

## **Quantifying the environmental impacts of a European citizen through a macro-economic approach, a focus on climate change and resource consumption**

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### **Abstract**

As economies in the European Union are ultimately driven by the final consumption of citizens, policy makers need proper indicators to monitor the environmental impacts associated with this consumption. These indicators can be constructed using two different approaches, each having their strengths and limitations. The top-down approach is based on environmentally extended input-output analysis and quantifies the environmental impacts of product groups and services provided by industrial sectors. The bottom-up approach is based on Life Cycle Assessment and quantifies the environmental impacts of a selection of representative products. The bottom-up approach has already been used by the European Commission's Joint Research Centre to calculate the impacts of the final consumption per capita in the European Union in 2006. In this paper, we calculated these impacts through a top-down approach, using the Exiobase database. The covered household activities are food, consumer goods, mobility, shelter and services. The goal was to calculate all the impact categories recommended by the International Reference Life Cycle Data handbook, and compare both approaches. However, the categories ionizing radiation, toxicity and abiotic resource depletion could not be included, as some relevant emissions and resources are not available in Exiobase. To study more profoundly the impact on natural resources, we added the Cumulative Exergy Extraction From the Natural Environment to the impact assessment. When comparing both approaches, it can be concluded that there is a considerable shift in the results. This means that the information obtained by a top-down approach could supplement the information base for policy support.