UN environment
United Nations Environment Programme

International Resource Panel

GLOBAL RESOURCES OUTLOOK 2019

NATURAL RESOURCES FOR THE FUTURE WE WANT

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OUTLINE

- INTRODUCING THE IRP
- GLOBAL RESOURCES OUTLOOK
- IMPLICATIONS FOR BUSINESS LEADERS
- POLICY IMPLICATIONS

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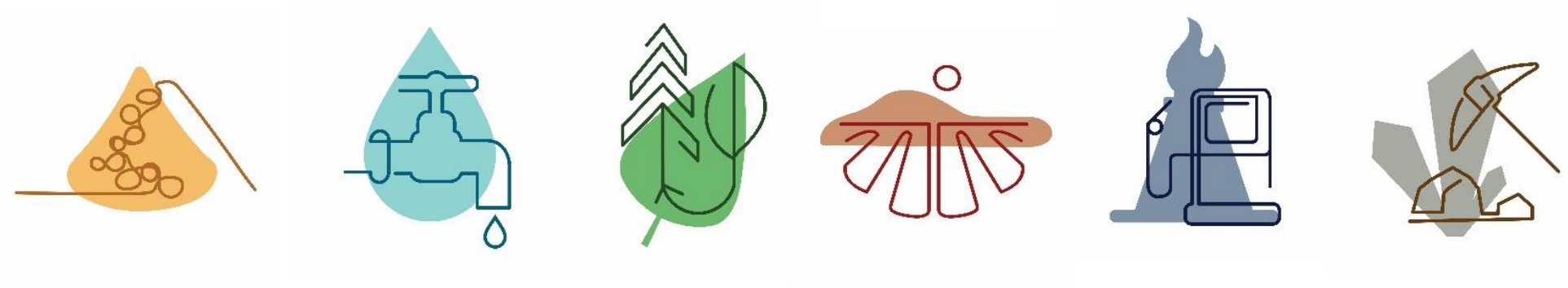
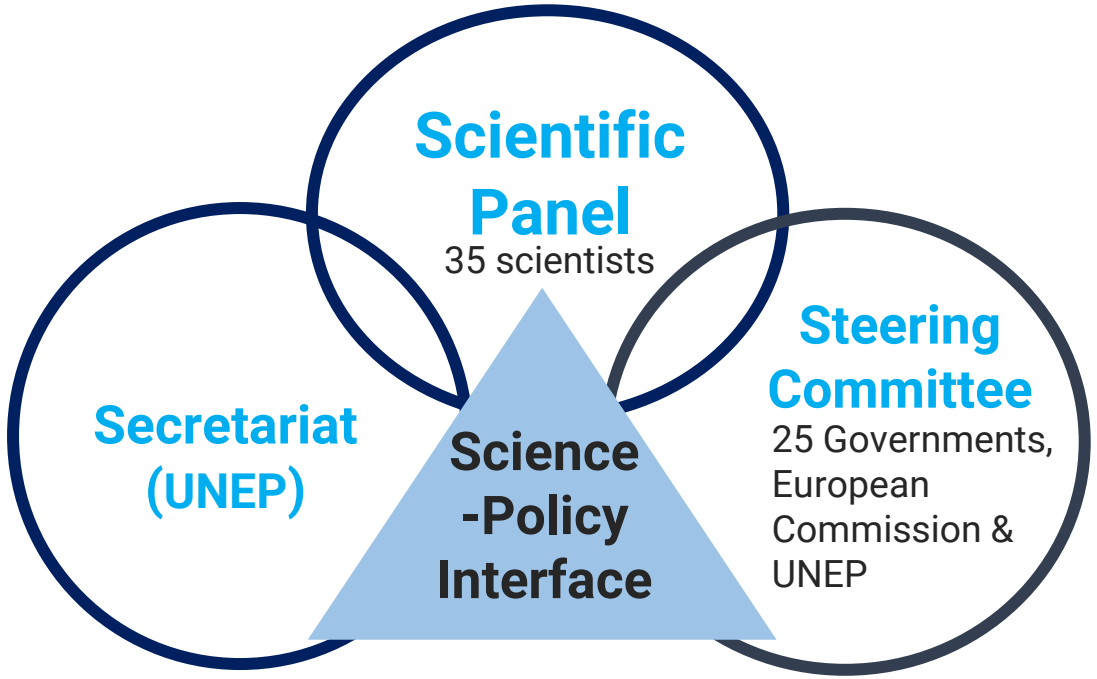


The International Resource Panel



An **independent** scientific Panel hosted by the United Nations Environment Programme created in 2007 to contribute to **a better understanding of sustainable development** from a **natural resources perspective**

The Panel proposes policy solutions to problems posed by resource depletion and misuse to high level policy audiences

G7 GERMANY
2015 | Schloss Elmau

G7 2017 ITALIA

WORLD RESOURCES FORUM

G20 2019 JAPAN

UNEA
United Nations Environment Assembly
of the United Nations Environment Programme

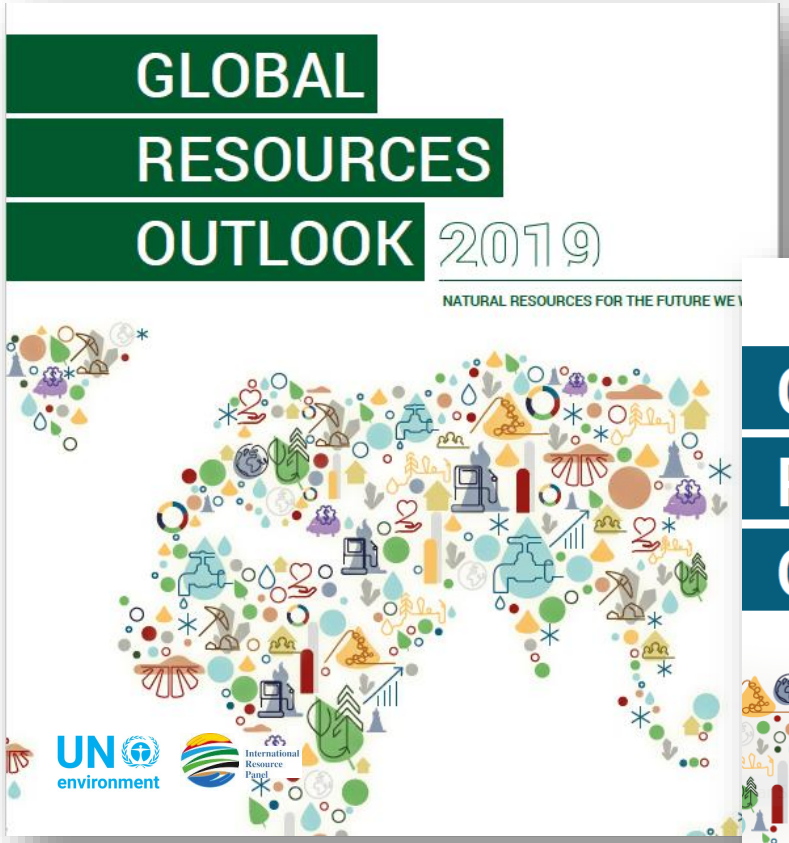
G20 ARGENTINA 2018

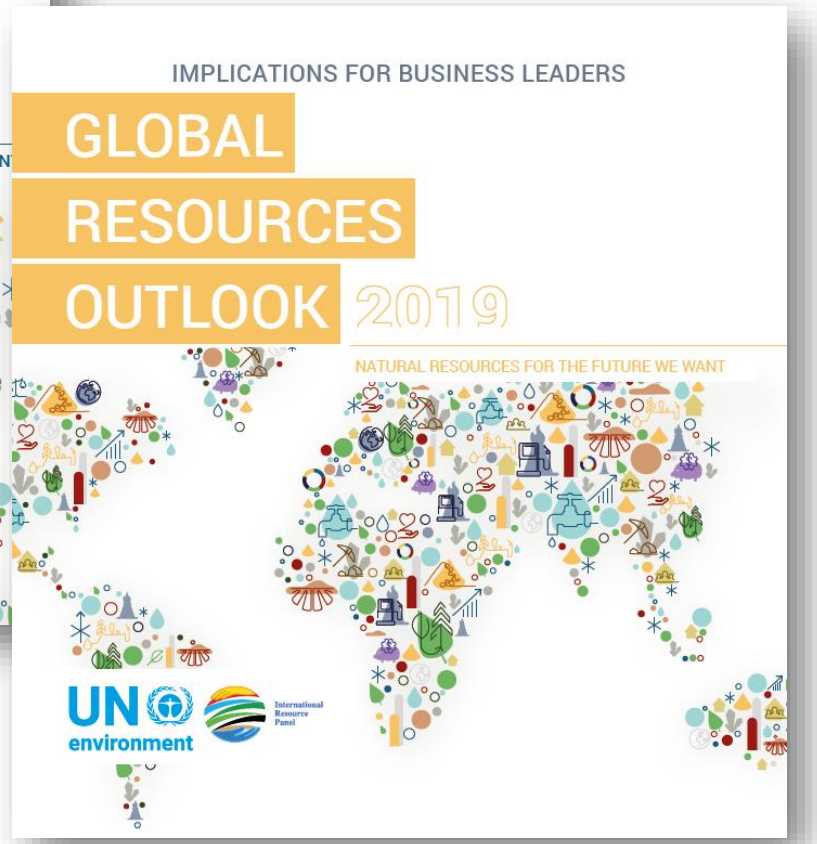
G7 FRANCE

WCEF 2018
WORLD CIRCULAR ECONOMY FORUM JAPAN

WORLD ECONOMIC FORUM

HIGH-LEVEL POLITICAL FORUM ON SUSTAINABLE DEVELOPMENT





Report launched 12th March 2019

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Why a Global Resources Outlook?

Formal Reason

In 2016, **UNEA-2 Resolution 2/8 on SCP** invited the International Resource Panel to make available **reports** relevant to the resolution, including on the state, trends and outlook of sustainable consumption and production, to a future meeting of the UNEA, but **not later than 2019**.

Resources are the (missing) **link** connecting climate change, biodiversity loss, pollution … **to economic activity**.

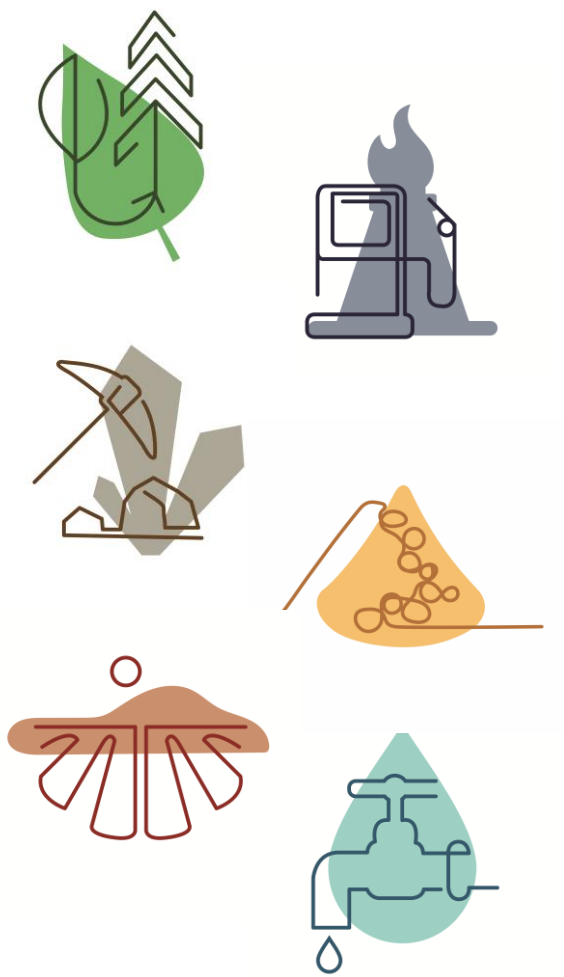
Only by putting resources at the **center** of our attention we can **solve** many **challenges** we face

SDGs DIRECTLY DEPENDENT ON NATURAL RESOURCES

Global Resources Outlook 2019

- ✓ **Global status and trends** on natural resources (metals, non-metallic minerals, fossil fuels, biomass, water, land).
- ✓ **Environmental, economic and social impacts** from current and future use of natural resources
- ✓ **Projections by 2060** on natural resource use and impacts under two scenarios: 'Historical Trends' and 'Towards Sustainability'
- ✓ **Policy recommendations** for economically attractive and technologically viable action to achieve sustainability goals.

Resources provide the **foundation** for the goods, services and infrastructure that make up **our current socio-economic systems**



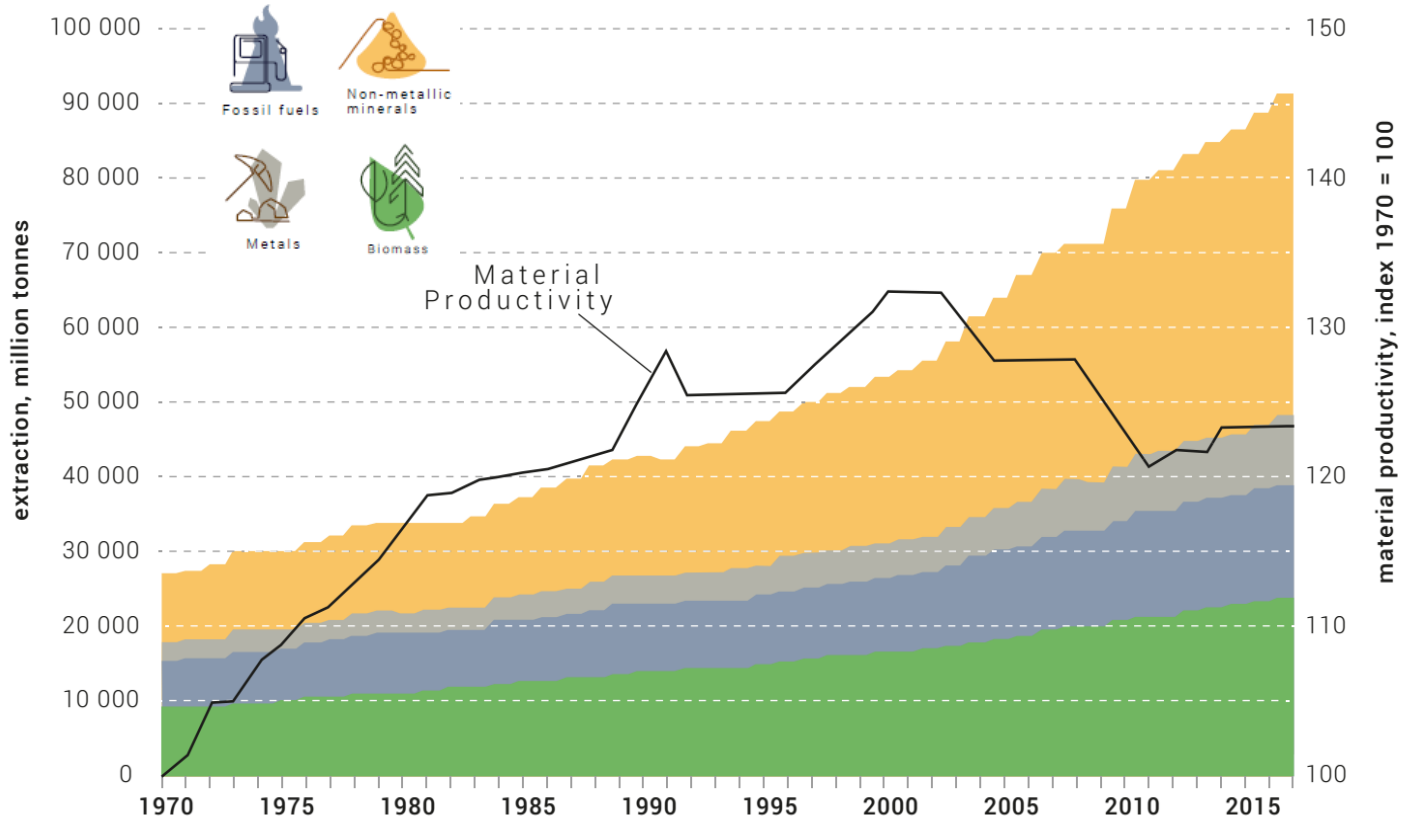
- **Biomass** (wood, crops, including food, fuel, feedstock and plant-based materials)
- **Fossil fuels** (coal, gas and oil)
- **Metals** (such as iron, aluminum and cooper…)
- **Non-metallic minerals** (including sand, gravel and limestone)
- **Land**
- **Water**

The **use** of natural resources has more than **tripled** from 1970, and **continues to grow**

92 billion tons of global extraction

12.2 tons materials demand per capita

Global material extraction and material productivity, 1970 - 2017



Myth: Technological advancement is making the global economy more resource efficient.

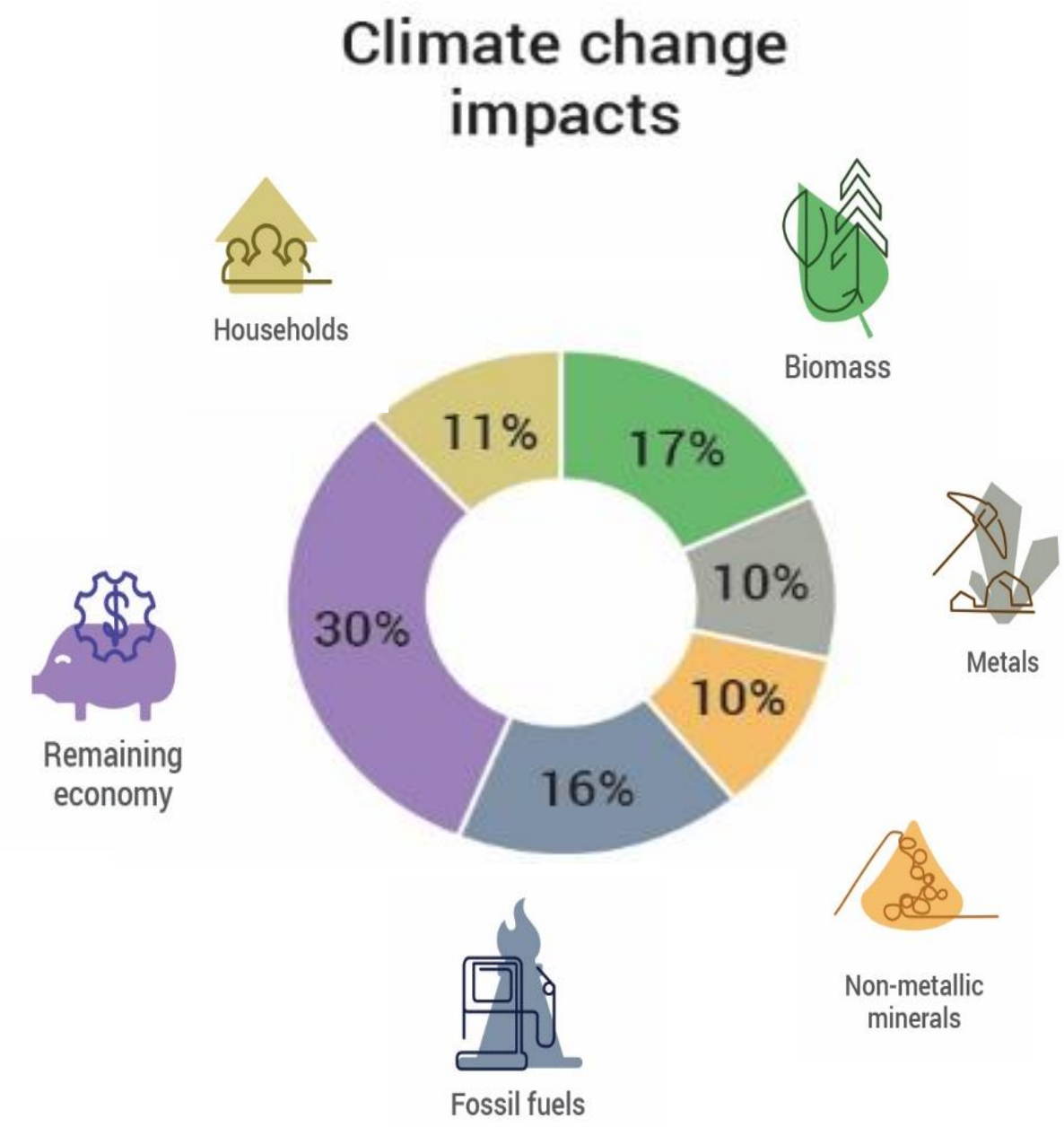
Fact: Some (high-income) countries are becoming much more efficient but **global productivity has not improved** in the last 20 years

Historical and current patterns of natural resource use are resulting in **increasingly negative impacts** on the environment and human health

50% of global climate change impacts

90% of global biodiversity loss and water stress

11% of global species loss



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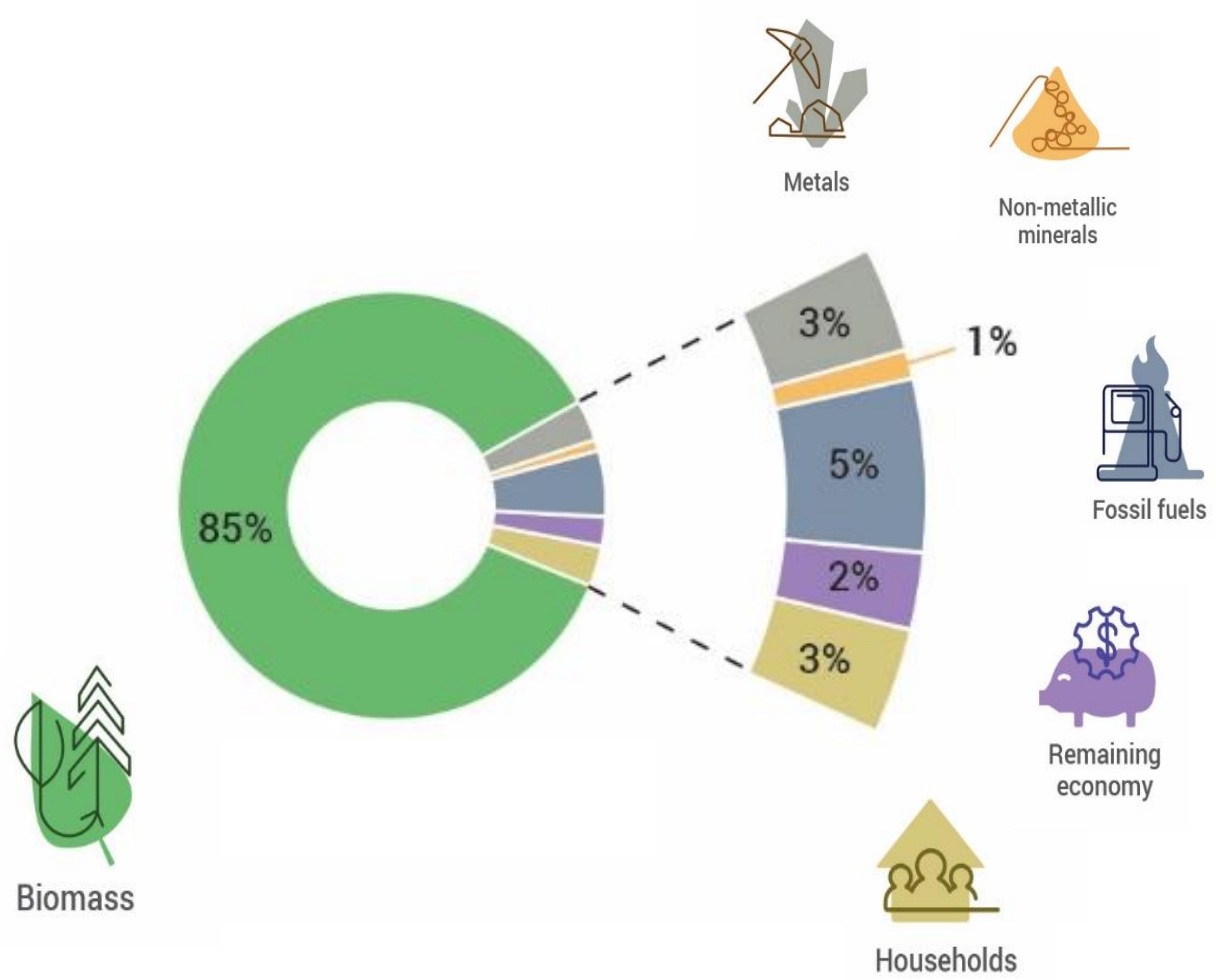
Water Stress Impacts



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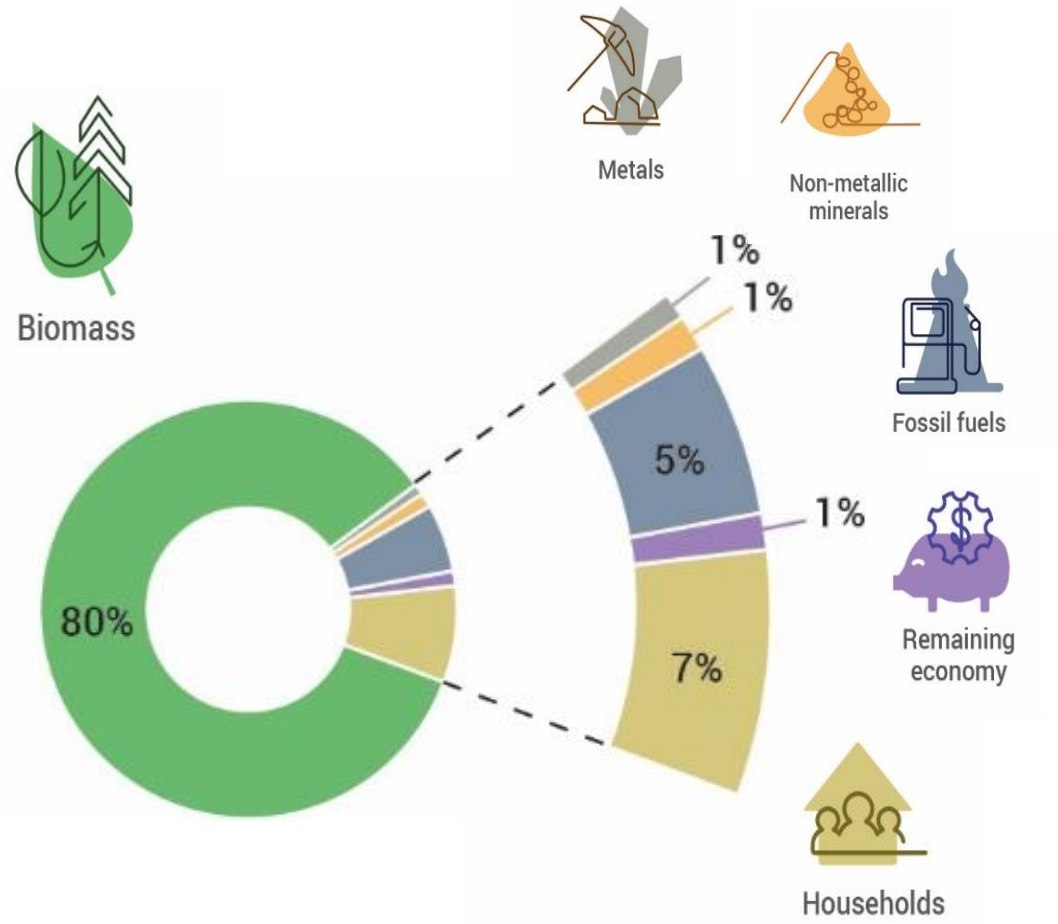
Land Use Related Biodiversity Loss



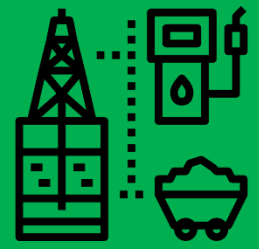
The use of natural resources and the related benefits and environmental impacts are unevenly distributed across countries and regions

The per capita material footprint from high-income countries is:

60% higher than the upper-middle-income group

13x the level of the low-income groups.

The per capita environmental impacts high-income countries is:



3-6x those of the low-income groups.

The use of natural resources and the related benefits and environmental impacts are unevenly distributed across countries and regions

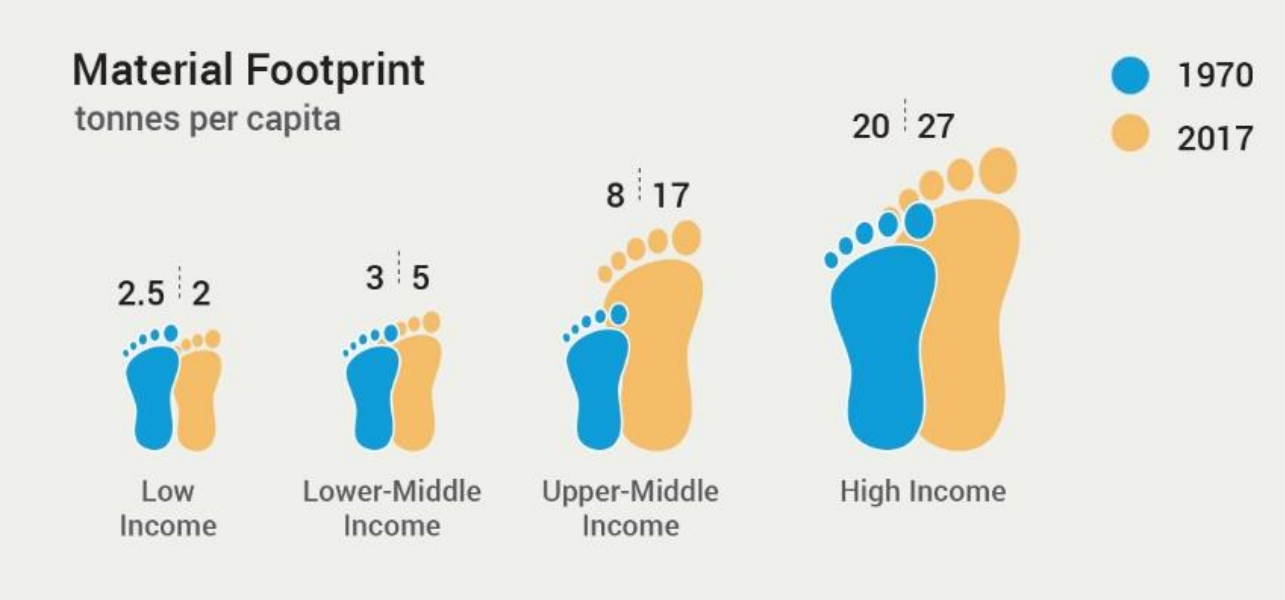
Rise of the upper-middle-income nations

56% of the global share of domestic material consumption in 2017

Higher per capita material consumption than the high-income group as of 2012

Practically **no change** for low income countries despite needing it the most

The use of natural resources and the related benefits and environmental impacts are unevenly distributed across countries and regions



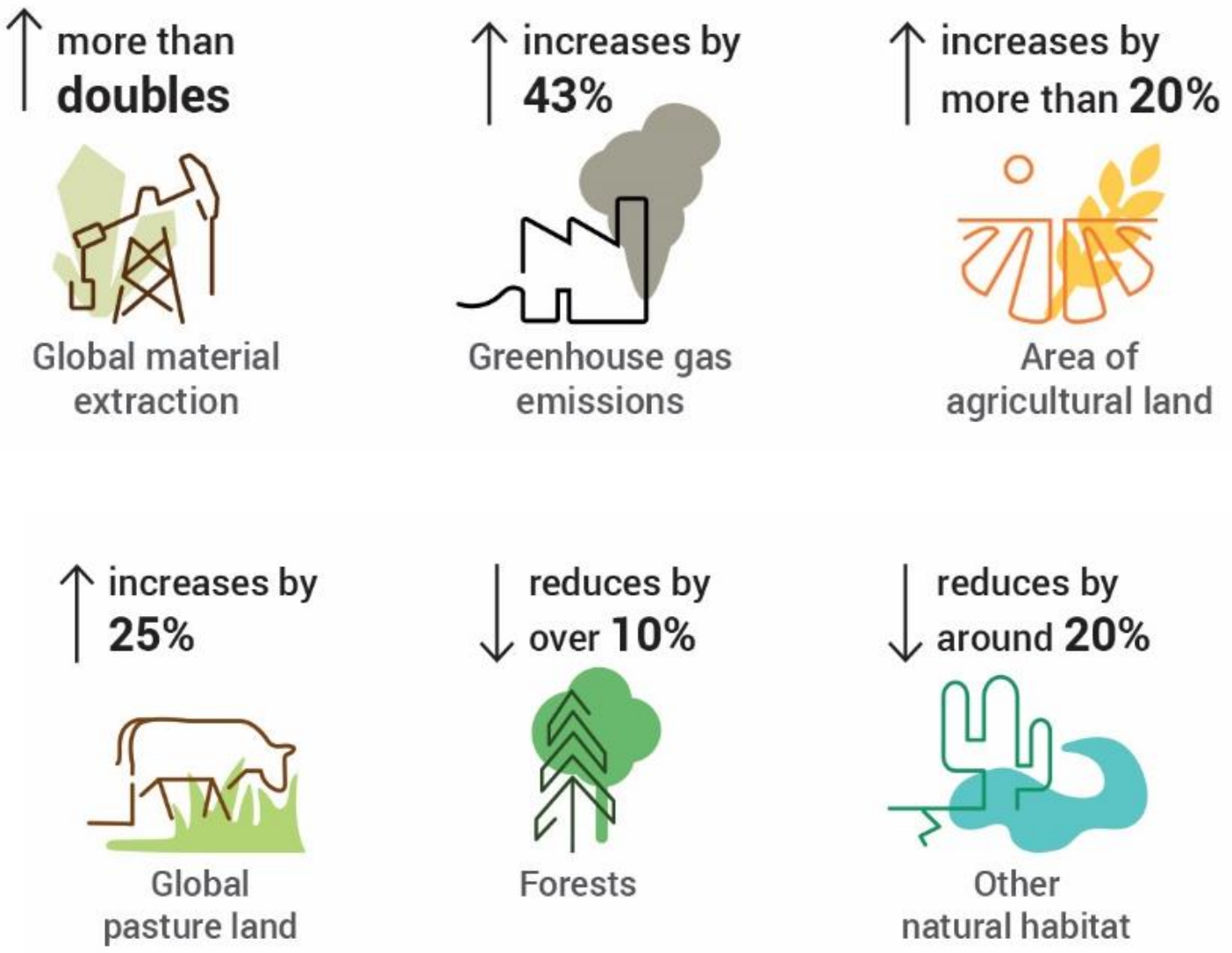
Two Key Drivers of Middle-Income Resource Use Growth

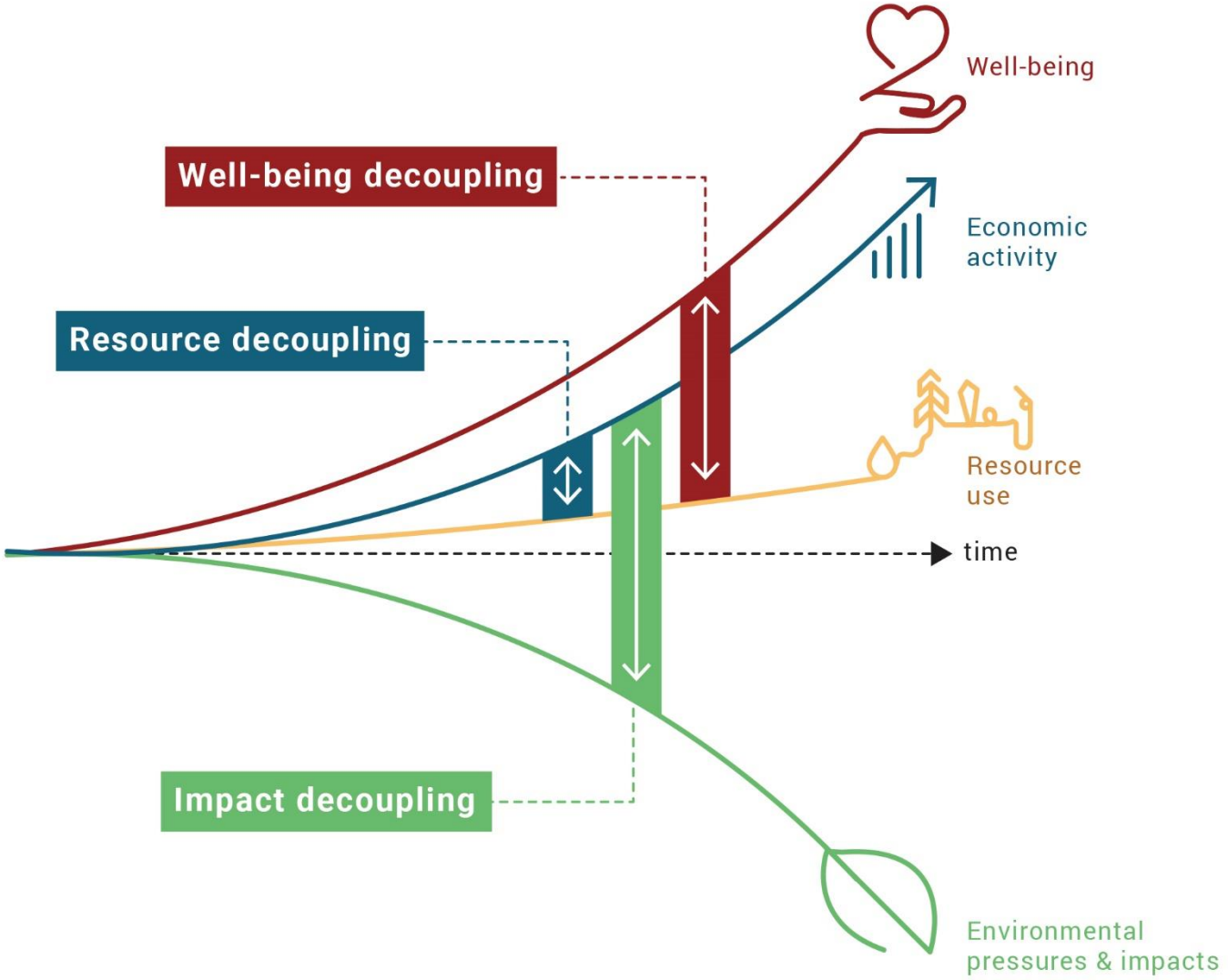
New infrastructure buildup in developing countries

Outsourcing of material & resource intensive production from high-income countries

High-income countries still dominate material footprints per capita

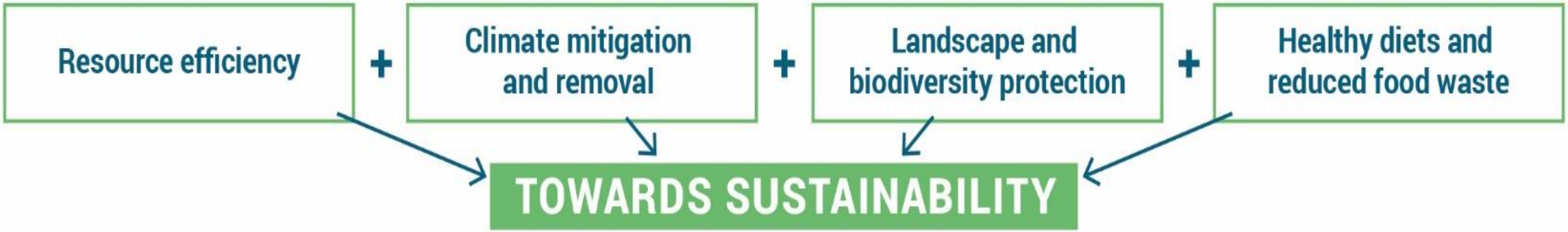
Without urgent and concerted action, rapid growth and inefficient use of natural resources will continue to create **unsustainable pressures** on the environment.





The decoupling of natural resource use and environmental impacts from economic activity and human well-being is an essential element in the transition to a sustainable future.

Achieving **decoupling is possible** and can deliver substantial **social and environmental benefits**, including repair of past environmental damage, while also supporting **economic growth and human well-being**



The *Towards Sustainability* scenario shows that changes in policies and behaviors can achieve decoupling of natural resource use and environmental impacts from economic growth and human wellbeing.

Towards Sustainability scenario assumptions

Resource Efficiency

Reduction in materials use in manufacturing and construction through innovation, increased demand and recycling

Assumed policies incl. regulations, technical standards, public procurement, shifts in taxation

Landscape and Biodiversity Protection

Bio-diversity in bio-sequestration solutions, reducing crop-based biofuels and limiting agricultural land

Assumed policies: biodiversity conditions on GHG sequestration sinks, and policies to conserve native vegetation and key biodiversity areas

Climate Mitigation and Removal

Bio-sequestration and carbon dioxide removal technologies

Assumed policies: Support of innovations through public investments, carbon levy for the financing of carbon sinks

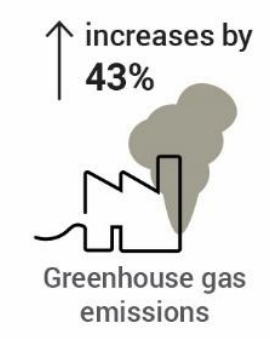
Shifts in Societal Behavior: Healthy Diets and Reduced Food Waste

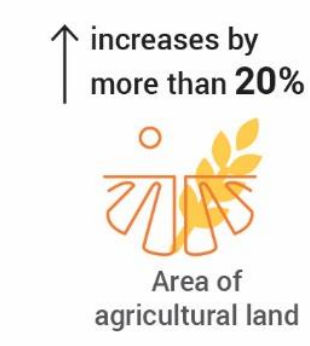
Halving the current meat consumption (less in regions of low-meat diets) and halving food waste by 2050

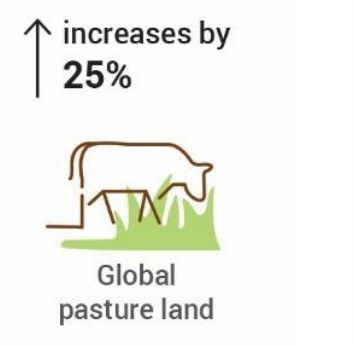
Assumed policies: Including public education

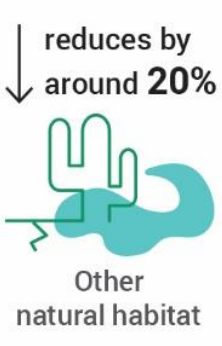
Historical Trends

Projected 2060 compared to 2015 levels in absence of urgent and concerted action



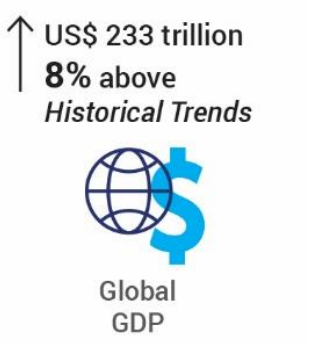


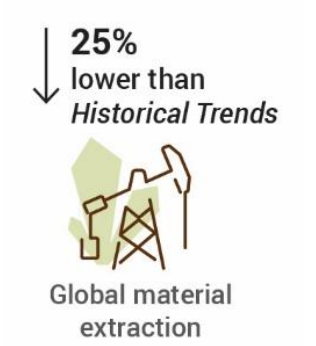


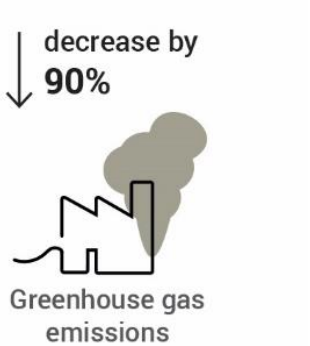


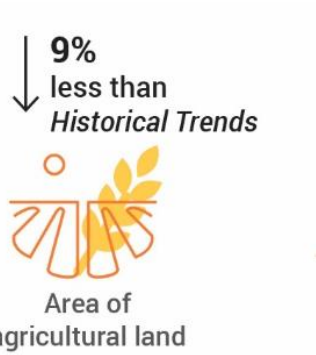
Towards Sustainability

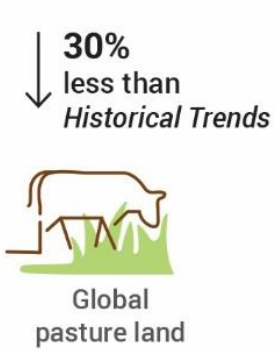
Projected 2060 levels “Towards Sustainability” in comparison to “Historical Trends”

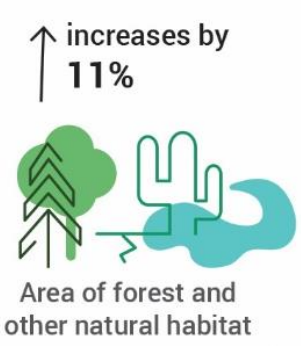


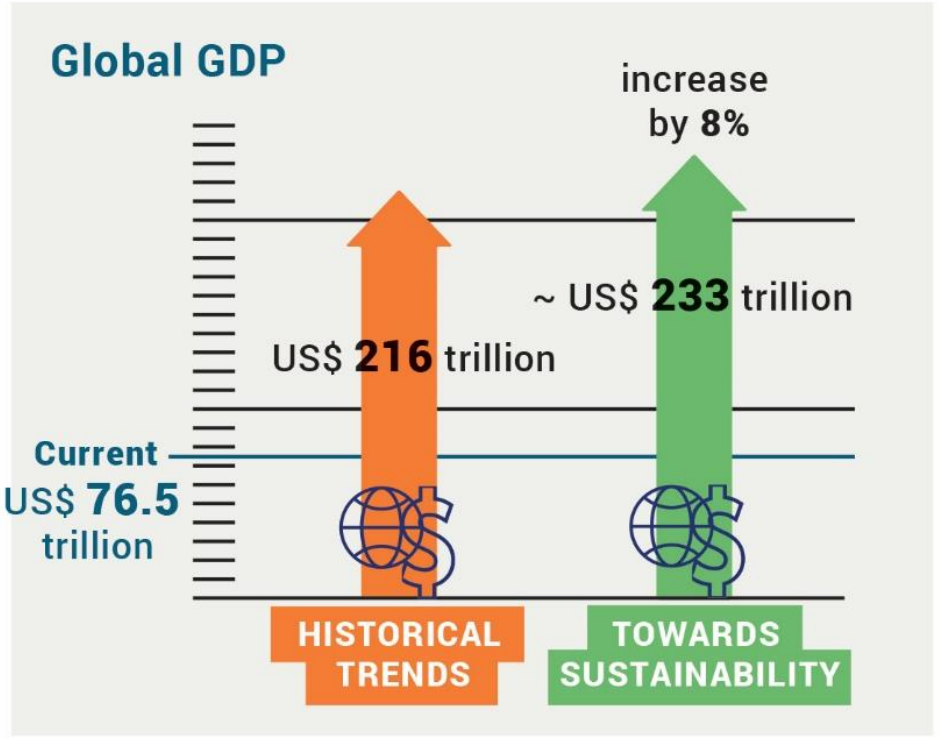


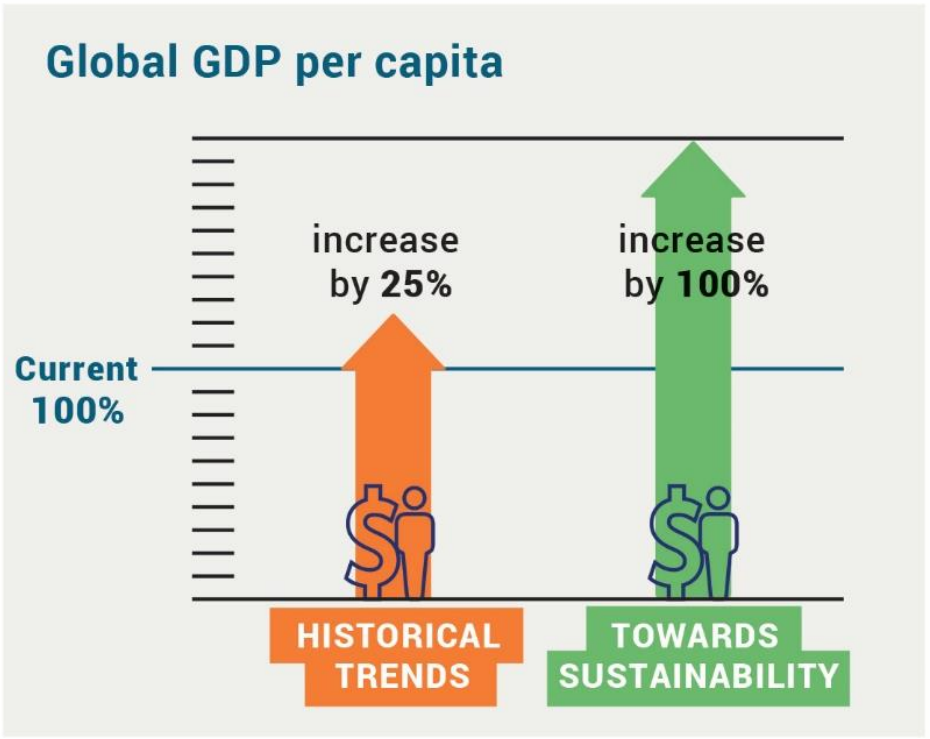






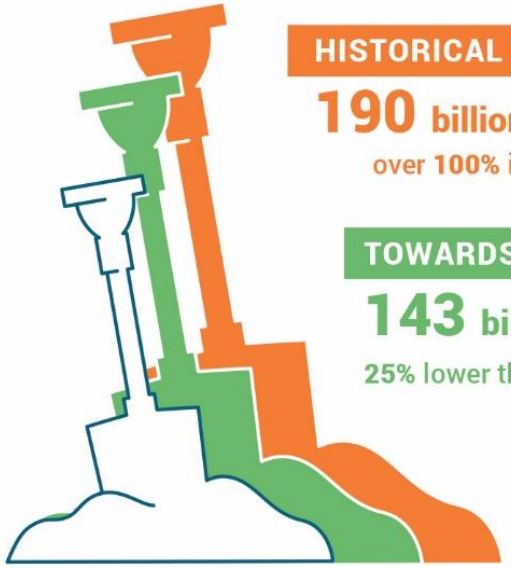






Growth rates in emerging and other developing economies must be **balanced** by absolute **reductions** in resource use in developed countries

Global material extraction



HISTORICAL TRENDS
190 billion tonnes
over **100%** increase

TOWARDS SUSTAINABILITY
143 billion tonnes
25% lower than under *Historical Trends*

CURRENT
92 billion tonnes

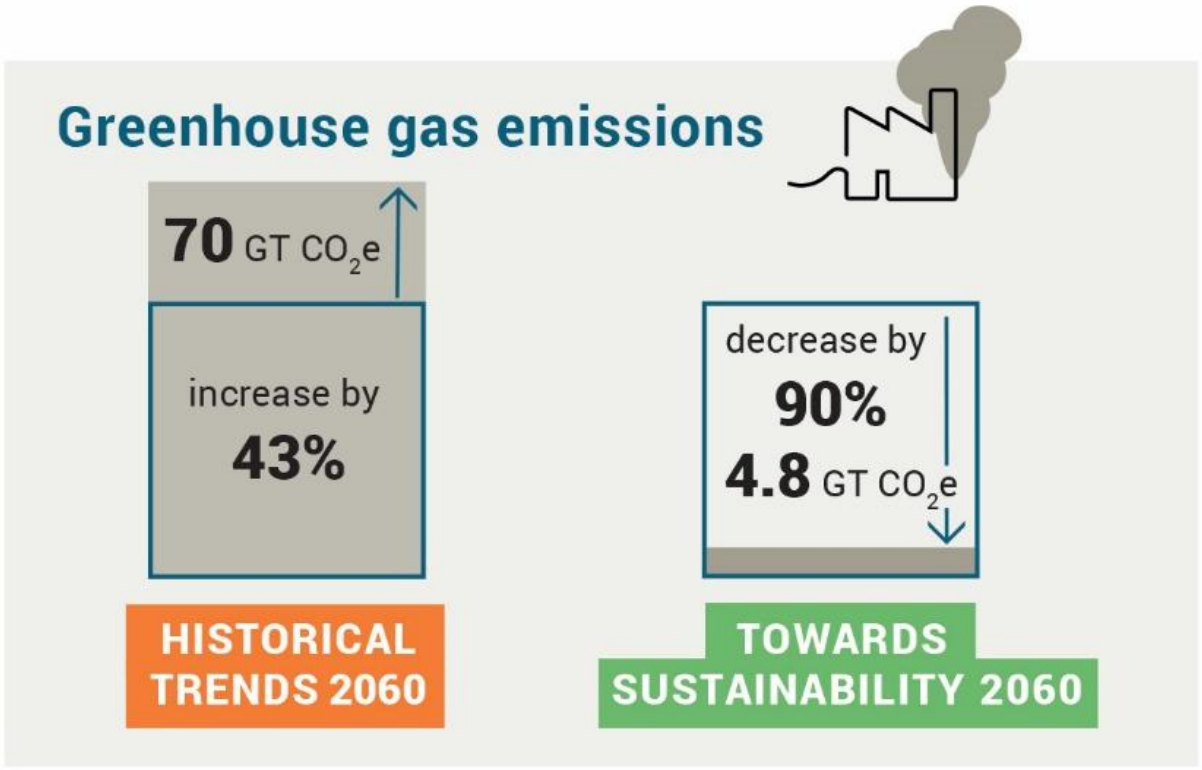
Domestic material consumption per capita

HISTORICAL TRENDS
18 tonnes
50% increase

TOWARDS SUSTAINABILITY
14 tonnes
only **17%** increase

CURRENT
12 tonnes

Growth rates in emerging and other developing economies must be **balanced** by absolute **reductions** in resource use in developed countries



Towards Sustainability

can achieve a

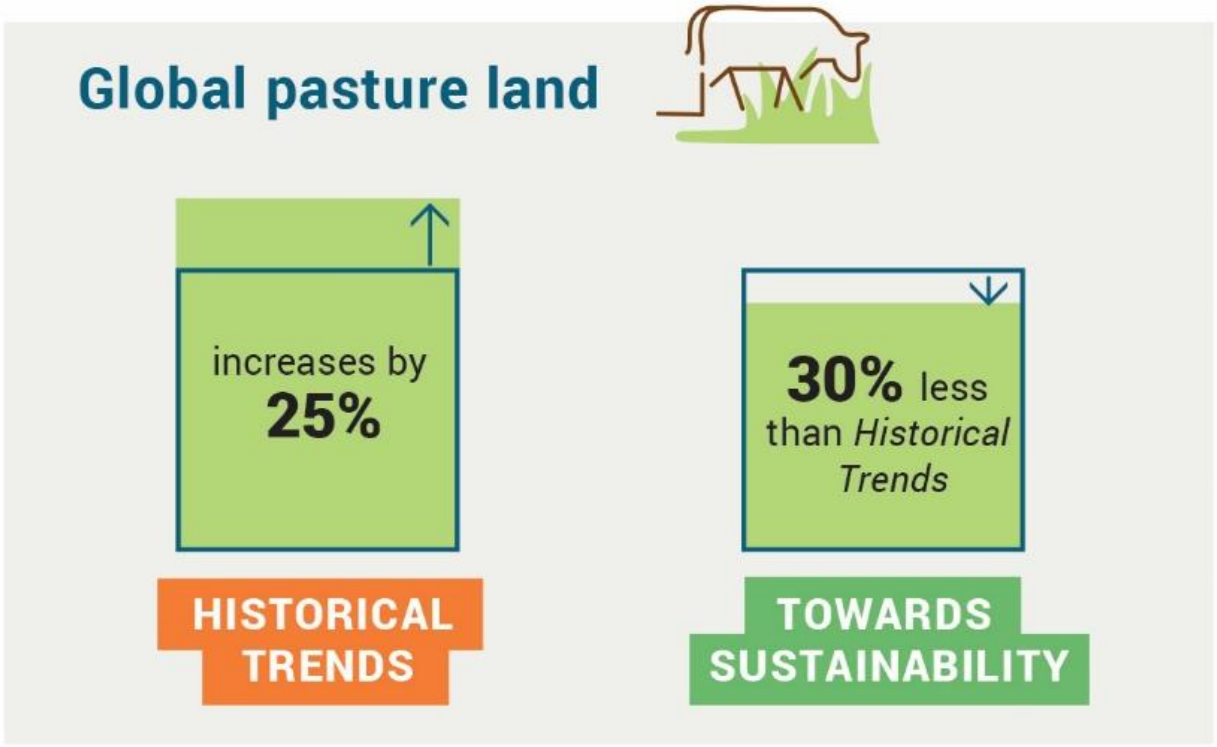
90% reduction

in

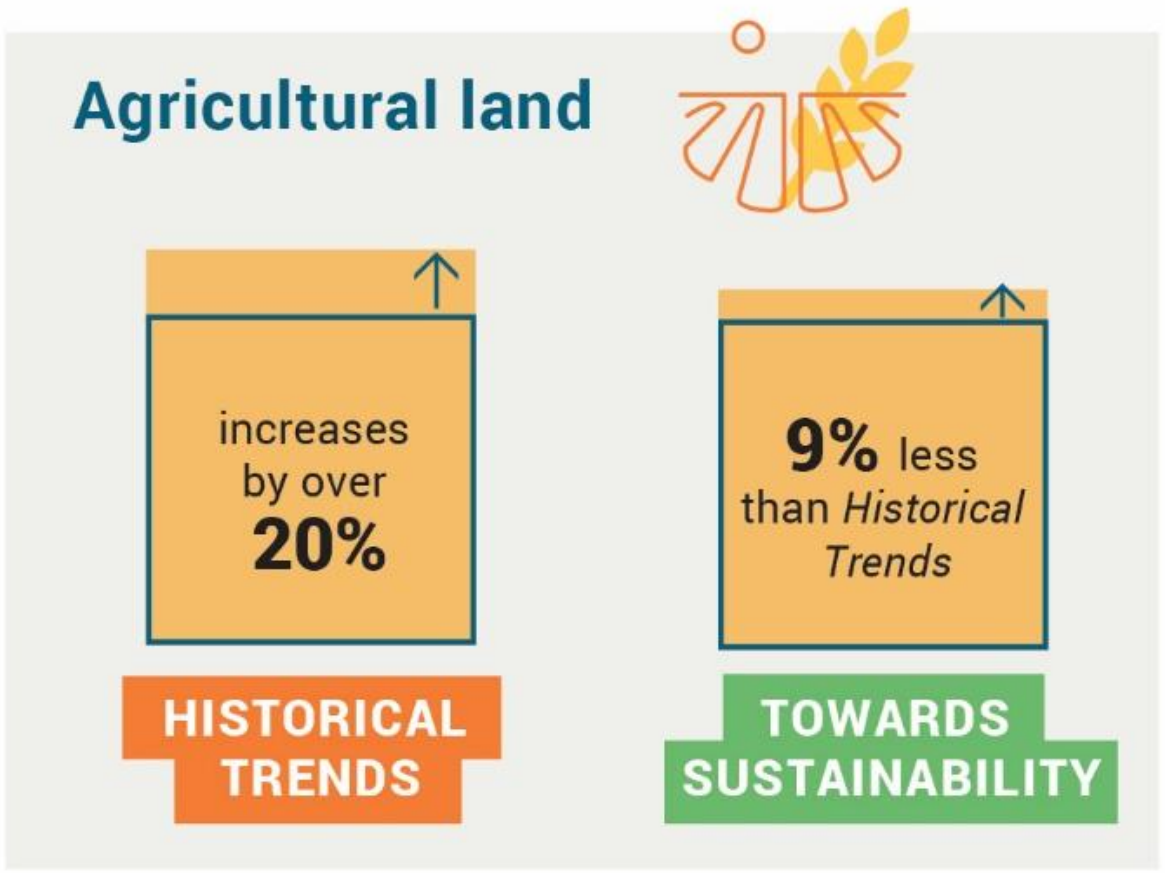
Greenhouse Gas Emissions

by

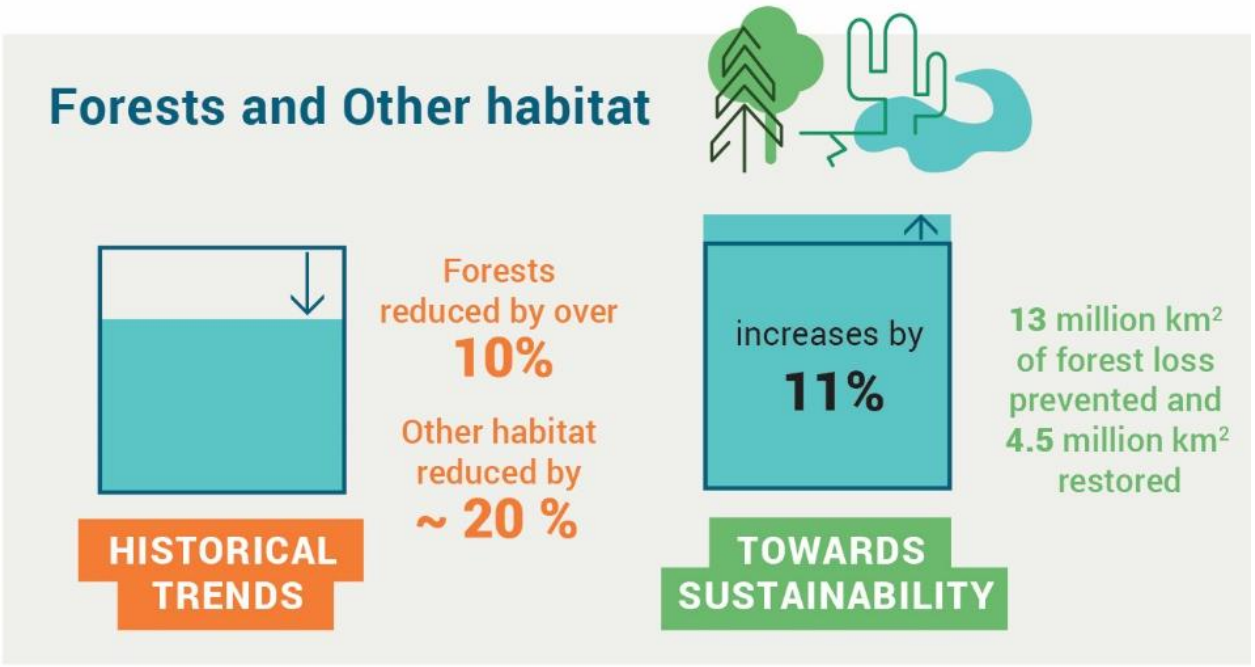
2060



Towards Sustainability
can achieve a
30% reduction
in
global pasture land
compared to Historical Trends
and by
2060



Towards Sustainability
can achieve a
9% reduction
in
global agricultural land
compared to Historical Trends
and by
2060



Towards Sustainability

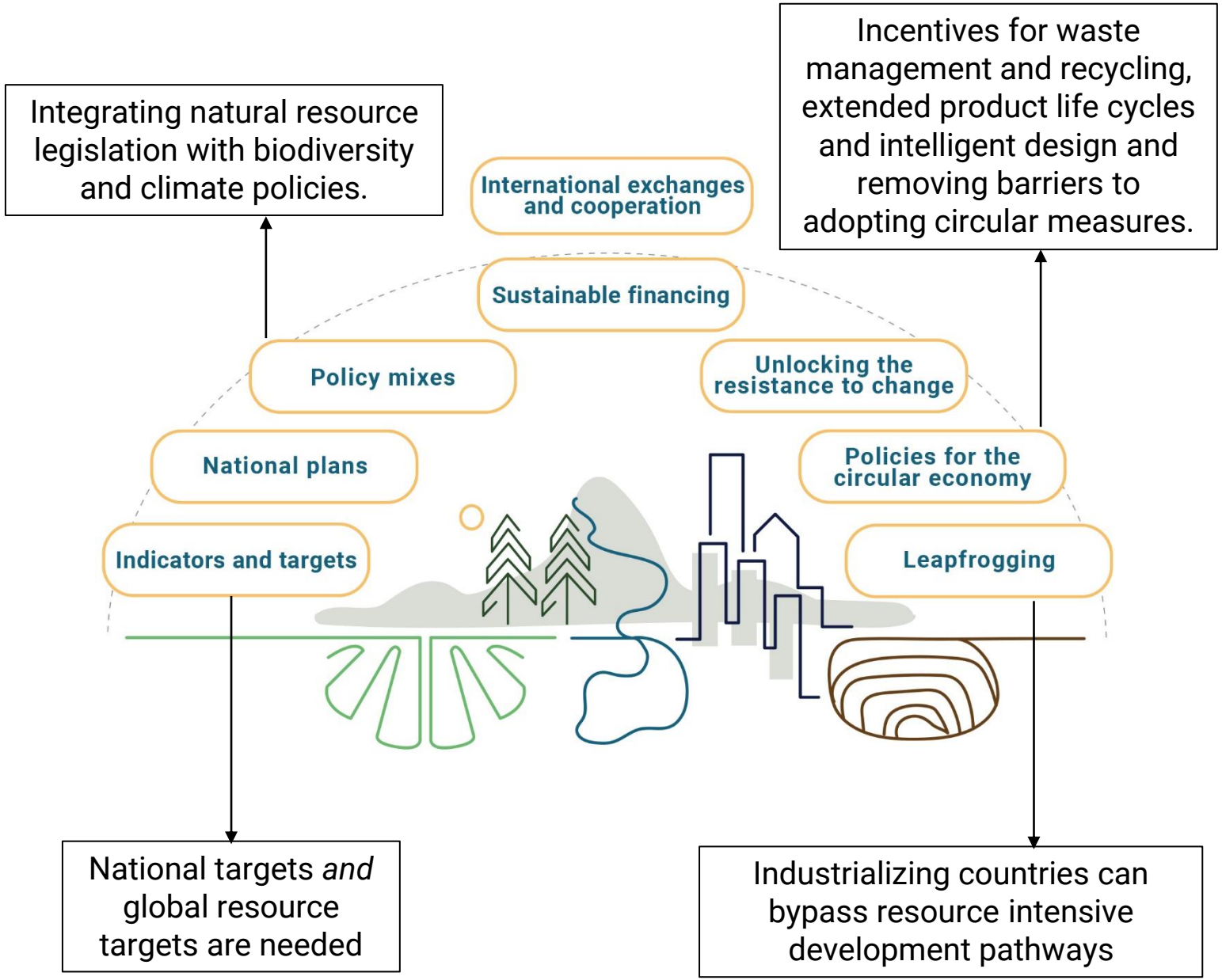
can

increase forests and other habitats

by **11%**

by **2060**

Policy and decision makers have tools at their disposal to advance worthwhile change, including transformational change at local, national and global scales.



International exchanges and cooperation can make important contributions to achieving systemic change.

Cooperation and information sharing with other global assessments for science based solutions

Exchange experiences and best practices through communities of practice and working groups

Synergistic approaches to international obligations

Global debate at high-level regional and global forums

UN environment
United Nations Environment Programme

International Resource Panel

Thank you!

Read the report: **www.resourcepanel.org/reports/global-resources-outlook**

Questions around the report or interest to engage within the IRP? **resourcepanel@unep.org**

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Implications for Business Leaders

TITLE

Date

Report Launch 13th March 2019

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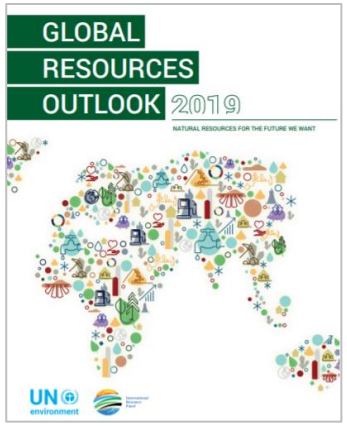
The *Implications for Business Leaders* is based on the GRO and inputs from IRP Strategic Partners in the private sector and their members



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Implications for Business Leaders report highlights and contextualizes GRO key findings for business-oriented decision makers

01 A new perspective: smart resource management for inclusive growth

02 A better science base is now available: key insights into global resource flows and their impacts

03 Making decoupling a reality: business and policy must target systemic actions

The IBL also offers a synthesis of the GRO 2019 Key insights per material[6]

01 Smart resource management can target today's complex challenges systemically and cost-effectively –and achieve inclusive growth

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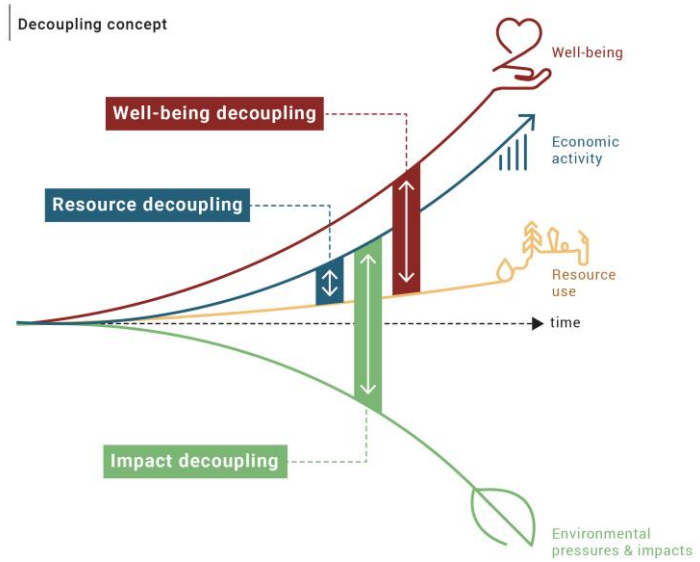
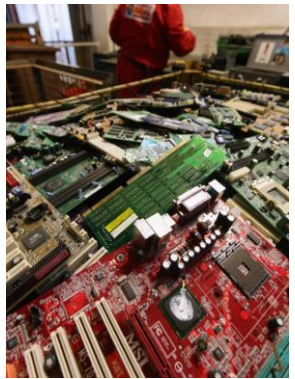
Disruption is ahead. It is time to shift away from traditional strategy setting based on extrapolation of historical trends to "embracing decoupling":



Save costs and build resilience to increasing resource price volatility and regulatory risks

Create new customer value and unlock new growth through resource-smart innovations, better services and building trust

Shape an economy that can deliver prosperity beyond 2030



02 Strategic decision-making must be based on a deep understanding of resource-related risks and opportunities

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The Global Resources Outlook 2019 provides better understanding of:

Global resource flows and implications: extraction, consumption and trade

The impacts of resource use and their distribution

Scenarios for our future – and decoupling as the viable avenue for continued and inclusive growth

Achieve the SDGs through concerted SCP measures: Boost the economy by 8%, converge incomes, and reduce environmental dangers

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The GRO provides new scenarios

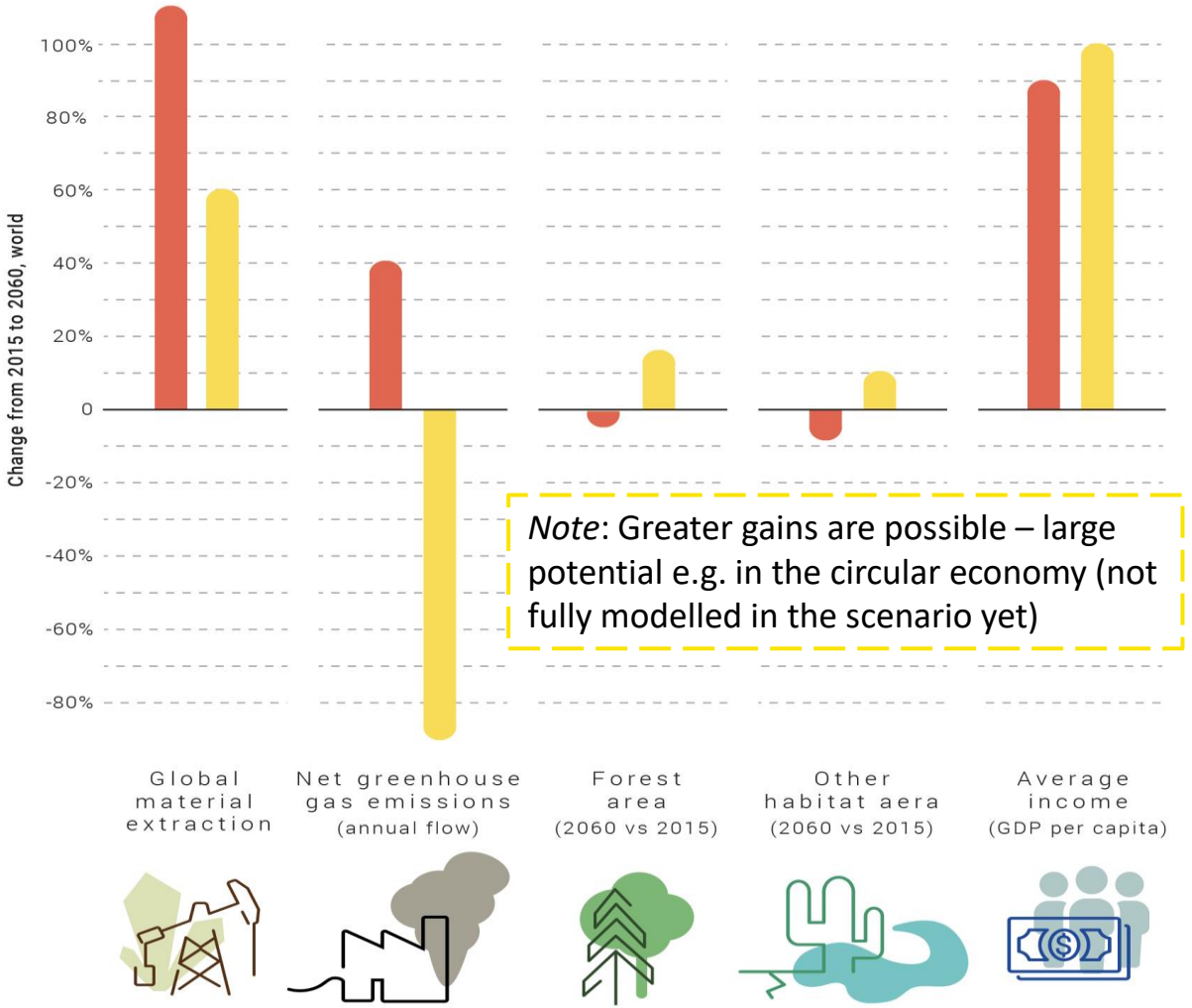
Towards Sustainability

- **Resource efficiency and innovation are key tools** to achieve economic development while reducing climate change, biodiversity and health dangers

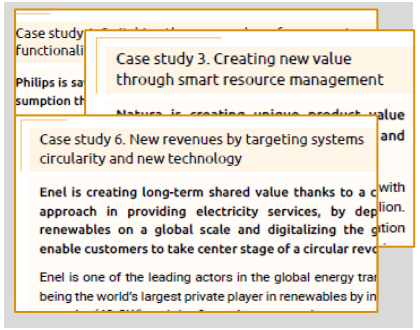
Historical Trends

- Continuing past economic trends would more than double global material use to 190 billion tonnes by 2060
- This would quickly exceed the planetary boundaries and prevent achieving the SDGs

Summary of selected benefits of concerted resource efficiency and sustainable consumption and production (SCP) measures modelled in the 'Towards Sustainability' scenario vs environmental pressures if 'Historical Trends' scenario continues



03 Making decoupling a reality: Start the transition to decoupled business success



Create a **vision of decoupled value creation** of your business, its value chain and markets

Get **inspired by frontrunners** and learn from good and bad examples

Start **immediately feasible innovations** in sourcing, design, production and marketing

Pursue **longer-term system strategies** to create circular markets and strengthen your competitive advantage

Enable the deep transition: Build coalitions and engage with policy making to create decupled markets

Collaboration across sectors and value chains can:

- Develop systemic visions and amplify ambition
- Share learnings and accelerate innovation
- Shape markets and educate consumers
- Share or de-risk investments and support scaling
- **Engage with policy making to ensure fairness and support to the transition**

Policy making with a systems approach is crucial to enable the decoupling transition

The IBL offers a selection of case studies of resource-smart business models and suitable coalition models to spur the systemic transition

International Resource Panel

*"Through **science-based analysis, targeted case studies and actionable recommendations**, this report provides critical insights for business leaders in developing more sustainable resource management practices."*

John W.H. Denton AO, Secretary General, International Chamber of Commerce

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cebds

ENERGY TRANSITIONS COMMISSION

Responsible Battery Coalition

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Confederation of Indian Industry

Additional Feature: The IBL offers a synthesis of the GRO key insights per material

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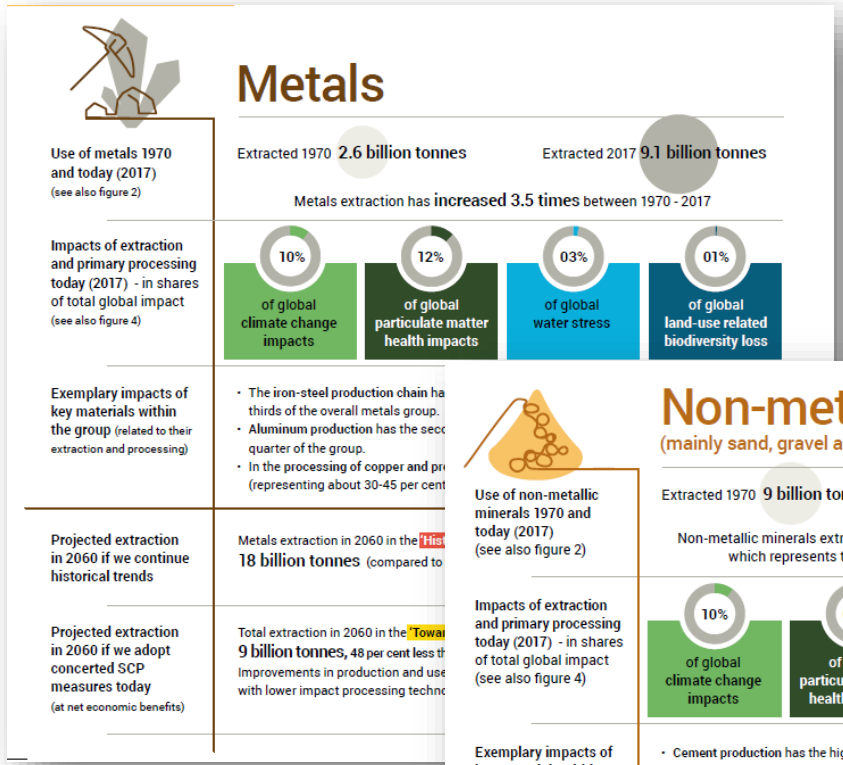


Metals

Use of metals 1970 and today (2017) (see also figure 2)

Extracted 1970 **2.6 billion tonnes** Extracted 2017 **9.1 billion tonnes**

Metals extraction has **increased 3.5 times** between 1970 - 2017

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 10% of global climate change impacts
- 12% of global particulate matter health impacts
- 03% of global water stress
- 01% of global land-use related biodiversity loss

Exemplary impacts of key materials within the group (related to their extraction and processing)

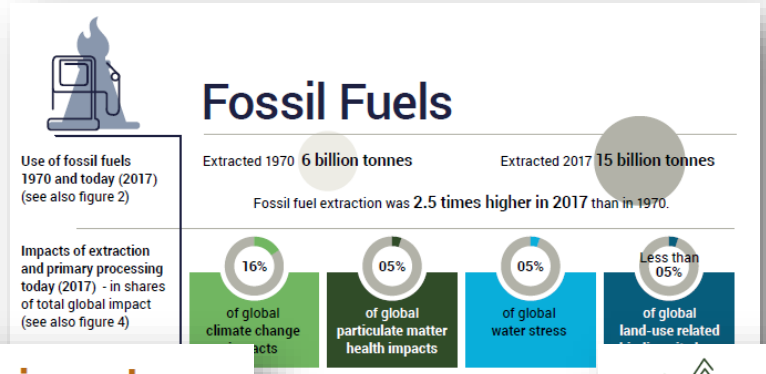
- The iron-steel production chain ha… thirds of the overall metals group.
- Aluminum production has the secc… quarter of the group.
- In the processing of copper and pr… (representing about 30-45 per cent

Projected extraction in 2060 if we continue historical trends

Metals extraction in 2060 in the 'Hist… **18 billion tonnes** (compared to

Projected extraction in 2060 if we adopt concerted SCP measures today (at net economic benefits)

Total extraction in 2060 in the 'Towa… **9 billion tonnes,** 48 per cent less th… Improvements in production and use… with lower impact processing techno…



Fossil Fuels

Use of fossil fuels 1970 and today (2017) (see also figure 2)

Extracted 1970 **6 billion tonnes** Extracted 2017 **15 billion tonnes**

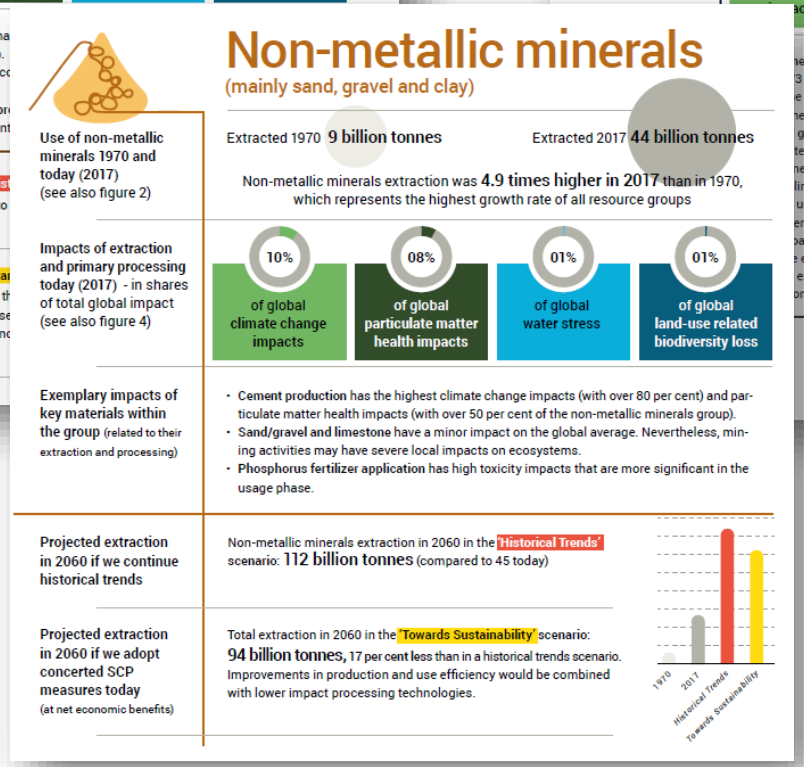
Fossil fuel extraction was **2.5 times higher in 2017** than in 1970.

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 16% of global climate change …acts
- 05% of global particulate matter health impacts
- 05% of global water stress
- Less than 05% of global land-use related …

…e emissions during fossil fuel extraction have a large climate … of the material group (fossil extraction and processing) and … latter without processing). Coal extraction alone contributes … emissions.

…gas extraction and processing are responsible for 26 per cent … group's climate change impact. Mostly, they arise from v… …ergy supply, as well as from leaks and other sources of fugitiv… …limate change impacts of the group's emissions are caused by … useful products (for example chemicals, various fuels and inte… …emical production (together >60 per cent of impacts of the ma… …al combustion and oil and gas extraction release significant a… …environment (for coal this is 35 per cent of global anthropoge… …extraction mercury is emitted with waste water and solid wast… …ons are major contributors to mercury contamination in ocean…



Non-metallic minerals

(mainly sand, gravel and clay)

Use of non-metallic minerals 1970 and today (2017) (see also figure 2)

Extracted 1970 **9 billion tonnes** Extracted 2017 **44 billion tonnes**

Non-metallic minerals extraction was **4.9 times higher in 2017** than in 1970, which represents the highest growth rate of all resource groups

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 10% of global climate change impacts
- 08% of global particulate matter health impacts
- 01% of global water stress
- 01% of global land-use related biodiversity loss

Exemplary impacts of key materials within the group (related to their extraction and processing)

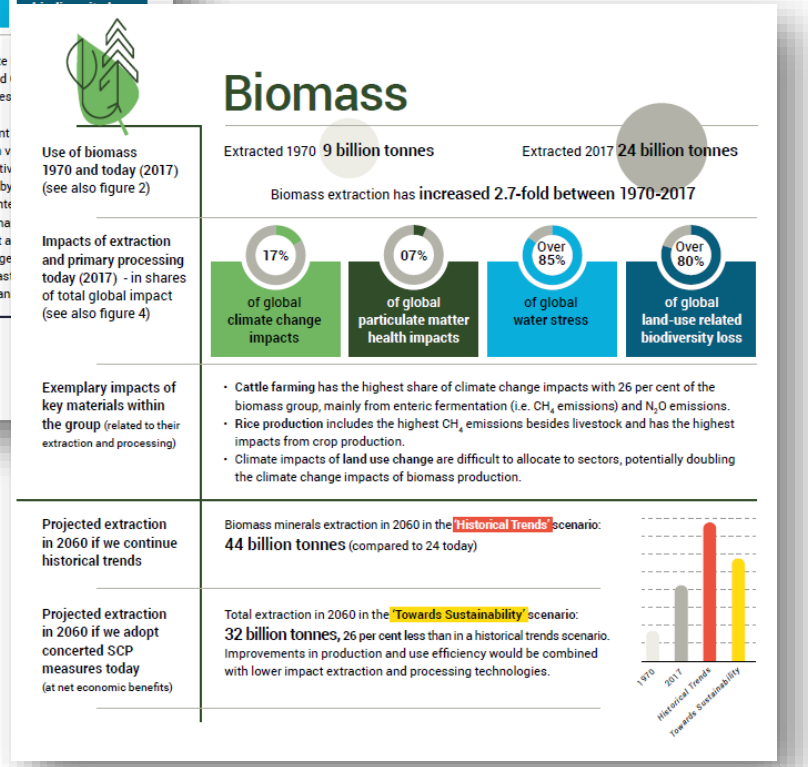
- **Cement production** has the highest climate change impacts (with over 80 per cent) and particulate matter health impacts (with over 50 per cent of the non-metallic minerals group).
- **Sand/gravel and limestone** have a minor impact on the global average. Nevertheless, mining activities may have severe local impacts on ecosystems.
- **Phosphorus fertilizer application** has high toxicity impacts that are more significant in the usage phase.

Projected extraction in 2060 if we continue historical trends

Non-metallic minerals extraction in 2060 in the 'Historical Trends' scenario: **112 billion tonnes** (compared to 45 today)

Projected extraction in 2060 if we adopt concerted SCP measures today (at net economic benefits)

Total extraction in 2060 in the 'Towards Sustainability' scenario: **94 billion tonnes,** 17 per cent less than in a historical trends scenario. Improvements in production and use efficiency would be combined with lower impact processing technologies.



Biomass

Use of biomass 1970 and today (2017) (see also figure 2)

Extracted 1970 **9 billion tonnes** Extracted 2017 **24 billion tonnes**

Biomass extraction has **increased 2.7-fold between 1970-2017**

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 17% of global climate change impacts
- 07% of global particulate matter health impacts
- Over 85% of global water stress
- Over 80% of global land-use related biodiversity loss

Exemplary impacts of key materials within the group (related to their extraction and processing)

- **Cattle farming** has the highest share of climate change impacts with 26 per cent of the biomass group, mainly from enteric fermentation (i.e. CH_4 emissions) and N_2O emissions.
- **Rice production** includes the highest CH_4 emissions besides livestock and has the highest impacts from crop production.
- Climate impacts of **land use change** are difficult to allocate to sectors, potentially doubling the climate change impacts of biomass production.

Projected extraction in 2060 if we continue historical trends

Biomass minerals extraction in 2060 in the 'Historical Trends' scenario: **44 billion tonnes** (compared to 24 today)

Projected extraction in 2060 if we adopt concerted SCP measures today (at net economic benefits)

Total extraction in 2060 in the 'Towards Sustainability' scenario: **32 billion tonnes,** 26 per cent less than in a historical trends scenario. Improvements in production and use efficiency would be combined with lower impact extraction and processing technologies.

International Resource Panel

Thank you!

Read the report: **www.resourcepanel.org/reports/global-resources-outlook**

Questions around the report or interest to engage within the IRP? **resourcepanel@unep.org**

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