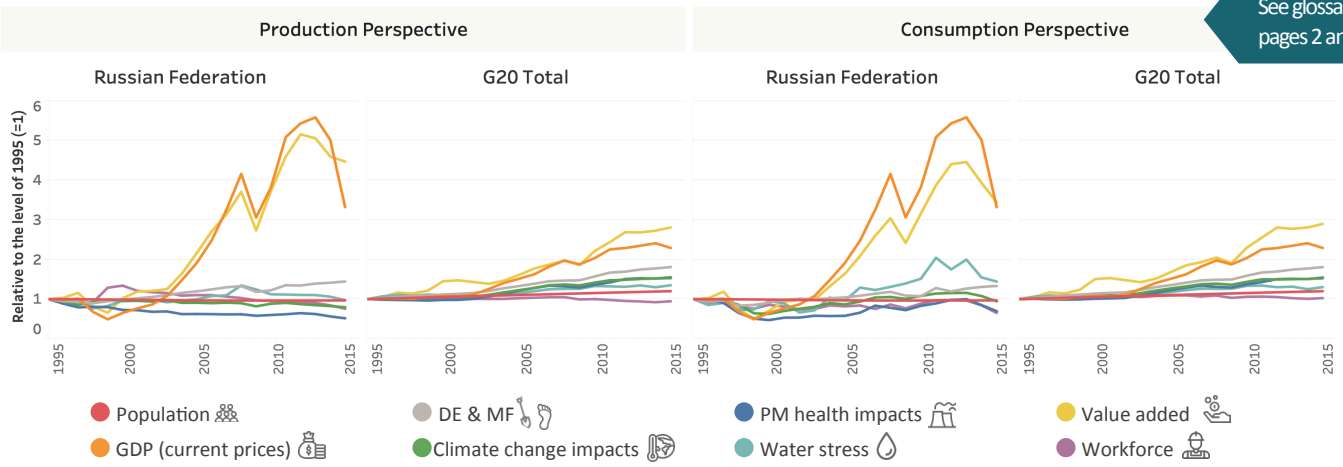
Natural Resource Use in the Group of 20

Status, Trends, and Solutions | Russia

Status and trends of Natural Resource Use

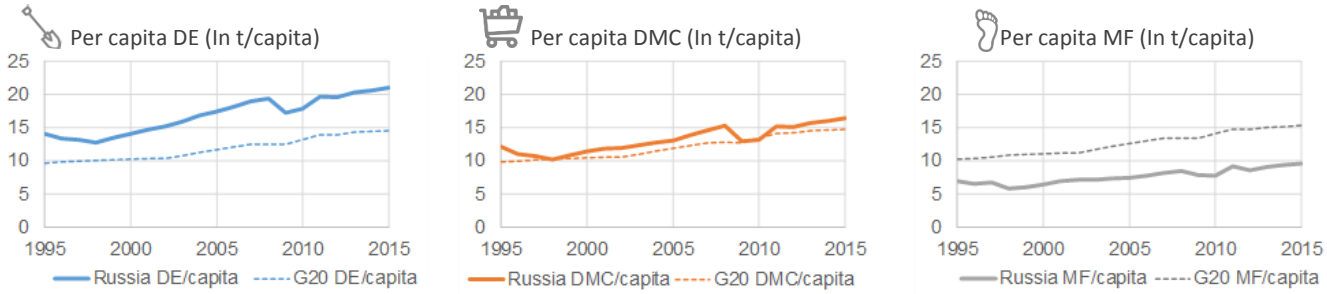
Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in Russia and in the G20 (1995-2015)*

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 Russia and in the G20 (1995-2015)



Source: IRP database

From 1995 to 2015

Population grew by **5%** and GDP multiplied threefold (with high fluctuations in-between).

Domestic extraction, domestic material consumption and material footprint all increased, following G20 average trends.

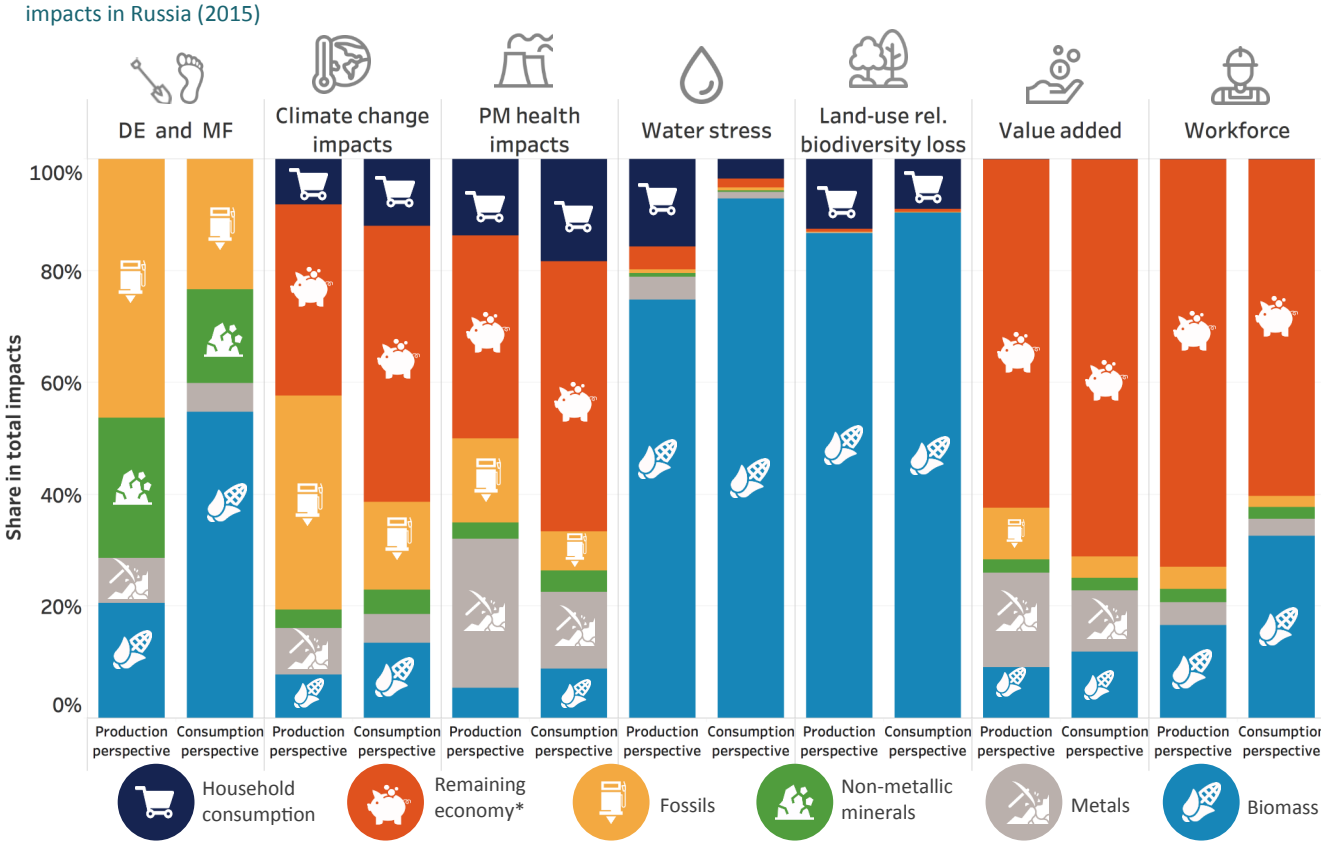
In 2015, domestic extraction was **21** tonnes per capita (higher than the G20 average of 15 tonnes per capita) while material footprint was **10** tonnes per capita (lower than the G20 average). This is due to Russia's status as a resource exporting nation.

Material related environmental impacts decoupled from GDP.

Particulate matter related health impacts showed the strongest absolute decoupling (in both perspectives) from GDP.

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 Russia (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, fossils dominated domestic extraction amounts while biomass caused most of the material footprint.

The extraction and processing of natural resources accounted for almost 60% of Russia's total climate change impacts from a production perspective and almost 40% from a consumption perspective (the G20 average was approximately 50% from both perspectives).

The extraction and processing of natural resources accounted for almost half of Russia's total outdoor particulate matter health impacts from a production perspective and one third from a consumption perspective (higher than G20 average). Metal processing caused more than a quarter of Russia's outdoor particulate matter health impacts.

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

The material sector contributed to almost 40% of value added from a production perspective and to about 30% of value added from a consumption perspective. This is higher than the G20 average (which is less than 20%).

From a production perspective, about 25% of all workforce in Russia worked for the extraction and material processing sectors. From a consumption perspective, this share was about 40% (mainly due to low-paid jobs in agriculture for food imports).

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)

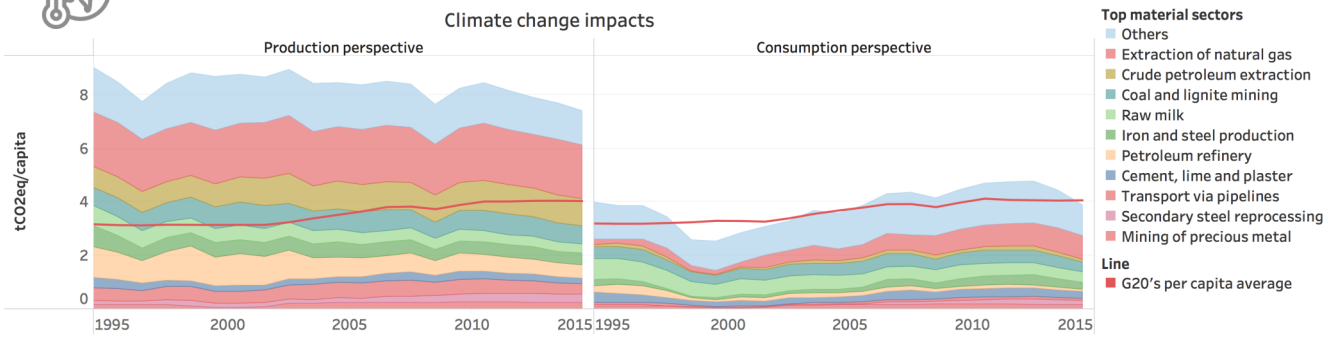
Domestic extraction (DE): Direct, gross physical extraction of materials within a country's territory (production perspective)

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

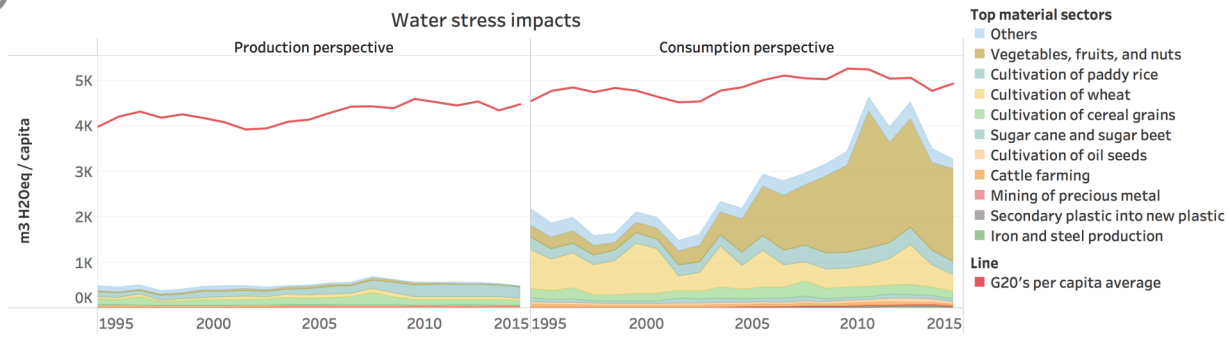
Key Sectors and Resources

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



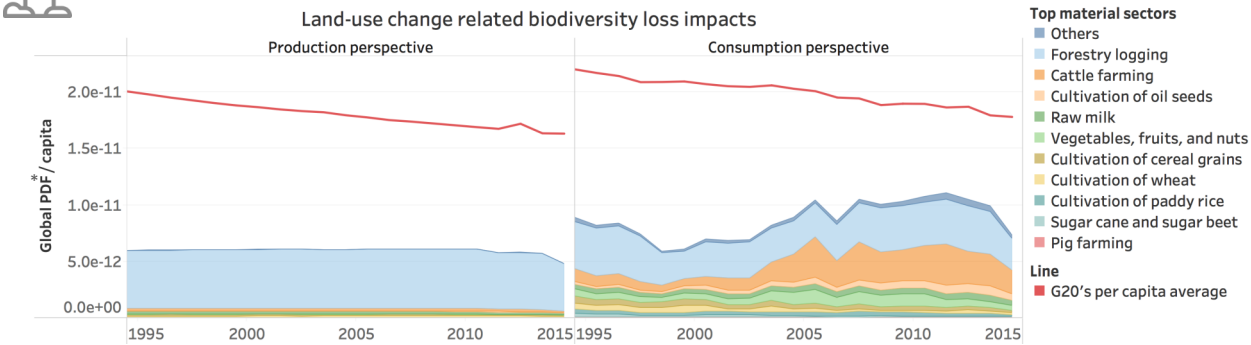
*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

Figure 5: Water stress from agricultural crop and material sectors in Russia (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 Russia (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 natural gas extraction, petroleum extraction and refinery, coal mining, iron and steel production and raw milk production.
- From a production perspective, material related climate change impacts were more than 85% higher than the G20 average.
- From a consumption perspective, material related climate change impacts were similar to the G20 average. The difference to the production perspective is mainly due to emissions caused by the extraction and processing of exported fossil fuels.
- Materials with large climate impacts (natural gas, petroleum) are often directly consumed by households especially for heating and mobility.
- A major industrial sector using climate-intensive materials is the construction industry.
- From a production perspective, water stress impacts are much lower than the G20 average. Paddy rice and cereal production caused most of these impacts.
- Water stress was higher from a consumption perspective than from a production perspective (but still lower than G20 average) due to imports of vegetables, fruits, nuts, and wheat.
- Land use related biodiversity loss was considerably lower than the G20 average. This loss was mostly caused by forestry (from both perspectives) and cattle farming (from a consumption 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)

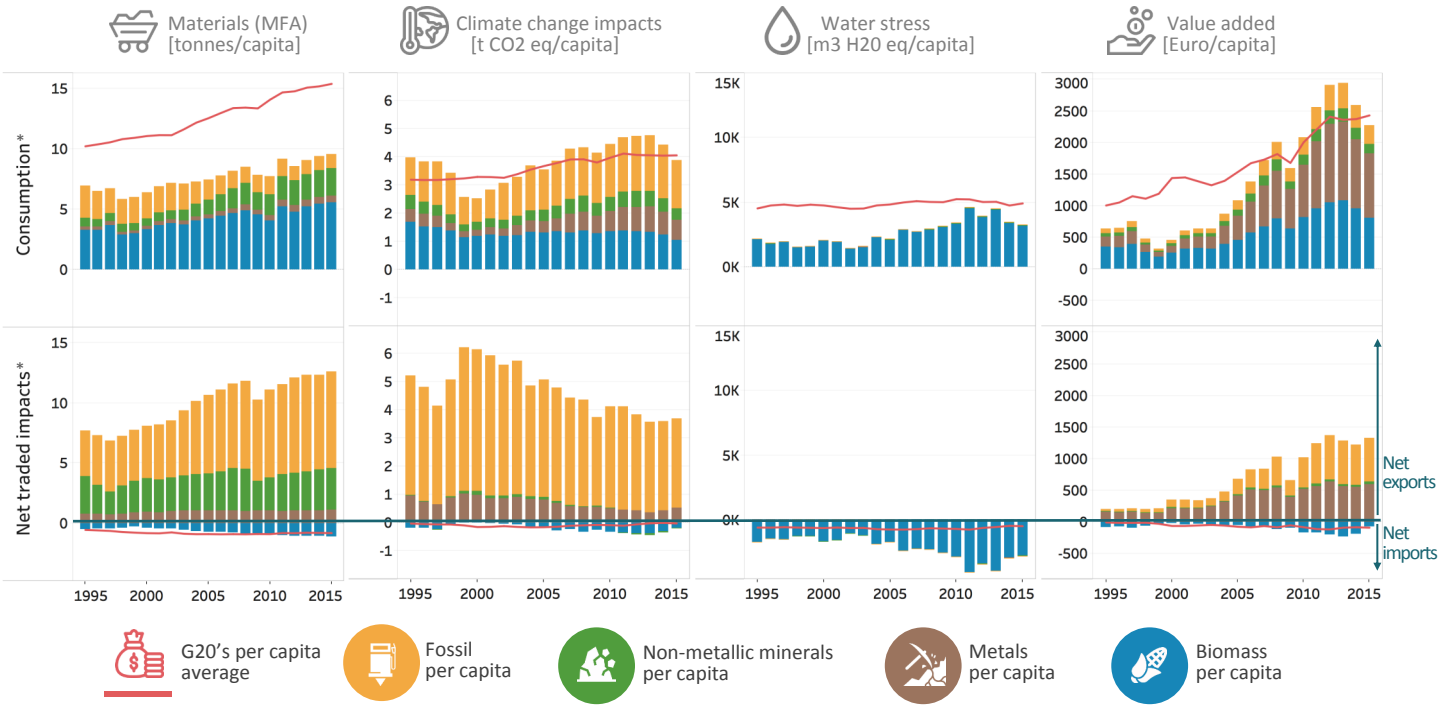
Material-related impacts: Impacts related to the extraction and processing of material resources (including the upstream supply chain, such as electricity generation and transport)

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 Russia (1995-2015)*



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

Russia is a net exporter of all material types except biomass.

Considerably more climate change impacts were caused by material exports than by material imports. This is especially the case for fossils, since more than two thirds of domestic climate change impacts related to fossils production were due to exported fuels.

More water stress was caused by imports than exports, due to food imports.

For all material types but biomass, material trade created net value added within Russia (mainly fossils and metals).

Future trends and potential Decoupling

Russia is a major exporter of fossil fuels with significant impacts on climate change in the use, extraction, and processing phases (e.g. losses of natural gas during extraction and pipeline transportation). An improved management in the extraction and processing phase and an overall significant reduction of fossil resource extraction will be needed to meet the Paris Agreement.

Russia is also an exporter of iron and steel products. This does not only lead to climate change impacts, but to particulate-matter related health impacts within Russia. Reducing emissions of particulate matter and substances that form particulate matter in the atmosphere (e.g. SOx and NOx) is therefore essential.

Material efficient urban design and circular economy solutions could help lower the material-use related climate change impacts of the construction 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

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