

Consumption and Environment

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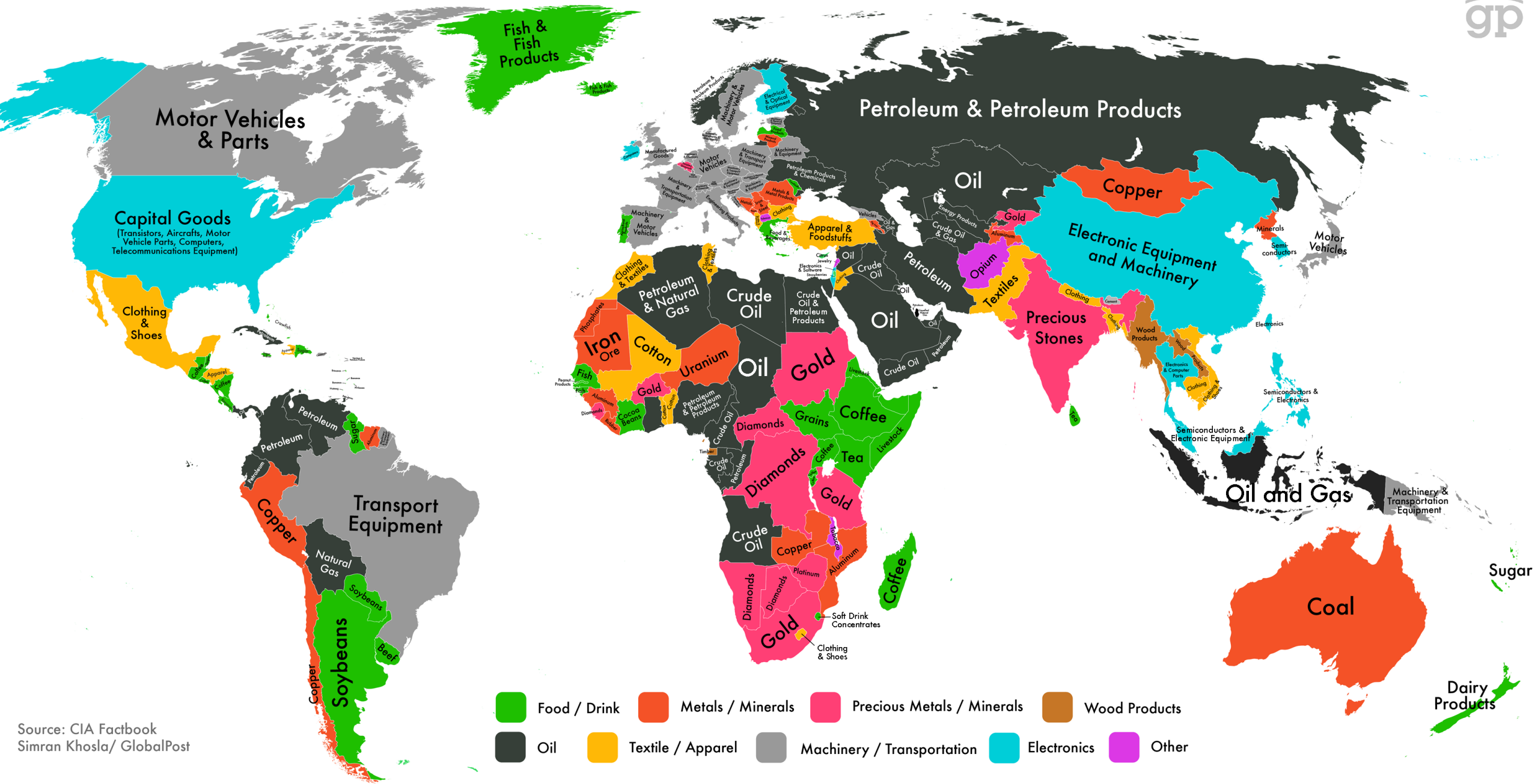
Outline

- Consumption, trade and global supply chains
- Consumption, economic growth, environment and human well-being
- Environmental footprints of consumption, incl. food
- Role of businesses

Introductions

Warm up questions:

- What is consumption?
- What we consume?



Source: CIA Factbook
Simran Khosla/ GlobalPost

Consumption

- Consumption ranks with population and technology as a major driver of environmental change and yet researchers and policymakers have paid it scant attention (Princen 1999)
- Consumption is defined as the use of goods and services by a household. It is a component in the calculation of the Gross Domestic Product (GDP). Macroeconomists typically use consumption as a proxy of the overall economy.
- Since 90s, there has been big progress in addressing consumption as one of the key drivers of global environmental change (SDG 12)
- Sustainable consumption, Responsible consumption
- Overconsumption, Consumerism

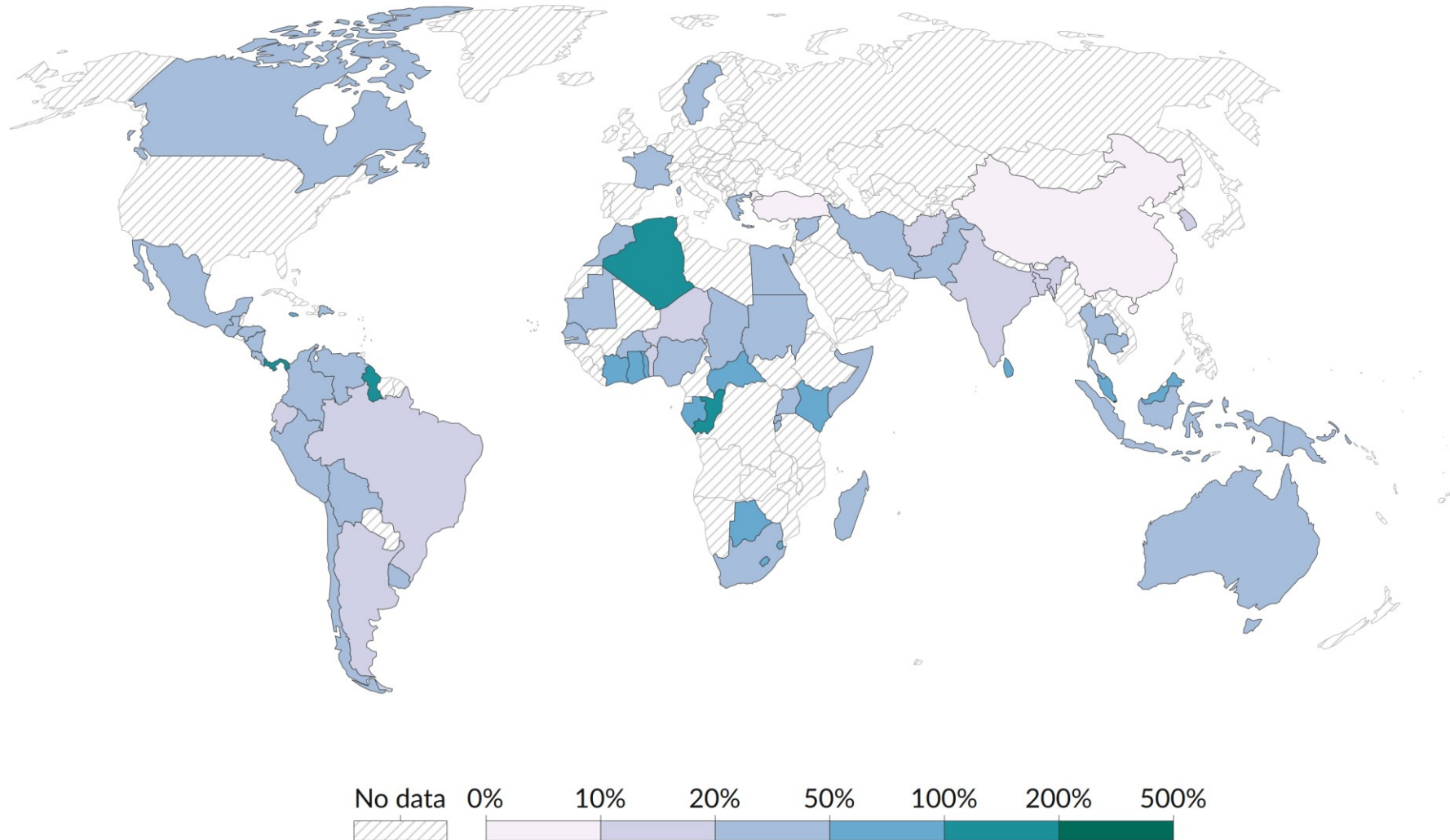
International trade

- The traditional view of international trade is that each country produces goods and offers services that are exported as final products to consumers abroad. However, in today's global economy, this type of trade only represents around 30% of all trade in goods and services.
- In reality, about 70% of international trade today involves global value chains (GVCs), as services, raw materials, parts, and components cross borders – often numerous times. Once incorporated into final products they are shipped to consumers all over the world.

(OECD)

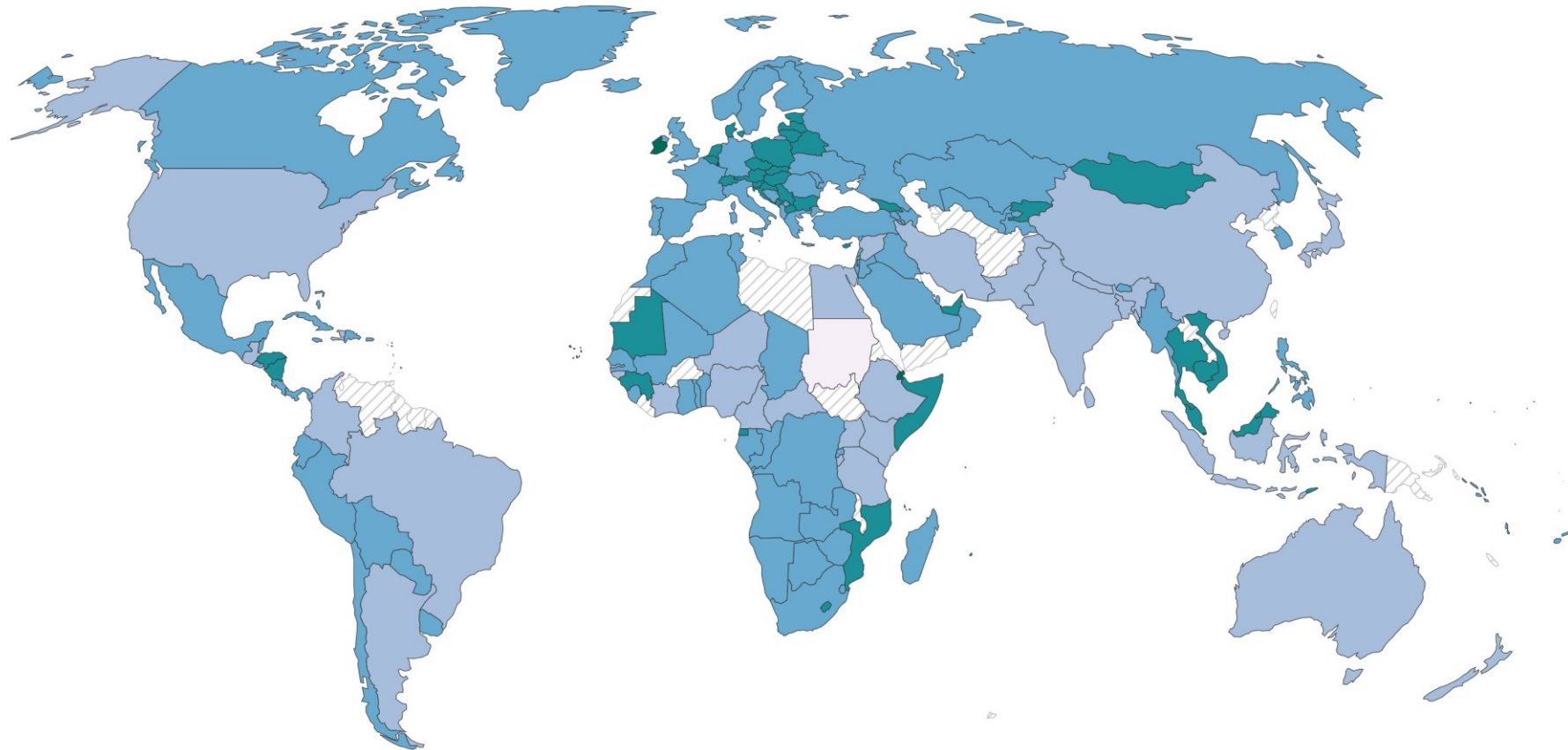
Trade as a share of GDP, 1960

Sum of exports and imports of goods and services, divided by gross domestic product, expressed as a percentage. This is also known as the "trade openness index".



Trade as a share of GDP, 2021

Sum of exports and imports of goods and services, divided by gross domestic product, expressed as a percentage. This is also known as the "trade openness index".



Global supply chains

- A supply chain is made up of all the stages involved in the production and sale of a specific product.
- The term “*global supply chains*” refers to the cross-border organization of the activities required to produce goods or services and bring them to consumers through inputs and various phases of development, production and delivery.

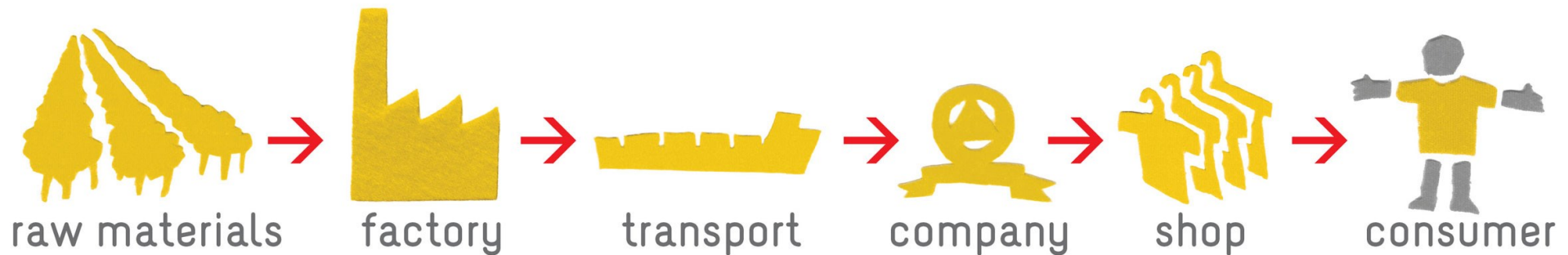
It is very tempting to seek out one single approach to **fix** the problems facing garment and textile workers worldwide.

Just get **the company** to tell **its factory** to shape up,

is a common response from consumers and businesses alike.

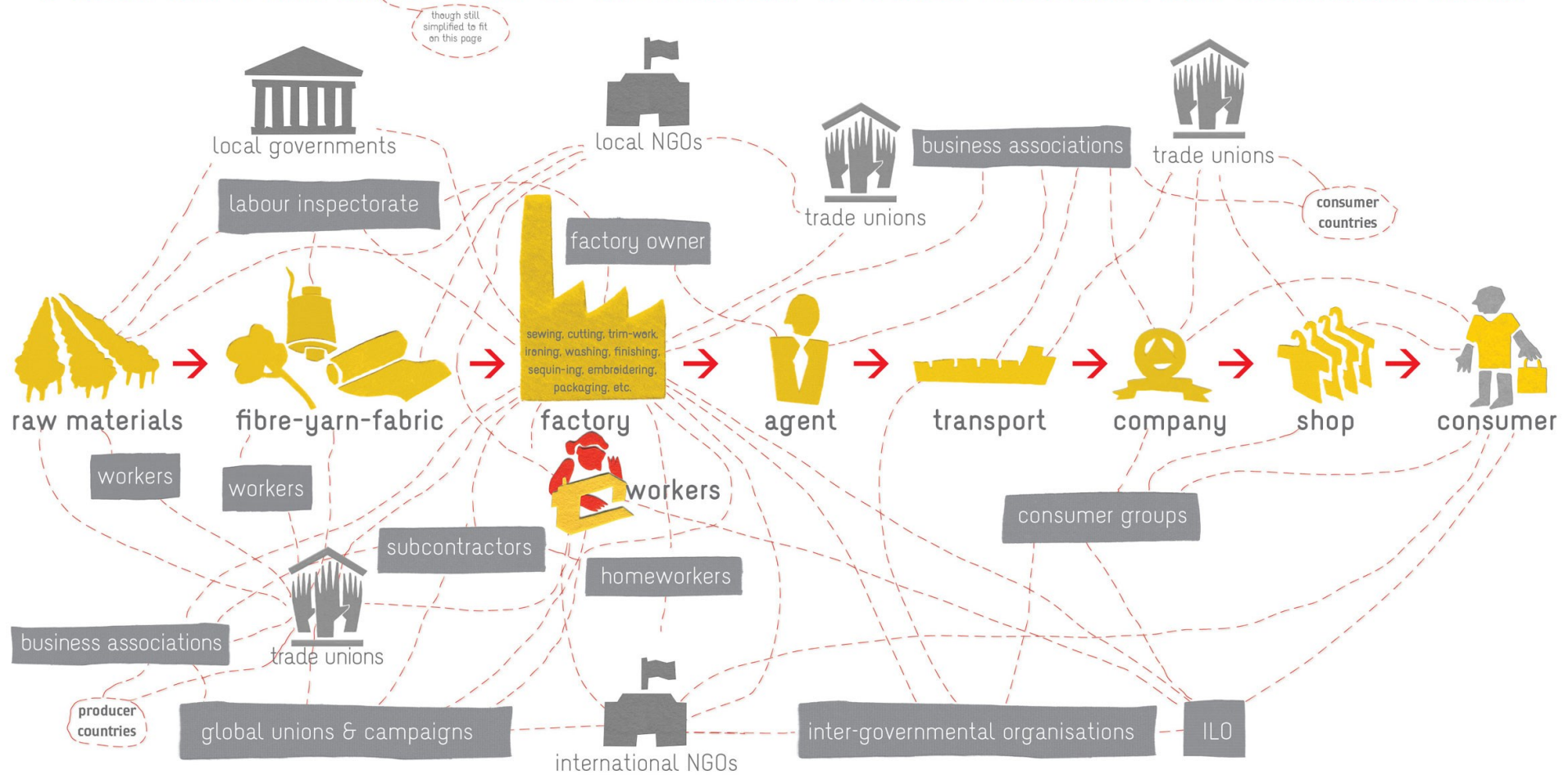
Fair enough.

In **garment supply chains of the past**, that might work. The company would likely own the factory or be one of a handful of its customers; and the terms of the business relationship would be clear and direct.



But today it's **quite different...**

A MORE REPRESENTATIVE VIEW OF THE CONTEXT IN WHICH FACTORIES AND COMPANIES WORK



Today's global garment and textile industry spans six continents. The particularities of a country's labour law and its industrial relations greatly impact workplace conditions, wages received, and workers' ability to exercise their freedom of association.

• outside variables

Many workers are engaged in producing a single t-shirt or pair of trousers. Increasingly, these workers are found in different factories (some are subcontractors), each with different management and workplace conditions.

• companies struggle to monitor every workplace where each product is made (remember: nowadays companies produce dozens or hundreds of styles each season)

It is common for large garment and textile companies to source from dozens - even hundreds - of factories. In this context, it is difficult to build long-term, trusting relationships between factories and companies.

• disincentives for investment in factory improvements

And, most factories receive orders from many companies, often with different expectations and requirements with regard to CSR.

• without collaboration, it is not likely that any single company possesses the leverage to effect real changes in the workplace.

It certainly is **complex**. But it is **not unsolvable**.

Trade and environment

- The expansion of global trade and the increasing integration of global value chains raise questions about how trade and the environment interact with each other. What are the effects of trade on the environment? And inversely, how can a changing natural environment (e.g. climate change impact) modify trade patterns?
- Economic growth resulting from trade expansion can have an obvious direct impact on the environment by increasing pollution or degrading natural resources.
- However, increased trade can in turn, by supporting economic growth, development, and social welfare, contribute to a greater capacity to manage the environment more effectively.

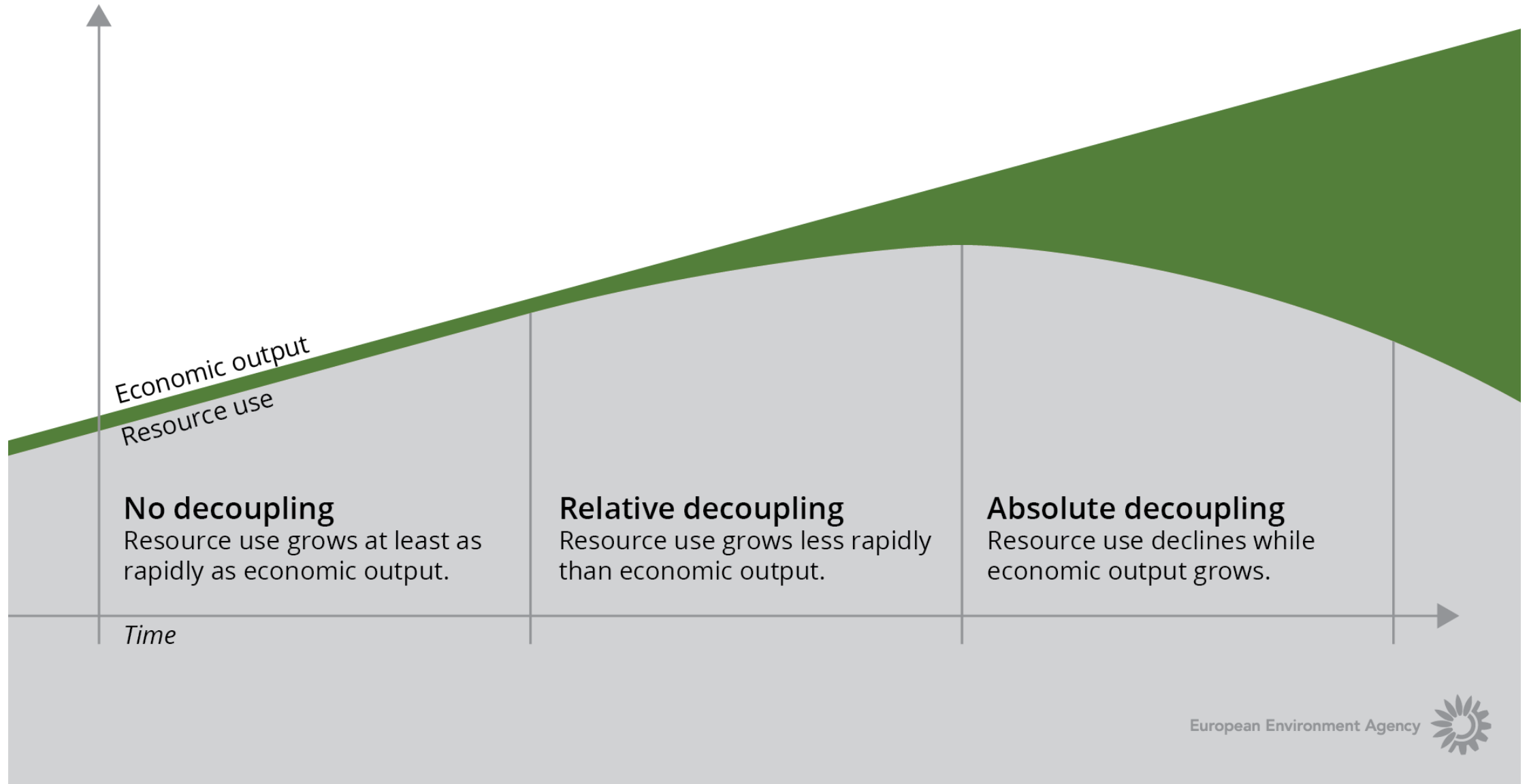
Economic growth, green growth and degrowth

Ecological modernisation paradigm:

- Economic growth is believed to support environmental protection, produce innovations and „green“ jobs, investments required to spur technology change positive to environment
- **Decoupling** refers to an economy that would be able to grow without corresponding increases in environmental pressure (GDP compared to environmental indices)
- **Cost of growth**: calculating economic cost and „externalities“ (Dasgupta review, Stern review,...)

Alternative models

- **Inclusive sustainable wellbeing** – good quality of life (Millennium Assessment, IPBES)
- Alternative measures of sustainable well-being („Beyond GDP“, „Genuine Progress Indicator,...“), rooted in ecological and feminist economics
- **Doughnut economics** – planetary and social boundaries
- **Life satisfaction** – subjective well-being („Happy Planet Index“)
- **Degrowth**



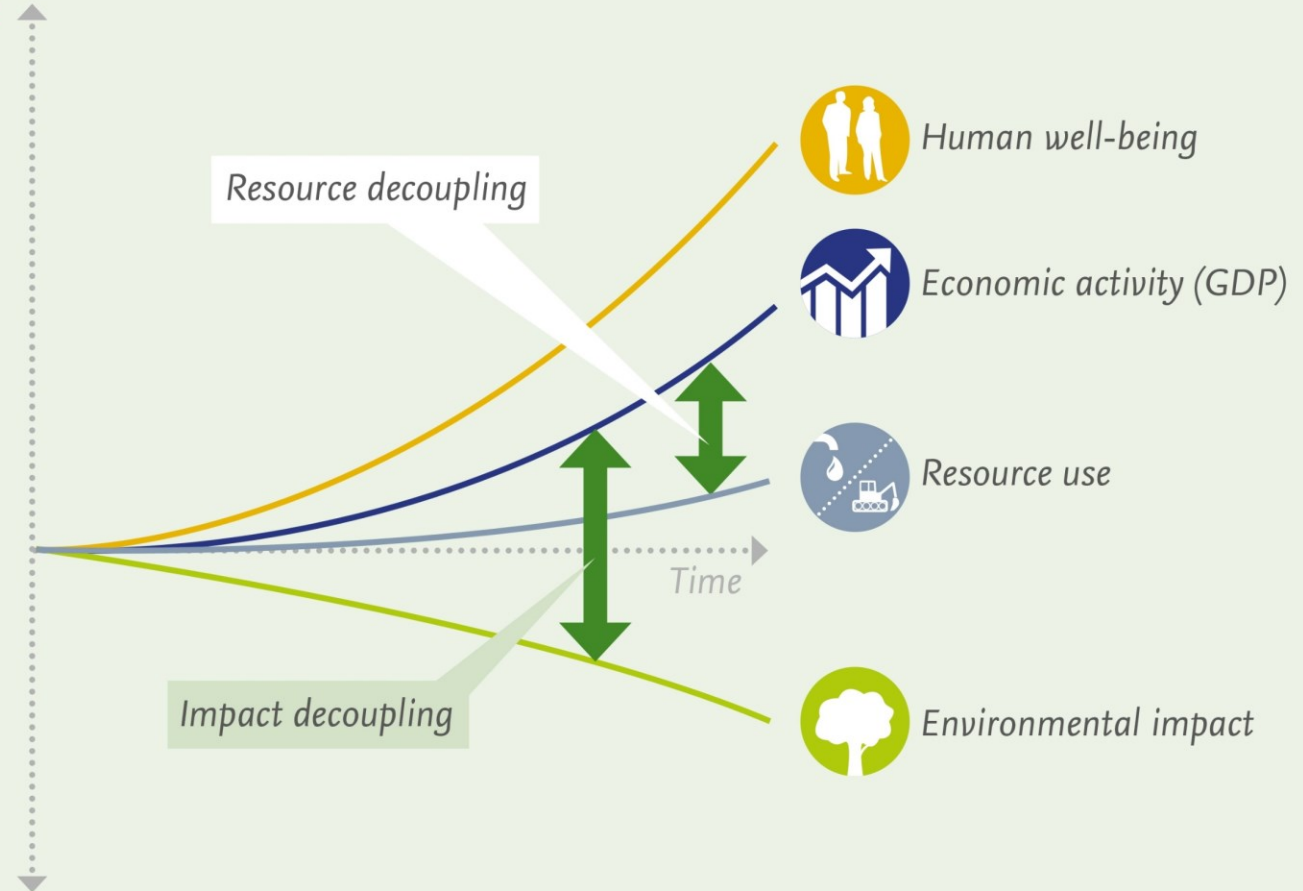
How can we protect the environment, reduce poverty and maintain economic growth?

By **Decoupling**: breaking the link between resource use and economic growth



Using less land, water, energy and materials to maintain economic growth is: **Resource decoupling**

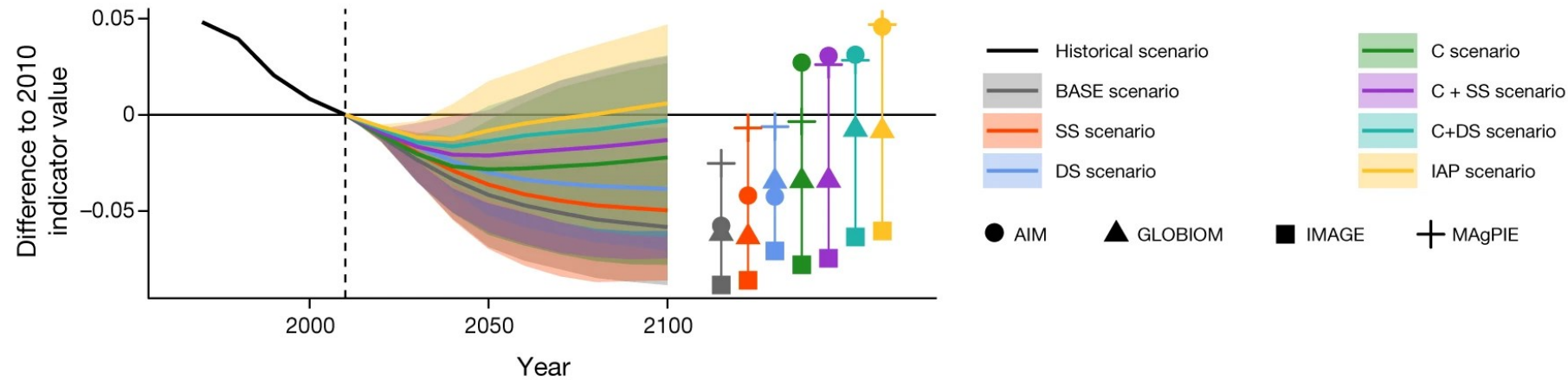
Using resources wisely over their lifetime to reduce environmental impact is: **Impact decoupling**



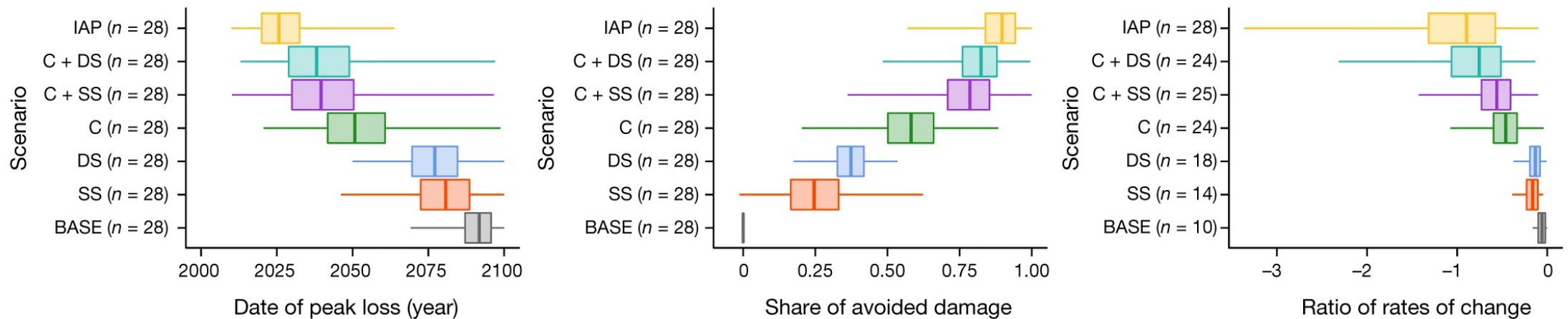
Bending the curve of global biodiversity loss

Leclère, D., Obersteiner, M., Barrett, M. et al. *Bending the curve of terrestrial biodiversity needs an integrated strategy. Nature* 585, 551–556 (2020).

a

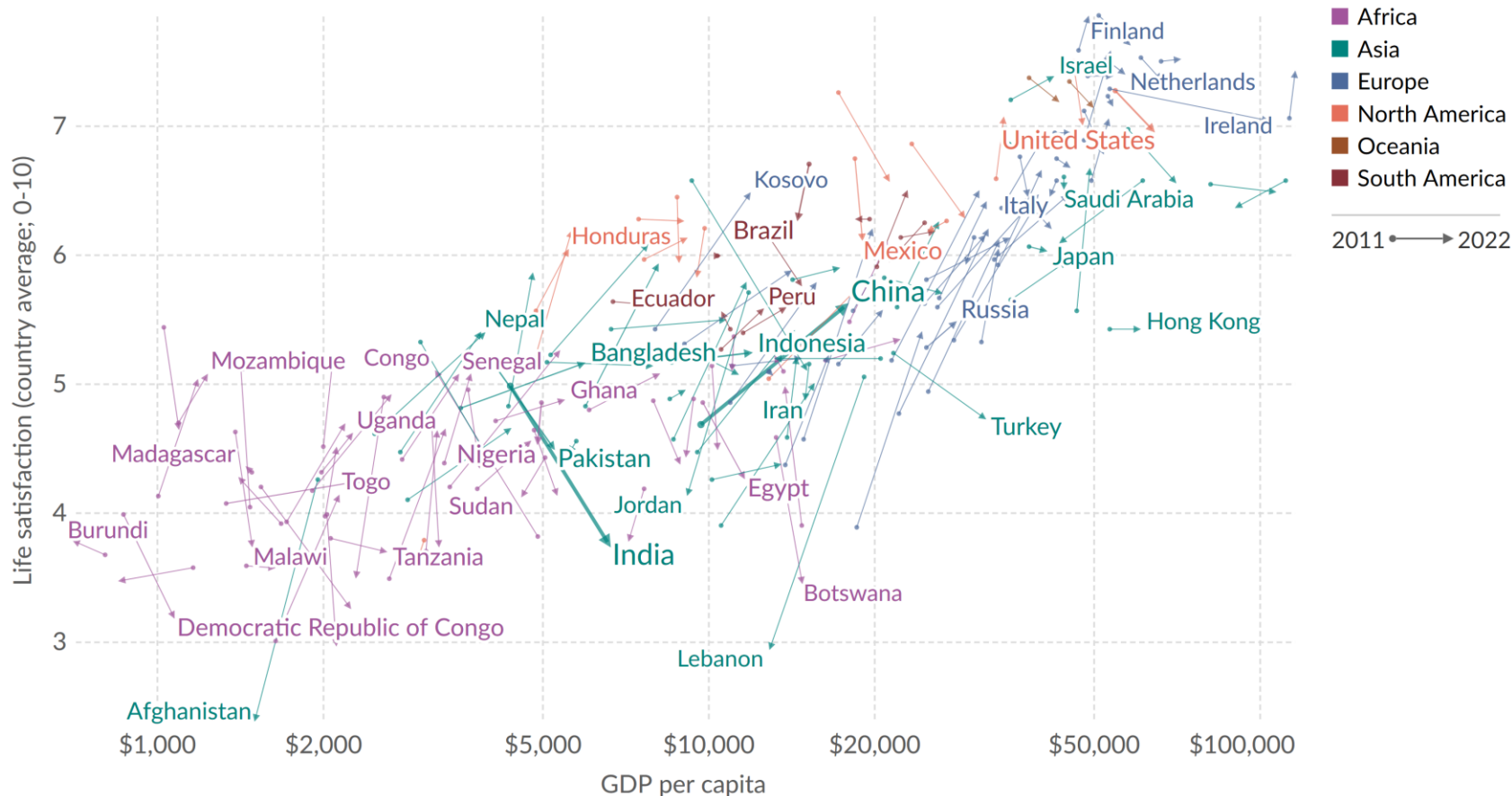


b



Self-reported life satisfaction vs. GDP per capita, 2011 to 2022

Self-reported life satisfaction is measured on a scale ranging from 0-10, where 10 is the highest possible life satisfaction. GDP per capita is adjusted for inflation and differences in the cost of living between countries.

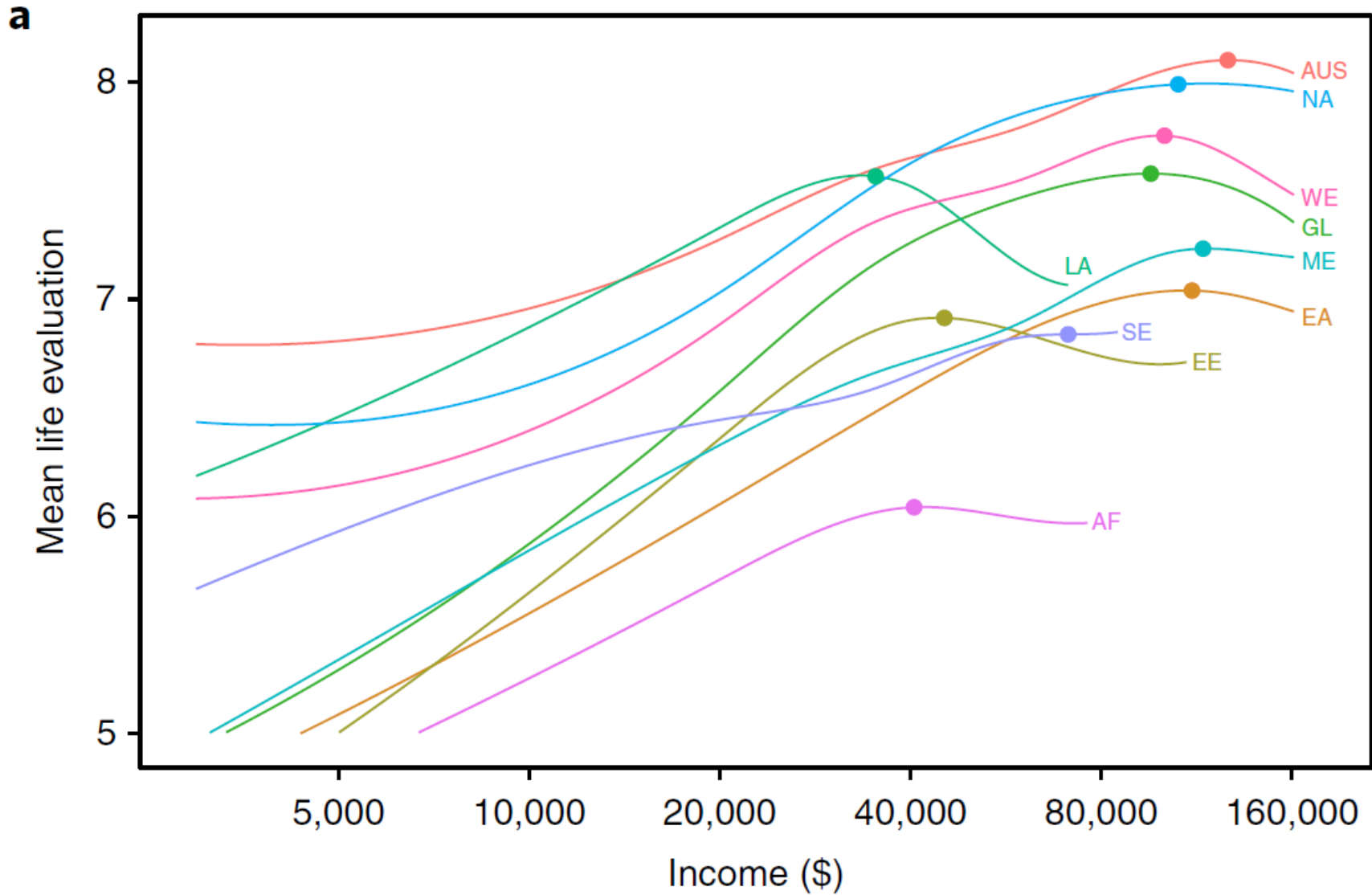


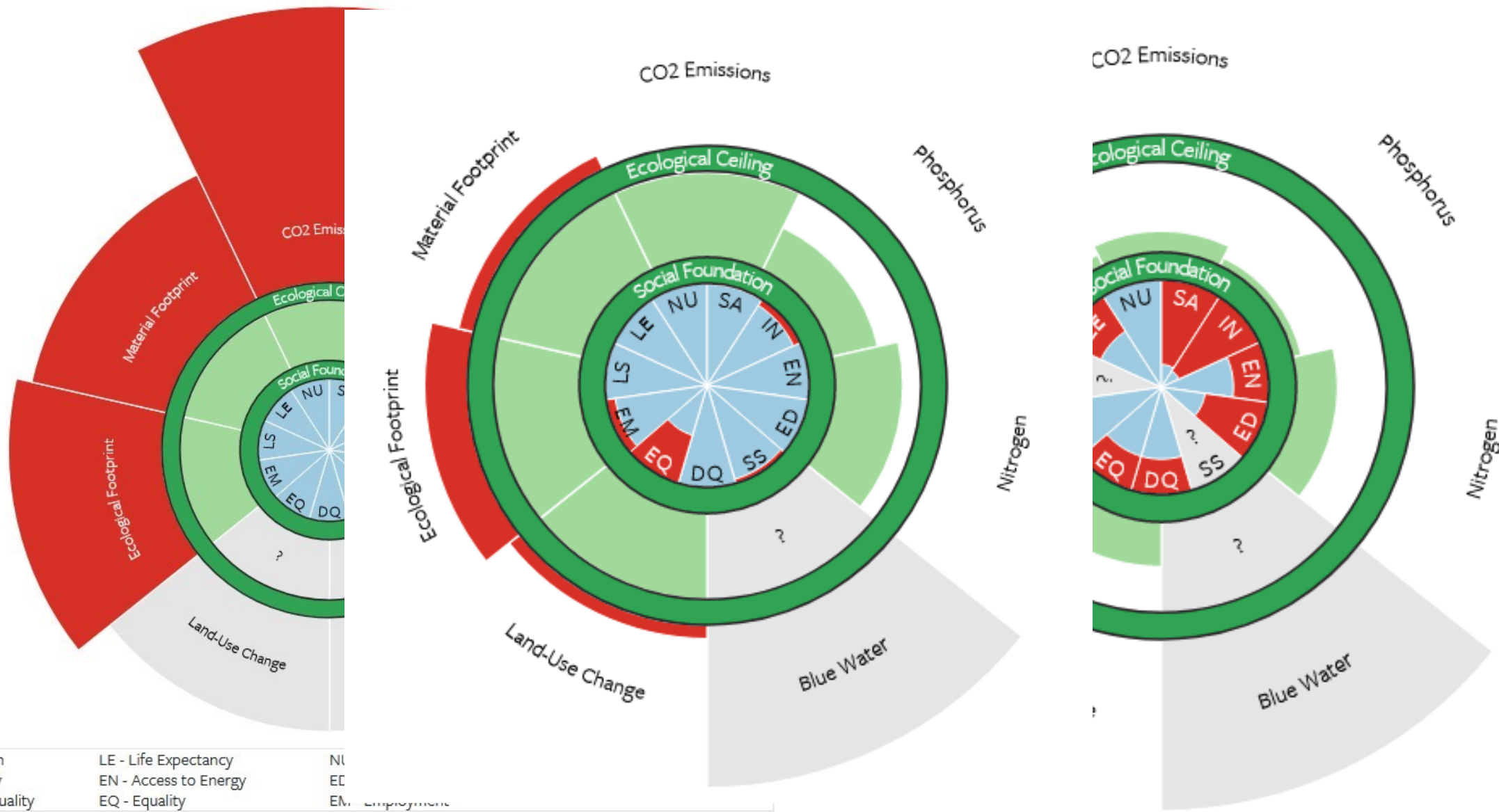
Data source: World Happiness Report (2023); World Bank (2023)

OurWorldInData.org/happiness-and-life-satisfaction | CC BY

Note: GDP per capita is expressed in international-\$¹ at 2017 prices.

1. **International dollars:** International dollars are a hypothetical currency that is used to make meaningful comparisons of monetary indicators of living standards. Figures expressed in international dollars are adjusted for inflation within countries over time, and for differences in the cost of living between countries. The goal of such adjustments is to provide a unit whose purchasing power is held fixed over time and across countries, such that one international dollar can buy the same quantity and quality of goods and services no matter where or when it is spent. Read more in our article: [What are Purchasing Power Parity adjustments and why do we need them?](#)





Daniel O'Neill et al., *A good life for all within planetary boundaries*. *Nature Sustainability* 1, 2018, pp. 88–95

Andrew L. Fanning et al., *The social shortfall and ecological overshoot of nations*. *Nature Sustainability* 5, 2022, pp. 26-36

How to measure impact of consumption: environmental footprints

The effect that a person, company, activity, etc. has on the environment, for example the amount of natural resources that they use and the amount of harmful gases that they produce

- Environmental footprints are quantitative measures showing the appropriation of natural resources by humans (Hoekstra, 2008). Footprints are divided into environmental, economic, and social footprints, and combined environmental, social, and/or economic footprints.
- Product environmental footprint, a multi-criteria measure of the environmental performance of a product or service throughout its life cycle.

Environmental footprints of households

Environmental impact of household consumption in terms of the material, water, and land-use requirements, as well as greenhouse gas (GHG) emissions, associated with the production and use of products and services consumed by these households.

Consumption contributing to more than 60% of global GHG emissions and between 50% and 80% of total land, material, and water use.

Mobility, shelter, and food are the most important consumption categories across the environmental footprints. Globally, food accounts for 48% and 70% of household impacts on land and water resources, respectively, with consumption of meat, dairy, and processed food rising fast with income.

Diana Ivanova, Konstantin Stadler, Kjartan Steen-Olsen, Richard Wood, et al. 2015. Environmental Impact Assessment of Household Consumption. Journal of Industrial Ecology. DOI: 10.1111/jiec.12371

Countries	Carbon Footprint(tCO ₂ -eq)	Land Footprint (1000 m ²)	Material Footprint (t)	Water Footprint (m ³)	
World average	3.4	10.0	4.9	209	
Austria	11.3	18.1	17.4	298	
Belgium	12.2	28.1	17.8	492	
Bulgaria	5.4	6.9	8.1	182	
Cyprus	10.9	9.2	12.4	278	
Czech Republic	9.4	9.2	11.8	174	
Germany	11.9	20.0	16.0	347	
Denmark	12.2	20.9	16.8	453	
Estonia	10.9	20.9	15.6	258	
Spain	8.1	21.0	14.2	561	
Finland	13.6	27.4	17.9	304	
France	8.8	22.3	14.2	396	
Greece	13.4	26.9	18.3	700	
Hungary	5.9	8.2	7.3	194	
Ireland	12.9	22.1	17.1	297	
Italy	9.6	19.1	13.6	407	
Lithuania	6.5	12.5	9.1	180	
Luxembourg	18.5	44.4	27.6	816	
Latvia	6.2	22.9	10.8	181	
Malta	9.2	14.9	14.8	628	
Netherlands	11.8	35.5	17.2	575	
Poland	7.8	9.2	10.3	130	
Portugal	6.8	18.0	11.5	509	
Romania	4.6	9.4	12.2	325	
Sweden	8.7	18.8	15.7	322	
Slovenia	10.1	20.2	13.4	262	
Slovakia	8.3	14.5	11.9	287	
United Kingdom	13.3	21.9	17.9	456	
United States	18.6	23.0	18.4	651	
Japan	9.0	11.2	9.2	290	
China	1.8	5.4	3.1	130	
Canada	14.6	40.6	18.1	510	
South Korea	8.7	13.8	10.4	340	
Brazil	1.8	22.0	8.2	159	
India	0.8	2.1	2.0	261	
Mexico	3.8	16.6	5.9	277	
Russia	7.6	69.6	9.3	331	
Australia	17.7	160.8	26.3	660	
Switzerland	11.3	26.5	15.7	396	
Turkey	4.7	13.0	7.7	388	
Taiwan	8.6	9.2	7.7	308	
Norway	10.3	37.2	18.6	474	
Indonesia	1.3	2.6	2.7	81.5	

Material footprints

How many and which natural resources are needed to sustain modern economies?

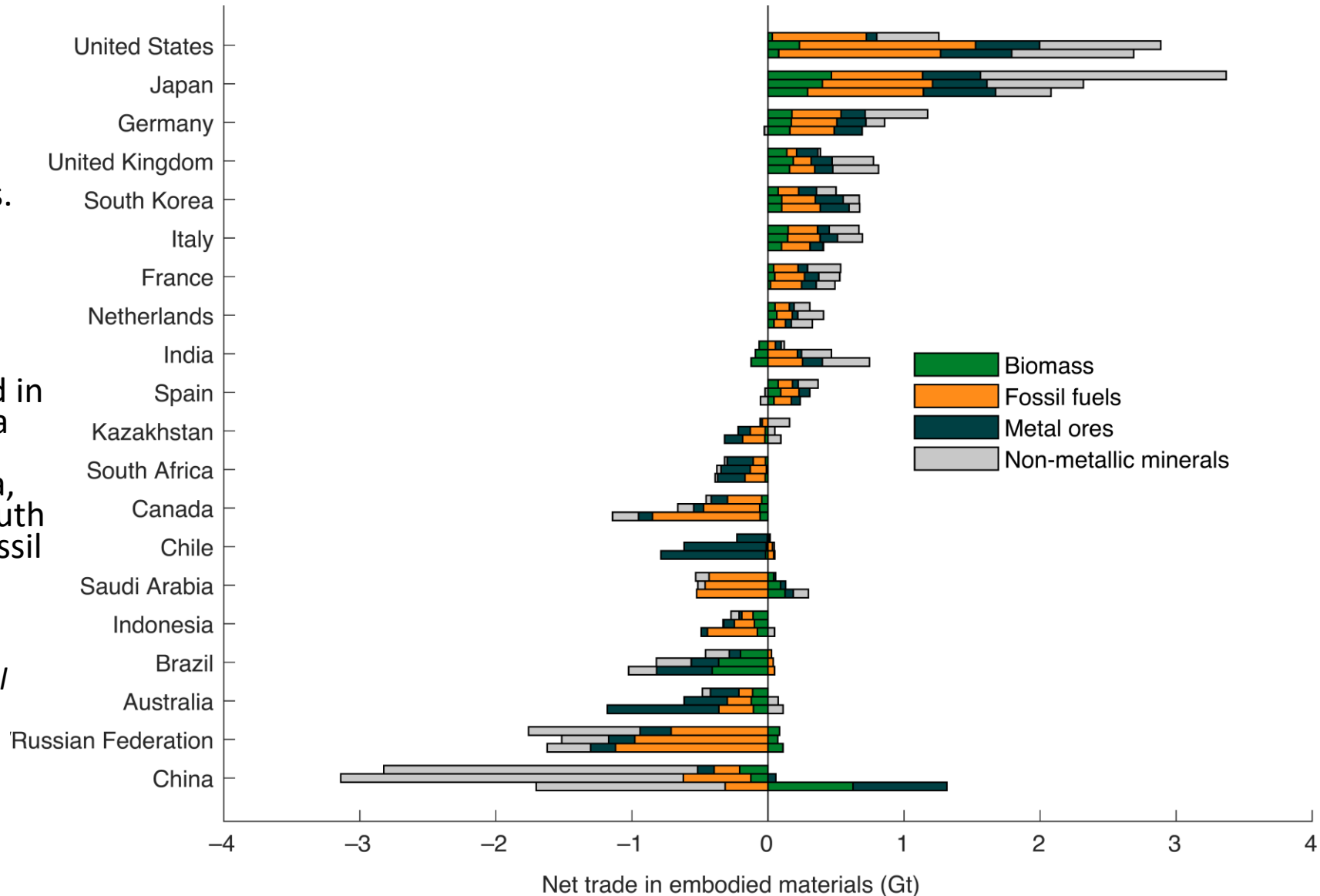
High-income countries (United States, Japan, the European Union) are net importers of a relatively evenly distributed mix across the main four material types because they import mainly composite manufactured goods.

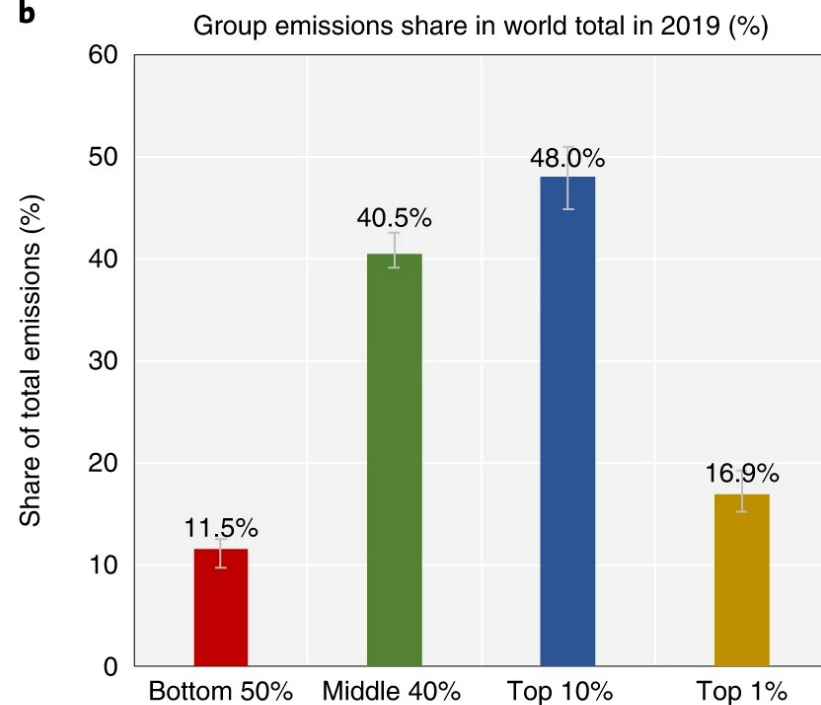
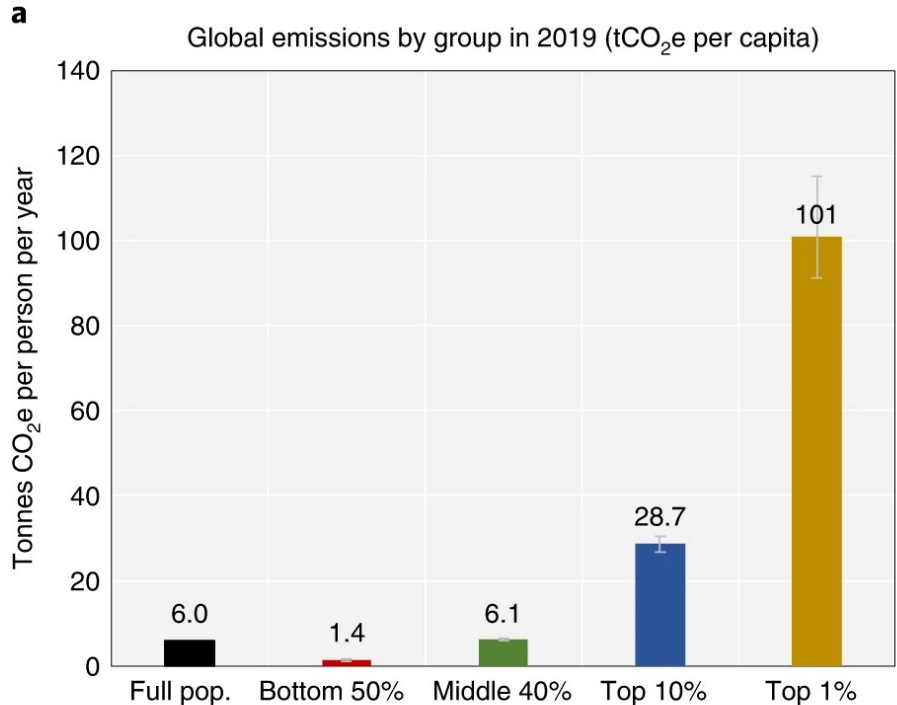
By contrast, net exporters are often developing or emerging economies specializing in primary materials extraction.

Brazil features large biomass embodied in its soybean and meat exports. Australia and Chile are significant exporters of metal ores and their derivatives. Russia, Kazakhstan, Saudi Arabia, Australia, South Africa and Indonesia export primary fossil fuels.

Lenzen, M., et al. Implementing the material footprint to measure progress towards Sustainable Development Goals 8 and 12.

Nat Sustain 5, 157–166 (2022).





Inequalities in carbon/GHG footprints

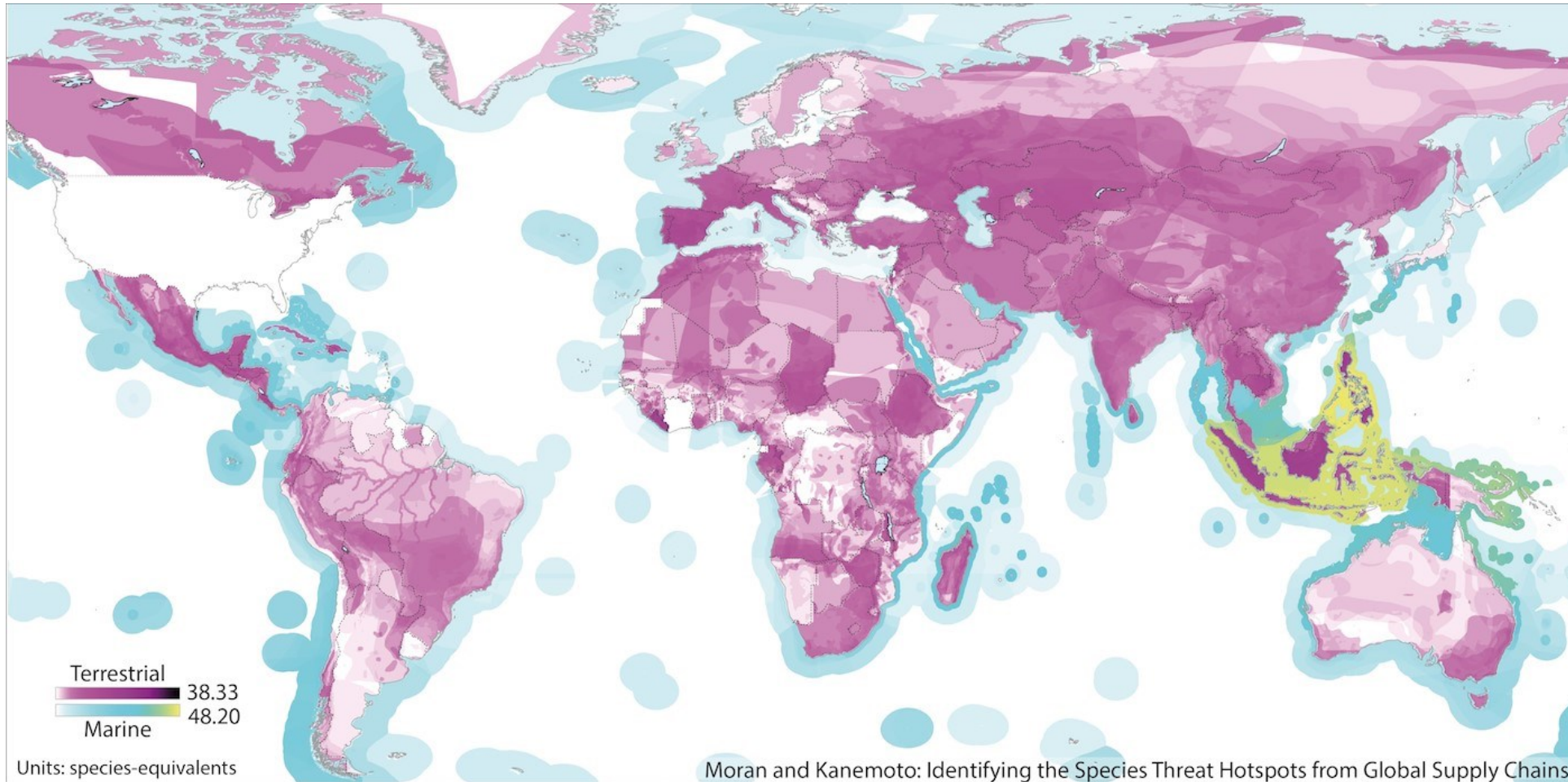
c Global emissions inequality in 2019: summary table

	Number of individuals (million)	Average (tonnes CO ₂ per capita)	Threshold (tonnes CO ₂ per capita)	Share (% total)
Full population	7,710	6	<0.1	100%
Bottom 50%	3,855	1.4	<0.1	11.5%
incl. bottom 20%	1,542	0.7	<0.1	2.3%
incl. next 30%	2,315	1.8	1.1	9.2%
Middle 40%	3,084	6	2.8	40.5%
Top 10%	771	29	13	48%
incl. top 1%	77.1	101	47	16.9%
incl. top 0.1%	7.71	425	125	7.1%
incl. top 0.01%	0.771	2,332	566	3.9%

The global bottom 50% emit on average 1.4 tCO₂e per year and contribute to 11.5% of the total. The top 10% emit 28.7 t (48% of the total).

Chancel, L. Global carbon inequality over 1990–2019. Nat Sustain 5, 931–938 (2022).

Biodiversity footprints

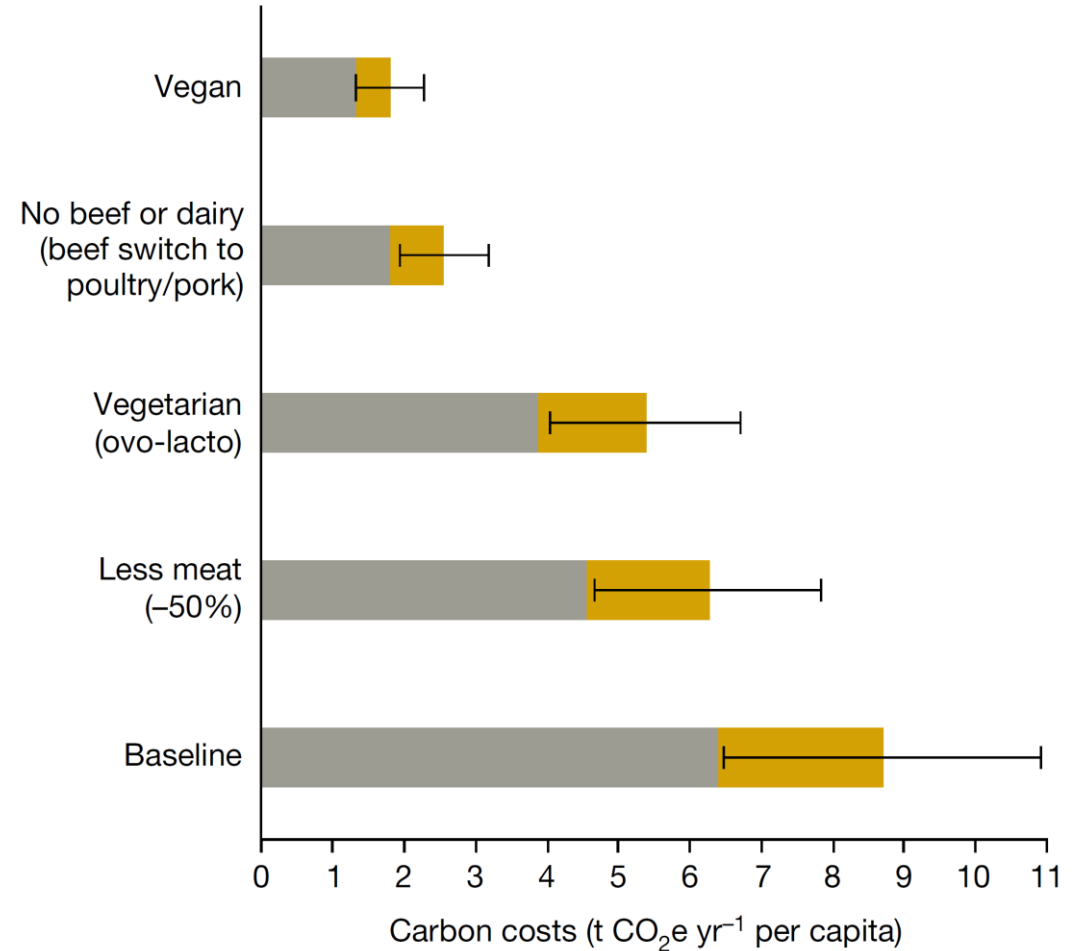
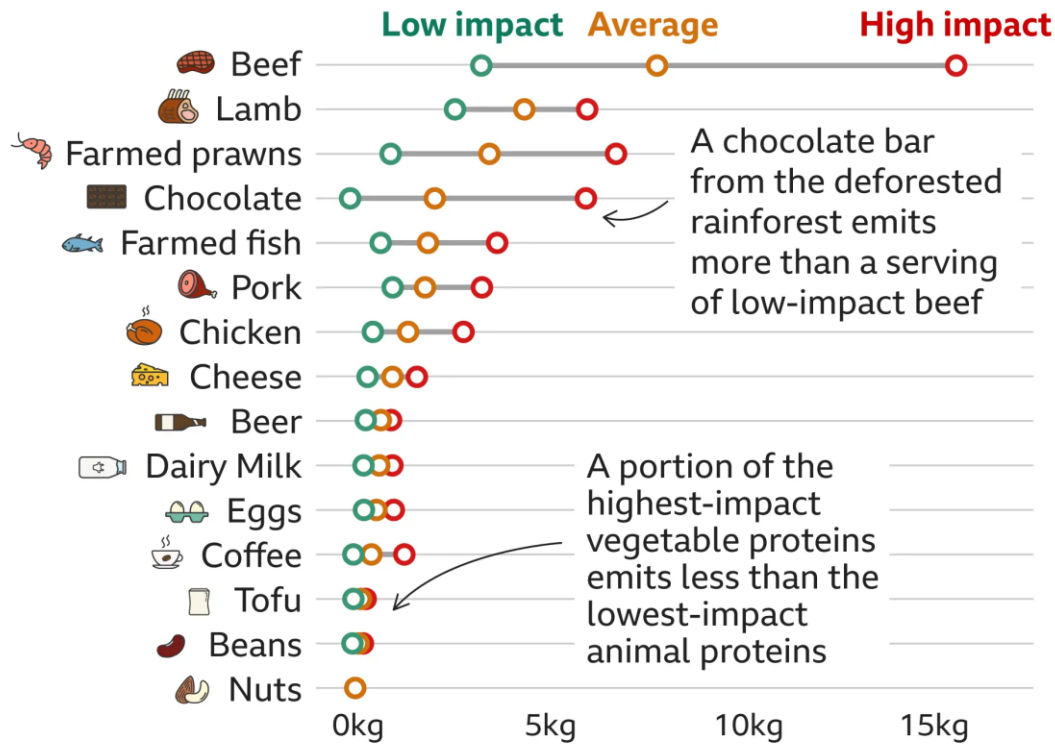


Biodiversity footprints link species threats, taken from the IUCN Red List, to production activities and then onward to the final consumers whose demand induces that production. It provides one method for attributing species threats to companies and consumers.

Role of diets in environmental footprints

Beef has the biggest carbon footprint – but the same food can have a range of impacts

Kilograms of greenhouse gas emissions per serving



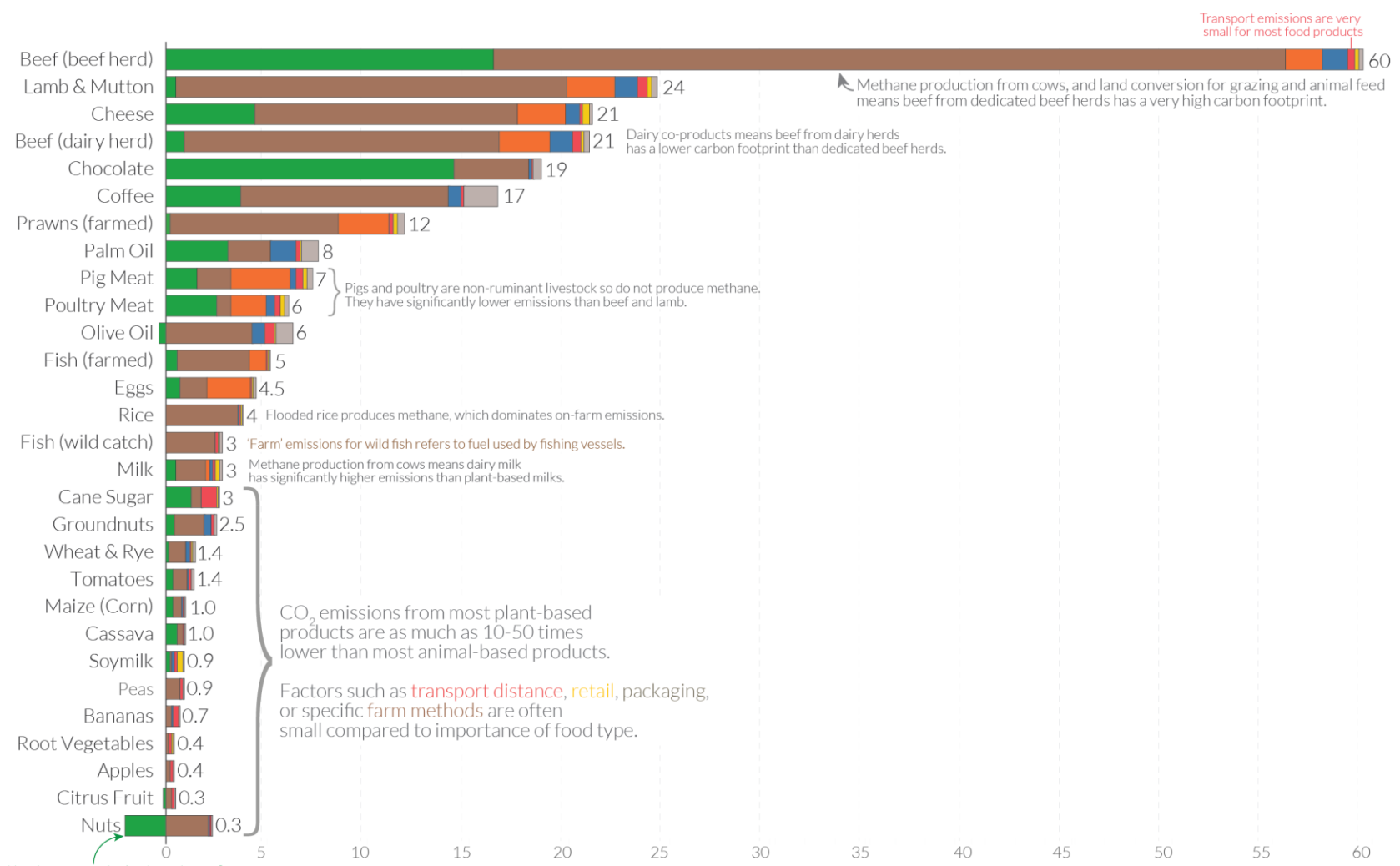
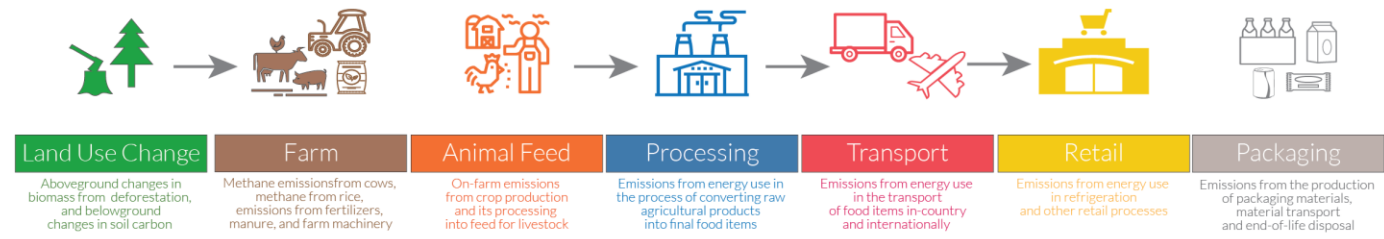
Note: The figures for each food are based on calculations from 119 countries. Serving sizes are from the British Dietetic Association (BDA) and Bupa.

Source: Poore & Nemecek (2018), Science



Searchinger, T.D., Wiersenius, S., et al. Assessing the efficiency of changes in land use for mitigating climate change. *Nature* 564, 249–253 (2018).

Food: greenhouse gas emissions across the supply chain



Transport emissions are very small for most food products

Methane production from cows, and land conversion for grazing and animal feed means beef from dedicated beef herds has a very high carbon footprint.

Dairy co-products means beef from dairy herds has a lower carbon footprint than dedicated beef herds.

Pigs and poultry are non-ruminant livestock so do not produce methane. They have significantly lower emissions than beef and lamb.

Flooded rice produces methane, which dominates on-farm emissions.

'Farm' emissions for wild fish refers to fuel used by fishing vessels.

Methane production from cows means dairy milk has significantly higher emissions than plant-based milks.

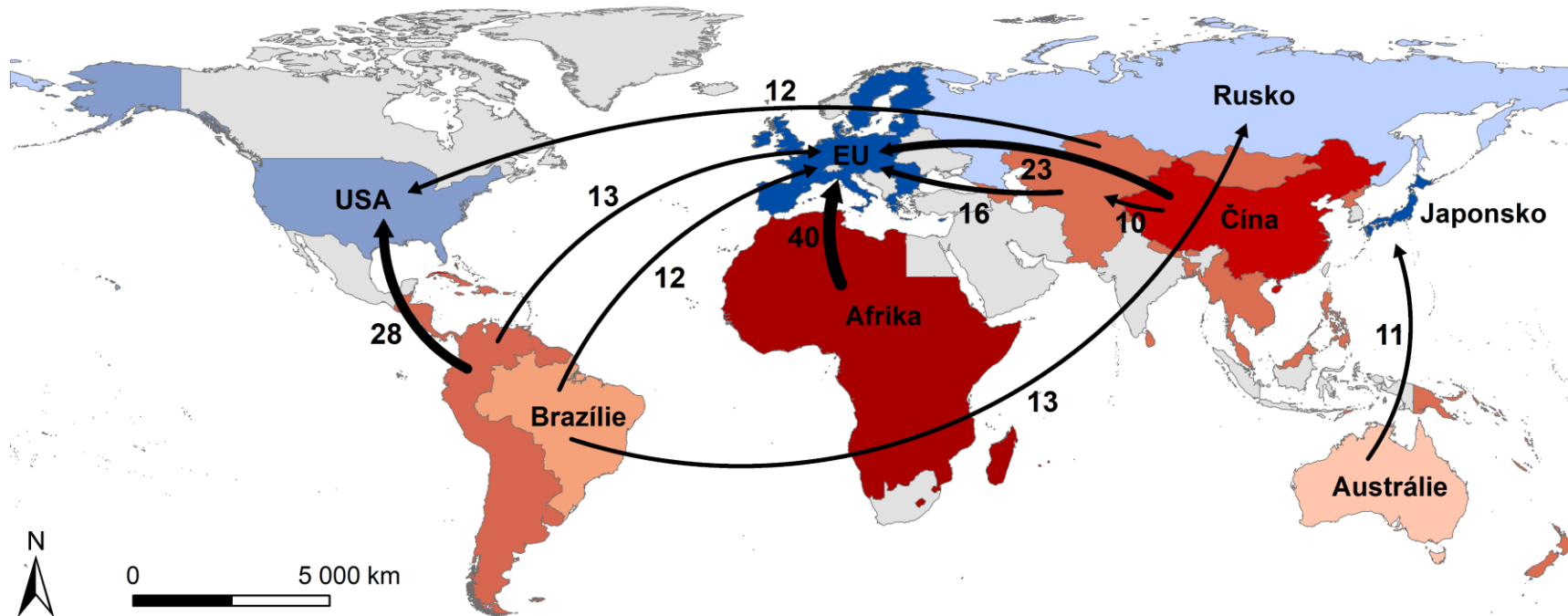
CO₂ emissions from most plant-based products are as much as 10-50 times lower than most animal-based products.

Factors such as transport distance, retail, packaging, or specific farm methods are often small compared to importance of food type.

Nuts have a negative land use change figure because nut trees are currently replacing croplands; carbon is stored in the trees.

Greenhouse gas emissions per kilogram of food product (kg CO₂-equivalents per kg product)

Global displacement of net primary production footprint— teleconnections in global system induced by international trade



Embodied potential NPP is displaced and disconnects production from consumption. EU, USA, Japan and wealthy regions drive displacement through consumption by international trade

Ecological debt

Ecological debt is a concept first elaborated among environmental justice organizations in Latin America and used mainly for political purposes with the aim of mobilizing public opinion to recognize the exploitation of the South by the North, and to support financial debt relief. More recently it was further elaborated by academics and official bodies (Warlenius 2016)

Ecological debt as ecological overshoot: demands made on a natural ecosystems exceed its regenerative capacity.

Earth Overshoot Day, also known as Ecological Debt Day, marks the date on which humanity's demand for resources in any given year surpasses the Earth's capacity to regenerate those resources that year.

Ecologically unequal exchange

- Asymmetric net transfers of resources (including labor) from peripheral to core areas of the global economic system (Hornborg 1998, 2019)
- Exporting products from poor regions and countries, at prices which do not take into account the local externalities caused by these exports or the exhaustion of natural resources, in exchange for goods and services from richer regions (Martínez-Alier 2002)
- In the broader context of natural resources being extracted from resource-rich but cash-poor countries to satisfy consumer demand in wealthy countries, it is called ecologically unequal Exchange. In the context of CO₂-intensive production moving offshore, this phenomenon is called carbon leakage. (Moran et al. 2013)

Role of businesses

- EU's Corporate Sustainability Reporting Directive (CSRD)
- Published in December 2022, the directive applies to some 50,000 businesses that are listed in the EU or have significant operations there, regardless of where they're based. And it requires them to report more about their sustainability performance than any other piece of regulation to date, beginning with the 2024 fiscal year in some cases.
- Corporate Social Responsibility (CSR) is a management concept in which companies integrate social and environmental concerns into their business strategy
- ESG is a sustainability assessment using Environmental, Social, and Governance metrics to evaluate how sustainable and resilient a company is to make it accountable for its sustainability claims.

Double materiality

FINANCIAL MATERIALITY

To the extent necessary for an understanding of the company's development, performance and position...



Primary audience:
INVESTORS

ENVIRONMENTAL & SOCIAL MATERIALITY

...and impact of its activities



Primary audience
CONSUMERS, CIVIL SOCIETY, EMPLOYEES, INVESTORS

Company impact on climate can be financially material

RECOMMENDATIONS OF THE TCFD

NON-FINANCIAL REPORTING DIRECTIVE

Discussion questions

- Brainstorming on what we consume and global supply chains
- Can you think about the global teleconnections between the origin of products and consumed goods and services?
- Do you know what is your ecological footprint?
- What is the role of consumption vs. other factors and drivers influencing global change?
- What are possible solutions to reduce the consumption-based environmental footprint?

Take-home messages

- Defining consumption and consumption categories is not trivial and is subject to economic models and statistical classifications and accounts, including hybrid environmental-economic accounting.
- Consumption is a major driver of global environmental change, contributing by 50 – 80 % to environmental impacts.
- There is an increasing attention to consumption as a driver of global environmental change, including footprint studies. It is addressed in SDGs 12 and 8.
- Consumption is a major contributor to economic growth. The role of economic growth is ambiguous, as evidence shows. Decoupling environmental impacts and human well-being from economic growth is however required for sustainability transitions.
- The sustainability can be defined as a good life within planetary boundaries. However, there are several challenges to implementing safe and just pathways, reflecting ethical, economic and political aspects, including postcolonialism. Understanding coupling of consumption and global environmental change is important to uncover limits of current sustainability paradigms.