRE](#) project¹, explored whether there was any decoupling between economic development and the environmental impact of traded products, between 1995–2011. It has been argued that international trade can promote resource efficiency by increasing competitiveness between countries and providing more efficient access to resources. However, the most growth in resource-intensive production is occurring in regions with relatively light environmental regulation. The researchers say that this begs the question, are we really seeing the decoupling of environmental impact from economic development, when we take a 'consumption' approach, including the impacts embodied in trade?

The researchers used [EXIOBASE 3](#), a new global multiregional input-output (MRIO) model, for assessing the links between consumption, environmental impact and trade over time. They write that it is the highest resolution global MRIO model available for tracking resources through the economy. For example, it includes far more data on the agricultural, forestry and mining sectors than previous efforts.

They calculated the environmental impact of producing and consuming 200 traded products from 163 industries for nine regions around the world, including the EU. Impact was defined in terms of five environmental pressures: greenhouse gas (GHG) emissions, energy use, material use, water use and land use. Data for these came from a wide range of sources including the [International Energy Agency](#) and the [Food and Agricultural Organization](#) of the UN².

To define the resource efficiency of trade, the researchers related one unit of environmental pressure caused by the products (e.g. one tonne of materials used), with two measures of economic development: one unit of population (per capita) and one unit of GDP growth (in US dollars).

The results show some small signs of economic development decoupling from the environmental impacts of trade and, therefore, a minor degree of improved resource efficiency. Overall, however, the researchers say achievements have been limited and efficiency has become worse in the case of material use. Globally, material use increased at a faster rate than GDP and, between 1995–2011, it went from 8.3 tonnes per capita to 11.3 tonnes, a 36% rise. GHGs, water use and energy use also rose but at a slowing pace, showing weak relative decoupling. Land use was the only measure to drop, by 0.3 hectares per capita. It is, therefore, the only trend that fully decoupled from economic growth. The researchers say that this is mainly due to slight reductions in the area of permanent meadow and pasture and non-planted forested land.

Continued on next page.

12 July 2018

Issue 510

[Subscribe](#) to free
weekly News Alert

Source: Wood, R., Stadler, K., Simas, M., Bulavskaya, T., Giljum, S., Lutter, S., & Tukker, A. (2018). Growth in Environmental Footprints and Environmental Impacts Embodied in Trade: Resource Efficiency Indicators from EXIOBASE3. *Journal of Industrial Ecology*. DOI: 10.1111/jiec.12735. This study is free to view at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jiec.12735>.

Contact:
richard.wood@ntnu.no

Read more about:
[Resource efficiency](#),
[Sustainable development and policy assessment](#)

1. DESIRE (Development of a System of Indicators for a Resource Efficient Europe) was supported by the European Commission under the Seventh Framework Programme: <http://fp7desire.eu/>

2. For full list of data sources, see: Stadler, *et al.* (2018) <https://onlinelibrary.wiley.com/doi/abs/10.1111/jiec.12715> (free to access)

Science for Environment Policy

Limited resource efficiency achievements for international trade, with concerns over material use (*continued*)

The sharp rise in material use probably reflects a change in consumption patterns — for example, the major shift towards cheaper, widely available electronics and high-volume, sweatshop-produced clothing bought by European consumers from foreign producers. Although these products are responsible for a fairly low percentage of overall environmental burdens, they represent the greatest growth in environmental pressures.

The major growth in material use raises concerns for future economic growth. Further concerns are presented by a strong link between material use and GHG emissions in capital-intensive low-carbon technologies and the use of carbon-intensive materials, such as cement and steel, in infrastructure building. The researchers argue that infrastructure should, therefore, be prioritised in sustainable economy and sustainable consumption and production strategies.

China and India showed the highest relative decoupling between environmental pressure and GDP growth. For instance, for every 1% of GDP growth, OECD countries increased GHG emissions embodied in traded goods by 0.8%, while China's increased by just 0.56% (the global average was 0.88%). However, they are also seeing faster per-capita growth in impacts.

As well as decoupling, the study also measured the displacement of environmental pressure through trade. It calculates that between 1995–2011 the net impact of global environmental pressure, as a percentage, displaced from consumer region to producer region, increased for all five impacts: from 23% to 32% for material use, 23% to 26% for water use, 20% to 29% for energy use, 20% to 26% for land use and 19% to 24% for GHG emissions.

The results confirm that global trade displaces all environmental impacts from developed to developing regions, which has implications for meeting SDGs. The displacement from OECD countries to non-OECD countries increased between 1995 and 2011 from 7.5% to 9.5% for material use. Energy use displacement also went up, from 3.9% to 4.6%, as did GHG emissions from 6.1% to 6.3%. Differences in net trade for water (8.1% to 7.2%) and land footprints (7.2% to 5.3%) decreased, but still represent displacement.

The study period 1995-2011 includes the most up-to-date data available for all of the environmental pressures (more recent data is only available for some of the impacts). This period, therefore, covers the financial crash of 2008, which saw a major drop in trade and associated impacts. However, trading activity recovered from 2010 onwards, and it can be assumed that the more recent trends since the financial crisis are unlikely to have changed significantly since 2011.

The researchers suggest that the study's results can inform [EU resource efficiency policy](#) as well as efforts to meet the UN's [Sustainable Development Goals](#), by highlighting the challenge in increasing global development whilst maintaining and reducing impacts on the environment.

In particular, they say that avoiding restrictive material-intensive development pathways, whilst exploiting potential benefits of trade, poses an interesting challenge to policymakers. They call for further investigation of international trade's role in the relative decoupling of economic growth and environmental pressures to assess whether trade contributes to linking resource availability with production, without leading to socioeconomic losses or increasing non-regulated and/or non-financial environmental impacts.



12 July 2018
Issue 510

[Subscribe](#) to free
weekly News Alert

Source: Wood, R., Stadler, K., Simas, M., Bulavskaya, T., Giljum, S., Lutter, S., & Tukker, A. (2018). Growth in Environmental Footprints and Environmental Impacts Embodied in Trade: Resource Efficiency Indicators from EXIOBASE3. *Journal of Industrial Ecology*. DOI: 10.1111/jiec.12735.

This study is free to view at:
<https://onlinelibrary.wiley.com/doi/abs/10.1111/jiec.12735>.

Contact:
richard.wood@ntnu.no

Read more about:
[Resource efficiency](#),
[Sustainable development and policy assessment](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this article/service: "[Science for Environment Policy](#)": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

