

# **The material basis of the global economy**

## **Worldwide patterns of natural resource extraction and their implications for sustainable resource use policies**

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### Abstract:

Material flow accounting and analysis (MFA) has been established as an influential framework for quantifying the use of natural resources by modern societies. So far, however, no reference data for overall scale and trends of global extraction of natural resources and their distribution between different world regions has been available. This paper presents the first comprehensive quantification of the material basis of the global economy, i.e. used domestic extraction in a time series from 1980 to 2002. We analyse time trends for major material groups (fossil fuels, metals, industrial and construction minerals, and biomass) disaggregated into seven world regions. This allows for (a) an illustration of the global economy's physical growth driven by worldwide processes of economic integration over the past decades, and (b) an indication of the worldwide distribution of environmental pressures associated with material extraction. The results show that annual resource consumption of the world economy increased by about one third between 1980 and 2002. This indicates that scale effects due to economic growth more than compensated for other effects, such as the relative increase of the service sectors' contribution to GDP (structural effect) and the use of new production technologies with higher material and energy efficiency (technology effect). The observed growth of natural resource extraction is unevenly distributed over the main material categories, with metals showing the highest growth rate. The regional analysis shows the increasing importance of Asia and Latin America in global resource extraction. On the global level, material intensity, i.e. Resource extraction per unit of GDP, decreased by about 25%, indicating relative decoupling of resource extraction from economic growth. The paper concludes with policy recommendations for a more sustainable use of natural resources.

**Keywords:** environmental policy, global resource use, international trade, material flow analysis, sustainable development indicators