Supporting Information

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SI Text

S1. Additional Results and Analysis

Detailed results for 2008 are available in spreadsheet format in Dataset S1. Results from the Eora model are also accessible via www.worldmrio.com. The following figures provide additional visualization of results and context to the analysis presented in the main text. The 2008 per-capita material footprint (MF) of nations is shown on a world map (Fig. S1) and by main material category (Fig. S2). The world average MF in 2008 was 10.5 tons per capita.

The "flows" of raw materials within and among nations are depicted in Fig. S3. The lines between resource-extracting countries on the left side and consuming countries on the right side are kept in the color of the country of origin. About 40% of raw materials produced worldwide are associated with international trade and serve the consumption of products and services in countries other than that of extraction. A dynamic version of this graphic, which allows adjusting a threshold for domestic extraction (DE) data, can be viewed at www.truthstudio.com/code/code_2012_csiro.html.

Domestic material consumption (DMC) represents the apparent physical consumption of an economy and does not distinguish between the intermediate demand and final demand for materials, whereas the MF is a measure of the total amount of primary materials required to satisfy a country's own final demand. Differences between the two indicators are expected, depending on the level of resource extraction, processing, and trading in a country. We find these differences to be remarkably large; in fact, for most countries, DMC is closer to DE than to the MF. Fig. S4 shows the average relative distance between the three indicators for all countries for which sufficient data on DE were available.

Fig. S5 is a detailed version of Fig. S4 and shows the position of DMC in relation to DE and the MF. Note that negative numbers in the graph occur when either DMC or the MF is larger than DE. Countries have been sorted by increasing per-capita gross domestic product (GDP/cap) from left to right.

S2. Details on Methodology and Data

S2.1. Conceptual Framework. The global multiregion input–output (MRIO) analysis used in this work is based on monetary interrelationships between economic sectors and countries, considering intermediate demand by industries and final demand by consumers and governments. To this highly disaggregated framework of the global economy, we linked country-specific extraction data for primary materials to those industries that produce or extract these materials in the first place. Raw material equivalents (RMEs) associated with final demand and imports in each country were then calculated according to Kanemoto et al. (1) [also Lenzen et al. (2)]:

$$\mathrm{MF} = \sum_{r} f_i^r \sum_{it} L_{ij}^{rt} y_j^{ts} \qquad \textbf{[S1]}$$

$$\mathrm{RME_{IM}} = \sum_{r} f_i^r \sum_{it \neq s} L_{ij}^{rt} y_j^{ts}, \qquad \textbf{[S2]}$$

where:

r, t, s = country of origin (r), last seller (t), and destination (s)

i, j = sector of origin (i) and destination (j)

f_i^r = material intensity of sector i in country $r = F_i^r/x_i^r$ = amount F of raw materials extracted by sector i in country r divided by total economic output x of sector i in country r

L_{ij}^{rt} = global Leontief inverse matrix (the derivation of L_{ij}^{rt} is provided in equation 5 in ref. 1)

y_j^{ts} = final demand for product j in country s (with y_j^{ss} = domestic final demand and $y_j^{t\neq s,s}$ = import of product j from country t to s)

We obtain RMEs associated with export by exchanging t and s:

$$\mathrm{RME_{EX}} = \sum_{r} f_i^r \sum_{it \neq s} L_{ij}^{rs} y_j^{st}, \qquad \textbf{[S3]}$$

with:

s, t = country of last seller (s) and destination (t)

$y_j^{s,t\neq s}$ = export for product j from country s to t

Final demand, y, contains the following categories: household and government final consumption, gross fixed capital expenditure, and changes in inventories (y_j^{ss} and $y_j^{t\neq s,s}$) and exports ($y_j^{s,t\neq s}$). Furthermore, the following identity holds:

$$\mathrm{MF} = \mathrm{DE} + \mathrm{RME_{IM}} - \mathrm{RME_{EX}}. \qquad \textbf{[S4]}$$

The MRIO footprint calculations trace the whole production and supply chain of traded products and associated materials with a country's final demand back to the original source of primary material extraction. However, this approach does not explicitly calculate material flows associated with intermediate demand [only with final demand; a comparison of different approaches is provided by Feng et al. (3) and Kanemoto et al. (1)]. Furthermore, the MRIO approach is different from the bottom-up approach used by Dittrich et al. (4). Instead of using material equivalent factors derived from life cycle analysis (LCA) applied to bilateral trade data, MRIO intrinsically calculates total RMEs of final demand across multiple countries and sectors (see comparison below).

S2.2. Data Sources. The two data sources used in this work are the global MRIO database Eora and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Global Material Flow Database.

Eora is an MRIO database that provides a time series of input–output and trade tables with matching environmental and social satellite accounts for 186 countries. Lenzen et al. (2) provide an overview of the project; in particular, they describe (*i*) the United Nations System of National Accounts (UN SNA) sectoral data on value added and final demand used for modeling input–output matrices for countries where input–output data are unavailable, (*ii*) the development of a large-scale constrained optimization algorithm and its implementation on multicore scientific workstations, and (*iii*) the bridging and harmonization of the large range of disparate information using concordance tables. The tradeoffs between conflicting data sources and how these tradeoffs were quantified as source data uncertainty estimates and transformed into estimates for the SDs of MRIO table elements are described in detail in by Lenzen et al. (5).

The main characteristics of Eora are as follows:

One hundred eighty-six individual countries represented by a total of 14,787 sectors

Heterogeneous classification using the maximum number of sectors available for each country (an aggregated version of Eora can be generated in a 25-sector harmonized classification)

- Continuous coverage for the period 1990–2011
- Environmental indicators cover air pollution, greenhouse gas emissions, water use, ecological footprint, material flows, and human appropriation of net primary productivity
- Raw data drawn from economic and trade databases from the United Nations, Eurostat, and numerous national agencies
- Distinction between basic prices and purchasers' prices through five valuation tables
- Reliability statistics (estimate of SD) for all results

The time series of MRIO tables in Eora was created in iterative steps of constrained optimization, starting with the year 2000 as the base year. Details of the fore- and back-casting procedures applied for the time series iterations are described in detail by Lenzen et al. (6). The UN SNA database contains information for constraints for every country and all years between 1990 and the current year, so that a situation with complete unsupported country and year never arises.

Eora data have been made available on the web at www.worldmrio.com.

The CSIRO Global Material Flow Database is a comprehensive compilation of global data for DE and physical trade of materials in yearly time steps for 1970–2008, and it was produced using standard material flow accounting principles following international guidelines (7). These data have been made available online for two world regions, namely, Asia and the Pacific (www.csiro.au/AsiaPacificMaterialFlows) and Latin America and the Caribbean (www.csiro.au/LatinAmericaCaribbeanResourceFlows). A technical annex available on these Web sites describes the data compilation methodology in detail. Main results from analyzing the database have been described in two reports (8, 9) and in the scholarly literature (10, 11). The data cover 191 countries and over 250 primary resource categories, which were aggregated to the 35 categories shown in Table S1 before adding them to the extensions in Eora. The matching of these 35 material categories with the extracting/producing industry sectors in the Eora MRIO was done by mapping both datasets to the six-digit subheadings of the Organization for Economic Cooperation and Development Harmonized Commodity Description and Coding System (HS6; www.oecd-ilibrary.org/trade/data/international-trade-by-commodity-statistics/harmonised-system-2007_data-00366-en).

S2.3. Methodological Limitations. Recent advances in global MRIO modeling (2, 12) now provide the means to analyze and monitor the MF of nations more reliably than before. However, the method is not without limitations.

MRIO accounts are provided initially in monetary terms rather than physical terms. So-called "price errors" can be introduced where individual transactions occur with a different price (dollars per quantity) than average. Allocation errors can occur due to low sectoral or product resolution. For example, a kilogram of gold included in a broad category of materials (e.g., "ores") allocated to a broad production sector (e.g., "metals and mining") will not be traced to its final demand as accurately as if gold were differentiated as a distinct input category and the MRIO used distinguished, more specific "gold," "precious metals," or "nonferrous metals" sectors rather than a broad metals and mining sector.

In this study, we differentiated 35 types of materials and the MRIO used between 25 and 510 industrial sectors per country (5). For countries with more raw material-producing sectors, the allocation of DE data are therefore more accurate than for countries where fewer such sectors are available. For example, if there is just one "aggregate" extraction sector, a part of the "building stone" material flow might be allocated to the chemical industry because some limestone (which is also extracted by the aggregate sector) is used by that industry and not in construction. It would be possible to allocate limestone extraction directly to both the construction and chemical industries; however, the exact proportions for each industry would have to be known or collected, which is time-consuming and inefficient. We therefore argue that the allocation via HS6 is a reasonable and practical compromise.

The limited resolution of some national input–output tables also constrains the method's ability in addressing issues around critical metals and resource security due to the facts that (*i*) many of the critical metals are "specialty metals," which are used for very specific applications that cannot be easily represented by flows between aggregate sectors/products, and (*ii*) resource security problems often arise from the presence of mono- or oligopoly structures within a sector. This is an area where hybrid approaches can be very useful. Here, input–output analysis (IOA) is combined with elements from process-based life cycle assessment (LCA) methods, such as those applied by Schoer et al. (13) in a study of the raw material consumption (RMC) of the European Union (EU). The hybrid method takes advantage of truncation-free enumeration of supply chains via IOA and product-specific detail via LCA (14–16). The current framework provides an important first step toward understanding potential risks associated with the global resource supply chain. More detailed information can be added targeting the hotspots identified through a hybrid approach, where process-specific information and aggregate product-level information are integrated.

More general elaborations on the uncertainty of MRIO modeling have been published in the literature (12, 17–19). Current MRIO research is aimed at understanding the uncertainties of calculating footprint accounts for nations (20) and improving the data basis and the accuracy of MRIO calculations. These efforts will eventually lead to the adoption of common practices, guidelines, and possibly standards, which, in turn, will facilitate the adoption of footprint indicators in policy making.

We are aware that the MF does not provide information on actual environmental impacts of resource use (RU) but only on the potential for impacts. A true decoupling of environmental damage from economic growth, however, can only be achieved if not just the total mass of materials consumed but the associated environmental impact is reduced (21). Future research therefore needs to establish and quantify causal links between final demand in countries and regional or local environmental impacts in other parts of the world.

S2.4. Comparison with Other Material Flow Accounting Approaches. A number of approaches have been applied in the literature to account for the indirect material requirements of modern economies (22, 23). As an extension to DMC, the total material consumption (TMC) indicator explicitly takes into account the indirect raw materials required to produce imports and exports of materials, as well as the flows of unused (hidden) extraction of raw materials [likewise, the total material requirement (TMR) extends direct material input by indirect and hidden material flows (24)]. TMC and TMR thus allow estimating the "ecological rucksack" of the material basis of nations. To calculate TMC and TMR, material intensity factors of imports and exports are derived from simplified life cycle inventories (4, 25). A drawback of this LCA factor method is that "that the ecological rucksack of a good which is passing more than one border in one or different process stages is counted more than one time within the volume" (4). This double-counting problem does not occur in MF calculations based on IOA because DE volumes are merely reallocated from production to consumption in a mutually exclusive and collectively comprehensive way. A further complication of the factor method used in TMC/TMR calculations is that coefficients of indirect material flows of imports and exports are mostly derived from specific production systems, such as Germany or the EU (25). Deriving more country-specific coefficients or updating them to represent technological development over time is resource-intensive

(4). IOA, on the other hand, calculates raw material requirements intrinsically by reallocating DE as described above.

In our analysis, we compare the MF with DMC rather than with the more comprehensive indicator of TMR. This is for two main reasons.

First, although the indirect flows component of TMR is similar to the RMEs calculated by the MF, the component of unused extraction renders comparisons futile. This is not just because unused extraction has not been included within the MF (or RME concept) but because estimations of unused extractions compound the already considerable uncertainties embodied in estimates of DMC. Unused extractions are usually very poorly recorded, if at all. For example, although mining overburden often greatly outweighs ore mined, its calculation would require country-specific stripping ratios, which vary greatly among different ore body configurations. The stripping ratio increases linearly with depth if the ore body is in horizontal sheet form (e.g., coal seams), as the square of depth if it is in vertical sheet (vein) form, and as the cube of depth if it is in pod (point) form. Therefore, arriving at a usable average stripping ratio is practically difficult. Errors in determining stripping ratios would then compound with those already inherent in the original ore tonnage estimation. It is not unlikely that errors in the estimation of TMR attributable to mining would be greater than total ore tonnage mined in some cases.

Second, TMR magnifies the problem of adding together material categories that exert very dissimilar environmental impacts. This is an (often criticized) aspect of all material flow indicators, including both DMC and the MF (22–28). However, in TMR accounting, a ton of uranium can end up grouped together with a ton of topsoil. In some categories, relatively inert materials that have minimal direct and indirect environmental consequences can therefore overwhelm the materials of consequence.

S2.5. Multivariate Regression Analysis. A cross-country multivariate regression analysis for the year 2008 was carried out to test changes in RU per capita (MF/cap and DMC/cap) in dependence of (*i*) GDP/cap, (*ii*) DE/cap, and (*iii*) population per area as explanatory variables. We initially tested four explanatory variables by including the Human Development Index (HDI) as an indicator for the development status of nations. (In part, the selection of explanatory variables was also driven by the availability of suitable data.) However, HDI was highly correlated with GDP/cap, thus introducing multicollinearity into the regression (Pearson's linear correlation coefficient of 0.80). As a result, HDI was excluded from the analysis.

Elasticities α, β, and γ for explanatory variables were calculated as the regression coefficients of an ordinary least-squares estimation of the relationship expressed in Eqs. **S5** and **S6**, with F being RU per capita (MF/cap or DMC/cap) and k being a constant. We did not choose a weighted least-squares approach because the data underlying the regression are unlikely to be heteroscedastic. This is because even though estimates of A, B, C, and F span a wide range, they are based on national data collated to international standards, and therefore are likely to be measured with comparable SDs for small and large countries alike:

$$F = k \cdot A^{\alpha} \cdot B^{\beta} \cdot C^{\gamma} \quad \textbf{[S5]}$$

$$\log(F) = \log(k) + \alpha\log(A) + \beta\log(B) + \gamma\log(C). \quad \textbf{[S6]}$$

The elasticities represent the relative change in per-capita RU corresponding to a relative change in the explanatory variables (Eq. **S7**; further explanation is provided in section 2.4 of ref. 29):

$$\alpha = \frac{dF/F}{dA/A},\ \beta = \frac{dF/F}{dB/B},\ \gamma = \frac{dF/F}{dC/C}. \quad \textbf{[S7]}$$

Relationships between resource productivity (GDP/RU, with RU being the MF or DMC) and explanatory variables can be derived from Eq. **S5** as follows:

$$\frac{RU}{pop} = k \cdot \left(\frac{GDP}{pop}\right)^{\alpha} \cdot \left(\frac{DE}{pop}\right)^{\beta} \cdot \left(\frac{pop}{area}\right)^{\gamma} \quad \textbf{[S8]}$$

$$\frac{RU}{pop} \cdot pop \cdot GDP^{-1} = k \cdot \left(\frac{GDP}{pop}\right)^{\alpha} \cdot \left(\frac{DE}{pop}\right)^{\beta} \cdot \left(\frac{pop}{area}\right)^{\gamma} \cdot pop \cdot GDP^{-1} \quad \textbf{[S9]}$$

$$\text{Resource intensity} = \frac{RU}{GDP} = k\left(\frac{GDP}{pop}\right)^{\alpha-1} \cdot \left(\frac{DE}{pop}\right)^{\beta} \cdot \left(\frac{pop}{area}\right)^{\gamma} \quad \textbf{[S10]}$$

$$\begin{aligned}\text{Resource productivity} &= \frac{GDP}{RU} \\ &= k^{-1} \cdot \left(\frac{GDP}{pop}\right)^{1-\alpha} \cdot \left(\frac{DE}{pop}\right)^{-\beta} \cdot \left(\frac{pop}{area}\right)^{-\gamma} \\ &= k^{-1} \cdot A^{1-\alpha} \cdot B^{-\beta} \cdot C^{-\gamma}.\end{aligned} \quad \textbf{[S11]}$$

Eq. **S11** shows that the regression coefficient of resource productivity with income is $1 - \alpha$. This is equivalent to the definition provided by Ausubel and Waggoner (ref. 30, p. 12774), who see dematerialization (or the decrease of RU per GDP) as equal to income elasticity minus 1.

It is general practice to use GDP adjusted by purchasing power parity (PPP) for comparisons of resource productivity among countries and constant price GDP for comparisons over time (31). To be consistent across our analyses, we used GDP-PPP in a constant international unit (dollar) for the year 2005 (denoted as "GDP-PPP-2005") for comparing among countries and over time.

We present regression coefficient (R^2) values as adjusted values that take into account the number of explanatory variables. Unlike the raw R^2, the adjusted R^2 will decrease if an additional explanatory variable adds insufficient explanatory power to the regression.

To test the robustness of our results and to investigate further how growing wealth influences the MF of nations, we repeated the multivariate regression for the GDP/cap for a subset of the entire population of country samples by moving a window of 70 countries across a ranked list of the regression data, starting with the poorest and ending with the richest 70 countries over the range of 137 countries. The result is 68 pairs of average GDP-PPP/cap values and their corresponding elasticities α presented as plots in Fig. S6, showing the following:

> The MF of crops, particularly those crops used for animal production, is clearly responsible for the overall increase of elasticity with wealth. Whereas every 10% increase of affluence in poorer countries only leads to an increase of 2% in the MF of fodder crops, this number is 6% at the high end of wealth. As countries become wealthier, they not only consume more food per capita; more importantly, the mix of food they consume tends to incorporate more animal products, which are often imported (32). As a consequence, the total MF/cap increases more steeply with income for wealthy countries where shifts to meat-based diets occur.

The MF of fossil fuels is more than proportional to the GDP across all income ranges. Elasticities range between $\alpha = 1.1$ and $\alpha = 1.4$ for all ensembles of countries. This result is a reflection of the well-known "energy ladder," where traditional biofuels are rapidly replaced by commercial fuels and electricity with larger material overheads as wealthier aspiring households acquire vehicles and appliances for convenience, comfort, and status (section 4.2.3.1 in ref. 33).

Elasticities for both metal ores and construction minerals decrease with affluence, starting at around $\alpha = 1$ at the lower end of wealth and ending up at around $\alpha = 0.8$ and $\alpha = 0.6$ at the higher end, respectively. This indicates a certain level of saturation for infrastructure and metal-based consumer goods (e.g., cars, household durables) with increasing income.

S3. Comparison with Other Studies

Some studies have calculated the RMEs of consumption or trade of individual countries or world regions. Table S2 provides a comparison of total MF results with this work. Although all studies are based on IOA, the underlying data sources and assumptions made when constructing the models, as well as the model design and scope, vary widely. A systematic cross-model comparison has not yet been undertaken [except for carbon footprint modeling (20)] and is recommended as an important future area of research.

S4. Note on the Term "Material Footprint"

The term "material footprint" was first mentioned in a report by Lettenmeier et al. (34), who use it as a synonym for ecological rucksack (ref. 34, p. 9) and define it as "the total input of natural resources required by any product from the cradle to the point of sale" (ref. 34, p. 50). Most previous studies that used IOA to allocate raw material extraction to final consumption (35–41) call the resulting indicator RMC rather than the MF. RMC was mentioned in the Eurostat handbook on economy-wide material flow accounting as a consumption indicator based on RMEs (42), although it was not further developed in that guide. The MF has been mentioned a couple of times (13, 43); however, more often, RMC has been used to identify the indicator.

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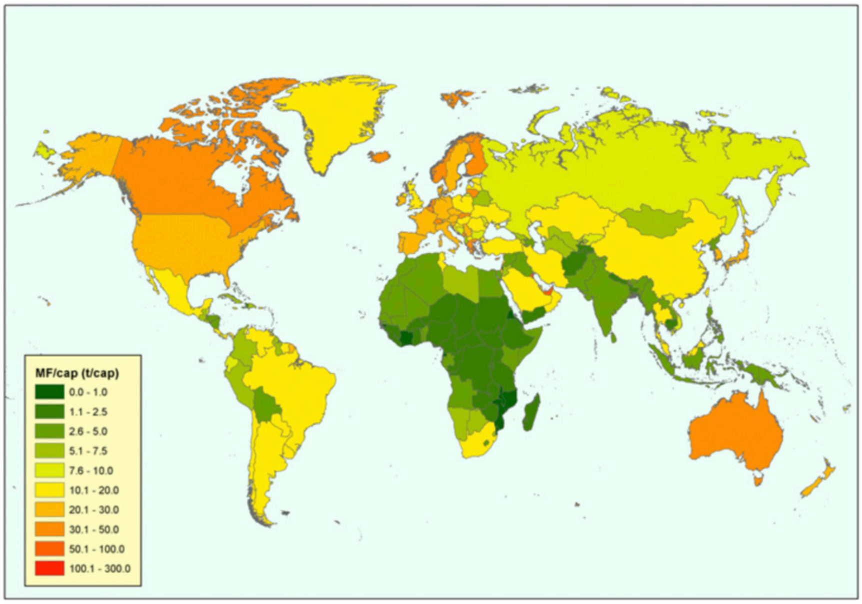

Fig. S1. MF/cap of nations in 2008.

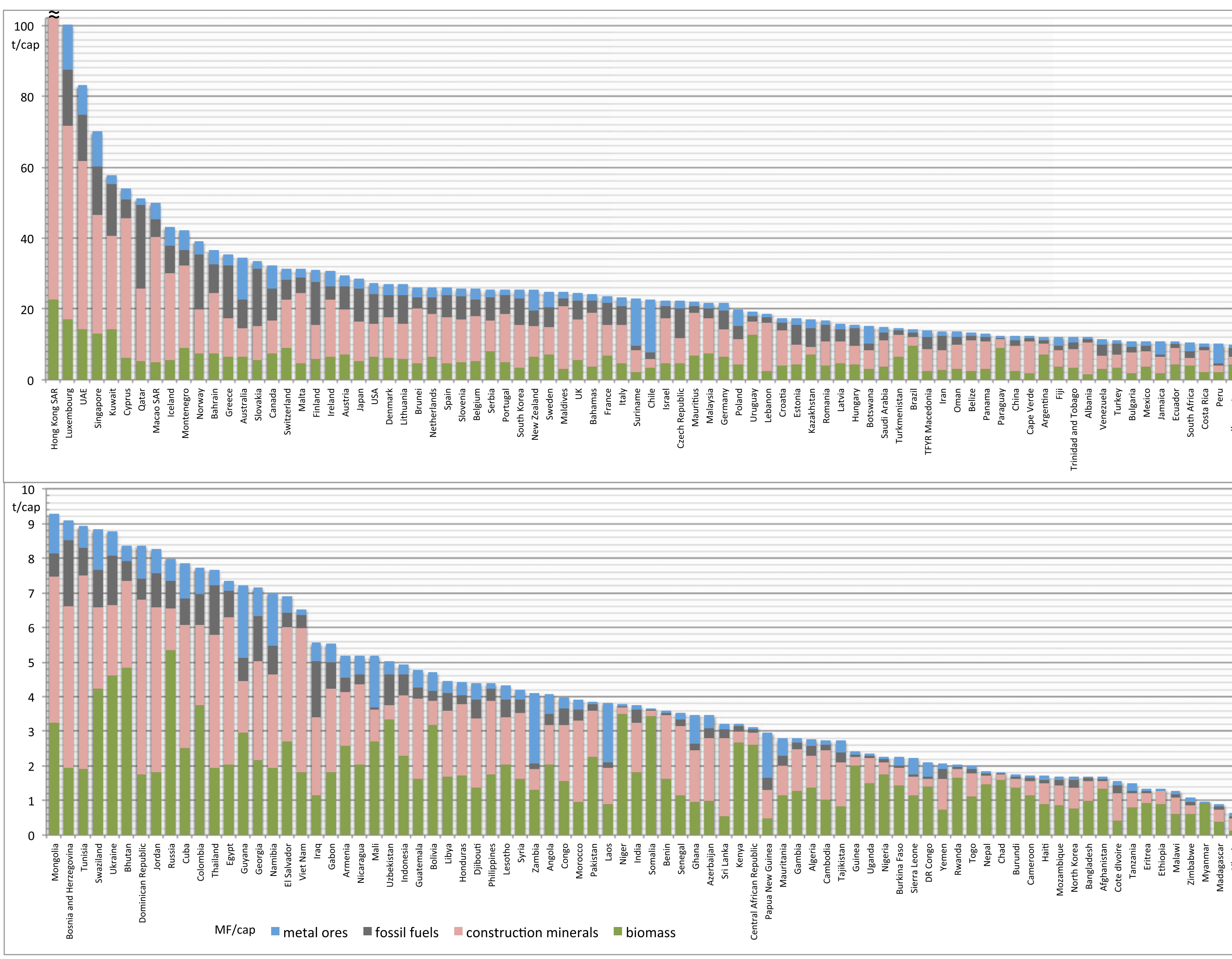

Fig. S2. MF/cap of all nations with a population larger than 300,000 for the year 2008 (note different scales for the two halves of the graph).

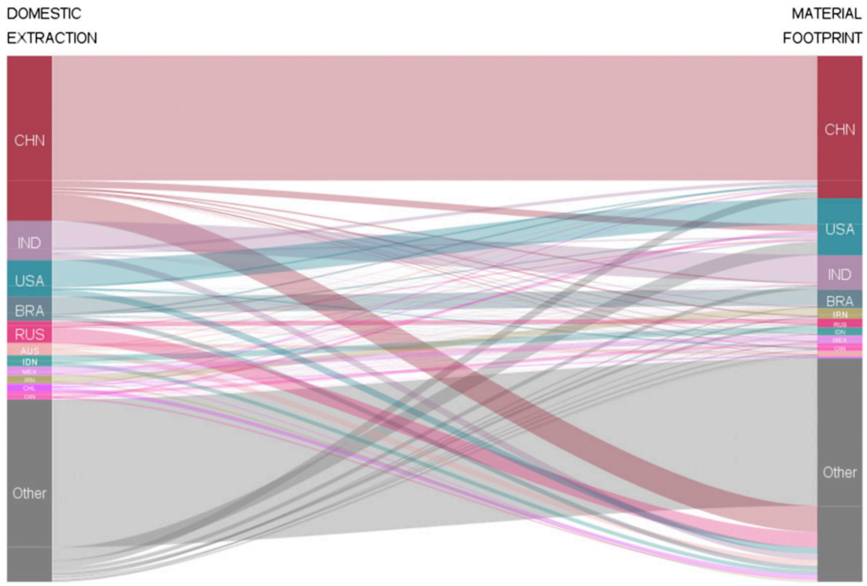

Fig. S3. Visualization of DE (*Left*), the MF (*Right*), and RMEs of domestic and international trade flows in 2008 (total of all material categories). (See also www.truthstudio.com/code/code_2012_csiro.html.)

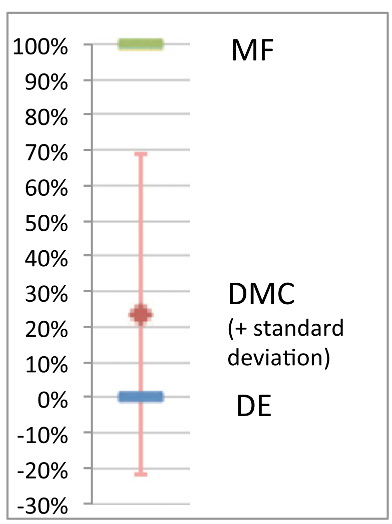

Fig. S4. Average relative distance of DMC from DE and the MF. The distance between DE and the MF has been normalized to 100% (114 countries for the year 2008; full plot is shown in Fig. S5).

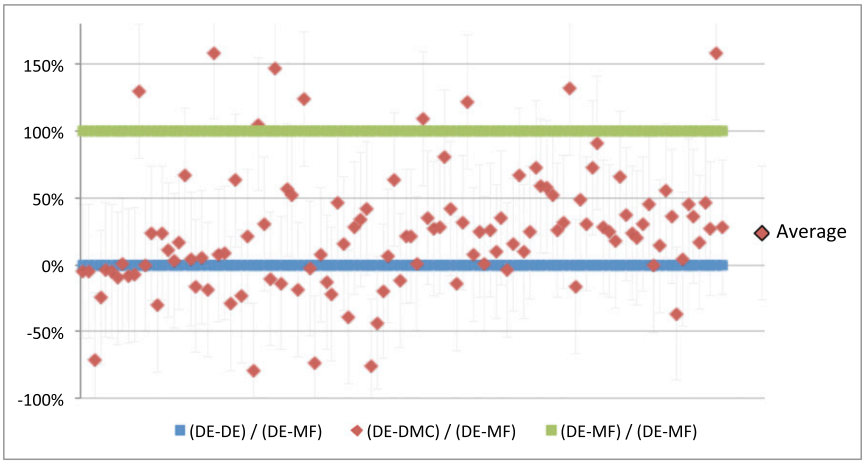

Fig. S5. Relative distance of DMC from DE and the MF for 114 countries for the year 2008. The distance between DE and the MF has been normalized to 100%.

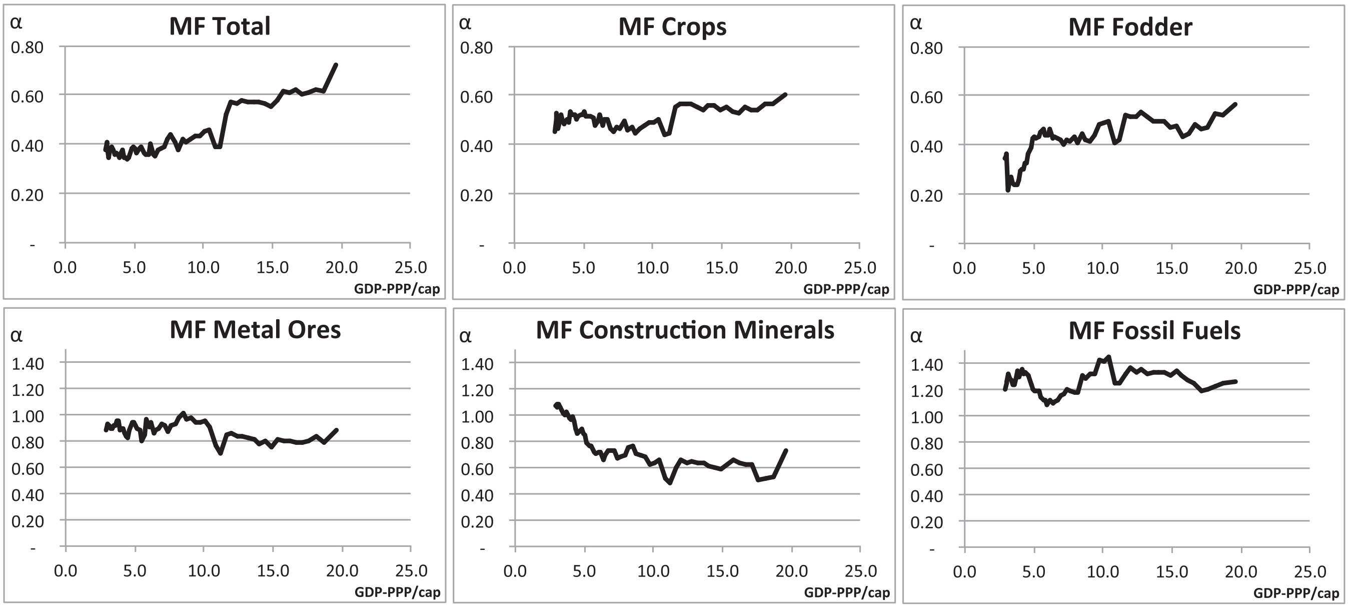

Fig. S6. Regression coefficients (elasticities α) for the dependence of MF categories on the changing wealth of nations (moving 70-country average of GDP-PPP-2005/cap).

Table S1. Material categories of the CSIRO Global Material Flow Database

Main category	EW-MFA category and name: One-digit	Two-digit	Three-digit
Biomass	A.1: Biomass	A.1.1: Crops (excluding fodder crops)	A.1.1.1: Cereals
			A.1.1.2: Roots and tubers
			A.1.1.3: Sugar crops
			A.1.1.4: Pulses
			A.1.1.5: Nuts
			A.1.1.6: Oil-bearing crops
			A.1.1.7: Vegetables
			A.1.1.8: Fruits
			A.1.1.9: Fibers
			A.1.1.10: Other crops
		A.1.2: Crop residues (used), fodder crops, and grazed biomass	A.1.2.1: Crop residues (used)
			A.1.2.2: Grazed biomass
		A.1.3: Wood	A.1.3.1: Timber (industrial round wood)
			A.1.3.2: Wood fuel and other extraction
		A.1.4: Wild fish catch, aquatic plants/animals, and hunting and gathering*	
Metal ores and industrial minerals	A.2: Metal ores (gross ores)	A.2.1: Iron	A.2.1.1: Iron ores
		A.2.2: Nonferrous metals	A.2.2.1: Copper ores (gross ore)
			A.2.2.2: Nickel ores (gross ore)
			A.2.2.3: Lead ores (gross ore)
			A.2.2.4: Zinc ores (gross ore)
			A.2.2.5: Tin ores (gross ore)
			A.2.2.6: Gold, silver, platinum, and other precious metal ores (gross ore)
			A.2.2.7: Bauxite and other aluminum ores (gross ore)
			A.2.2.8: Uranium and thorium ores (gross ore)
			A.2.2.9: Other metal ores (gross ore)
Construction materials	A.3: Nonmetallic minerals	A.3.1: Nonmetallic minerals	A.3.1.1: Ornamental or building stone (including A.3.1.3 slate)
			A.3.1.2: Chalk and dolomite
			A.3.1.4: Chemical and fertilizer minerals
			A.3.1.5: Salt
			A.3.1.6: Other mining and quarrying products not elsewhere classified
		A.3.2: Nonmetallic minerals, primarily construction	
Fossil fuels	A.4: Fossil energy materials/carriers	A.4.1: Coal and other solid energy materials/carriers	A.4.1.1: Brown coal (lignite)
			A.4.1.2: Hard coal
			A.4.1.3: Oil shale and tar sands*
			A.4.1.4: Peat
		A.4.2: Liquid and gaseous energy materials/carriers	A.4.2.1: Crude oil, condensate and natural gas liquids
			A.4.2.2: Natural gas

The MF analysis was carried out at the three-digit level of the economy-wide material flow accounting classification (EW-MFA) (7).
*Not used in the CSIRO database.

Table S2. Cross-study comparison of MF results for individual countries and world regions (total MF = RMC)

Source	Muñoz et al., 2009 (35)	Weinzettel and Kovanda, 2009 (36) and 2011 (37)	Bruckner et al., 2012 (38)	Wiebe et al., 2012 (39)	Schoer et al., 2012 (13)*	Tukker et al., 2013 (43)	Wiedmann et al. (this study)
Method used	Hybrid SRIO†	Hybrid SRIO†	Global MRIO	Global MRIO	Hybrid SRIO†	Global MRIO	Global MRIO
Country, year							
Argentina, 1995				689			438
Argentina, 2000				766			508
Argentina, 2005			637	637			437
Brazil, 1995				2,263			1,748
Brazil, 2000				2,378			1,914
Brazil, 2003	2,787						1,904
Brazil, 2005			2,575	2,575			2,048
Chile, 1996	95						299
Chile, 2003	140						335
Chile, 2005			394				363
China, 1995				4,234			7,014
China, 2000				4,822			9,217
China, 2005			6,660	6,660			12,759
Colombia, 2003	327						269
Czech Republic, 2000		196					290
Czech Republic, 2003		228					269
Czech Republic, 2007		213					333
Ecuador, 2003	91						107
France, 2005			1,272				1,424
Germany, 2005			1,731				1,726
India, 1995				2,298			2,905
India, 2000				2,616			3,023
India, 2005			2,951	2,951			3,657
Italy, 2005			949				1,351
Japan, 2005			2,577				3,811
Mexico, 2003	1,157						1,062
The Netherlands, 2005			528				399
Russia, 1995				1,557			765
Russia, 2000				1,068			666
Russia, 2005			1,546	1,546			892
South Africa, 1995				557			549
South Africa, 2000				566			504
South Africa, 2005				656			538
Switzerland, 2005			216				243
United Kingdom, 2005			1,166				1,486
United States, 2003	8,942						7,966
United States, 2005			12,445				8,655
Region, year							
EU27, 20050						10,095	9,113
EU27, 2005					8,435		11,075
OECD, 1995				25,173			21,524
OECD, 2000				27,966			24,537
OECD, 2005				30,327			27,637

All values are cited in million metric tons (Mt). MRIO, multiregion input–output (analysis); OECD, Organization for Economic Cooperation and Development; SRIO, single-region input–output (analysis).
*Noninternalized fixed capital formation (fixed capital formation treated as final use category).
†The word "hybrid" refers to the use of life cycle inventory data to adapt input–output tables and environmental extensions.

Other Supporting Information Files

Dataset S1 (XLSX)