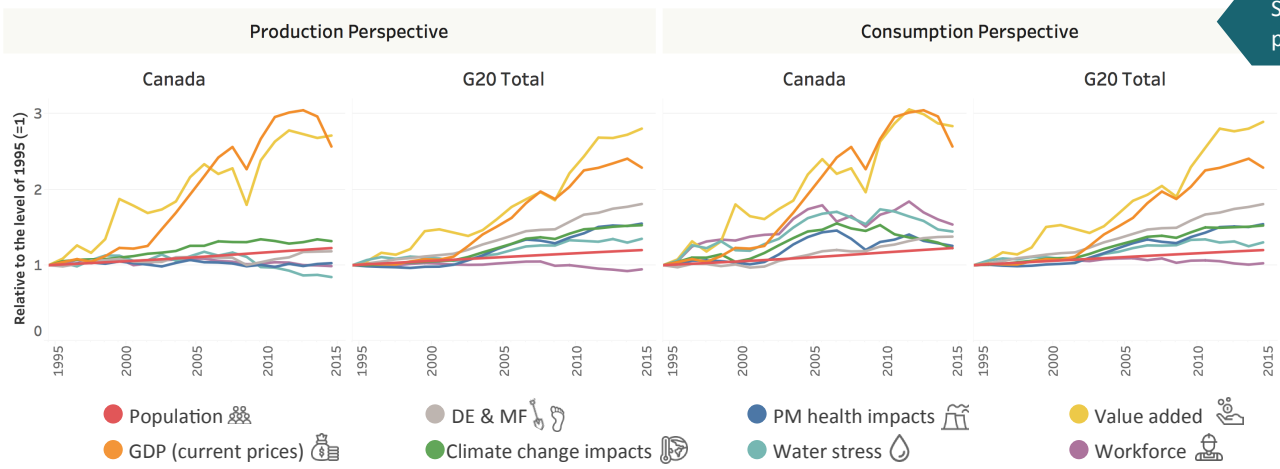
NATURAL RESOURCE USE IN THE GROUP OF 20

Status, Trends, and Solutions | Canada

STATUS AND TRENDS OF NATURAL RESOURCE USE

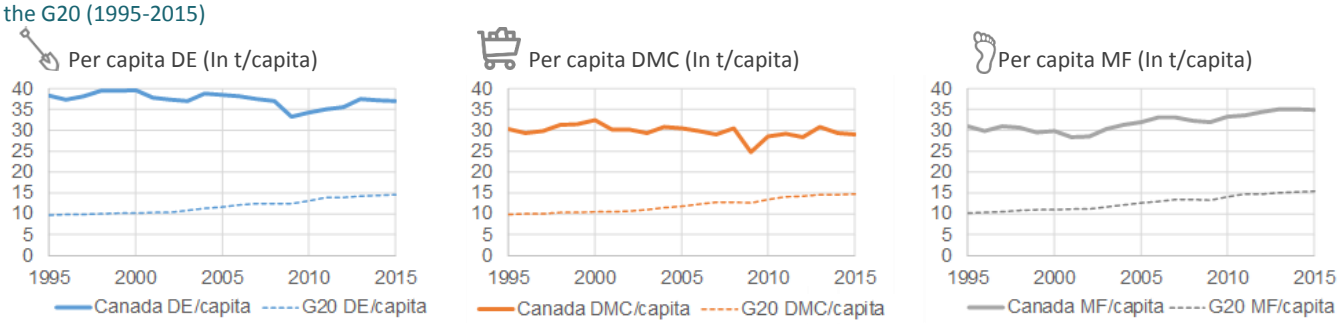
Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in Canada and in the G20 (1995-2015)*

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 (DE), domestic material consumption (DMC), and material footprint (MF) per capita in Canada and in the G20 (1995-2015)



Source: IRP database

From 1995 to 2015

Population grew by **23%** and GDP grew by a factor of **2.5**

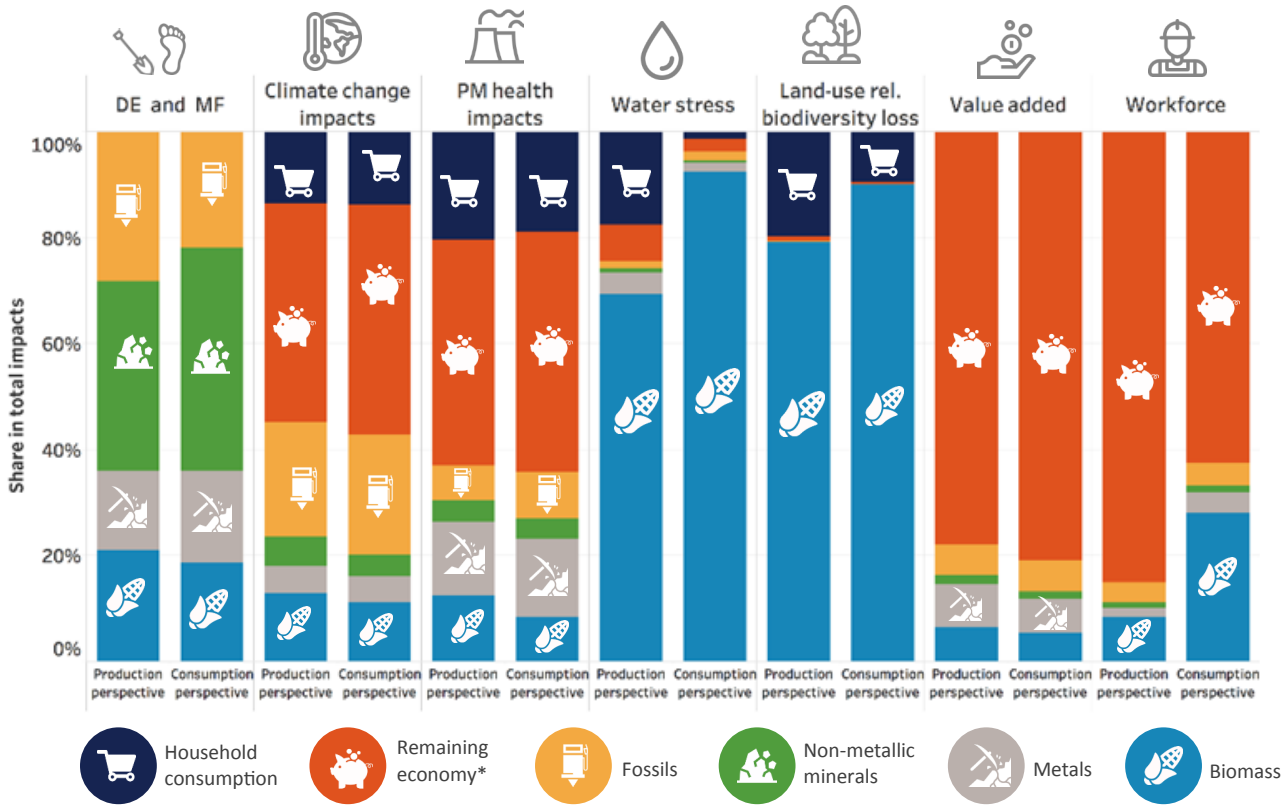
Domestic extraction remained rather stable at **37** tonnes per capita (G20 average was 15 tonnes/capita in 2015).

Material footprint increased from **31** tonnes per capita in 1995 to **35** tonnes per capita (G20 average was 15 tonnes per capita in 2015).

From a consumption perspective, there was a relative decoupling of material footprint and all environmental impacts from economic growth. However, climate change impacts were more than double 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 Canada (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 line with G20 average, non-metallic minerals like sand and gravel dominated the share of domestic extraction amounts and material footprint, but contributed to only a minor share of environmental impacts.

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

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

Resource extraction and processing caused almost 40% of outdoor particulate matter related health impacts.

The material sector contributed to a minor share of value added as well as domestic jobs (both around 20%), and relied on low-income workforce in agriculture outside of Canada for food imports.

In general, for all indicators but water stress and workforce, the share related to material extraction and processing from a consumption perspective was comparable to the share related to material extraction and processing from a production perspective.

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)

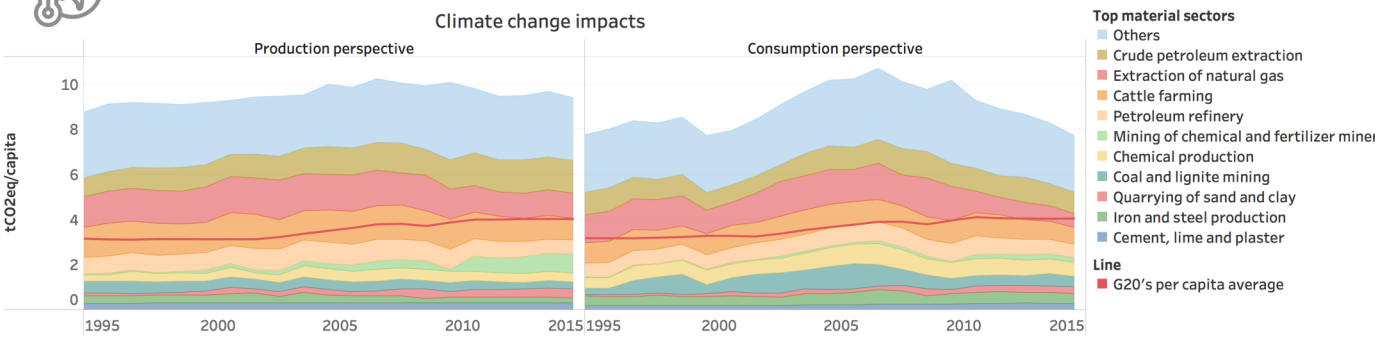
Domestic extraction (DE): Direct, gross physical extraction of materials within a country's territory (production perspective)

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

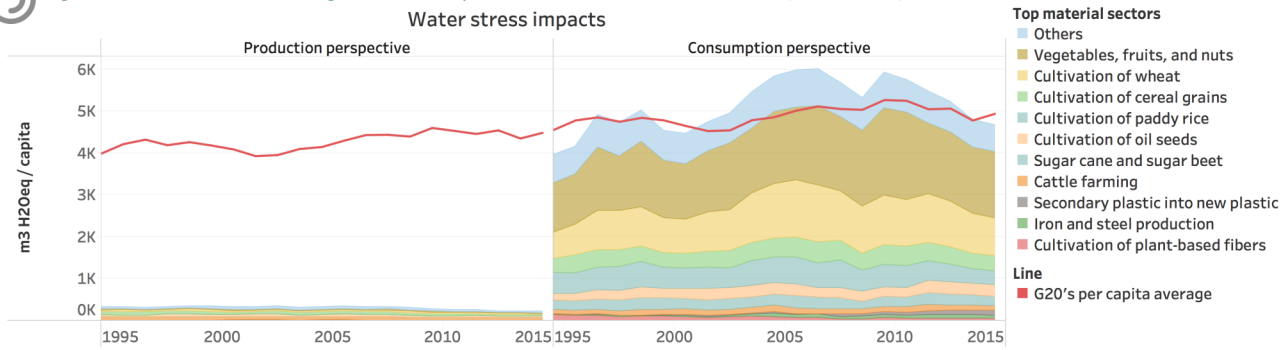
Key Sectors and Resources

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



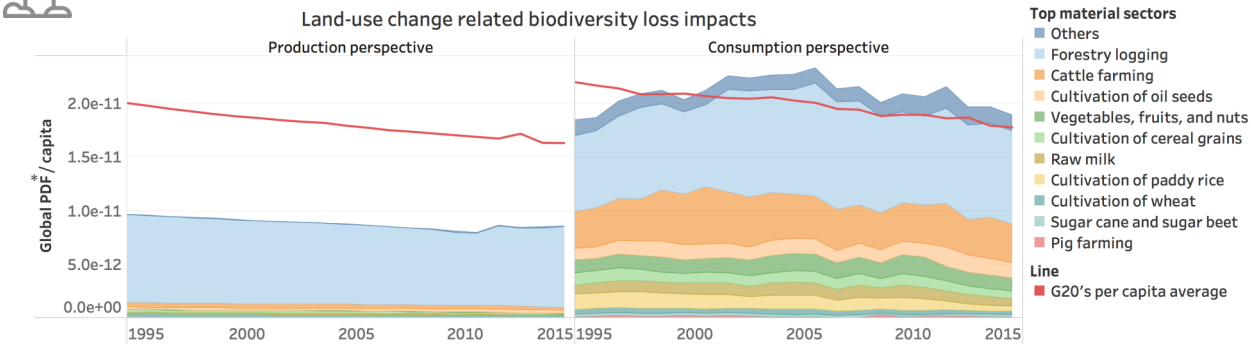
*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019

Figure 5: Water stress from agricultural crop and material sectors in Canada (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 Canada (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 in Canada were mainly caused by the extraction and refinery of petroleum, the extraction of natural gas, cattle farming, and mining of chemical and fertilizer minerals.
- Climate change impacts remained much higher than the G20 average (double for both perspectives in 2015).
- Materials with large climate impacts (petroleum, natural gas and beef) were mostly consumed by households, especially for mobility, heating and food.
- The construction and motor vehicle manufacturing sectors were the largest industrial users of climate-intensive materials.
- From a production perspective, there was almost no water stress within Canadian territory. This was due to low irrigation requirements and sufficient availability of renewable water sources to cover internal demand.
- From a consumption perspective, water stress levels were comparable to the G20 average. These were caused mainly by agricultural activities related to imports of vegetables, fruits, nuts, and wheat.
- From a production perspective, land use-related biodiversity loss was lower than the G20 average, mainly caused by forestry activities. However, from a consumption perspective, land use-related biodiversity loss was comparable to the G20 average due to imports of beef, oil seeds, vegetables, fruits and nuts from regions with high ecological value.

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)

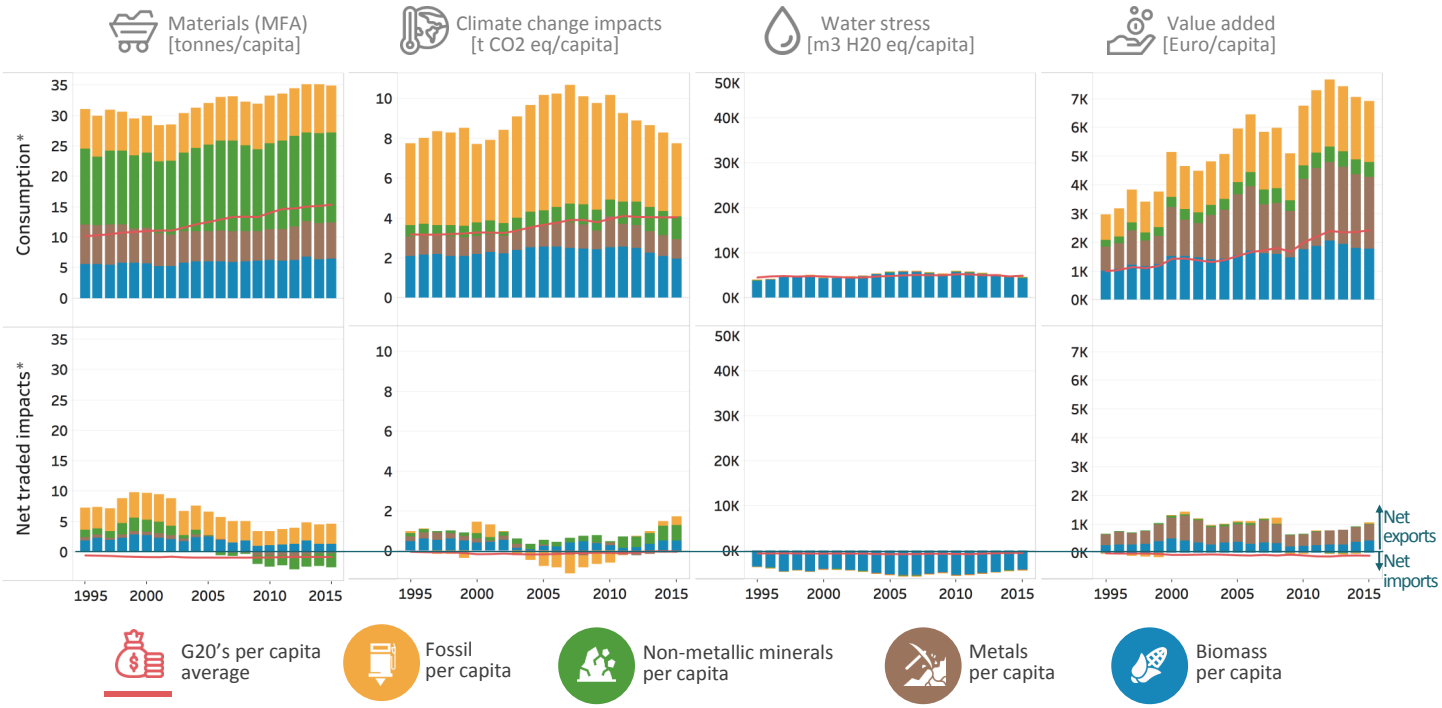
Material-related impacts: Impacts related to the extraction and processing of material resources (including the upstream supply chain, such as electricity generation and transport)

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 Canada (1995-2015)*



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

Canada has been a net exporter of biomass and fossil resources and a net importer of minerals since 2006.

More climate change impacts were caused by exports of biomass and non-metallic minerals than by imports. The trade balance for fossils and metals fluctuated over the years.

Food imports caused higher water stress impacts in the countries of origin than biomass exports from Canada (mainly wood).

For all material types, net value added was higher inside Canada than outside.

Future trends and potential Decoupling

Scenarios developed by the IRP forecast an increase of GDP by more than a factor of 2 and a population growth of more than 40% until 2060.

If ambitious resource efficiency policies are introduced, Canada could see absolute decoupling of domestic material extraction and domestic material consumption from GDP until 2060.

Material footprint and all environmental impacts per capita remained higher than the G20 average. Reducing the consumption of impactful resources like petroleum (particularly for mobility) and beef could help lower these impacts. Furthermore, material related impacts could be reduced with the design of material-efficient infrastructure and fossil fuels (natural gas) by constructing energy-efficient buildings.

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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