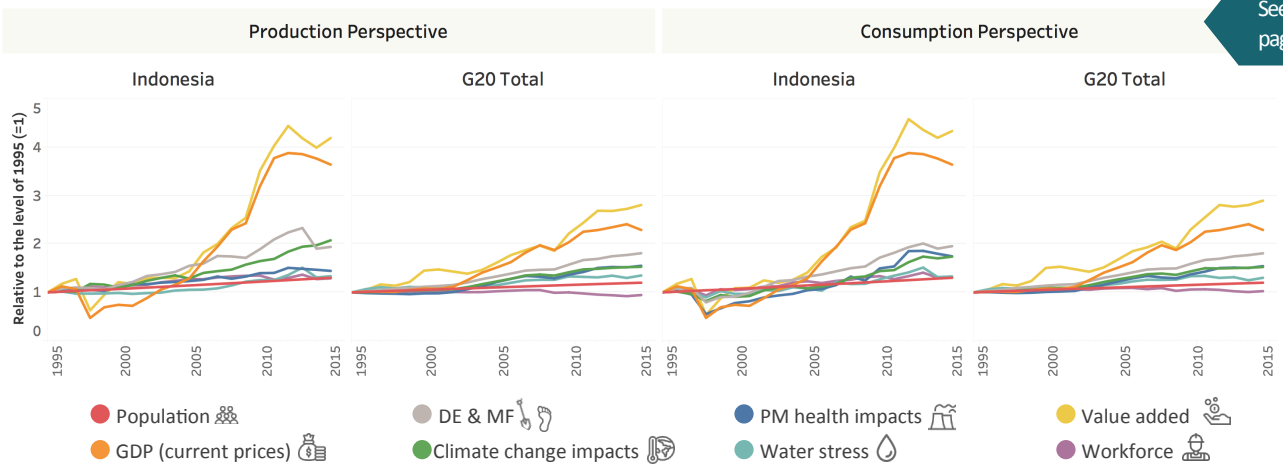
NATURAL RESOURCE USE IN THE GROUP OF 20

Status, Trends, and Solutions | Indonesia

STATUS AND TRENDS OF NATURAL RESOURCE USE

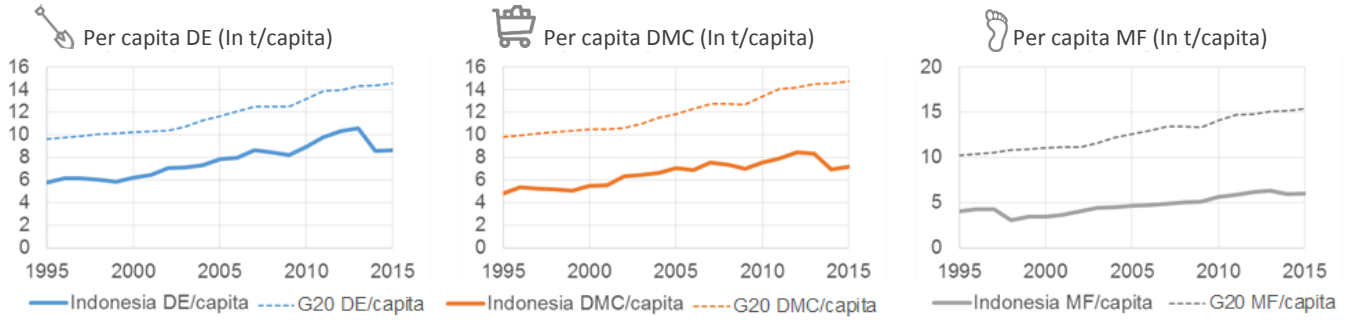
Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in Indonesia and in the G20 (1995-2015)*

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 Indonesia and in the G20 (1995-2015)



Source: IRP database

From 1995 to 2015

Population grew by **30%** and GDP multiplied almost **four-fold**.

Domestic extraction per capita and domestic material consumption per capita presented similar trends. Both were higher than material footprint.

Material footprint increased from **4** tonnes per capita in 1995 to **6** tonnes per capita in 2015 (G20 average in 2015 was 15 tonnes per capita). The difference with the G20 average increased over time.

Climate change impacts increased faster than the G20 average.

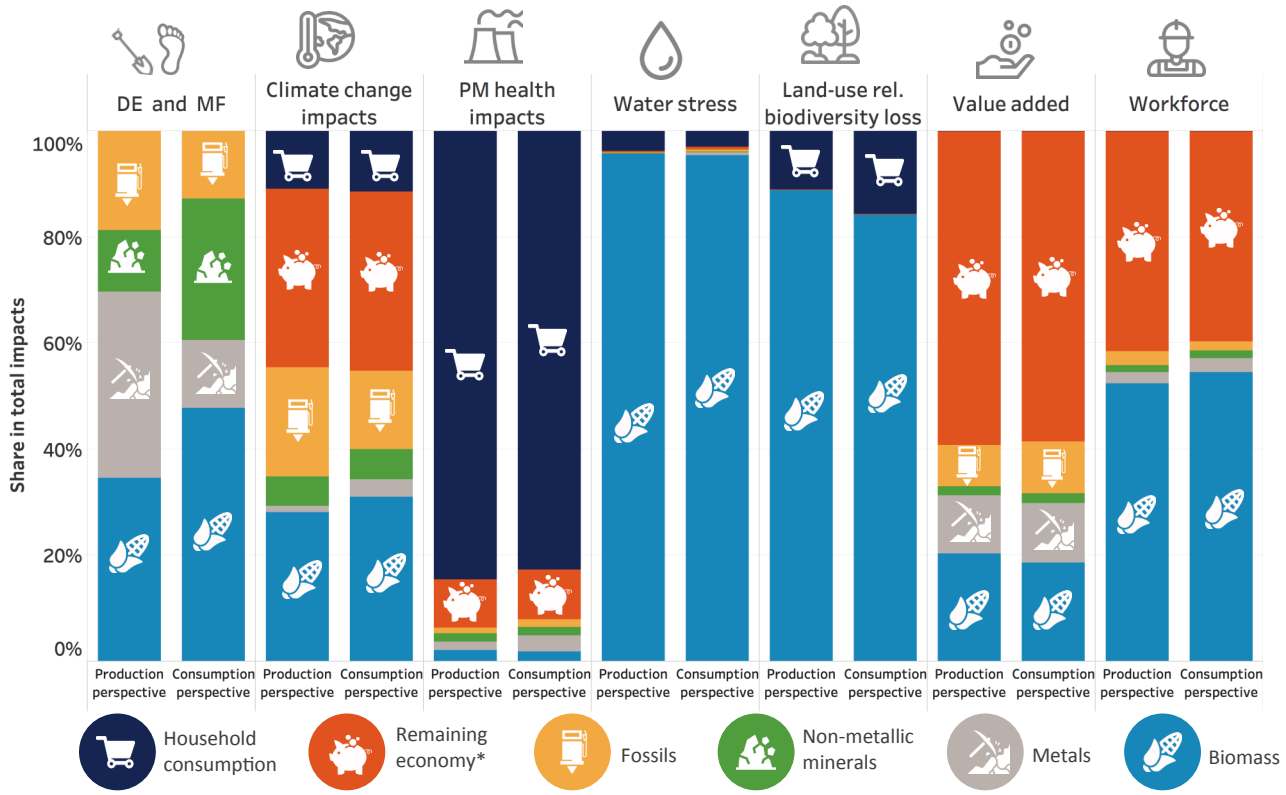
A strong relative decoupling occurred between both material use and impacts and national GDP and added value related to material production.

Water stress impacts related to material extraction and processing slightly increased in line with population growth. Per-capita water stress remained stable and was significantly below the G20 average

Particulate matter related health impacts increased more than the G20 average, from a consumption perspective. These impacts increased less from a production perspective.

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 Indonesia (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

Unlike the G20 average, metal and biomass dominated domestic extraction amounts (they both caused more than a third of total domestic extraction). Almost 50% of the material footprint was caused by biomass.

The extraction and processing of natural resources accounted for more than 50% of total climate change impacts from both a production and consumption perspective (similar to G20 average).

Outdoor particulate matter related health impacts came mostly from households (use of solid fuels for cooking and private mobility).

Water stress and land use-related biodiversity impacts were caused mainly by biomass production (similar to G20 average).

The material sector contributed 40% to value added and represented more than 50% of jobs, mostly low-income workforce in agriculture. The G20 average for both of these were less than 20%.

For all impact and socio-economic indicators, the production and consumption perspectives 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)

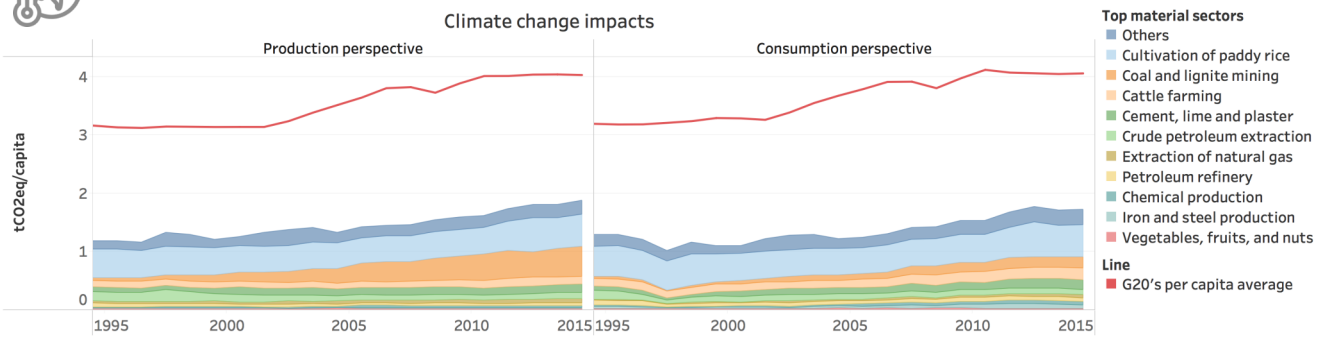
Domestic extraction (DE): Direct, gross physical extraction of materials within a country's territory (production perspective)

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

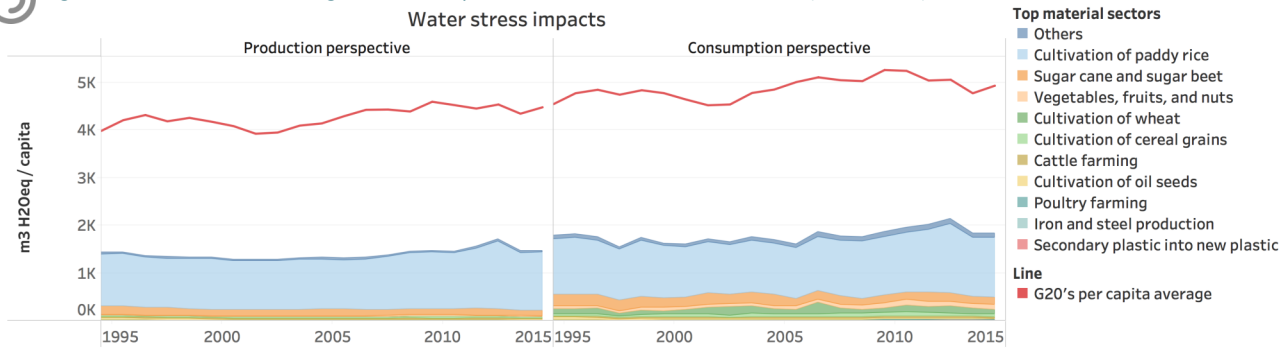
Key Sectors and Resources

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



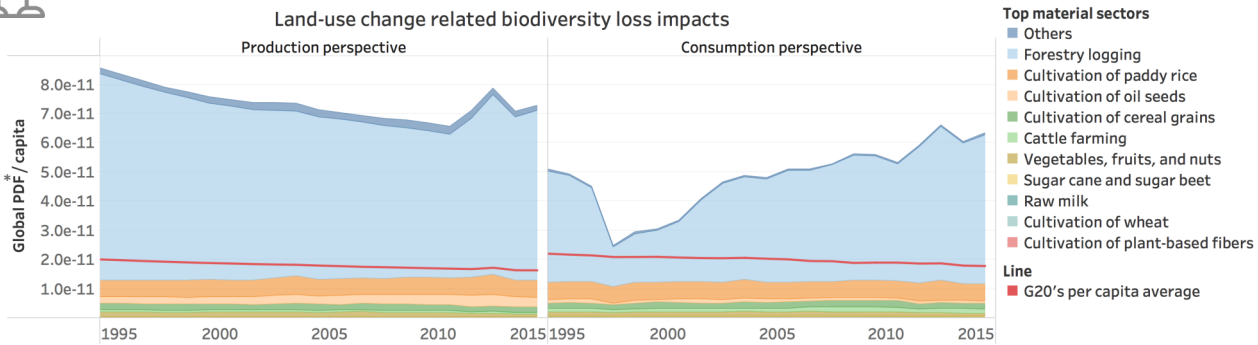
*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

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



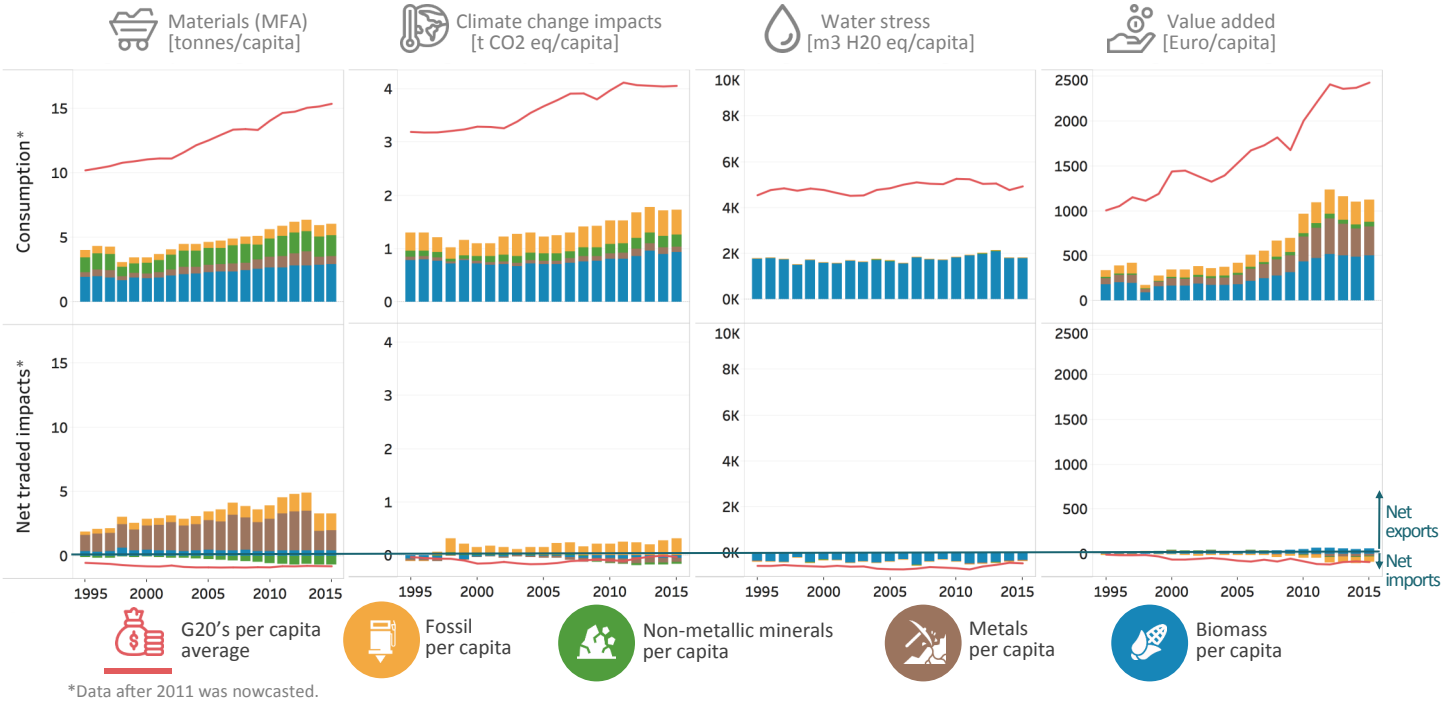
*Data after 2011 was nowcasted.
**PDF:* Potentially disappeared fraction of species
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

- Material-related climate change impacts were mainly caused by paddy rice cultivation and coal mining. Together, they accounted for 50% of said impacts. Coal and lignite mining increased significantly over time.
- Climate change impacts remained 50% lower than G20 average.
- Households directly consumed the most climate-intensive resources (paddy rice). The second largest share of material -related climate impacts were caused by the construction and chemical industries.
- Water stress impacts were significantly lower than the G20 average, and caused almost solely by the cultivation of rice.
- Land use related biodiversity loss is roughly 4 times higher than the G20 average. While it has decreased from a production perspective, it significantly increased from a consumption perspective (more than 3.5 times higher than the G20 average in 2015). The forestry sector caused more than 80% of this loss, followed by paddy rice (consumption and production perspective). Indonesia harbors valuable ecosystems in its territory, explaining the large impact of land use interventions.

- **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 Indonesia (1995-2015)*



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

Indonesia's demand for resources was mostly covered by domestic sources.

Until 2013, Indonesia was a large net exporter of metals (mainly raw bauxite) and fossils. It was the second largest exporter of coal and it imported crude oil. Furthermore, it was a net importer of non-metallic minerals, with relatively low traded amounts.

More climate change impacts were caused by fossil exports than by fossil imports. However, Indonesia is a net importer of climate change impacts from other materials.

More water stress impacts were caused by imports than by exports, due to relatively small amounts of food imports.

For all material categories but biomass, net value added was higher outside of Indonesia. This means that cheap raw materials are exported and more expensive materials are imported.

Future trends and potential Decoupling

- Scenarios developed by the IRP forecast an increase of GDP by a factor of between 6 and 9 and a population growth of between +4% and +12% until 2060.
- If ambitious resource efficiency policies are introduced, relative decoupling of domestic material extraction and domestic material consumption from GDP until 2060 could occur. Overall, DE and DMC are projected to increase by 74% and 121%, respectively, in the best-case scenario.
- Indonesia suffers largely from particulate matter pollution from material use by households. Lowering solid fuel burning, providing higher fuel quality and generally improving transportation systems can help significantly decrease these impacts.
- A large build-up of infrastructure is anticipated in the next decades. Due to size of the population, this could result in significant resource demands and environmental impacts. Material efficient urban design is, therefore, of strategic importance.
- Several types of environmental impacts have relatively decoupled from material extraction.
- There is great potential to decrease land use related biodiversity loss from forestry through resource efficiency strategies.

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.

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