# Modelling the nexus between resource use and climate change: Multi-regional input-output modelling

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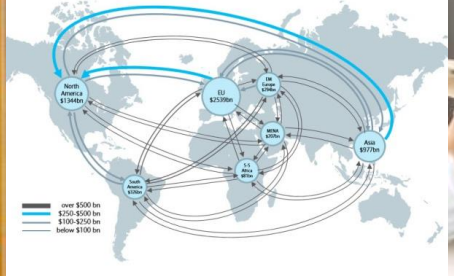
# Global resource flows

Primary production → Supply chains → Trade flows → Consumption

Supply chains → direct/indirect → „virtual" flows → „footprint"

# Environmentally extended multi-regional input-output approaches (EE-MRIO)

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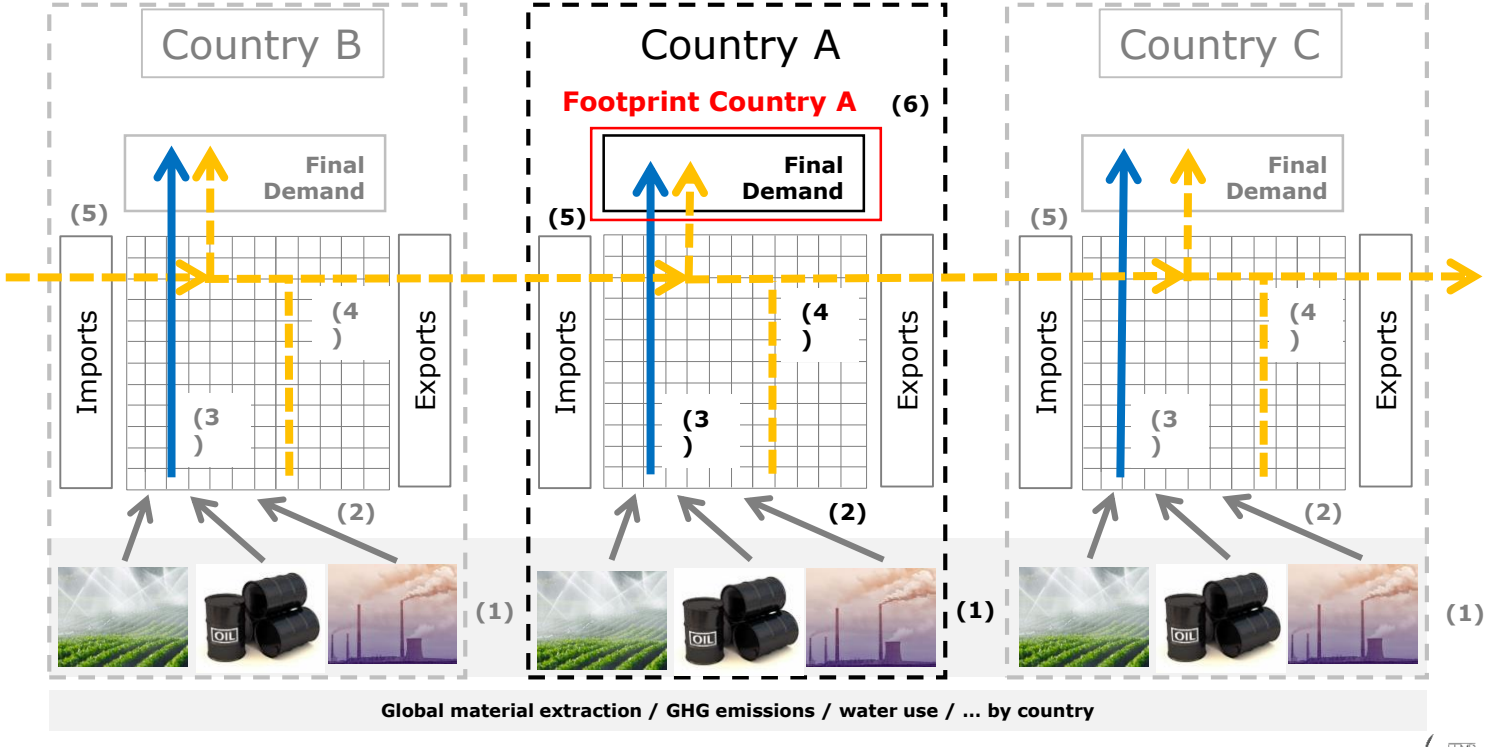
## Accounting for resource footprints



# Environmentally extended multi-regional input-output approaches (EE-MRIO)

| | | Country 1 | | | Country 2 | | | Final demand ($y$) | | Total output (X) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Agriculture ($z_{i1}$) | Industry ($z_{i2}$) | Services ($z_{i3}$) | Agriculture ($z_{i1}$) | Industry ($z_{i2}$) | Services ($z_{i3}$) | C1 | C2 | |
| Country 1 | Agriculture ($z_{1j}$) | | | | | | | | | Σ |
| | Industry ($z_{2j}$) | | | | | | | | | Σ |
| | Services ($z_{3j}$) | | | | | | | | | Σ |
| Country 2 | Agriculture ($z_{1j}$) | | | | | | | | | Σ |
| | Industry ($z_{2j}$) | | | | | | | | | Σ |
| | Services ($z_{3j}$) | | | | | | | | | Σ |
| | Material use ($e_j$) | | | | | | | | | |
| | Ghg ($e_j$) | | | | | | | | | |

$$(I-A)^{-1} * Y = X \qquad E = \hat{e}\,(I-A)^{-1} Y$$

# Applying EE-MRIO nexus analyses: The UBA report series “Resource Use in Germany”

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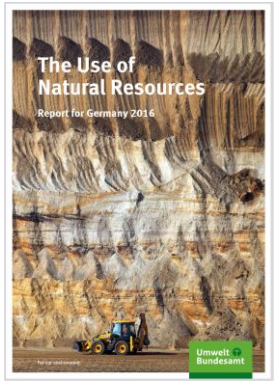
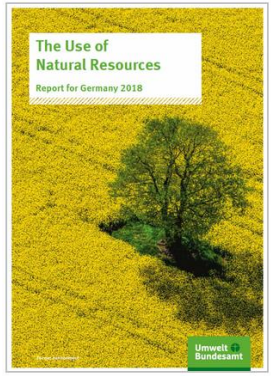
- …complements existing statistics and reports by addressing a broad range of stakeholders and making the topic more tangible;
- …sets the territorial perspective into relation with the footprint perspective;
- …in 2018 used EE-MRIO (e.g. EXIOBASE) to compare trends in Germany of the raw material footprint and the carbon footprint;
- …in 2022 will use EE-MRIO to carry out comprehensive nexus footprint analyses;
- …should inform and motivate readers to become responsible and active citizens;
- …aims at supporting the implementation of the Resource Efficiency Programme (ProgRess) of the German Federal Government.
- …can be found at https://www.umweltbundesamt.de/en/resource-use-in-germany




SCP HOTSPOT ANALYSIS

# Applying EE-MRIO nexus analyses: The SCP Hotspots Analysis Tool (SCP-HAT)

- …can be found at scp-hat.lifecycleinitiative.org
- …was commissioned by the Life Cycle Initiative together with the One Planet Network and the International Resource Panel;
- …aims at supporting science-based policy frameworks for SCP → SDG monitoring;
- …identifies hot spot areas of unsustainable production and consumption, to support setting priorities in national SCP and climate policies;
- …identifies hotspots related to domestic pressures and impacts (production perspective) and impacts occurring in foreign countries linked to domestic consumption (consumption or footprint perspective);
- …is based upon a global EE-MRIO (Eora)
- …was developed by WU Vienna, in collaboration with CSIRO and kindly supported by KGM & Associates (Eora database);

# SCP-HAT coverage

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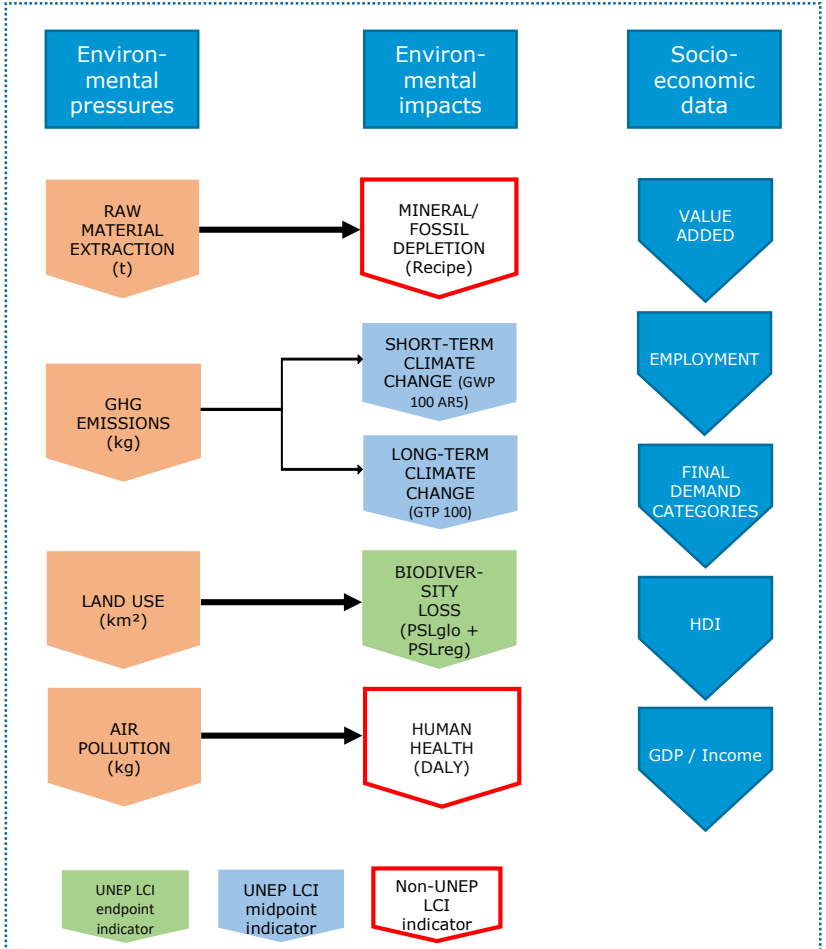
**Current SDG coverage**

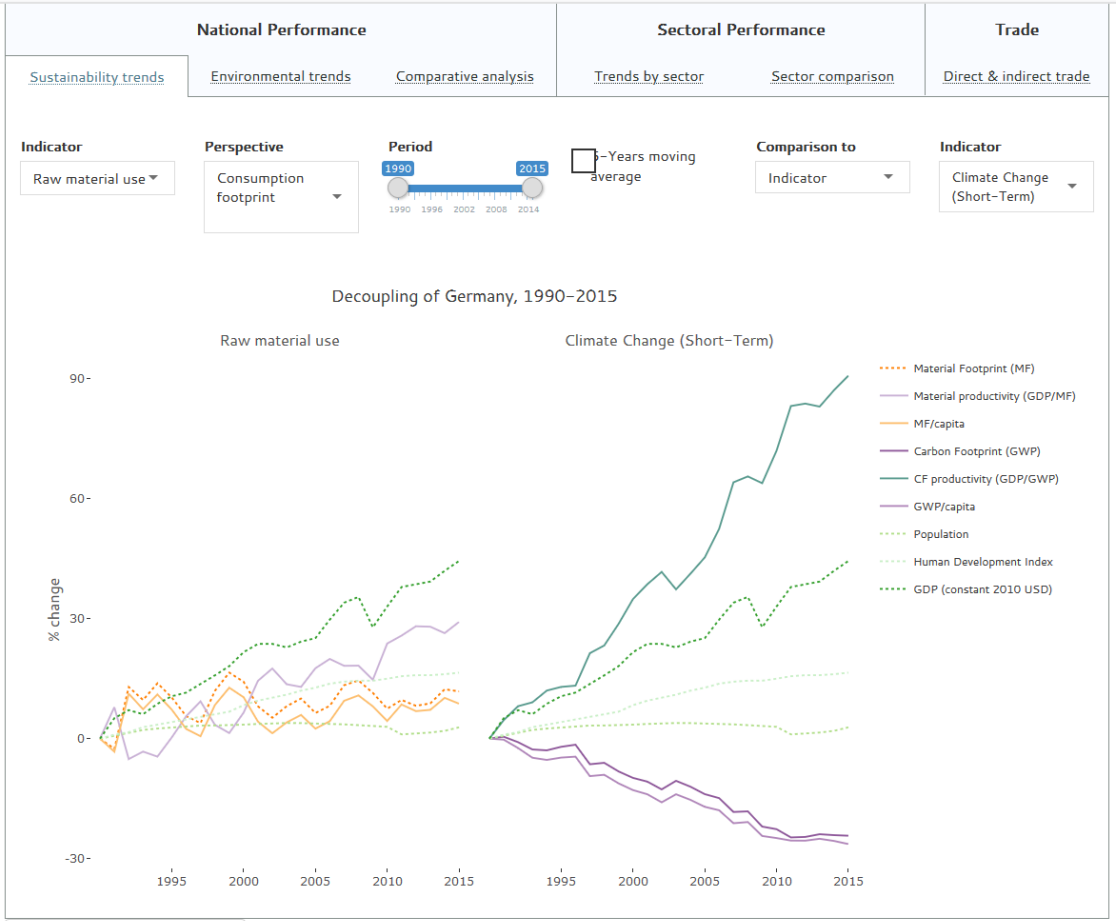




**Possible expansion areas**

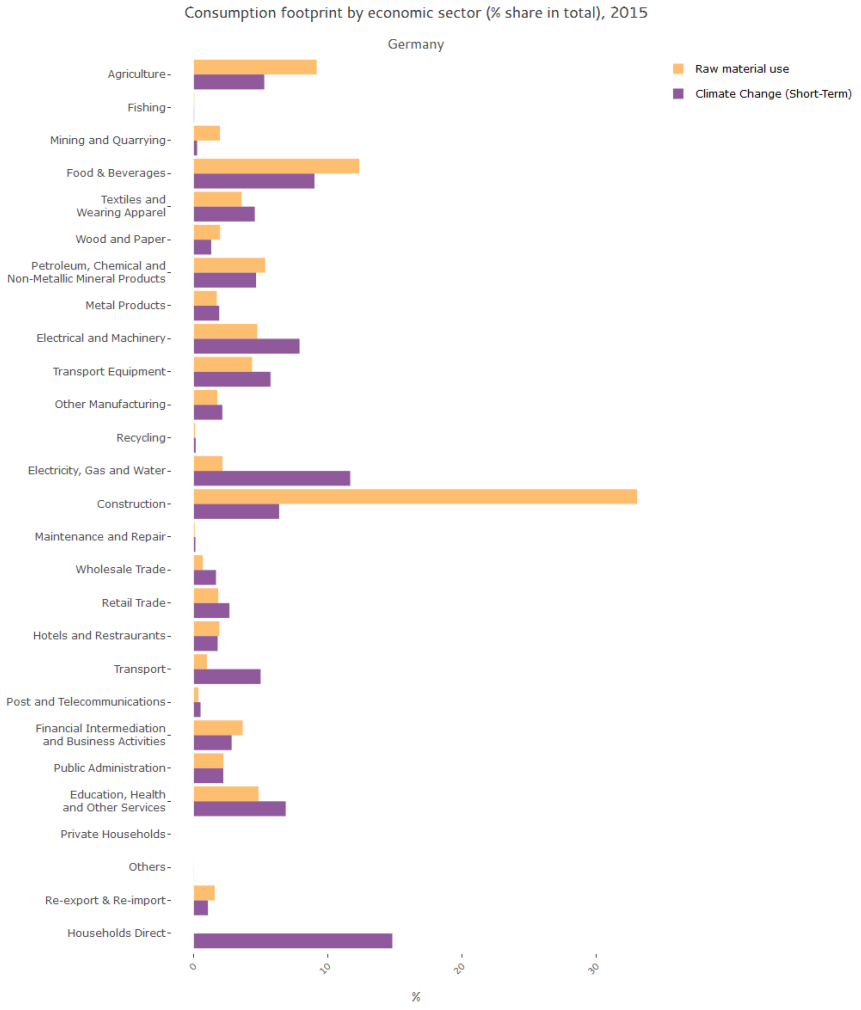

- Sustainable Food Systems
- Sustainable Buildings and Construction
- Sustainable Public Procurement

EFMD EQUIS ACCREDITED · AACSB ACCREDITED · ASSOCIATION AMBA ACCREDITED

# SCP-HAT: Comparing trends



# SCP-HAT: Comparing sectors



# SCP-HAT: Evaluation

- Great interest by policy/research community
  - Uptake by UNDP to support Nationally Determined Contribution (NDC)
  - Uptake by individual countries for SCP strategy development (SDG 12)
- Improvement needs
  - Increasing sector/product coverage → MRIO selection
  - Increasing thematic coverage (e.g. water, energy, etc.)
  - Include uncertainty analysis

# Thank you for your attention!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