

NATURAL RESOURCE USE IN THE GROUP OF 20

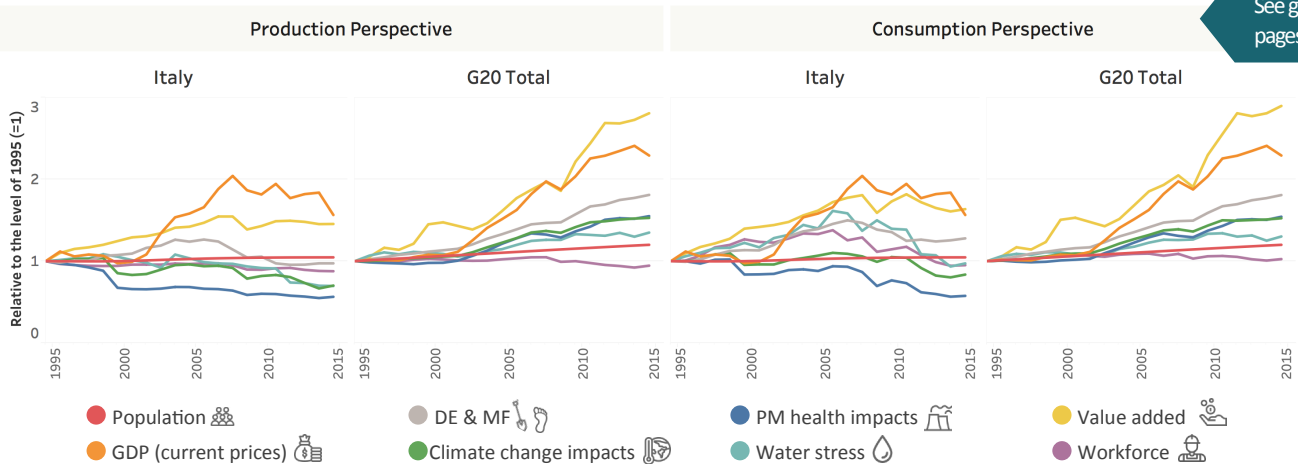
Status, Trends, and Solutions

Italy

STATUS AND TRENDS OF NATURAL RESOURCE USE

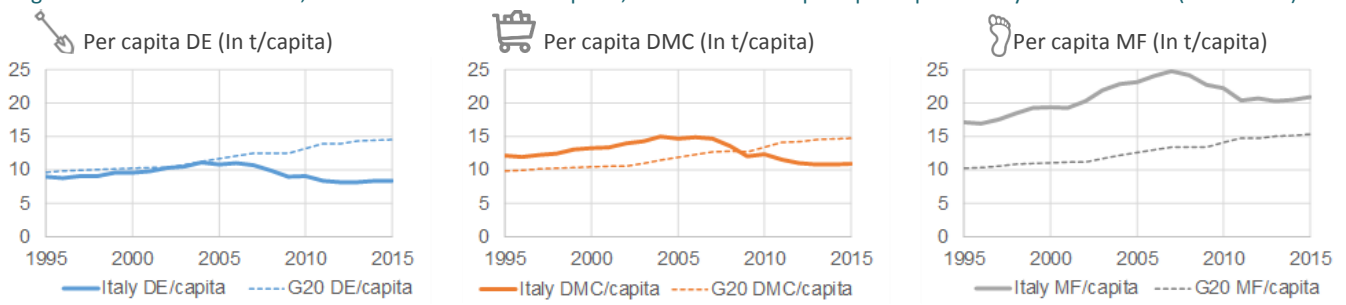
Figure 1: Socio-economic indicators, domestic extraction, material footprint, and material-related environmental impacts in Italy and in the G20 (1995-2015)*

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 Italy and in the G20 (1995-2015)



Source: IRP database

From 1995 to 2015

+5%

While population grew slightly, GDP almost doubled until the global financial crisis and then declined.

Material footprint increased to 21 tonnes/capita (G20 average was at 15 tonnes/capita in 2015).

This increase occurred in the supply chain of imported products, while domestic extraction and domestic consumption of materials slightly decreased and even fell below G20 average.



Climate change impacts related to material extraction and processing slightly decreased, but the absolute level of material-related climate change impacts remained above G20 average (>20% higher than G20 average from a consumption perspective).

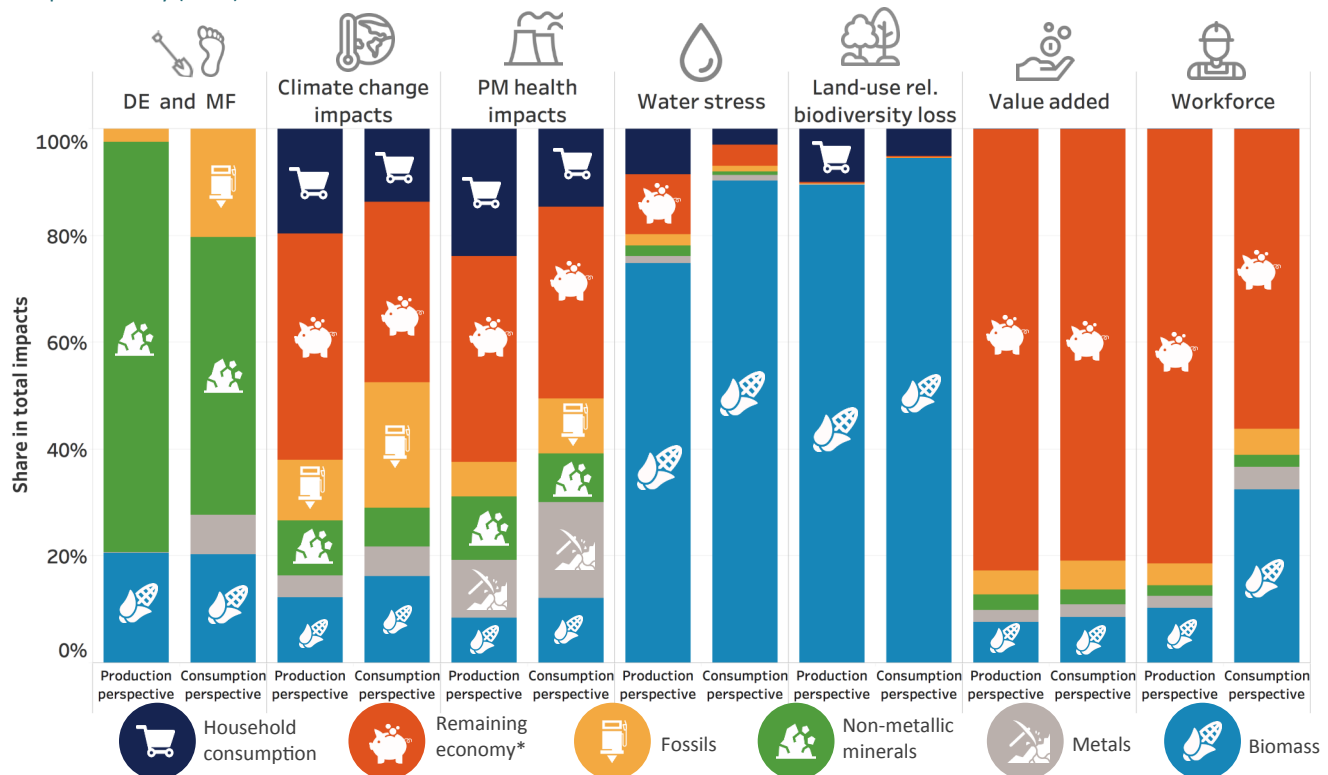
Water stress decreased from both the production and consumption perspectives.

Particulate matter (PM) health impacts related to resource extraction and material processing showed the strongest absolute decoupling.



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 Italy (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



Non-metallic minerals like sand and gravel dominated domestic extraction amounts, but contributed less to the material footprint and only caused a minor share of environmental impacts. There was nearly no metal extraction and only little fossil extraction (mainly natural gas) within Italy (production perspective), but the contribution of resources to material footprint resembles well G20 average.



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



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



Outdoor particulate matter (PM) related health impacts mainly came from the remaining economy (e.g. fossil electricity and transport) and households.



Less than 20% of economic value added was created through resource extraction and processing both from a production and consumption perspectives.



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



In general, for all indicators, the share related to material extraction and processing was comparable or higher from a consumption perspective than 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)

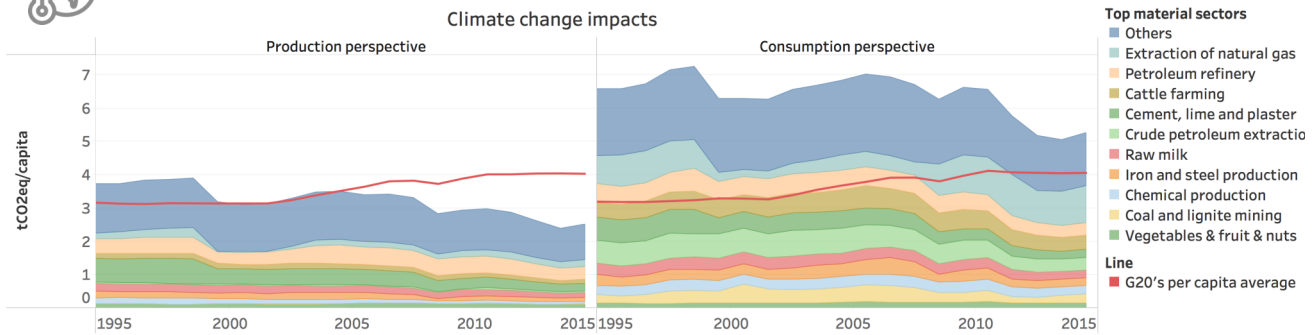
Domestic material consumption (DMC): Amount of materials directly used by an economy (DMC = DE + Material Imports - Material Exports)

Material resources:
- metals,
- non-metallic minerals,
- biomass,
- fossils

KEY SECTORS AND RESOURCES



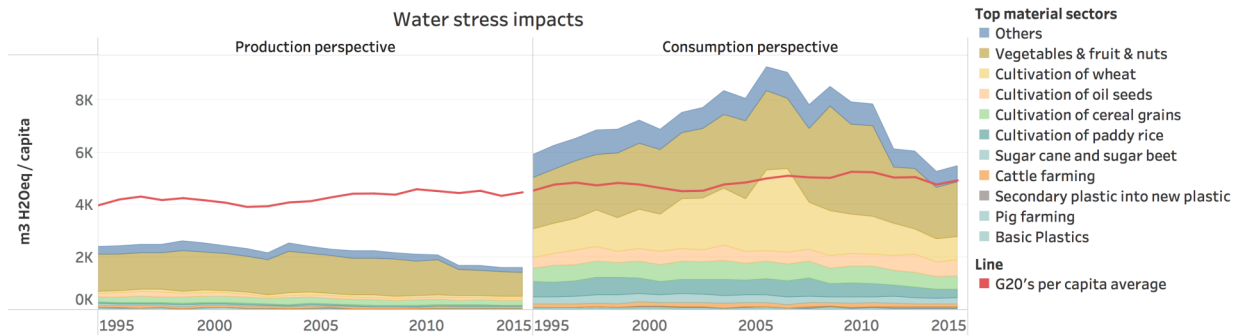
Figure 4: Climate change impacts from material sectors in Italy (1995-2015)*



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



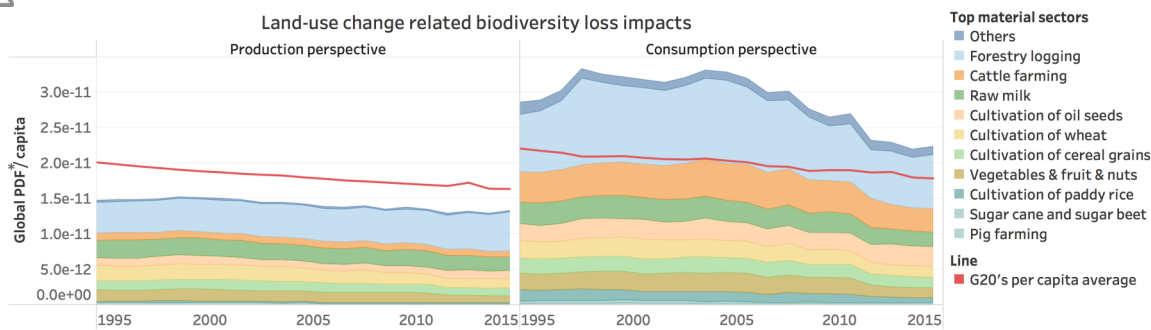
Figure 5: Water stress from agricultural crop and material sectors in Italy (1995-2015)*



*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 Italy (1995-2015)*



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

- More than a third of material-related climate change impacts within Italy (production perspective) were caused by petroleum refining, cement and milk production.
- From a production perspective, climate change impacts decreased below G20 average. From a consumption perspective, climate change impacts were 20% higher than the G20 average. This is due to imports of goods with large embodied greenhouse gas emissions for domestic consumption, e.g. natural gas.
- The majority of biomass and fossils are consumed by Italian households (e.g. for food, mobility and housing).
- Minerals and wood play a key role for Italy's construction, furniture and machinery sectors.
- From a production perspective, water stress is mainly caused by the production of vegetables, fruits, and nuts.
- Water stress caused abroad for Italian consumption is dominated by agricultural activities, such as the production of vegetables, fruits, nuts, wheat, oil seeds, paddy rice and cereals.
- From a production perspective, land use-related biodiversity loss is slightly lower than the G20 average. It is higher than the G20 average from a consumption perspective. Main causes of this biodiversity footprint are imports of wood, beef, milk and oil seeds 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 the efficiency of material use (MI = DMC/GDP)

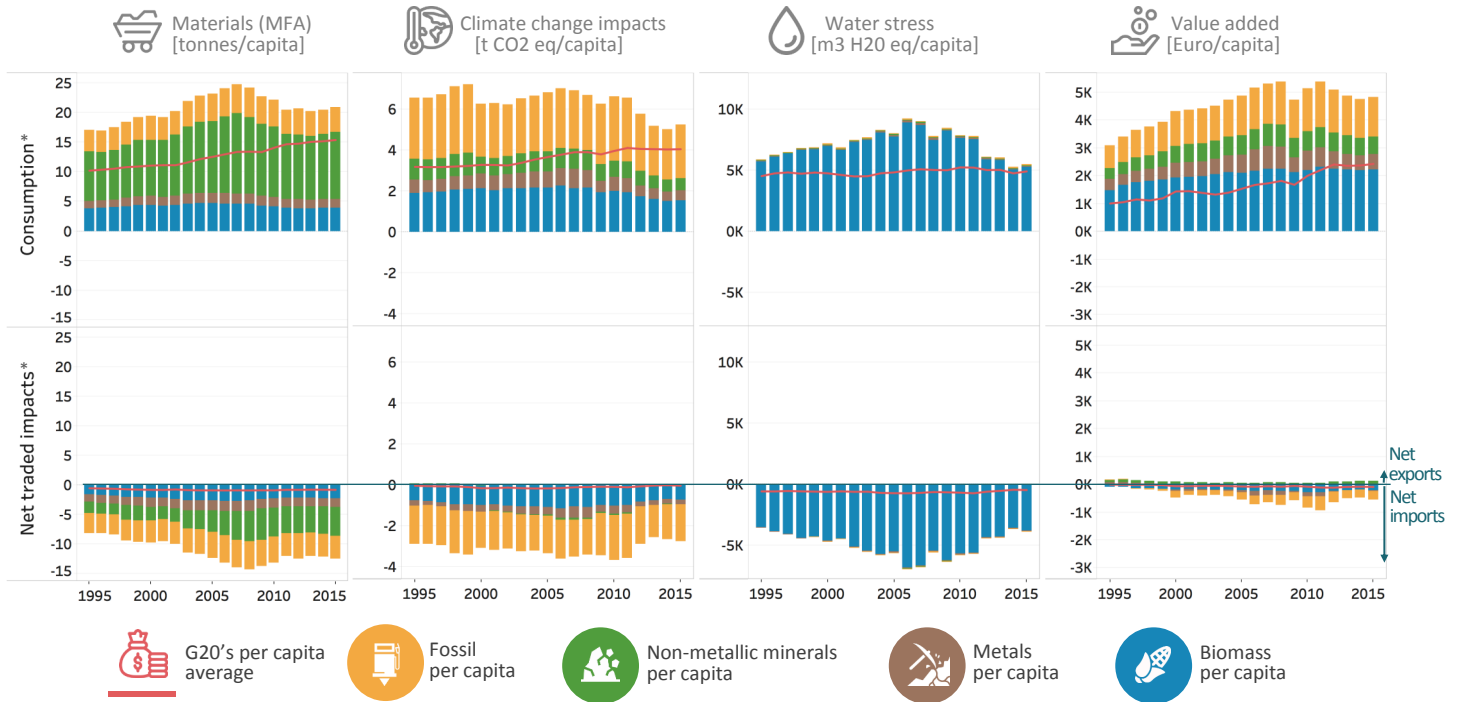
Material-related impacts: Impacts related to the extraction and processing of material resources (including the upstream supply chain, such as electricity generation and transport)

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 Italy (1995-2015)*



*Data after 2011 was nowcasted.

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

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

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



Italy is a net importer of all material types (with a much higher reliance on trade than the G20 average). Accordingly, more environmental impacts are caused outside of Italy from material imports than within its borders from material exports.



Value added for traded non-metallic minerals was higher within Italy than outside. This indicates that rather cheap raw materials are imported, while more expensive products are exported (e.g. marble products).



For traded fossils, metals and biomass, the net added value created was higher outside of Italy than inside, since the year 2000.

FUTURE TRENDS AND POTENTIAL DECOUPLING



Scenarios developed by the IRP forecast an increase of GDP of 74% to 97% and a rather constant population rate until 2060.



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



Material-related climate change and water stress impacts have slightly decreased in the past two decades. However, material footprint and all environmental impacts per capita remain above G20 average (consumption perspective). Resource efficiency strategies along the entire supply chain (including responsible sourcing of biomass imports and reduction of reliance on fossil fuels) could help decrease these impacts.