

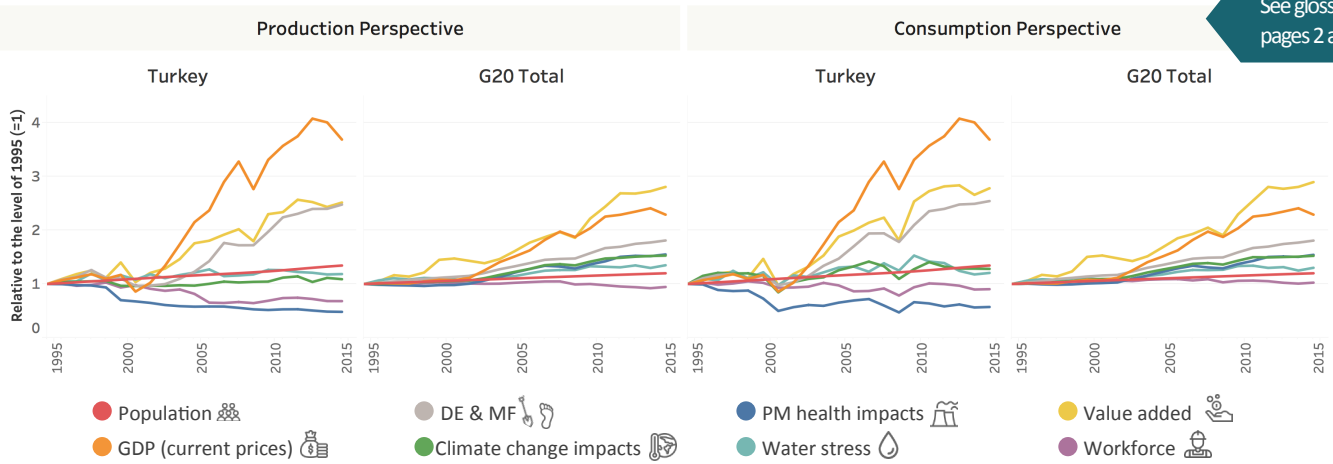
# NATURAL RESOURCE USE IN THE GROUP OF 20

## Status, Trends, and Solutions Turkey

### STATUS AND TRENDS OF NATURAL RESOURCE USE

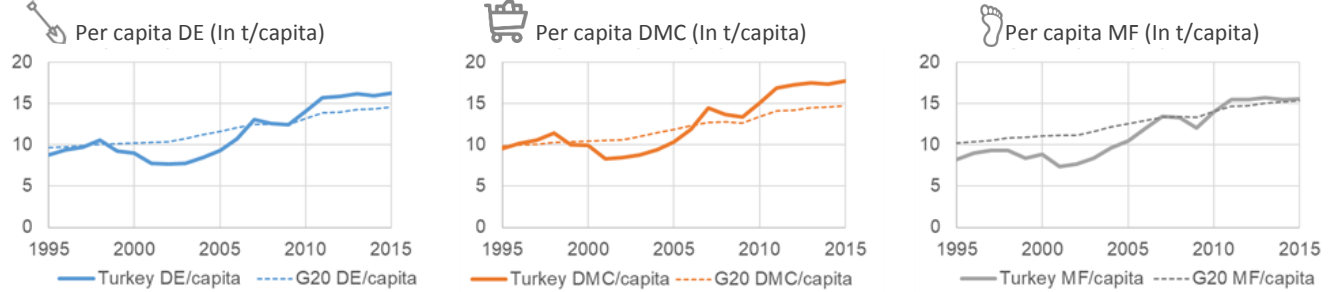
Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in Turkey and in the G20 (1995-2015)\*

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 Turkey and in the G20 (1995-2015)



Source: IRP database

### From 1995 to 2015



Population grew by **34%** and GDP increased by almost a factor of **4**.

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



By 2015, domestic extraction reached **16** tonnes per capita; domestic material consumption reached **18** tonnes per capita; and material footprint reached **16** tonnes per capita. The G20 average for all of these indicators was 15 tonnes per capita.



All material related environmental impacts decoupled from GDP from both the consumption and production perspectives.

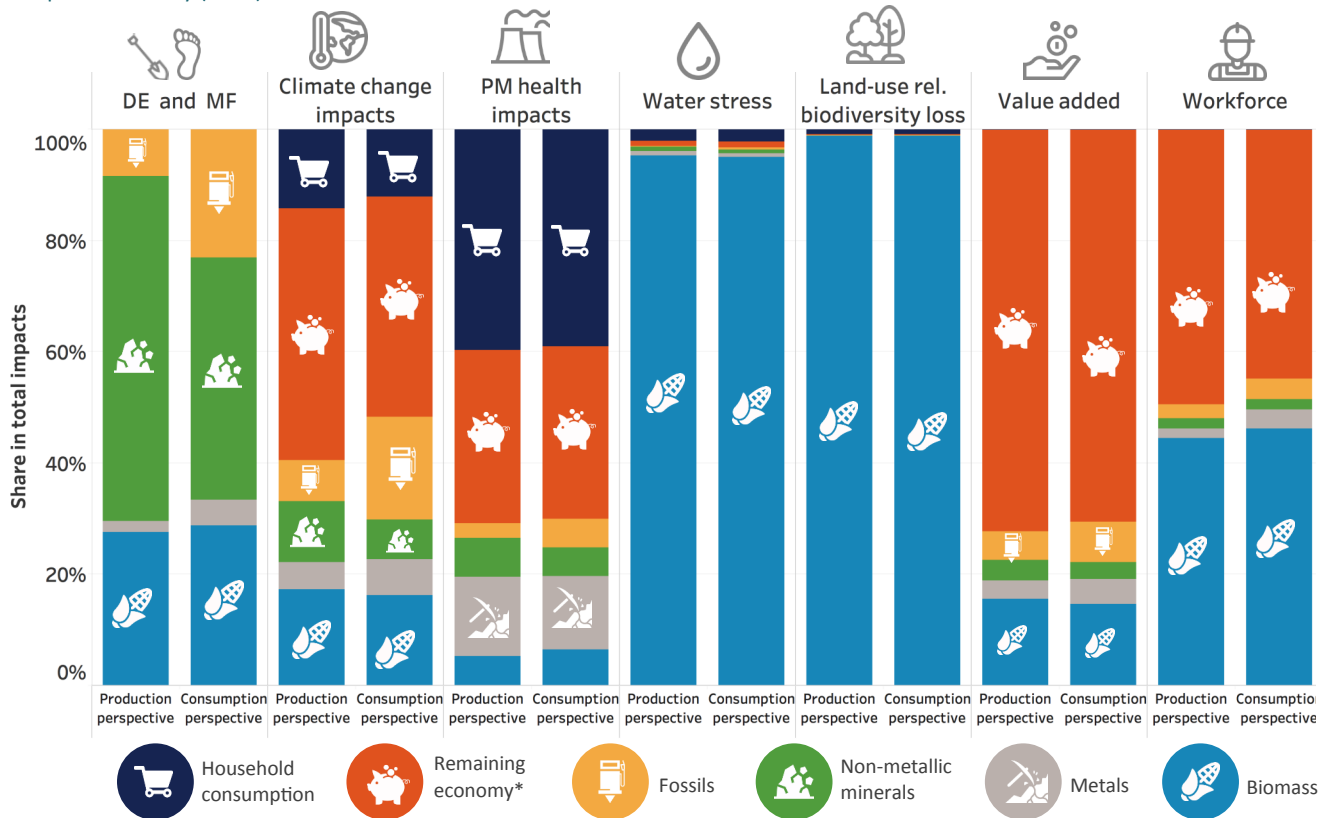


Outdoor particulate matter health impacts showed the strongest absolute decoupling from GDP.



## 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 Turkey (2015)



Non-metallic minerals like sand and gravel dominated the domestic extraction amounts, but contributed less to material footprint and only caused a minor share of environmental impacts.

From a production perspective, the extraction and processing of natural resources accounted for approximately 40% of total climate change impacts. From a consumption perspective, these accounted for less than 50% of total climate change impacts. The G20 average was approximately 50% from both perspectives.

Outdoor particulate matter related health impacts came mainly from households (coal-based heating, personal transport, electricity) and the remaining economy.

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

The material sector contributed to almost 30% of value added from both a production and consumption perspective. The G20 average of this contribution was approximately 20%.

From both a consumption and production perspective, more than 50% of the workforce is used for the production of materials, mainly for low-paid jobs in the agriculture sector.

## 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)

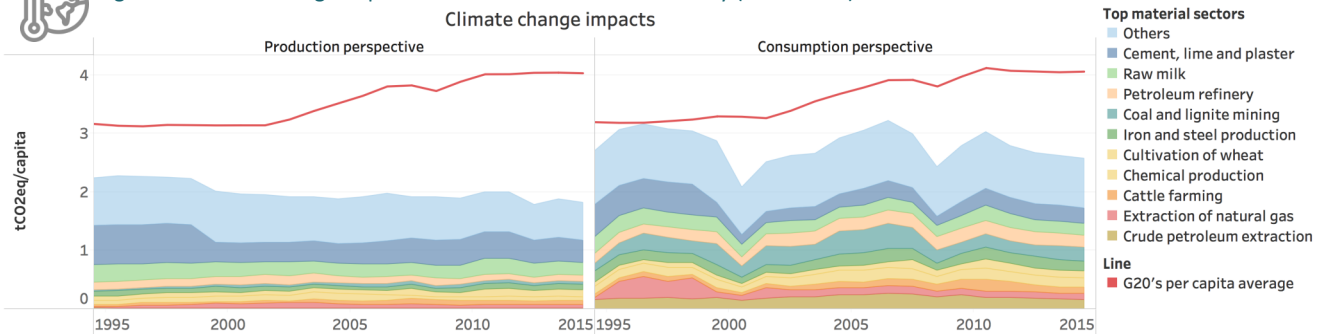
**Material resources:**

- metals,
- non-metallic minerals,
- biomass,
- fossils

## KEY SECTORS AND RESOURCES



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

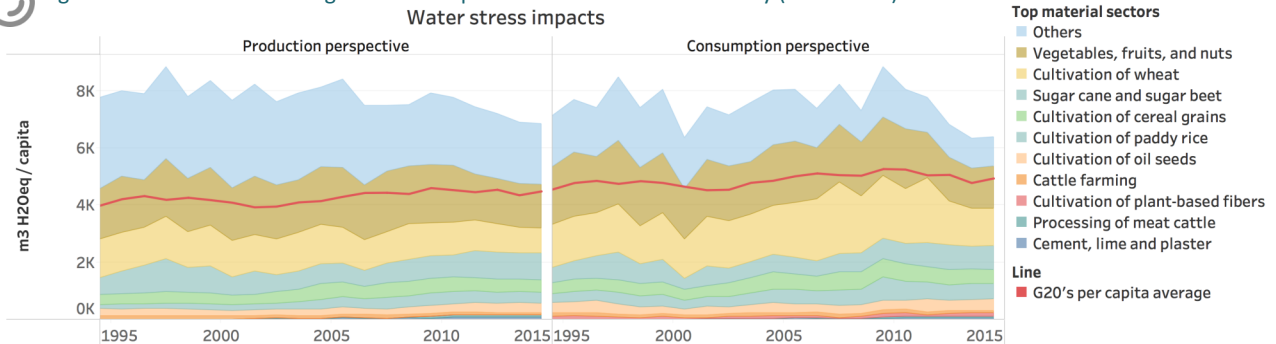


\*Data after 2011 was nowcasted.

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



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

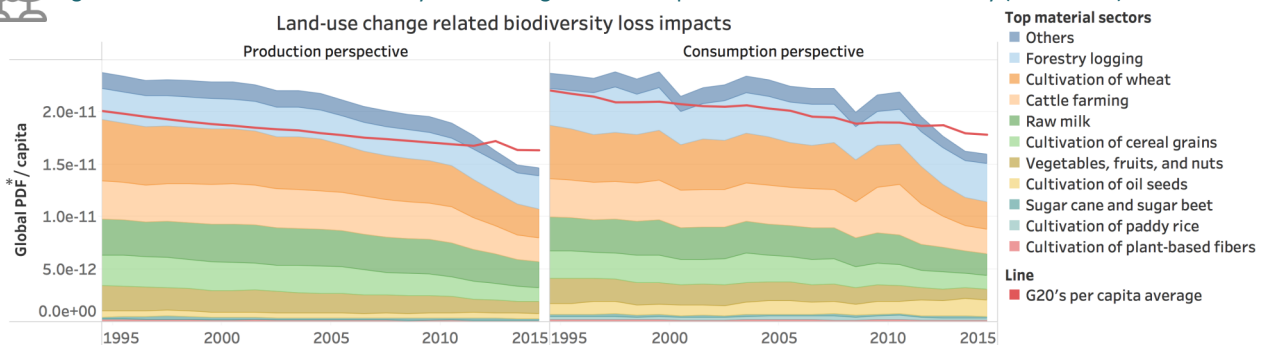


\*Data after 2011 was nowcasted.

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



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



\*Data after 2011 was nowcasted.

\*PDF: Potentially disappeared fraction of species

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

- From a production perspective, material-related climate change impacts were mainly caused by cement and raw milk production. From a consumption perspective, cement played a lower, but still significant role.
- From a consumption perspective, in addition to the above, sectors with major contributions to material-related climate change impacts included petroleum refinery, coal and lignite mining, iron and steel production, wheat cultivation and chemical production, due to imports.
- Material related climate change impacts slightly decreased. From a production perspective, these were almost 50% less than the G20 average. From a consumption perspective, these represented more than 30% less than the G20 average.
- Food products with large climate impacts (processed food) were mainly consumed by households.
- The construction, hotel and restaurant, textile, and clothing sectors were the major industrial end-users of climate-intensive materials.
- Water stress impacts were much higher than the G20 average (more than 50% from a production perspective and more than 25% from a consumption perspective). This was caused by domestic agriculture in water-scarce regions.
- From a production perspective, water stress was dominated by agriculture, particularly by the cultivation of vegetables, fruits and nuts, sugar beet, and wheat.
- Land use related biodiversity loss was similar in magnitude to the G20 average. From both a consumption and a production perspective, major contributing sectors included forestry, wheat and milk production, as well as cattle farming.

**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)

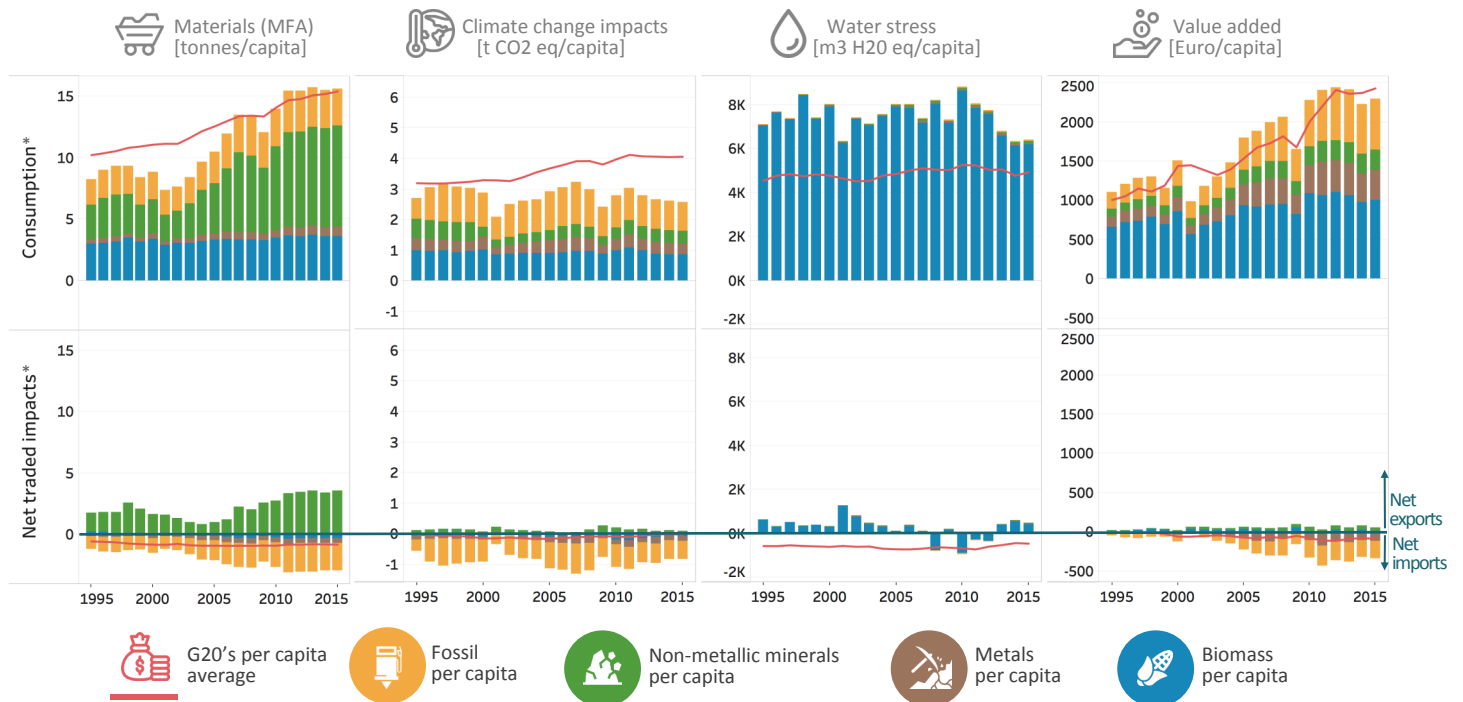
**Material-related impacts:** Impacts related to the extraction and processing of material resources (including the upstream supply chain, such as electricity generation and transport)

**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 Turkey (1995-2015)\*



\*Data after 2011 was nowcasted.

\*Consumption: Impacts throughout the supply chain from goods imported and consumed in Turkey.

\*Net traded impacts: Difference between material-related impacts from a production and consumption perspective.

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

- Turkey is a net importer of all material types, except non-metallic minerals, which are exported in large amounts. Almost all fossils are imported to Turkey.
- More climate change impacts are caused by imports than by exports. This is mainly due to fossil imports.
- For water stress, net trade fluctuated between negative and positive over the years and is not significant compared to total water stress of Turkey.
- For all fossils and metals, material trade created relevant net value added outside of Turkey, while small amounts of net value added were created for non-metallic minerals and biomass inside Turkey.

## FUTURE TRENDS AND POTENTIAL DECOUPLING

- Turkey has relatively low levels of per capita greenhouse gas emissions compared to the G20 average but is likely to experience major climate change impacts. The reduction of dependency on fossil energy sources would help mitigate climate change impacts related to material use. This reduction should be paired with appropriate adaptation measures.
- A large share of climate impacts related to materials came from the tourism sector and textile industry. Improving material productivity and efficiency in these sectors could help decouple environmental impacts from economic growth.
- Circular economy solutions, including proper waste management and material recycling would also be beneficial.
- Turkey suffers from water scarcity in large parts of the country. Improving the management of water resources and increasing resource efficiency in the agriculture sector are of critical importance.
- Turkey harbors many endemic species and thus significant biodiversity loss risks. Efforts to protect unique ecosystems have shown positive results and should be continued.

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