



GLOBE

EUROPEAN UNION

The Network for Environmental Legislators

Global Resource Outlook 2024

Bend the Trend

Pathway to a Liveable Planet as Resource Use Spikes

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Member International Resource Panel - IRP

Member Club of Rome

WISE Dialogue 14 March, 2024

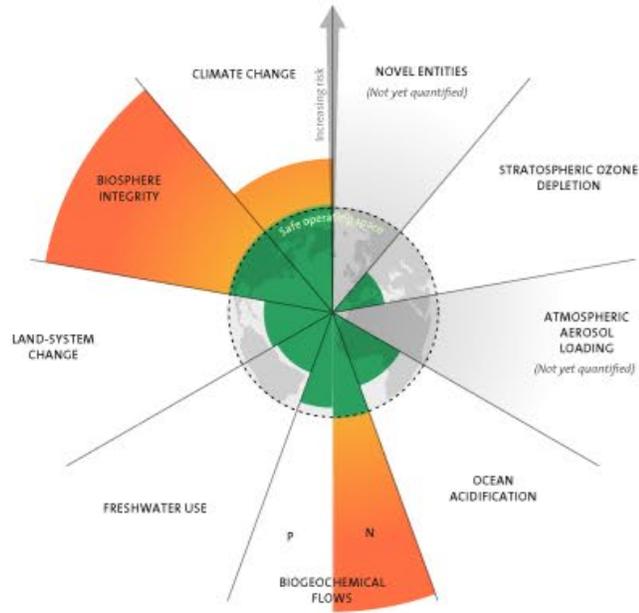


*For the first time in a human history, we face the emergence of a single, tightly coupled human **social-ecological system of planetary scope.***

*We are more **interconnected** and **interdependent** than ever.*

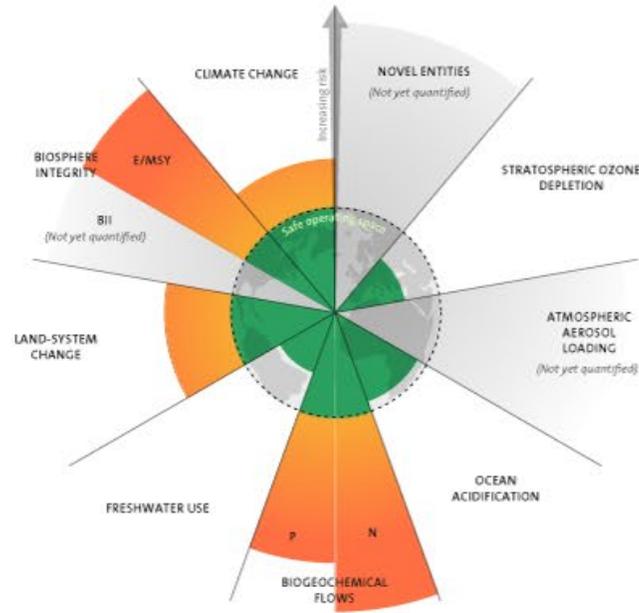
*Our individual and collective **responsibility** has enormously increased.*

2009



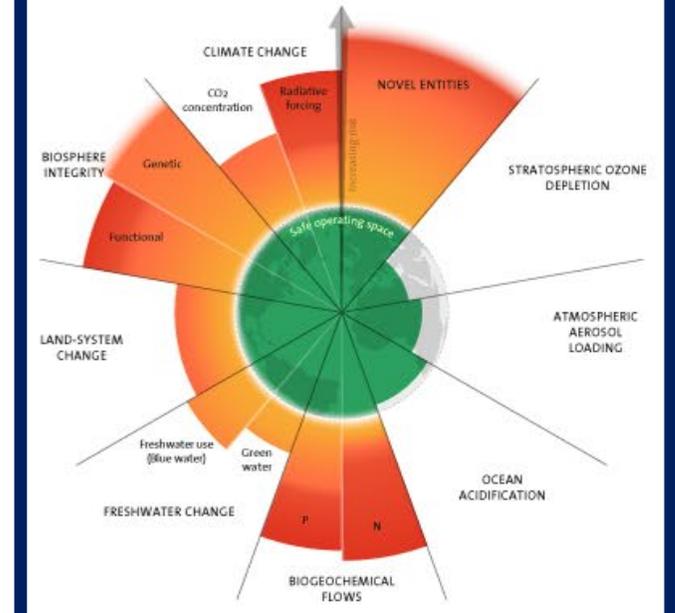
3 boundaries crossed

2015



4 boundaries crossed

2023



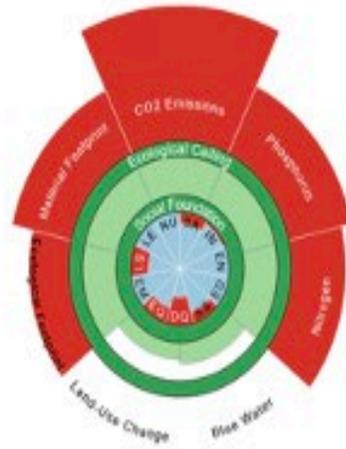
6 boundaries crossed

Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

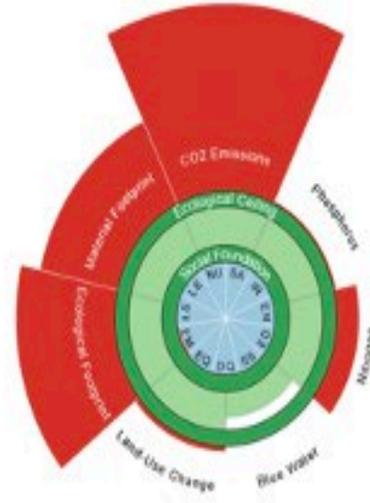
Rich countries are massively overstepping planetary boundaries



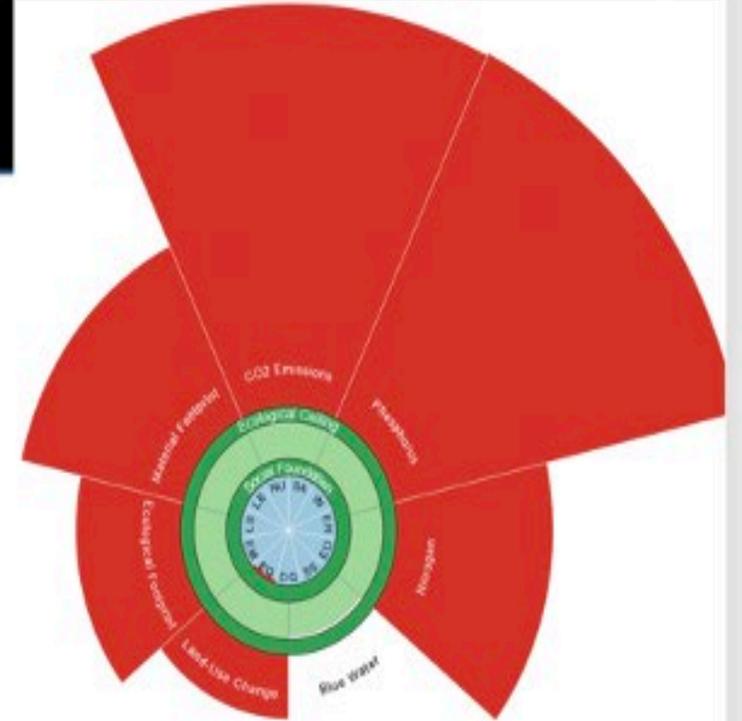
Malawi
\$1,000 pc



China
\$17,200 pc



Belgium
\$54,000 pc



Australia
\$54,900 pc

Source: Doughnut Economics Action Lab, University of Leeds (goodlife.leeds.ac.uk)

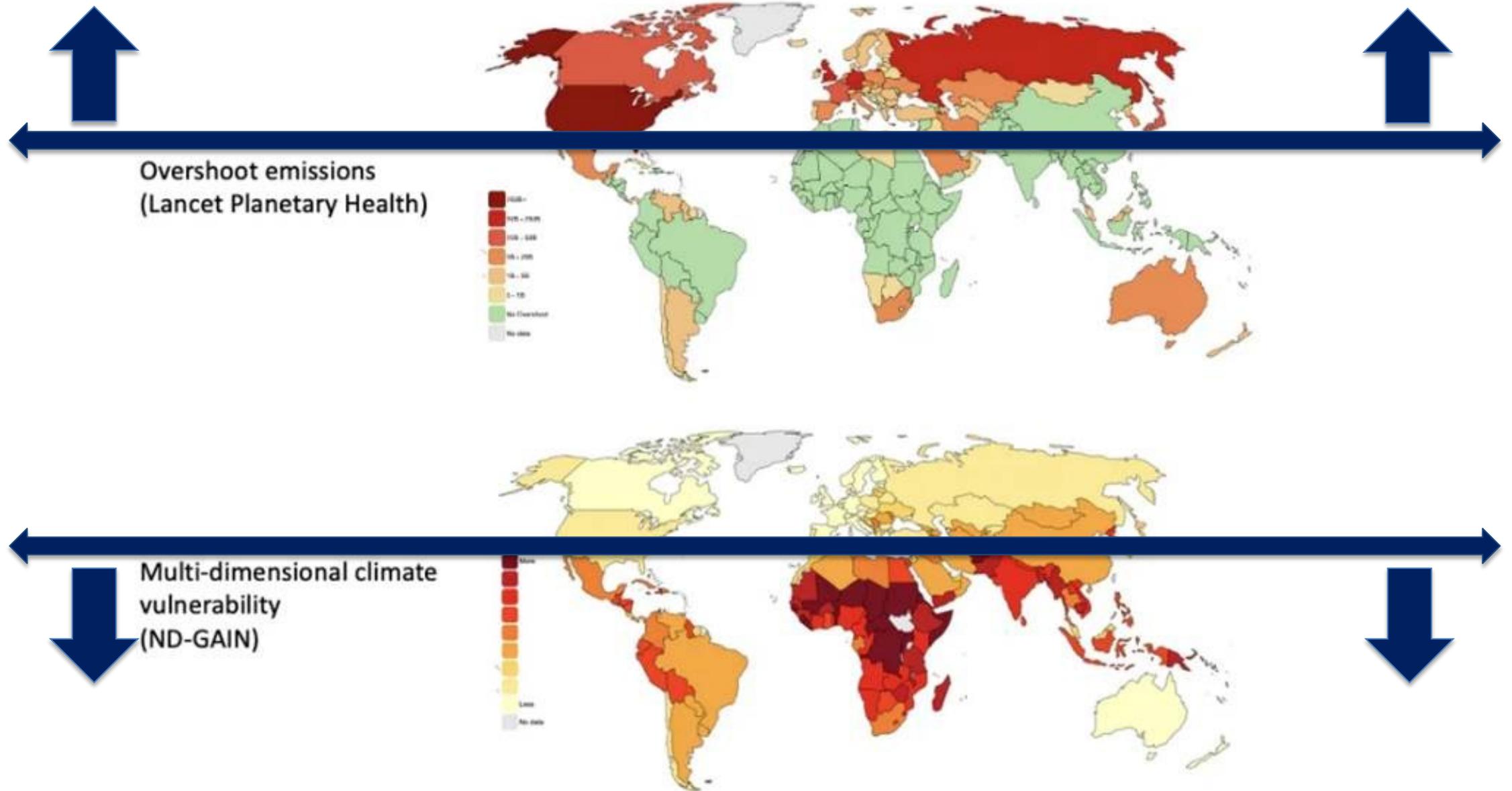


Some Climate Change Related Facts

- *Global CO₂ emissions in billion metric tonnes 37.55 (Source: Statista 2023)*
- *Global surface temperature increase above pre-industrial level 1.48 degrees Celsius (Source Copernicus 2023)*
- *The heat absorbed in the Oceans is at a record level*
- *Fossil fuel subsidies \$7 trillion or 7.1 percent of GDP (Source: IMF 2022)*
- *Annual economic losses due to climate extreme weather events increasing (Multiple sources)*

*All above data are the highest in the history for
the last recorded year*

Those Benefiting Most, and Those Facing Worst Climate Consequences



Global Resources Outlook 2024

Under strict embargo until
March 1 from 13:10GST / 10:10 CET / 04:10 EST

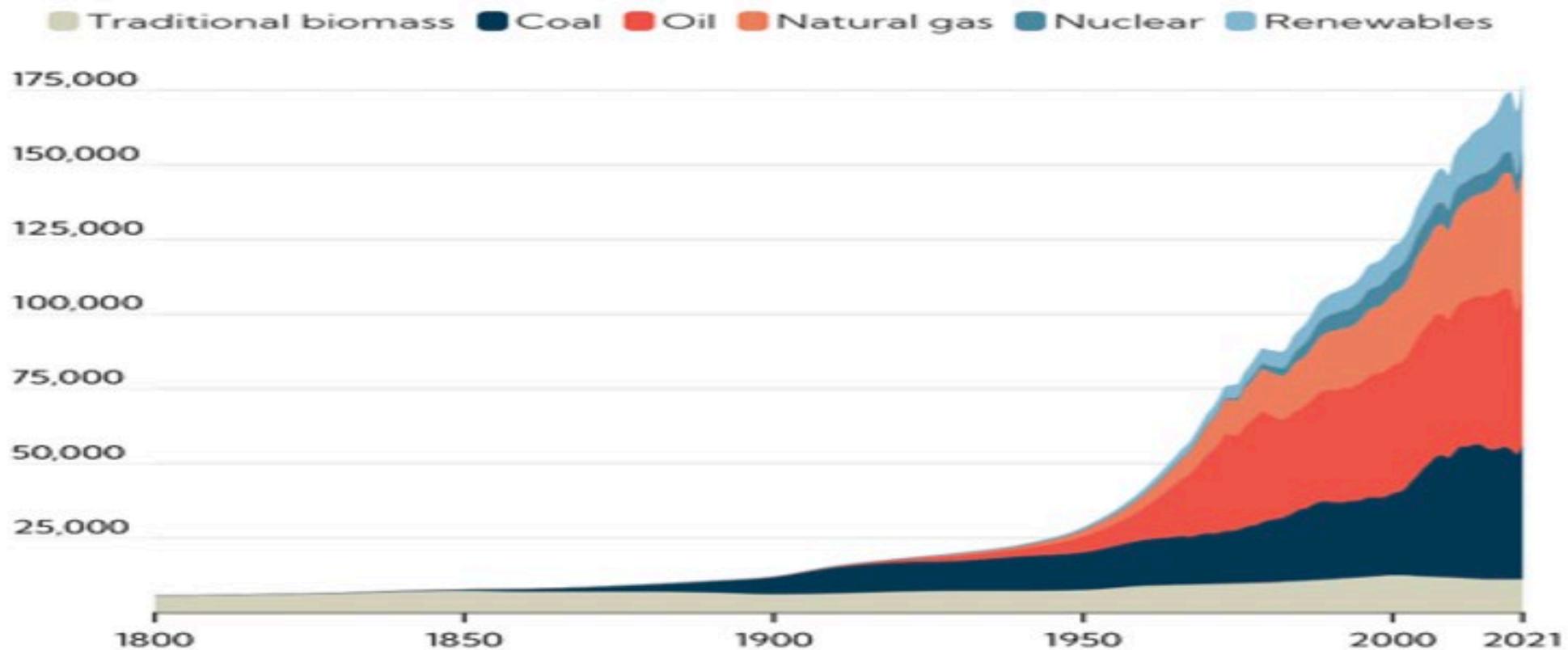
Bend the trend

Pathways to a liveable planet as
resource use spikes



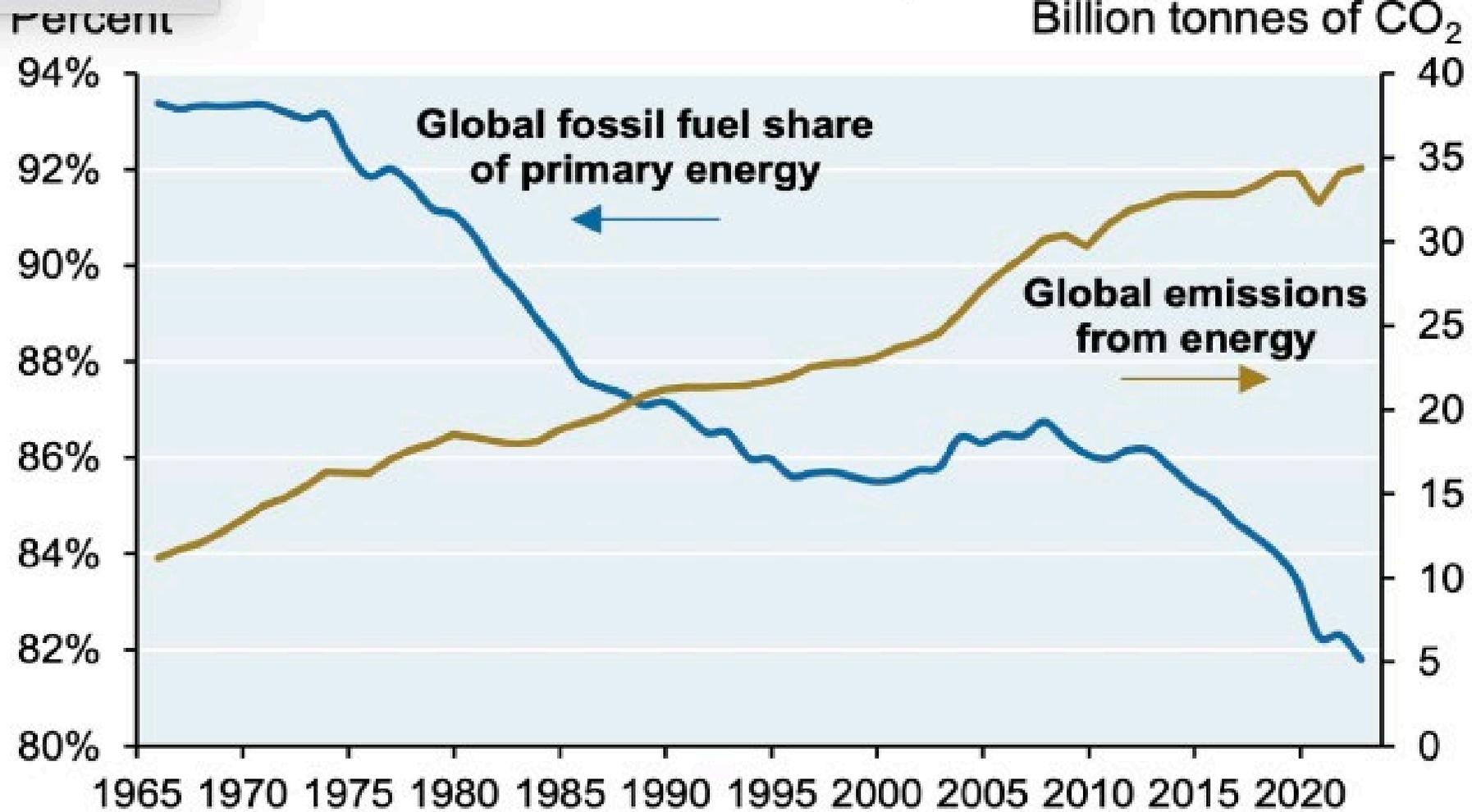
An uphill battle...

Global primary energy consumption by source.
(terrawatt-hours)



Source: Our World in Data based on Vaclav Smil, *Energy and Civilization: A History*; and the BP Statistical Review of World Energy. Note: Primary energy is calculated according to the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting nonfossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.

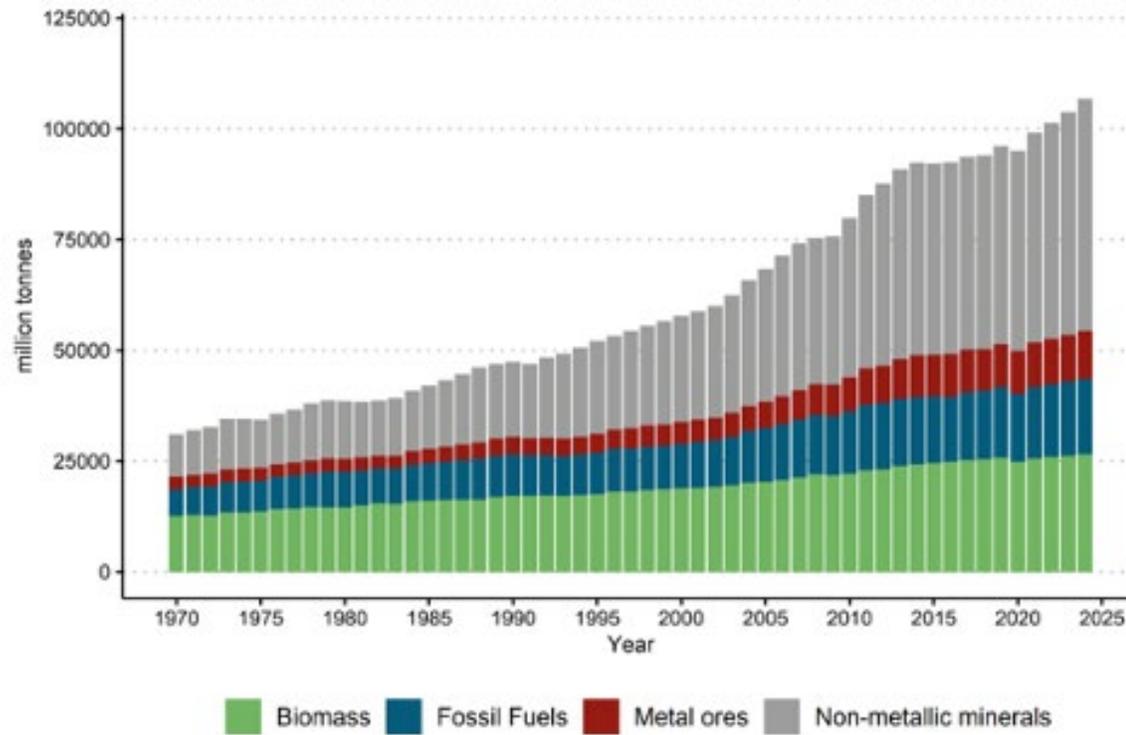
[Ingen rubrik] **Fossil fuel shares mask reality of rising emissions**



Source: EI Statistical Review of World Energy, JPMAM, 2023

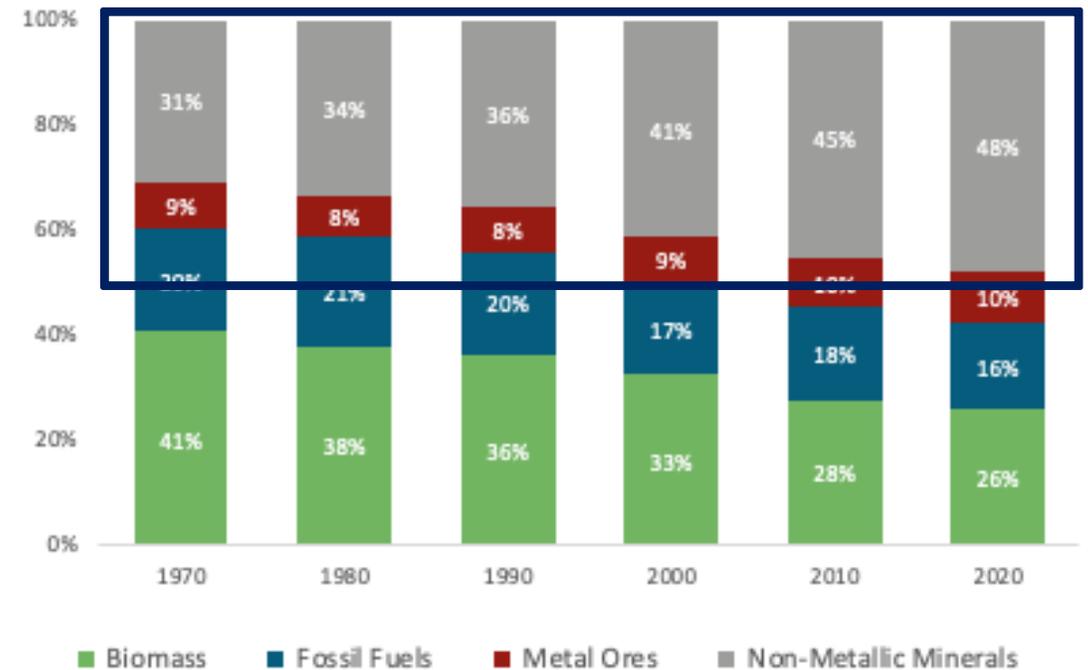
Trends: Global Material Use and Share in 1970-2023

Global Material Use has increased for more than a factor of 3 since 1970 due to urbanisation and industrialisation (and population growth) - 2.3% per year



Global material extraction, four main material categories, 1970 – 2024, million tones.

... which is increasing also the share of Non-Metallic Minerals in Global Material Use



Global material extraction, four main material categories, 1970-2020, shares

Definition: Materials and Resources



Biomass: crops for food, energy and bio- based materials, wood for energy and industrial uses



Fossil fuels: covering coal, gas and oil, among other



Metals: such as iron, aluminum and cooper, among other



Non-metallic minerals: sand, gravel, limestone and minerals used for industrial applications



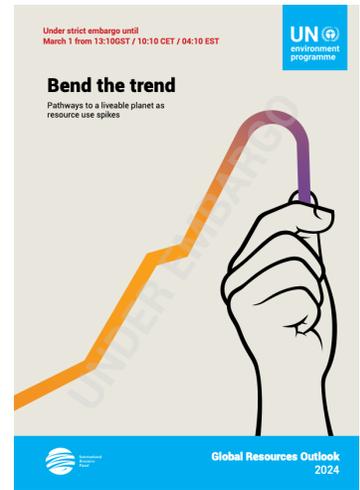
Land



Water

Materials:
Everything
extracted from
the Earth

Resources:
Materials + Land
and Water



Impacts: Extraction and Processing of Natural Resources Drives all Aspects of the Triple Planetary Crisis

Environmental impacts of materials in the value chain in extraction and processing phase



Biomass



Metals



Non-metallic minerals



Fossil fuels



Remaining economy



Households

60% of global climate change impacts

40% of air pollution health impacts

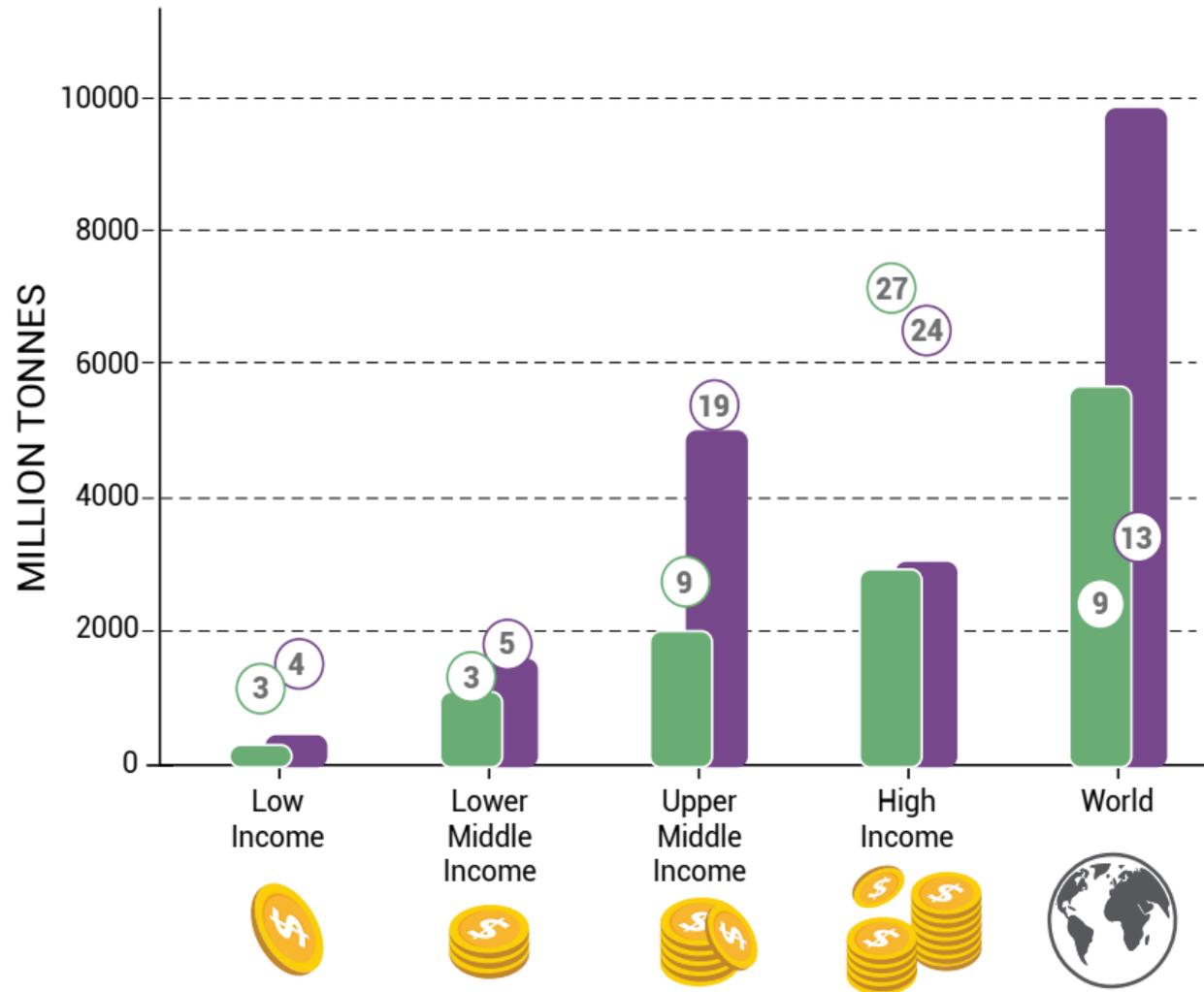
More than 90% of water stress and global land and water eutrophication related biodiversity loss

To mitigate climate change by a focus on the phase-out of fossil fuels alone will not work;

Material consumption is the main driver and materials such as steel, concrete, aluminum, plastics, ammonia, textiles etc require a lot of fossil materials for their production

Ex 1,9 Billion tons of steel produced every year; the transition to green steel will take decades and the more demand can be reduced, the better

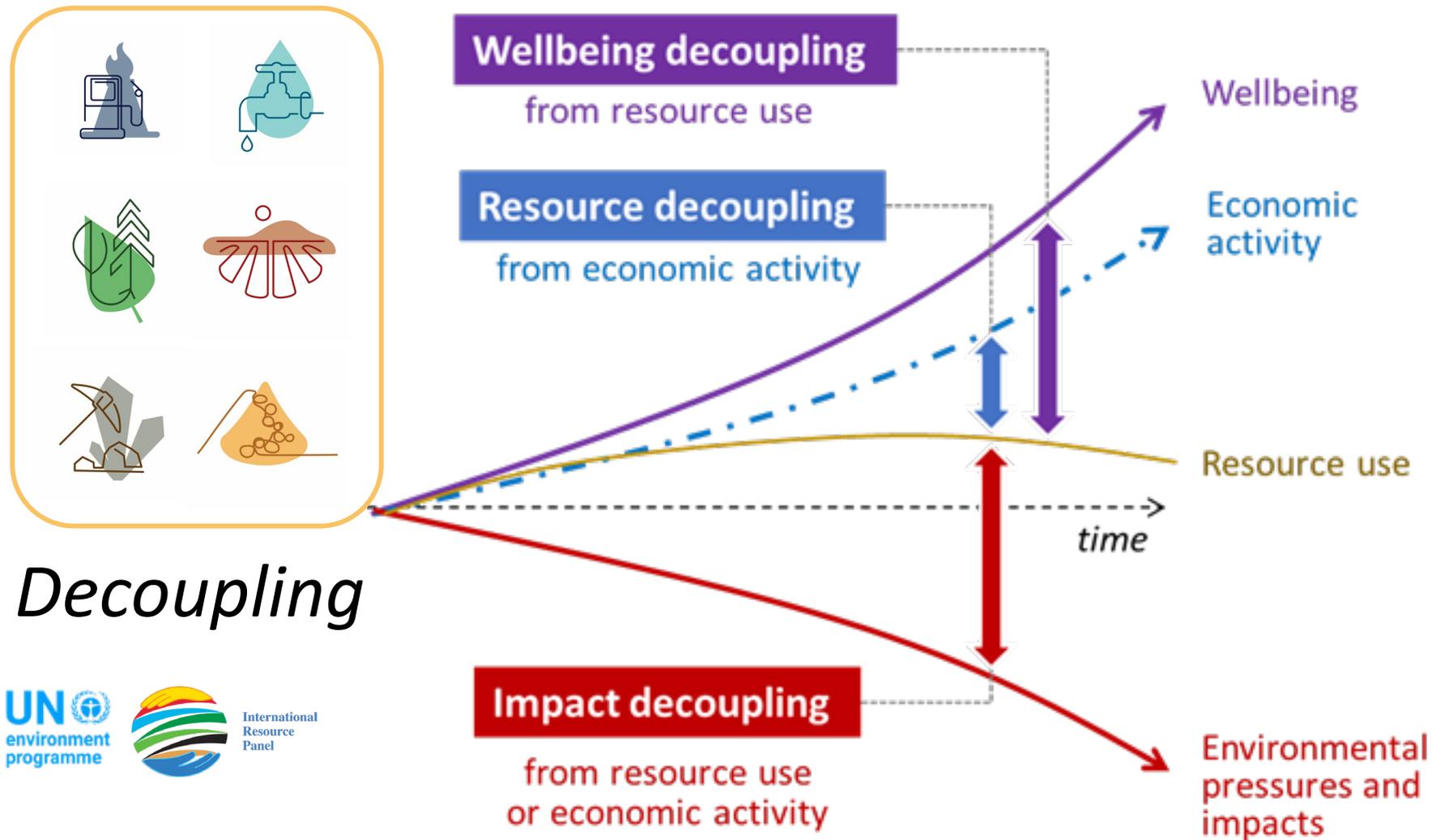
Trends: High-income countries use six times more materials per capita and are responsible for ten times more climate impacts per capita than low-income countries.



Since 2000 ...

- **High-income:** Highest material footprint of all groups, relatively constant. Climate impact per capita = 10 x low-income group.
- **Middle-income:** material footprint more than doubled, approaching high-income levels. Climate impact per capita = roughly 50% of high-income group; 6 x low-income group.
- **Low-income:** Remain comparatively low, and mostly unchanged.

If current trends would continue, global material consumption is predicted to *increase for 60% by 2060 comparing to 2020 levels*



*Economy championed by industrialised nations is
wasteful and unjust.*

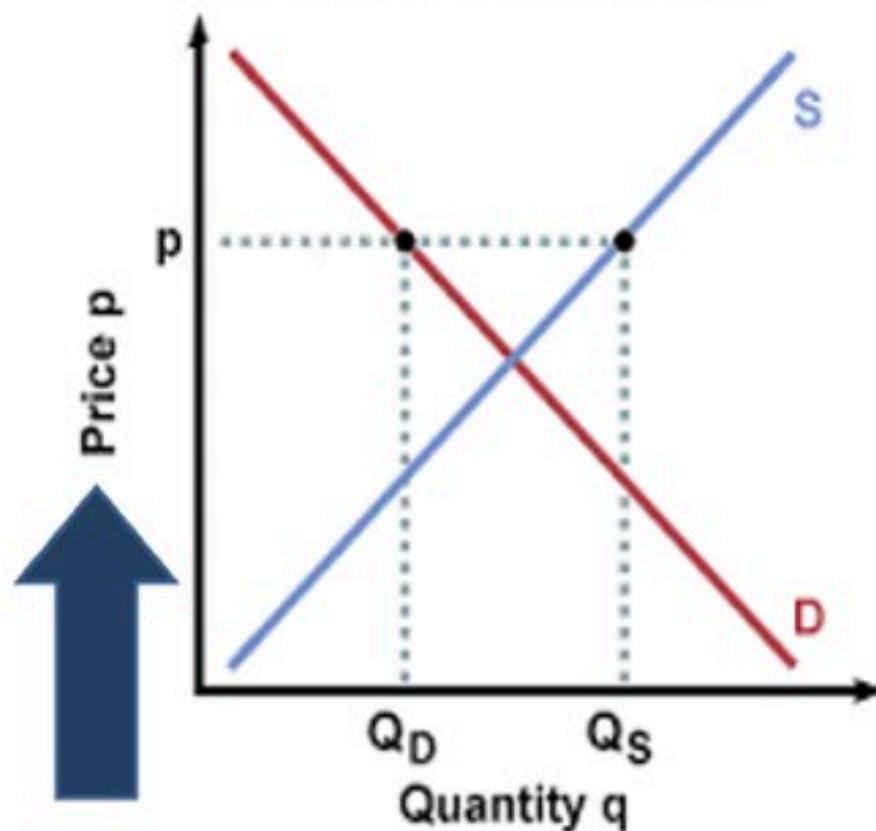
*We must shift away from the prevailing resource wasteful
economic approach based on maximising the output of sectors,
simplistically defined by GDP, towards an economy that is
efficiently meeting human needs and optimise human wellbeing
within the Planetary Boundaries.*

The current logic is both ethically and ecologically unsustainable.

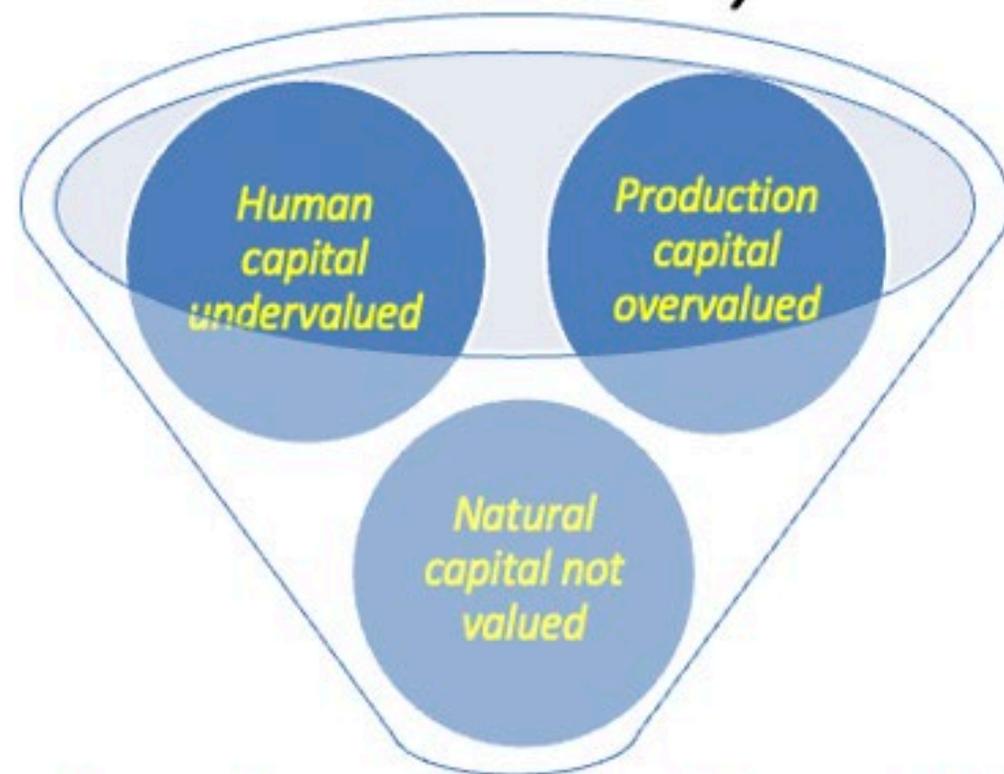
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Confusing market Signals Summary:

*Producers/Consumers
Rational Behaviour*



Market Economy



*Economic, social and environmental
(in)balance*

*A **pathway** towards sustainable resource use, which maintains and even enhances human wellbeing, while prevent planetary boundaries to be crossed is possible, but we **urgently must change the direction and fix the broken compass***



Source: Pixabay



Source: Dentistry.co.uk

Major novelty of GRO24

- *We have simply been **setting the order right**. Economy was invented to serve humans and not the opposite.*
- *We were looking at how to optimise provisioning systems, human needs, rather than maximising the output of individual sectors. We acknowledge the usefulness of GDP, but we should be **guided by wellbeing**.*
- *We propose to **focus on the most resource intensive provisioning systems** - built environment, mobility, food, and energy, which represent 90% of global material demand.*

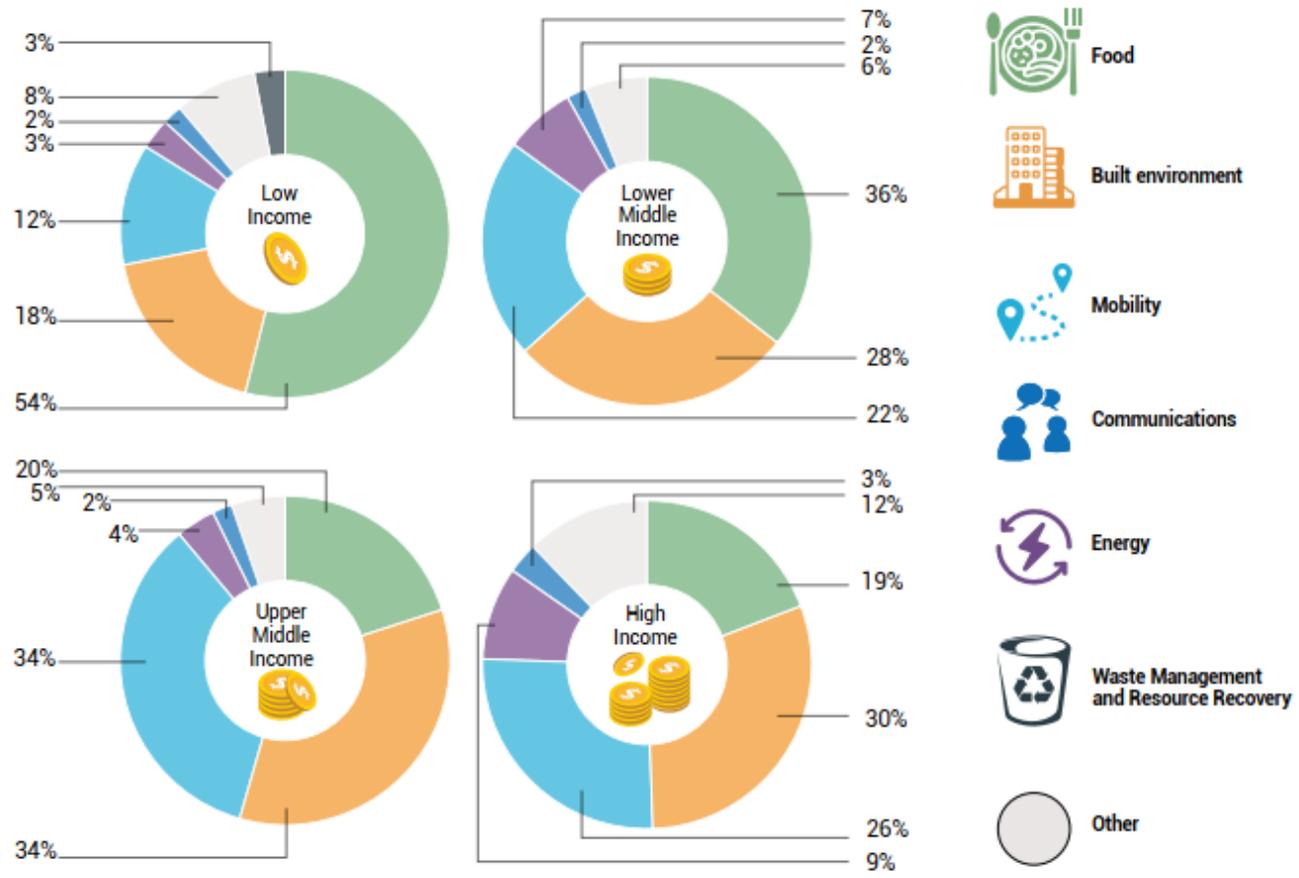
Main question often-overlooked to be addressed

*How to meet human
needs in most
energy and resource
efficient way?*

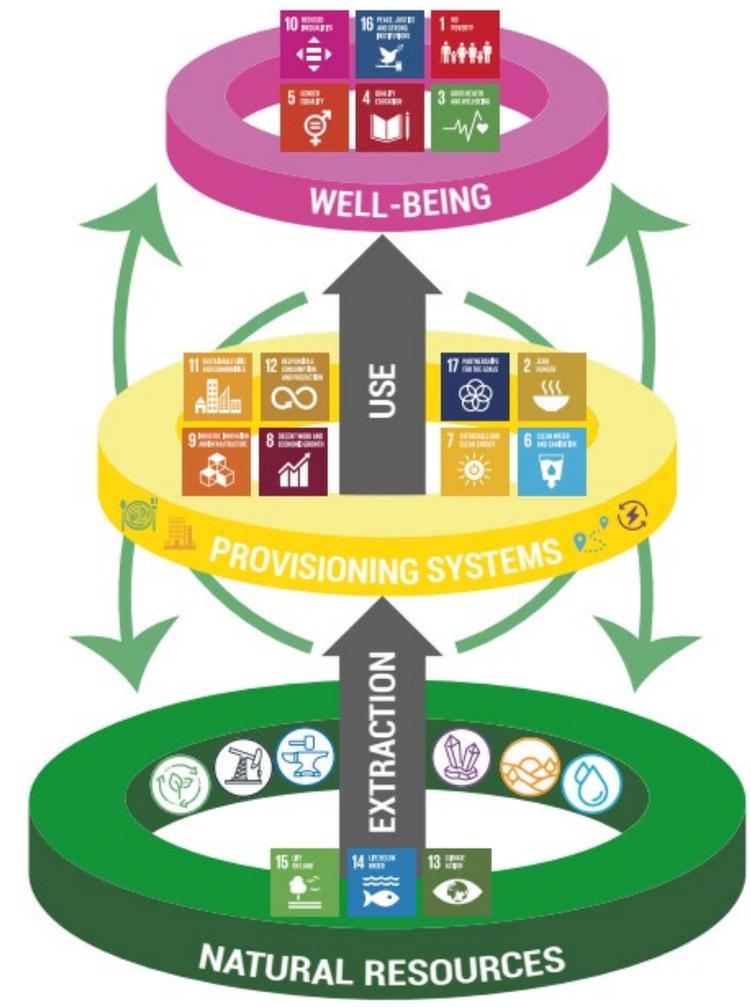


<https://edistaffing.com>

Solutions: Focusing on supply-side (production) measures must be supplemented with a strong focus on demand-side (consumption)

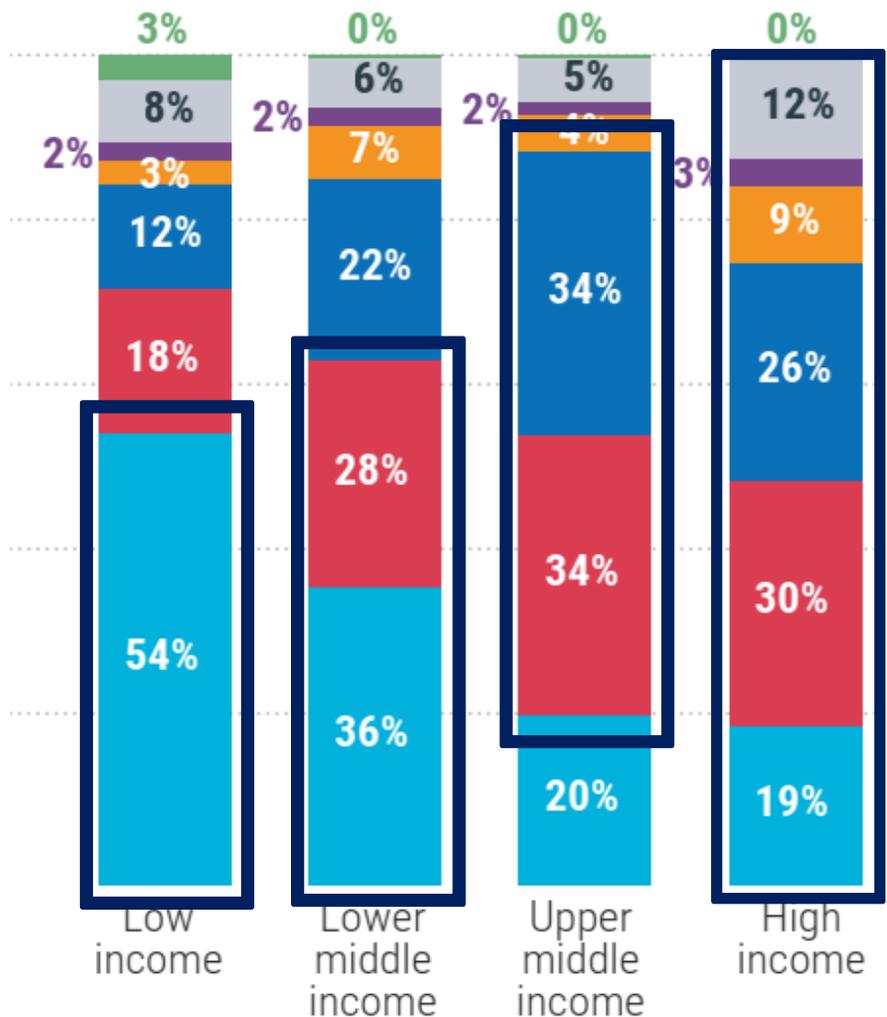


Shares of material footprint by provisioning systems and by country income group, 2020, percentage



*Actions should focus on the most
resource-intensive provisioning systems
reorganizing them by using system-based
logic and solutions*

Trends: The material needs for provisioning systems (built environment, mobility, energy and food) by country income groups (2020)



- Food
- Mobility
- Built environment
- Energy
- Communication
- Other
- Waste Management and Resource Recovery

Energy includes household energy consumption

All other provisioning systems include their embodied energy

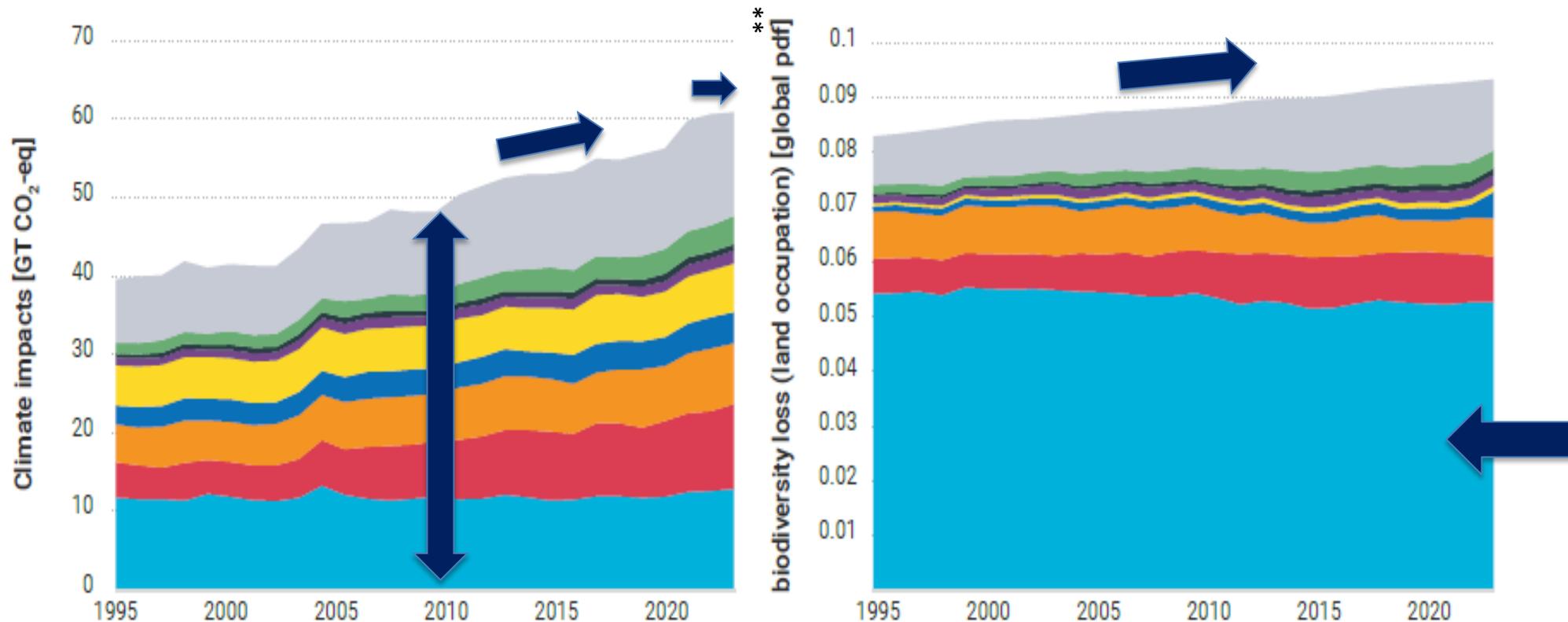
Built environment and mobility: (construction, transport sector & infrastructure): 59 billion tonnes

Food: 23.6 billion tonnes

Energy: (electricity, power, heat): 6.1 billion tonnes

Together = 90% of total global material demand, but differ in importance by income group

Impacts: "Provisioning systems" - human needs with most environmental impacts requesting our focus



Provisioning system*



*Including embodied energy

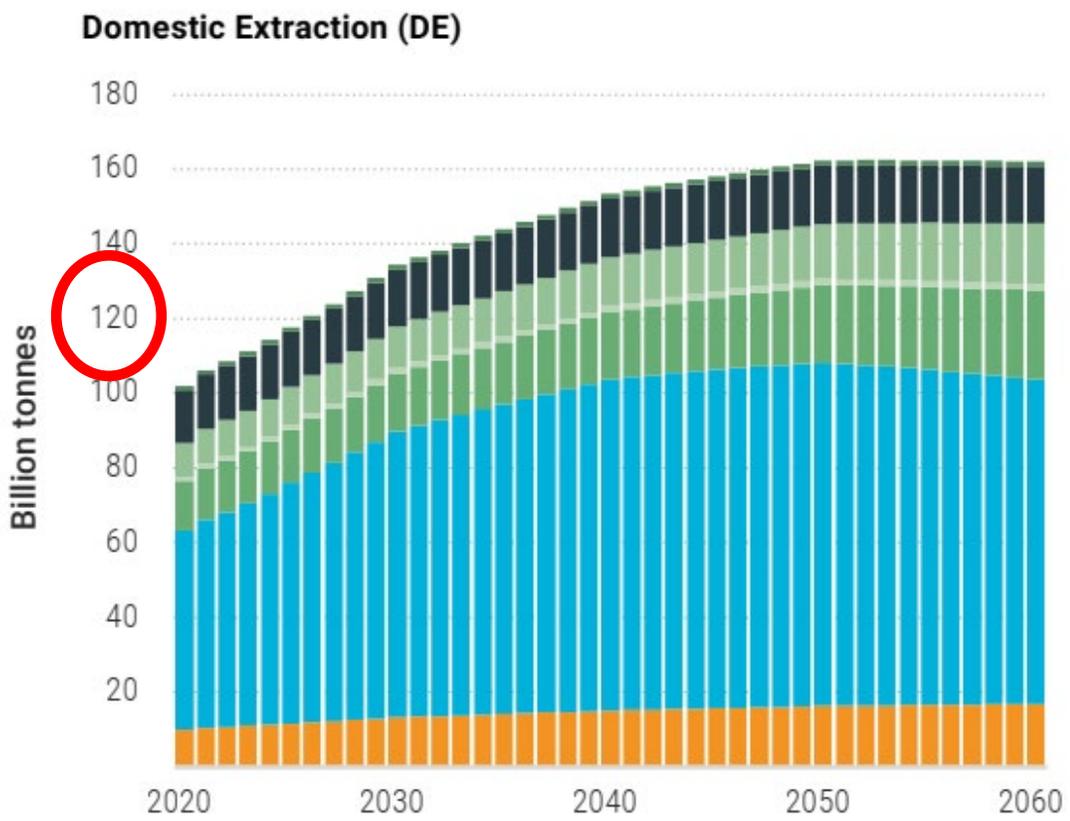
** Global pdf: Global potentially disappeared fraction of species

Modelling Scenarios Capturing the System Change Dimension

- *Modeling results are not predictions, but illustrations of 'what if' effects.*
- ***Historic Trends scenario*** *explores the consequences of continued historical trajectories of resource production and consumption, including current improvements rates in resource efficiency as well as production methods and current climate policies*
- ***Sustainability Transition Scenario*** *explores a sustainable path for global resource use if we would do a systemic shift to provisioning systems from both a supply and demand side and consumption perspective*

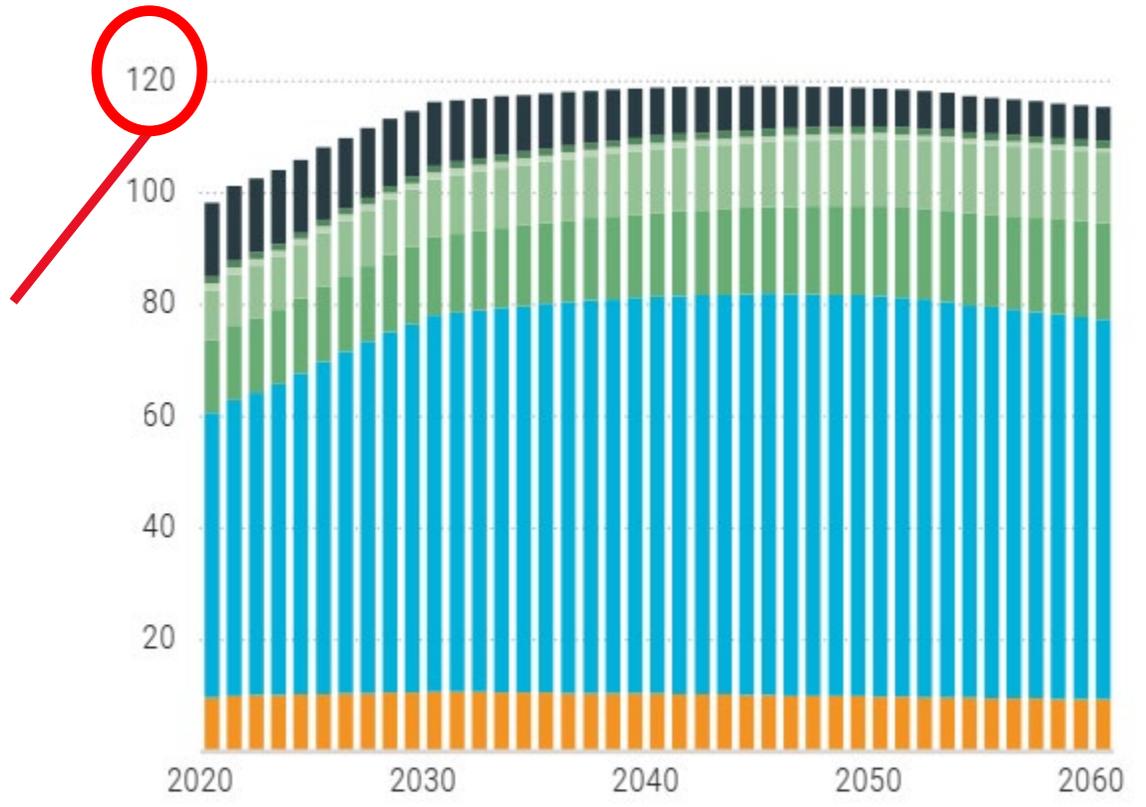
Impacts: Outlook of Material Extraction under two scenarios

Historical Trends



Sustainability Transition

Resource extraction by major categories



- Metal Ores
- Non-Metallic Minerals
- Biomass: Grazing & Fibre
- Biomass: Timber
- Biomass: Food
- Fossil Fuels
- Biomass: Energy



Scenario outlook: Sustainability Transition compared to Historical Trends Scenario (2060)



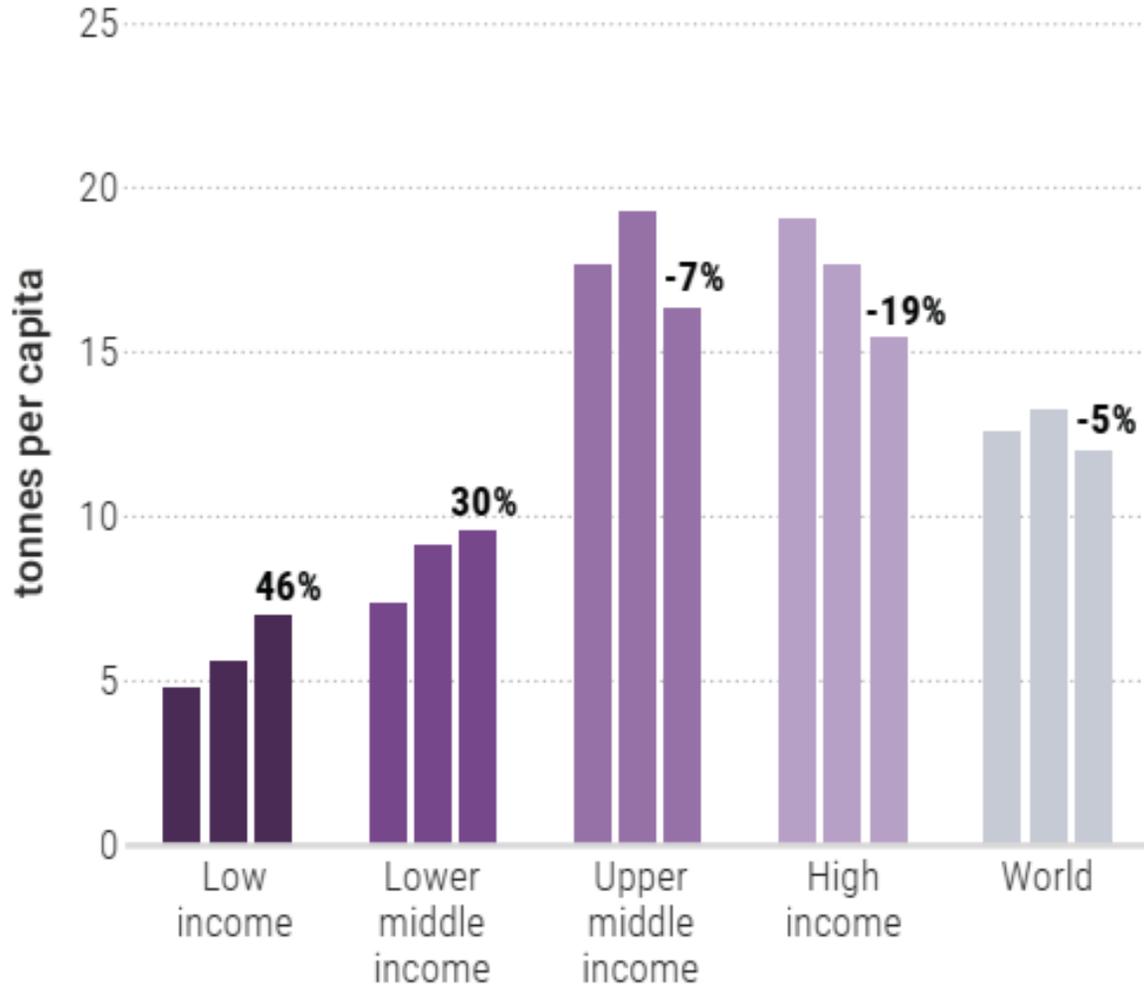
- Growing Economy:*
- Reduced inequality:*
- Improved wellbeing:*
- Reduced growth in resource use:*
- Reduced environmental impacts:*

- + 3%*
- Lower income group Material Footprint gap*
- Higher HDI all income groups*
- By 30%*
- GHG emissions - 83%*
- Energy demand - 27%*
- Agricultural land area - 5%*

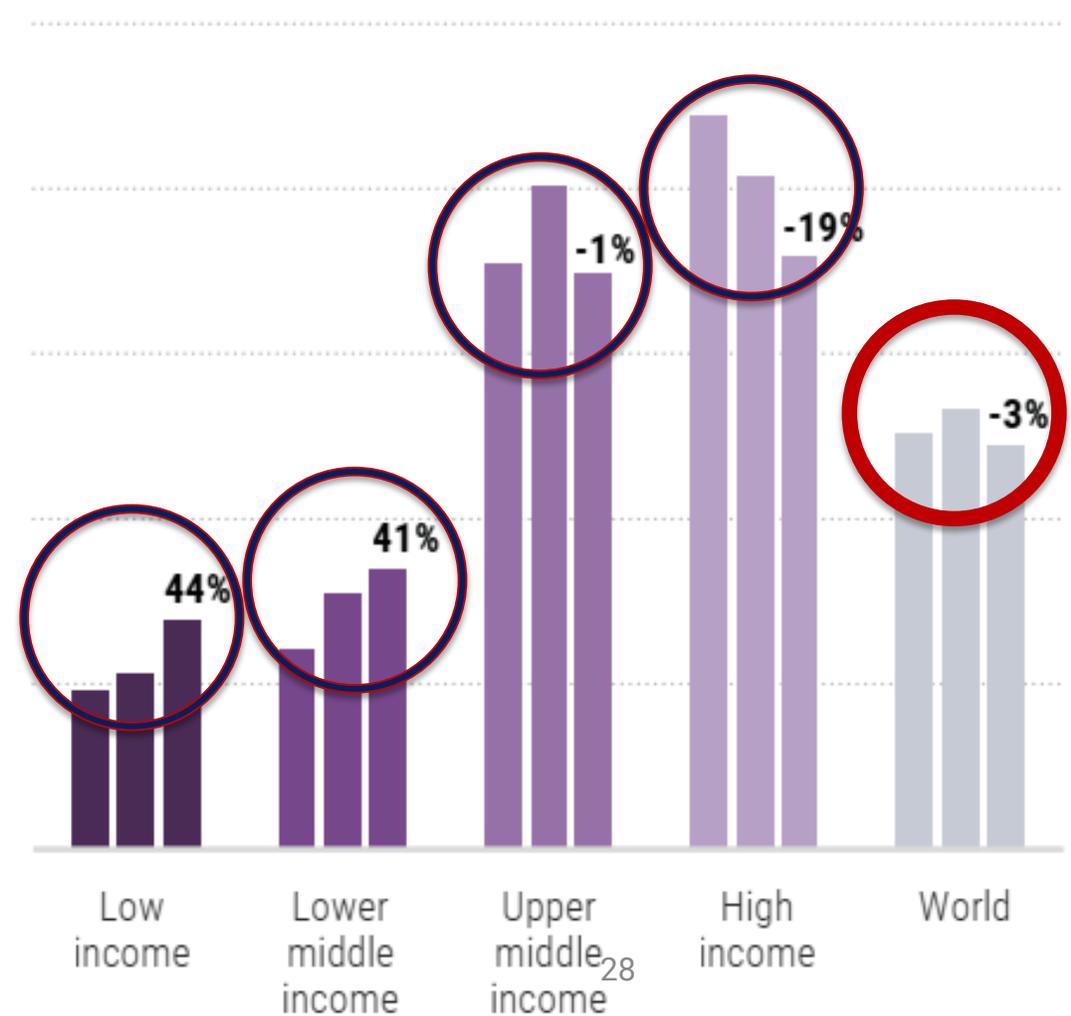


Impacts: Reductions in high consumption contexts means that resource use grows where it is most needed

Resource extraction (DE) per capita by income group, 2020, 2040 and 2060



Material footprint (MF) per capita by income group, 2020, 2040 and 2060



Solutions: Strategies for Reducing Resource Use across Provisioning Systems

Provisioning system	 Food	 Built environment	 Mobility	 Energy
Recommendations	<ul style="list-style-type: none"> Reducing the demand of the most impactful food commodities Reducing food loss and food waste Protecting and restoring productive land while meeting demand for nutrition 	<ul style="list-style-type: none"> Assuring sustainability of the new building stock Retrofitting the existing building stock More intensive use of buildings 	<ul style="list-style-type: none"> Cities moving towards active mobility and public transportation Reducing carbon-intensive frequent traveling modalities Decreasing emissions intensity of transport modalities 	<ul style="list-style-type: none"> Decarbonizing electricity supply through the scaling up of low-resource renewable energies and increased energy efficiency
Outcomes from policies modelled in Scenarios	Can decrease the land needed for food by 5% compared to 2020 levels while more equitably ensuring adequate nutrition for all	Can decrease building material stocks by 25% by 2060, leading to a 30% decrease in energy demand, and 30% decrease in GHG emissions compared to current trends.	Can reduce related material stock requirements (-50%), energy demands (-50%) and GHG emissions (-60%) by 2060 compared to current trends.	Can drive a sharp decrease in energy demand, with reductions of climate impacts by more than 80 per cent.

**SUSTAINABLE CONSUMPTION
AND PRODUCTION (SCP)**

**RESOURCE
EFFICIENCY**

- **Resource tax, revenue neutral ecological tax reform**
- **Investment in resource efficiency innovation, demand shift**
- **Efficient and sustainable settlements, shelter and building materials**
- **More compact and sustainable urban form and transport modes**

**CLIMATE
AND ENERGY**

- **Price on carbon, early deployment of carbon removal technologies**
- **Renewable energy, electrification, energy efficiency**
- **Bioenergy limited to bioenergy with carbon capture and storage to avoid pressure on food prices**

**FOOD AND
LAND**

- **Nature protection and restoration, reduced water stress**
- **Healthy diets with convergence to less average meat and dairy**
- **Reduced food waste**

**JUST
TRANSITION**

- **Global resource and carbon dividend (equal per capita payment)**
- **No net economic loss from sustainability transitions**

To Conclude

*Science is Clear and Change is Unavoidable
Towards the World of GRO 2024*

Main Blind-Spots preventing us to move faster and deeper

Lack of Holistic System approach

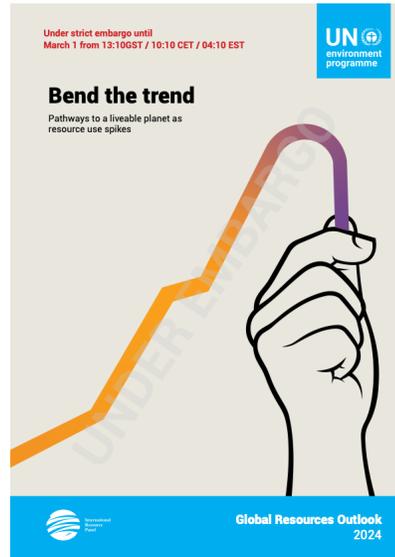
*Public leaders and others lack capacity or knowledge of how to translate **system change visions** into their **concrete policies/investment structures** which ends in conflicting policy logics that hinder real transformation*

Lack of Drivers and Pressures Perspective

*Policy attention does not focus on the roots of the problem and address the drivers and pressures. It **lack focus on natural resource use and management, as well as on market signals** leading consumers and producers' behaviour.*

Lack of Demand Side Focus

*Policy **attention is mainly given to the supply side** of the economy, to the cleaning of the existing economic system - lacking the attention to the demand side which is **leaving out an important solutions potential and questions of responsibility and equity.***



We are indebting future generations, financially and by depleting the Nature.

This is simply wrong. Apparently, we humans are the most intelligent species on this planet. It is high time to prove it. More than an economic or a technological choice, this is a moral choice.

*Any transformation is a major business opportunity
for those who are innovative, those who dare and those who understand
the essence of the challenges ahead of us.*

*We should not accept that meeting human needs should be resource
intensive and stop stimulating extraction based economic success and rather
reward responsible, innovative, creative ways of meeting human needs.*

This Transformation is not only about Environmental Sustainability

*Access to and use of natural resources have been in the human history **closely related to the level of the achieved wellbeing, but also to stability, security, conflicts, wars** (Access to Land, Water, Oil and Gas, Minerals, Precious Metals ...)*

*And the whole history of the colonialisaton of nature, is also central to **fairness and equity**.*



Changing our Relationship with (the rest of) Nature, is ultimately an Economic, Equity and Security Imperative to strengthen collective Resilience

*The lessons learned recently (war, pandemic, the hottest summer) are more than convincing to understand that. This relationship is not stable, nor balanced, and it will be **resolved either with collective wisdom and effort, or in a hard and very painful way** (conflicts, pandemics, migration ...)*

The future will be green ... or there will be no future.

