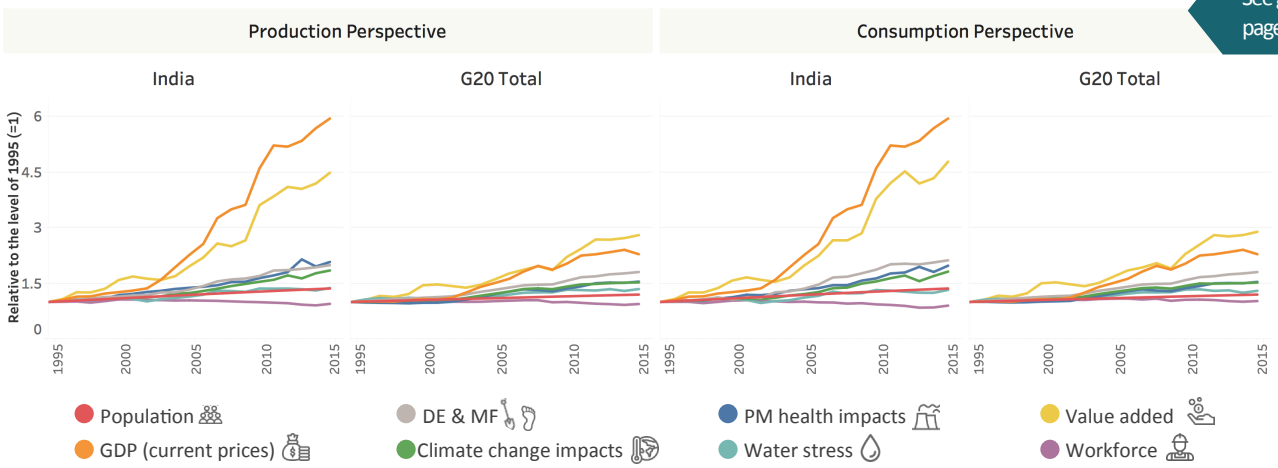
Natural Resource Use in the Group of 20

Status, Trends, and Solutions | India

Status and Trends of Natural Resource Use

Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in India and in the G20 (1995-2015)*

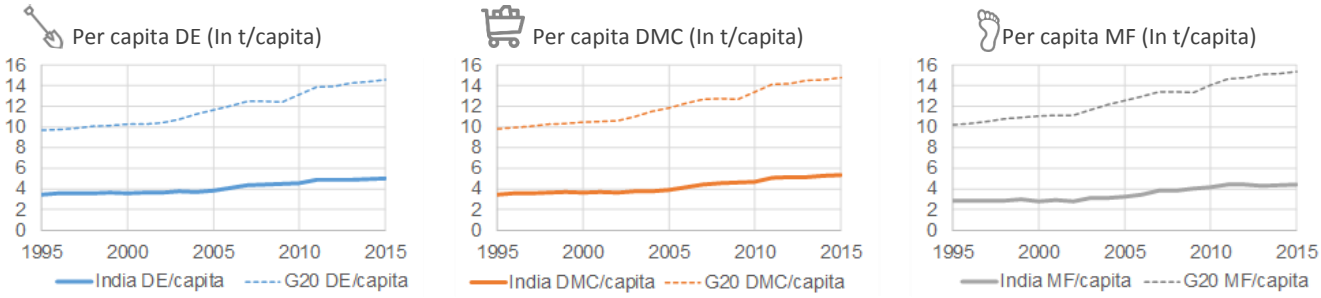
See glossary on pages 2 and 3



*Data after 2011 was nowcasted.

Source: IRP database, Exiobase v3.4 and Cabernard et al. 2019

Figure 2: Domestic extraction, domestic material consumption, and material footprint per capita in India and in the G20 (1995-2015)



Source: IRP database

From 1995 to 2015

Population grew by **36%** and GDP multiplied almost **sixfold.**

Domestic extraction, domestic material consumption and material footprint are similar in trend and magnitude.

Material footprint increased from **3** tonnes/capita in 1995 to **4.5** tonnes/capita in 2015 (only **30%** of the G20 average of 15 tonnes/capita in 2015). The difference with the G20 average grew over time.

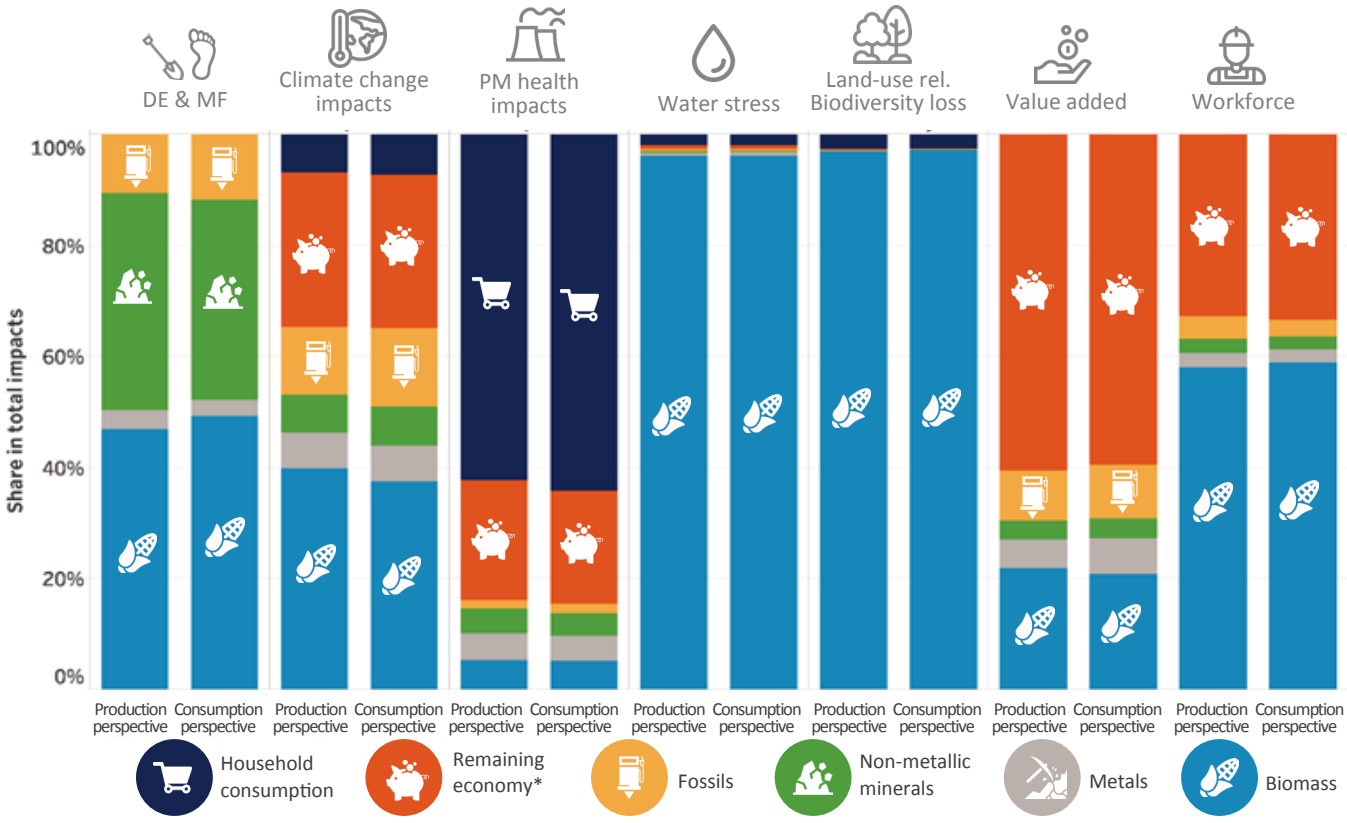
India experienced a strong relative decoupling of both material use and impacts from national GDP and added value related to material production. However, all material impacts increased on an absolute scale.

Water stress impacts related to material extraction and processing grew in line with population growth. The absolute level remained above G20 average

PM related health impacts grew stronger than the G20 average.

Contribution of Natural Resources by Category

Figure 3: Contribution of resource types to domestic extraction, material footprint, and total environmental and socio-economic impacts in India (2015)



*Remaining economy refers to activities other than resource extraction and processing (e.g. manufacturing of finished products, construction).
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

In contrast to G20 average, biomass dominated the share of domestic extraction amounts and material footprint. Non-metallic minerals only came in second, as India has not yet built up all infrastructure.

The extraction and processing of natural resources accounted for two thirds of India's total climate change impacts from both a production and consumption perspective (the G20 average was approximately 50% from both perspectives).

Outdoor particulate matter (PM) related health impacts mainly came from households (use of solid fuels for cooking).

In line with other G20 countries, India's water stress and land use-related biodiversity impacts were caused mainly by biomass production.

The material sector contributed 40% to value added and two thirds of all jobs, mostly low-income workforce in agriculture. This is much higher than G20 average (both less than 20%).

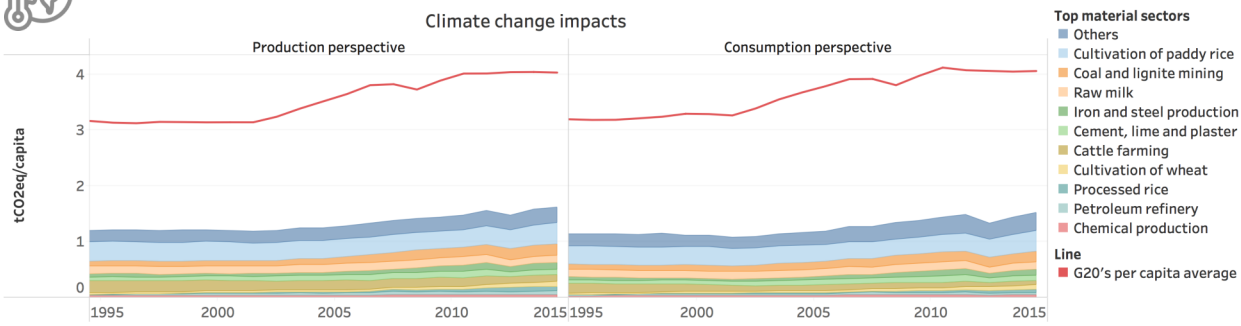
Results for all indicators from both a production and consumption perspective were rather similar.

Glossary

- **Consumption perspective:** The consumption perspective allocates the use of natural resources or the related impacts throughout the supply chain to the region where these resources, incorporated in various commodities, are finally consumed by industries, governments and households
- **Decoupling:** Decoupling is when resource use or some environmental pressure either grows at a slower rate than the economic activity that is causing it (relative decoupling) or declines while the economic activity continues to grow (absolute decoupling)
- **Domestic extraction (DE):** Direct, gross physical extraction of materials within a country's territory (production perspective)
- **Domestic material consumption (DMC):** Amount of materials directly used by an economy (DMC = DE + Material Imports – Material Exports)
- **Material resources:**
  - metals,
  - non-metallic minerals,
  - biomass,
  - fossils

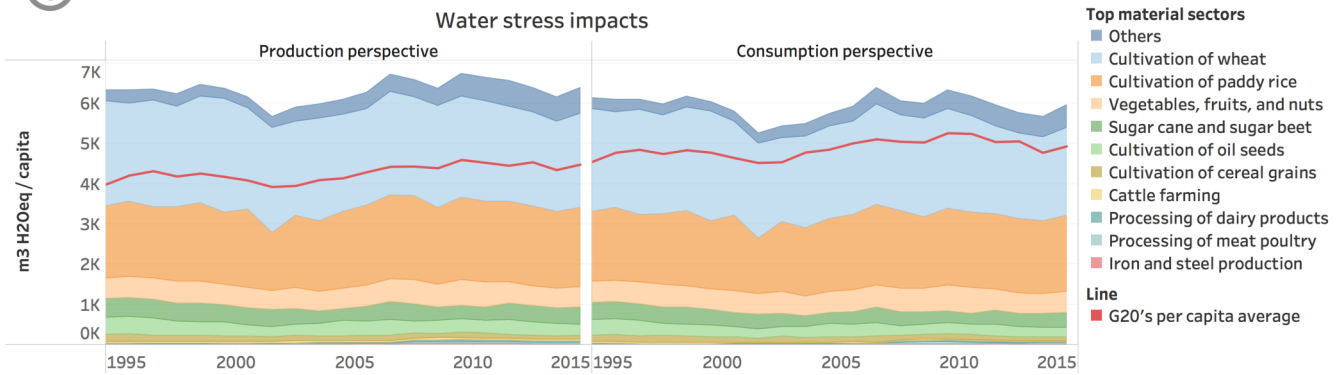
Key Sectors and Resources

Figure 4: Climate change impacts from material sectors in India (1995-2015)*



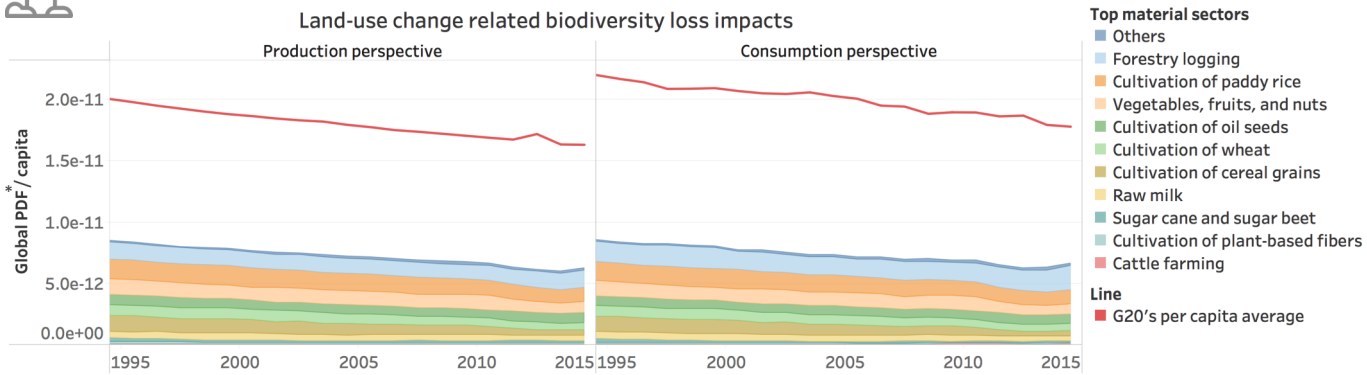
*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

Figure 5: Water stress from agricultural crop and material sectors in India (1995-2015)*



*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

Figure 6: Land-use related biodiversity loss from agricultural crops and material sectors in India (1995-2015)*



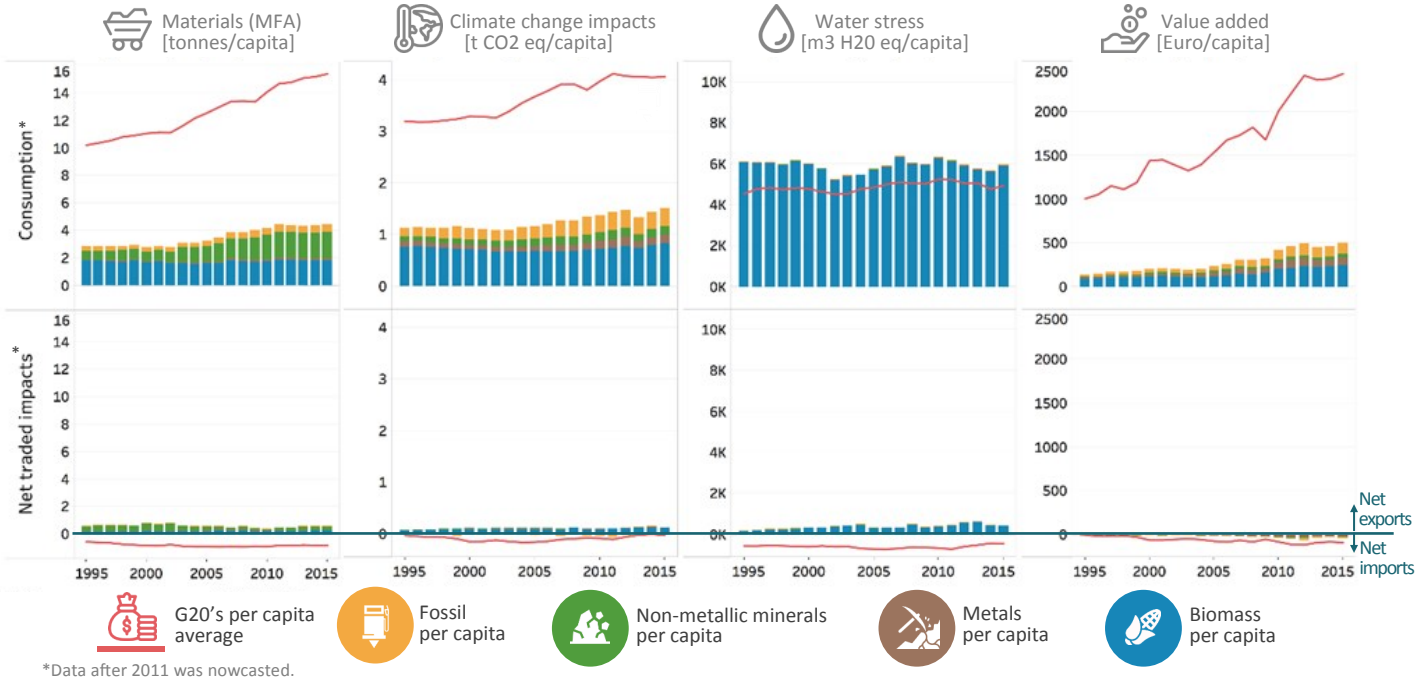
*Data after 2011 was nowcasted.
**PDF:* Potentially disappeared fraction of species
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

- Material-related climate change impacts were mainly caused by paddy rice production, coal mining and milk production.
- Climate change impacts remained 50% lower than G20 average.
- The construction industry used most climate-intensive materials, followed by the leather industry. Paddy rice and milk production caused the highest climate impacts from food consumed directly by households.
- Water stress impacts are significantly higher than the G20 average, due to domestic agriculture in water-scarce regions.
- Water stress is dominated by the production of wheat and paddy rice from both a production and consumption perspective.
- Land use related biodiversity loss is more than 50% lower than G20 average, with a decreasing trend. This loss comes mostly from the forestry sector, followed by paddy rice production (from a consumption and production perspective).

- **Material footprint (MF):** A nation's MF fully accounts for material extraction in other countries used for local consumption in the nation of interest (consumption perspective)
- **Material intensity (MI):** Indicates efficiency of material use (MI = DMC / GDP)
- **Material-related impacts:** Impacts related to the extraction and processing of material resources (including the upstream supply chain, such as electricity generation and transport)
- **Net traded materials/impacts:** Difference between material-related impacts from a production and consumption perspective. In the case of environmental impacts, a positive value means that the material-related impacts from exports are greater than the impacts from imports (and vice-versa: environmental impacts with negative values mean that the material-related impacts from imports are greater than the impacts from exports)
- **Production perspective:** The production perspective allocates the use of natural resources or the impacts related to natural resource extraction and processing to the location where they physically occur

The environmental effects of trade

Figure 7: Per-capita consumption footprints (above) and net traded impacts (below) in India (1995-2015)*



*Data after 2011 was nowcasted.
Consumption: Impacts throughout the supply chain from goods imported and consumed in India.
Net traded impacts: Difference between material-related impacts from a production and consumption perspective.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

India's demand for resources is mostly covered by domestic sources.
India is a net exporter of all material types, but traded amounts are relatively low.

Accordingly, more environmental impacts are caused within India for material exports than outside its borders for imports (except for climate change impacts of fossils).

For all material types but biomass, net value added was higher outside of Indian borders. This means that cheap raw materials were exported and more expensive materials were imported.

Future trends and potential Decoupling

- Scenarios developed by the IRP forecast an increase of GDP by a factor of between 7 and 10 and a population growth of between +19% and +36% until 2060.
- If ambitious resource efficiency policies are introduced, India could see a relative and maybe even absolute decoupling of domestic material extraction and domestic material consumption from GDP until 2060. Overall, DE and DMC are projected to increase by 50% and 70%, respectively, in the best-case scenario.
- India suffers from considerable particulate matter pollution due to resource use. Lowering solid fuel burning in households and improving coal power abatement technologies are essential steps for combating health effects.
- A large build up of infrastructure is anticipated in the next decades. Due to the size of the population, this could result in significant resource demands and environmental impacts. Material efficient urban design is therefore of uttermost importance.
- Several types of environmental impacts have been relatively decoupled from material extraction. Opportunities for further improvement exist, for example in the coal-based electricity sector.

This factsheet from the International Resource Panel, was prepared in cooperation with the Ministry of Environment of Japan and the Institute for Global Environmental Strategies, as a contribution to the G20 Resource Efficiency Dialogue 2019 in Japan. The document is based on research completed by the IRP for the report "Global Resources Outlook 2019: Natural Resources for the Future We Want." The data analysis and text for the G20 was prepared by Livia Cabernard, Stephan Pfister Stefanie Hellweg (ETH Zurich), and Maria Jose Baptista (UNEP) with inputs from Victor Valido (UNEP), Yingying Lu and Heinz Schandl (CSIRO). The layout and infographics were designed by Yi-Ann Chen with support from Qinhan Zhu on figure layout. Icons used are from Freepik.

International Resource Panel

UN environment programme