Population increased by 11% while GDP increased by almost 80% until the start of the global financial crisis in 2007. GDP remained rather stable afterwards with some fluctuations.

Material footprint remained around 21 tonnes/capita, with a slight intermediate increase until 2007 (G20 average was at 15 tonnes/capita in 2015).

The domestic extraction and domestic consumption of materials slightly decreased after the year 2000 and fell below G20 average.

France experienced absolute decoupling of climate change impacts related to material extraction and processing from economic growth. However, material-related climate change impacts remained above G20 average (>20% higher than G20 average from a consumption perspective).

Water stress decreased from the production but not from the consumption perspective.

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

Biomass contributed ~40% to domestic extraction. There is nearly no metal and fossils extraction within France (from a production perspective).

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

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

Outdoor particulate matter (PM) related health impacts came mainly from households and the remaining economy.

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 France for food imports.

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

**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

*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
### Key Sectors and Resources

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

- Material-related climate change impacts within France (production perspective) were particularly caused by cattle and milk production, followed by iron, steel, and cement production as well as petroleum refining.

- From a production perspective, climate change impacts decreased below G20 average. From a consumption perspective, they were more than 20% higher than the G20 average. This is due to imports of goods with large embodied greenhouse gas emissions for domestic consumption, e.g., crude petroleum.

- The construction sector, followed by motor vehicle manufacturing were the largest industrial users of climate-intensive materials.

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

- Materials with large climate impacts are often directly consumed by households, especially fossil fuels for mobility and heating, and food (particularly beef and dairy).

- From a production perspective, water stress is mainly caused by cereals, but at a very low level.

- Water stress caused abroad for French consumption is dominated by agricultural activities, such as the production of vegetables, fruits, nuts, wheat, other cereals and oil seeds.

- From a production perspective, land-use-related biodiversity loss is considerably lower than the G20 average. It is similar to the G20 average from a consumption perspective. Main causes of this biodiversity footprint are imports of wood, beef, and oil seeds from regions with high ecological value.

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*Data after 2011 was nowcasted.
Source: IRP database, Exiobase v3.4, Cabernard et al. 2019
**The Environmental Effects of Trade**

Figure 7: Per-capita consumption footprints (above) and net traded impacts (below) in France (1995-2015)*

Future trends and potential Decoupling

- Scenarios developed by the IRP forecast an increase of GDP by 113% to 141% and a rather small population increase (22%-26%) until 2060.
- If ambitious resource efficiency policies are introduced, France could see an absolute decoupling of domestic material extraction and domestic material consumption 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 (with a special focus on cattle farming) could help decrease these impacts.

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France is a net importer of all material types (much higher reliance on trade than G20 average). Accordingly, more environmental impacts are caused by material imports than by material exports.

For all material types and particularly fossil fuels, net value added was created outside of France for material imports since the year 2004.

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*Data after 2011 was nowcasted.

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

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

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

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