



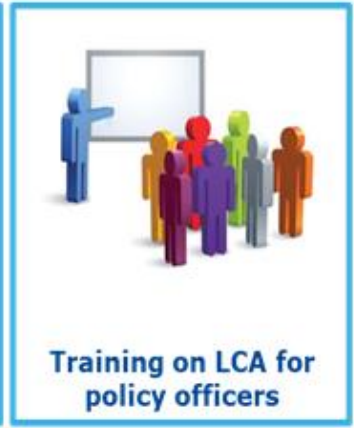
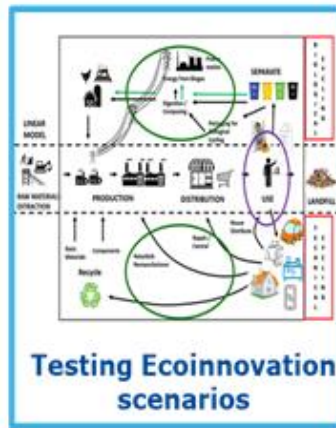
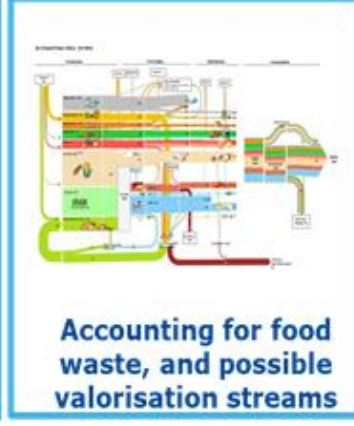
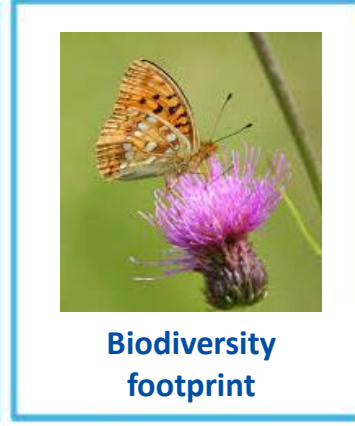
LCA to support policy actions: Life cycle-based indicators for monitoring the environmental impacts of EU consumption

Esther Sanyé Mengual, Serenella Sala

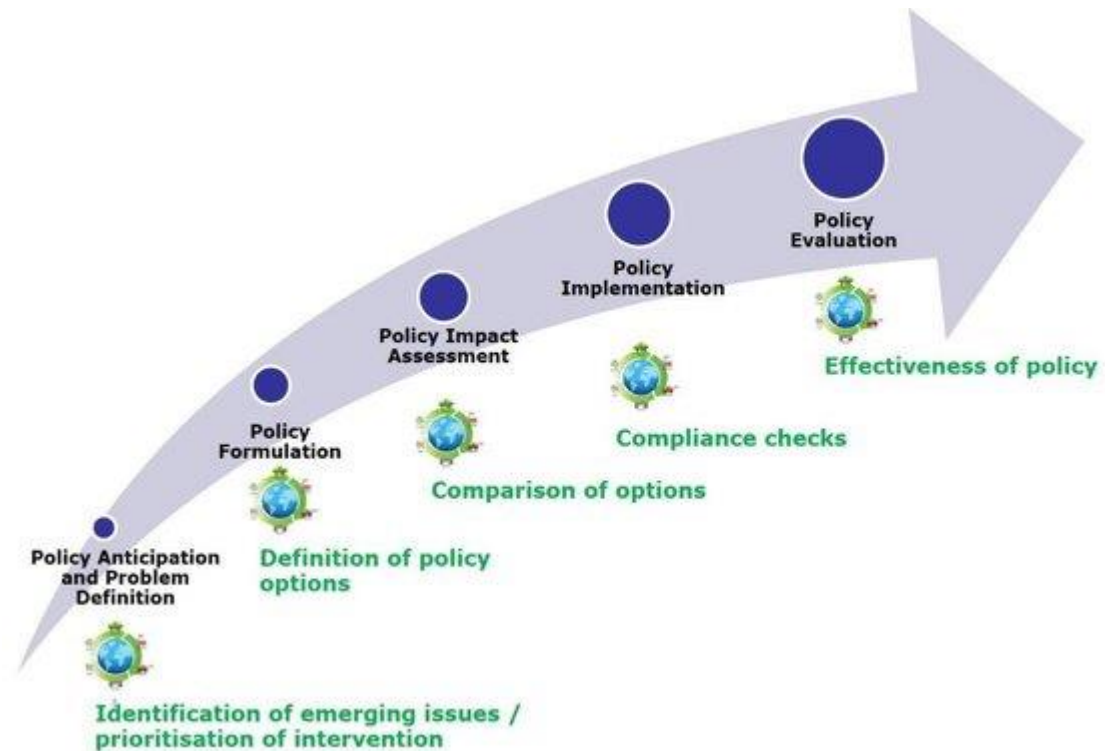
Land Resources Unit,
Directorate Sustainable Resources,
Joint Research Centre, European Commission

*78th Jubilee Swiss Discussion
Forum LCA – 13-14.09.2021*

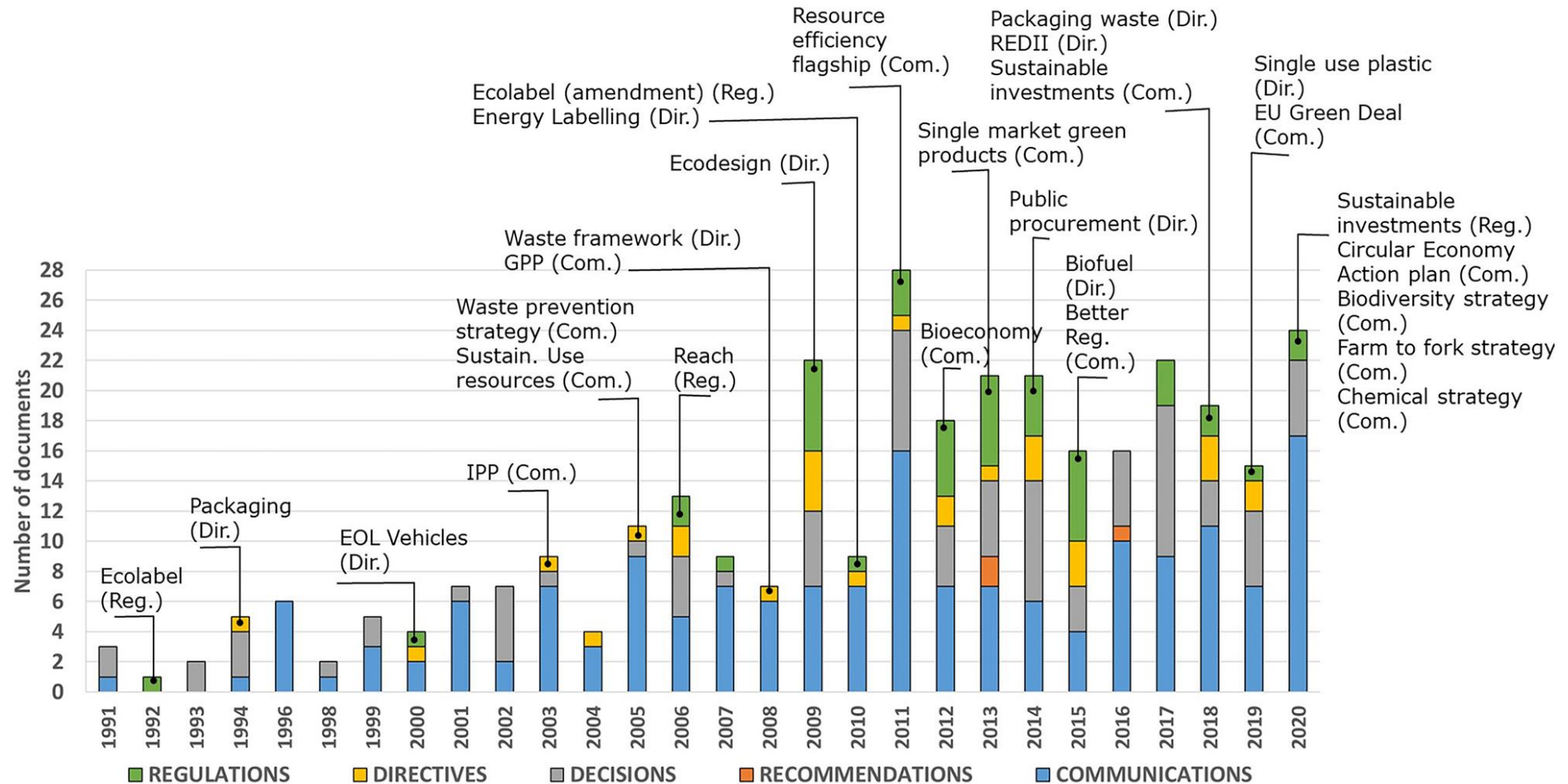
The LCA team at the JRC



Uses of LCA in the policy cycle



Evolution of LCA in EU policy



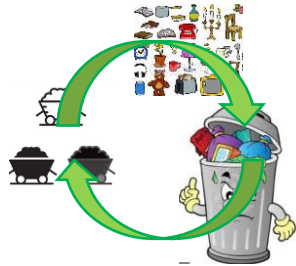
Life cycle thinking is central in the GREEN DEAL and beyond

Key Policies

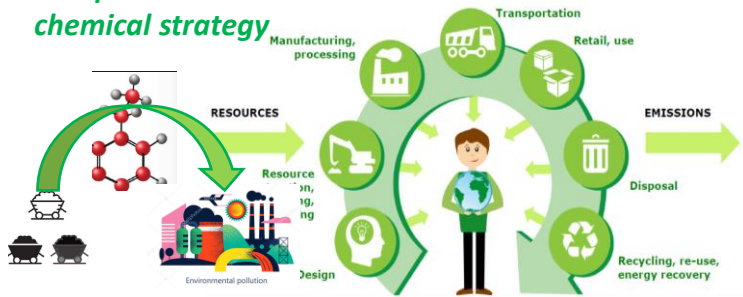
Farm to fork



Circular economy

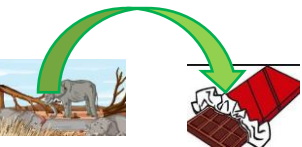


Zero pollution and chemical strategy



Life Cycle Assessment

Biodiversity strategy



Sustainable Development Goals



And many others...

Implementing tools



Environmental footprint

Comparing product A and product B



Consumption Footprint

Macro-scale assessment of EU consumption and production



Consumer Footprint

Assessing impacts of individual consumption

The Consumption Footprint indicator



Selection of representative products



Food

(45 products)



Mobility

(34 vehicles)



Housing

(30 archetypes)



Household goods

(37 products)



Appliances

(18 products)

Calculation of consumption intensity

Quantification of the consumption intensity of each **representative product**:

- Apparent consumption = production + imports – exports
- Modelling of entire sector (i.e., housing, mobility)

Data from, e.g., Eurostat, FAOstat, literature.

Assessment of potential environmental impacts



climate change



water scarcity



land use



acidification



ozone depletion



human toxicity non-cancer effects health risk



marine eutrophication



eco-toxicity freshwater



terrestrial eutrophication



particulate matter respiratory inorganics



resource use mineral



resource use energy carriers



aquatic freshwater eutrophication



human toxicity cancer effects



ionising radiation



photochemicals ozone formation

Environmental Footprint (EF) 3.0
16 midpoint impact categories (*)



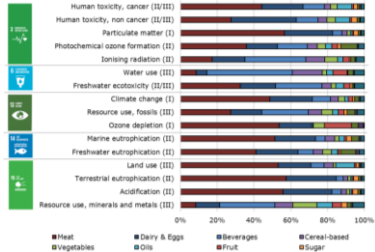
Normalisation and weighting into **single weighted score**

* <https://ec.europa.eu/environment/eussd/smgp/communication/impact.htm>

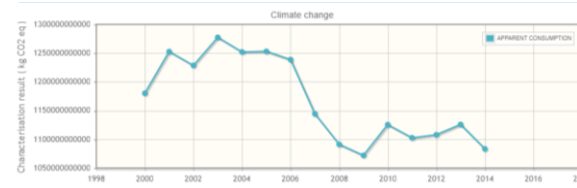
Potential uses of consumption-based footprints

Comparison against Planetary Boundaries

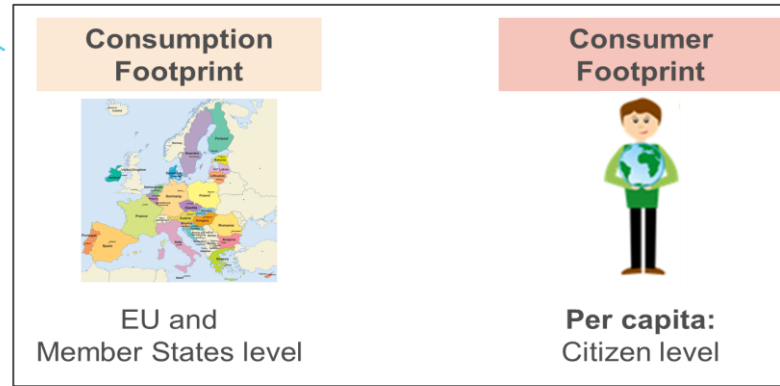
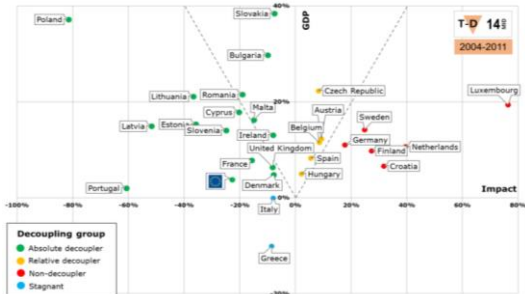
Identification of hotspots



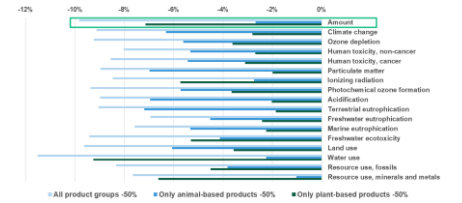
Monitoring / Trend over time



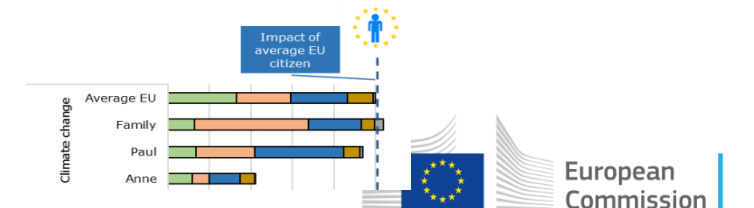
Monitoring: Assessment of environmental impact decoupling



Testing scenarios



Evaluation of lifestyles and consumption patterns

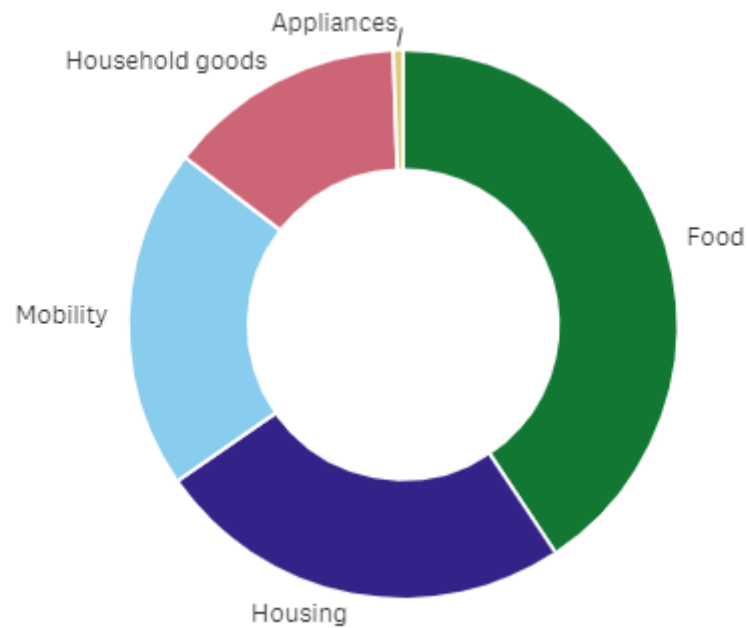


Monitoring of SDGs (especially 12)

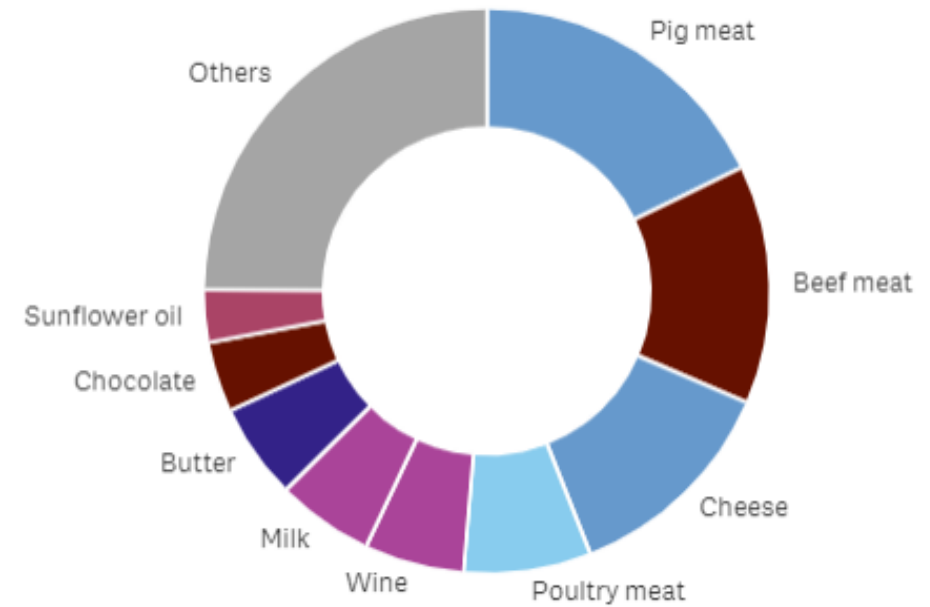


Identification of hotspots

Contribution of areas of consumption to the Consumption Footprint EU-28 (2018)

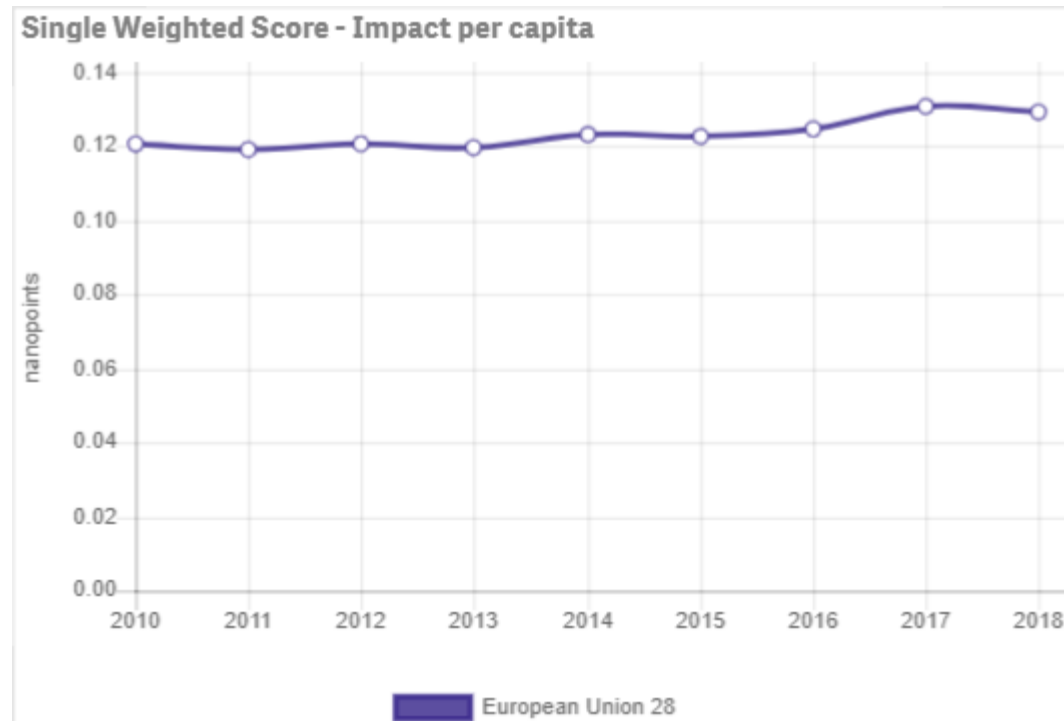


Contribution of representative products to the FOOD Consumption Footprint EU-28 (2018)



Monitoring

Time trends: Evolution of Consumption Footprint



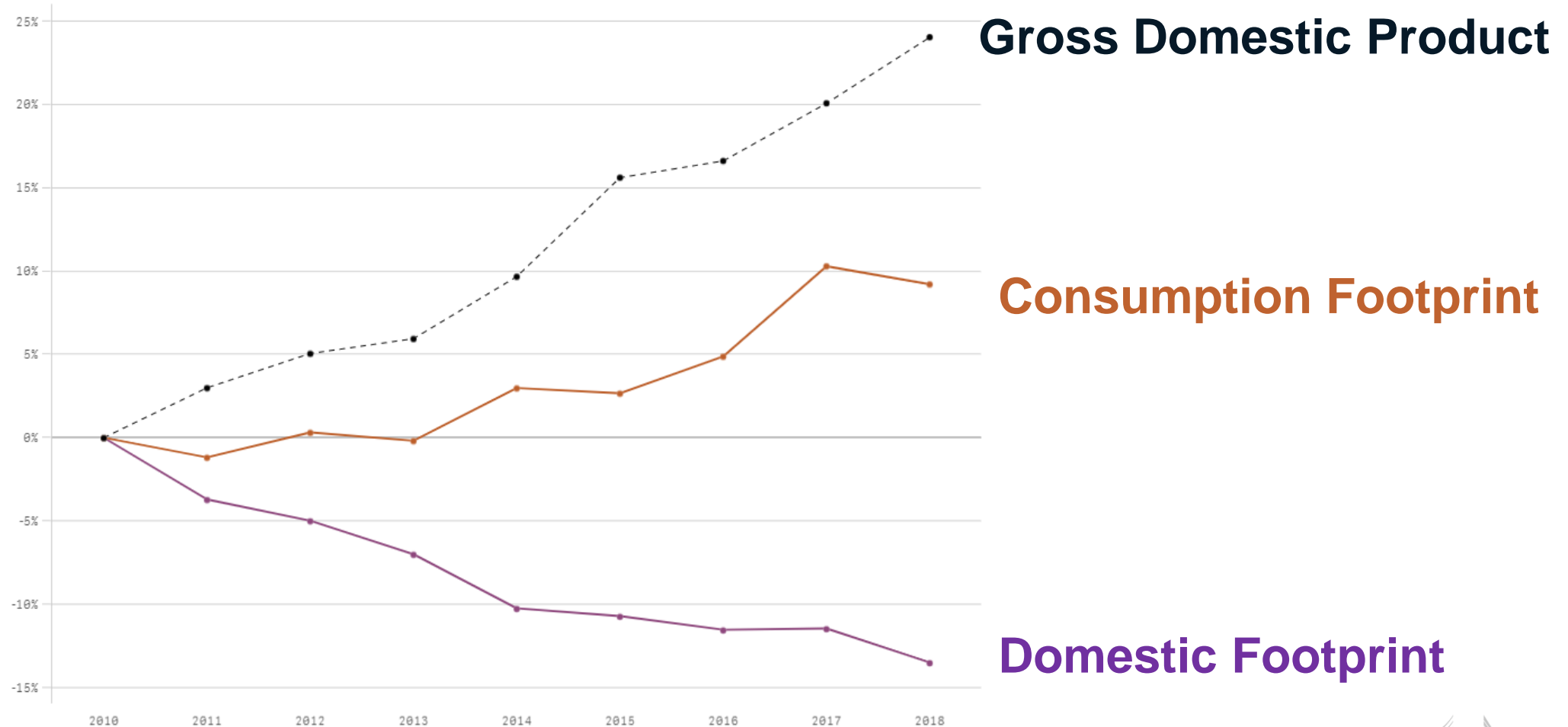
- **Trend evaluation**
- Assessment against **policy targets**
- Assessment against **science-based thresholds**

Monitoring of SDGs (especially 12)

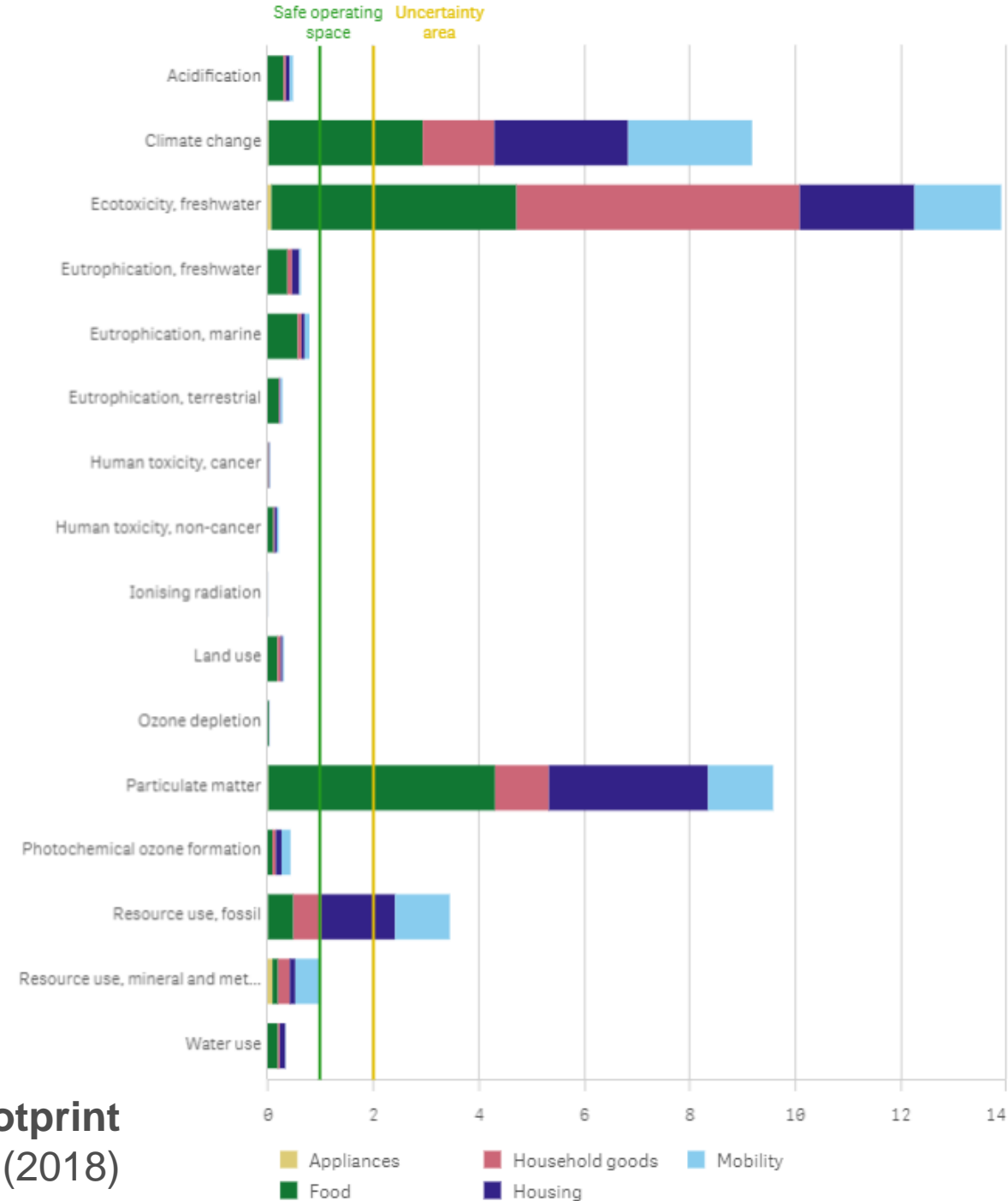
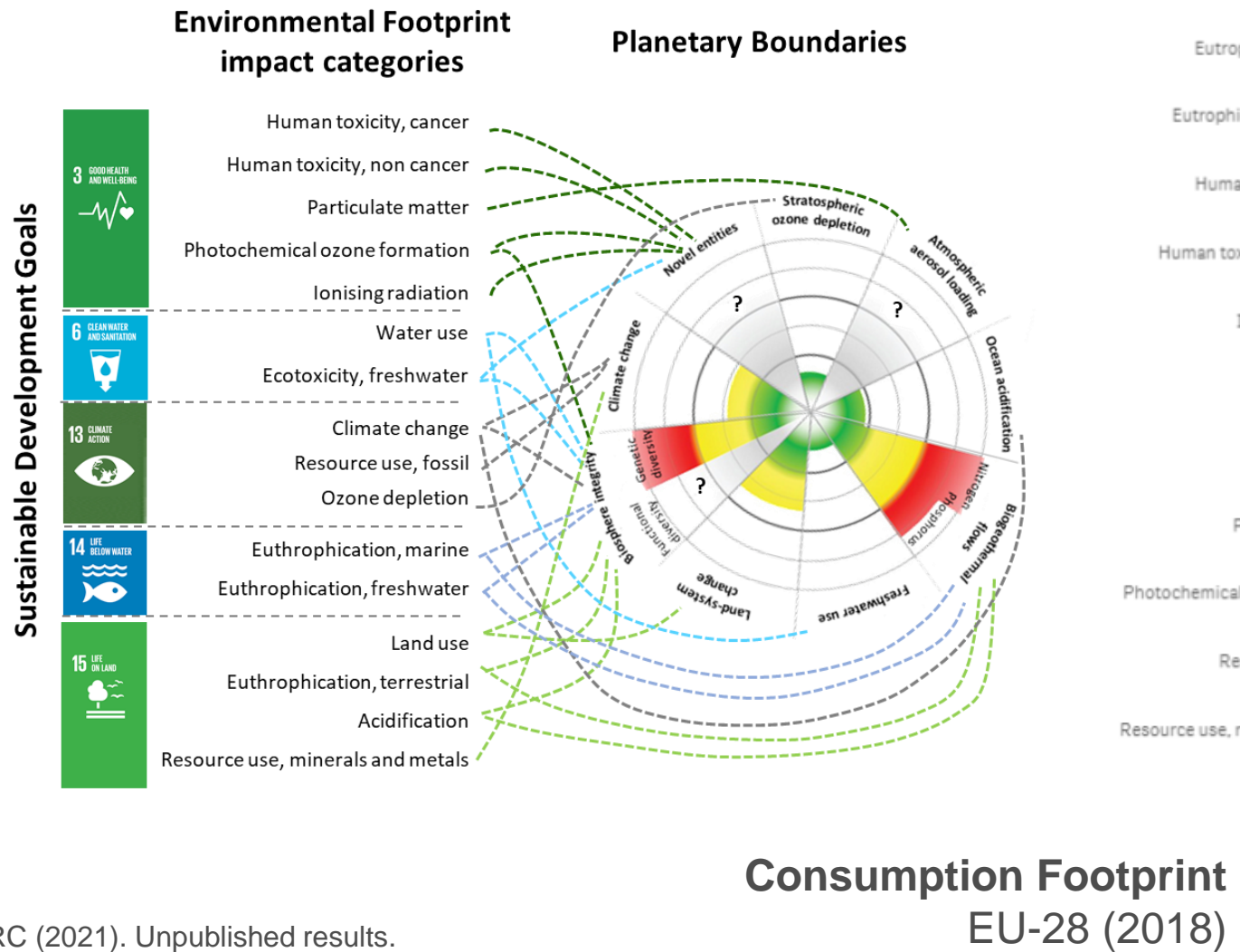
The Single weighted score of the Consumption Footprint can be employed to monitor **SDG12** along time.



Assessment of environmental impact decoupling

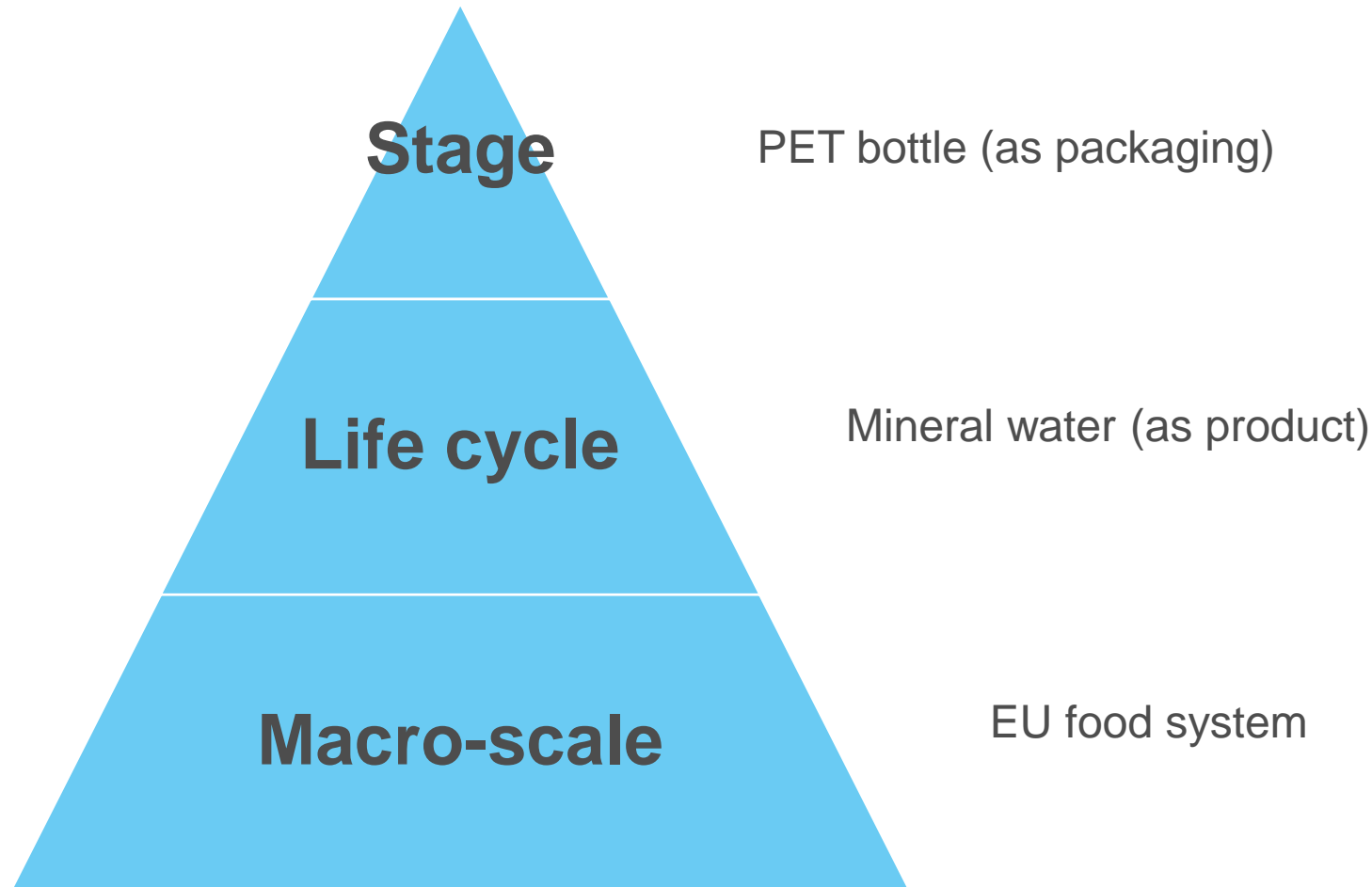


Comparison against Planetary Boundaries

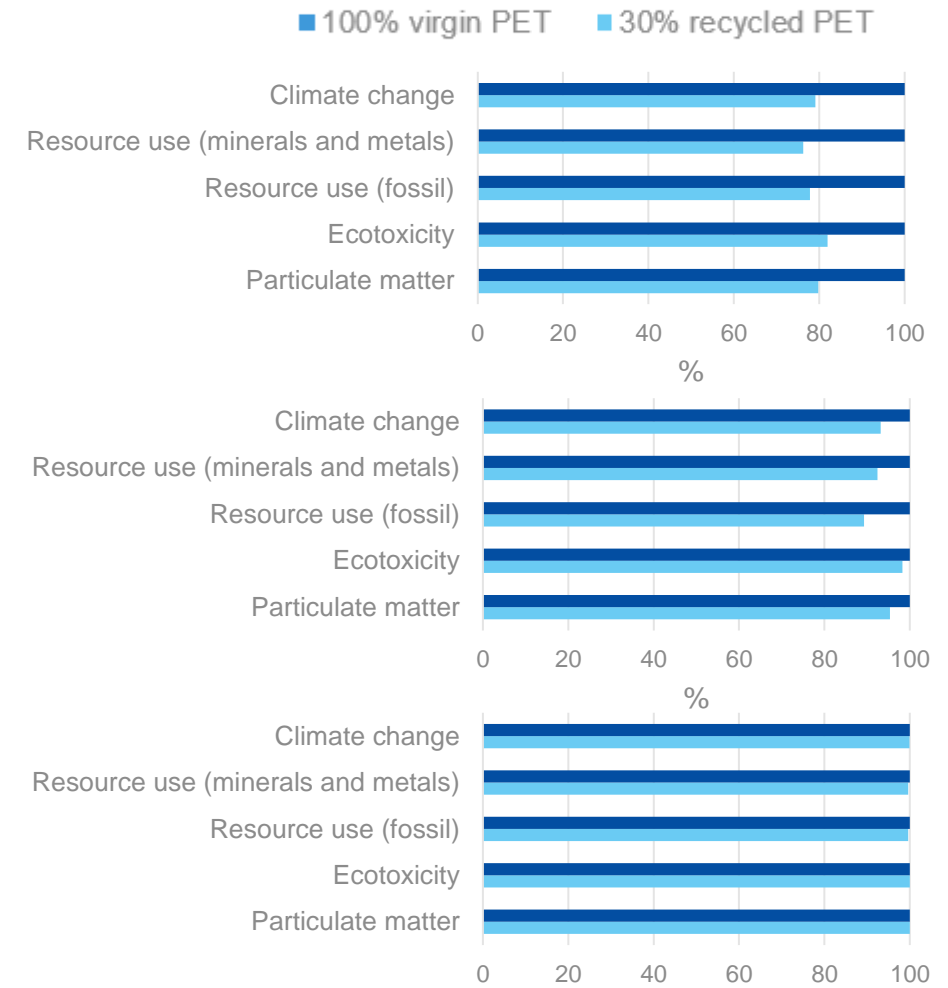


Testing scenarios

Increased 30% of **recycled PET** in packaging bottle production



Different levels of assessment



Evaluation of lifestyles and consumption patterns



Anne (23 years old)



Paul (25 years old)



Maria (32 years old), Evan (35), Ana (7)

Example of patterns

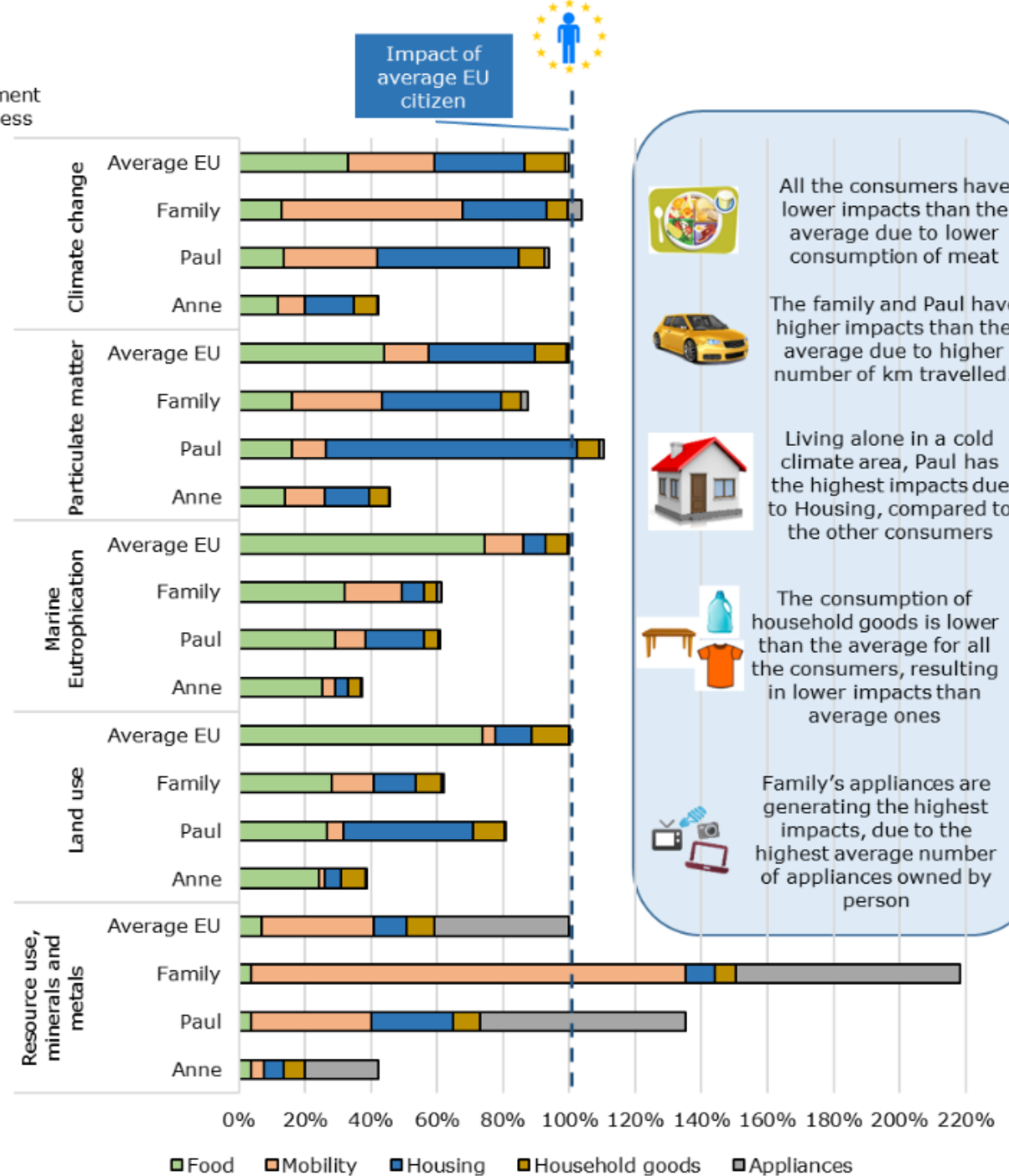
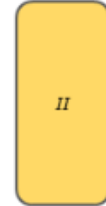


Vegetarian

Semi-vegetarian (non-vegetarian options only when he eats outside)

Mediterranean diet

Impact assessment model robustness



All the consumers have lower impacts than the average due to lower consumption of meat

The family and Paul have higher impacts than the average due to higher number of km travelled.

Living alone in a cold climate area, Paul has the highest impacts due to Housing, compared to the other consumers

The consumption of household goods is lower than the average for all the consumers, resulting in lower impacts than average ones

Family's appliances are generating the highest impacts, due to the highest average number of appliances owned by person

Sala et al. (2019). Indicators and assessment of the environmental impact of EU consumption.
https://eplca.jrc.ec.europa.eu/uploads/Science_for_policy_report_final_on_line.pdf

The Consumer Footprint Calculator



Goal: Increase **awareness** of the environmental impact of lifestyles

What is the impact of our lifestyle?

Quantifying the **environmental impacts of your consumption habits**

How can we improve our current environmental impacts?

Evaluating how **changes in your lifestyle** may affect your personal **footprint**

Link to **policies** addressing:

- Consumer information and consumer awareness and empowerment
- Transitions in lifestyles

<https://eplca.jrc.ec.europa.eu/sustainableConsumption.html>

The Consumer Footprint Calculator



How many portions do you consume every DAY of these food items?

<p>Vegetables</p> <p>0</p>	<p>Milk</p> <p>0</p>	<p>Bread</p> <p>0</p>
<p>Bottled mineral water</p> <p>0</p>	<p>Coffee</p> <p>0</p>	<p>Tea</p> <p>0</p>

Questionnaire on 5 areas of consumption

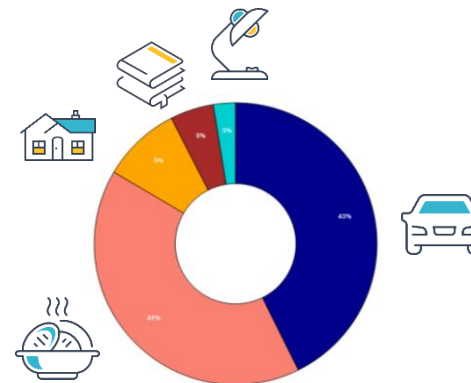


- Consumption intensity
- Behaviour

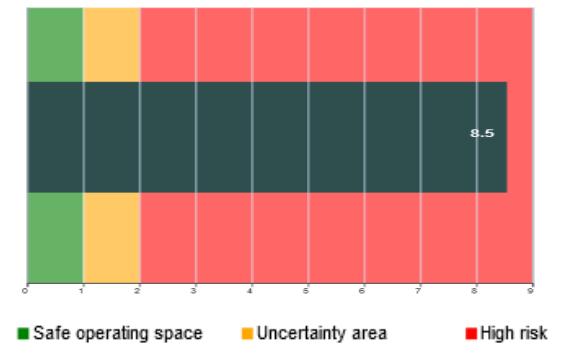
Impacts on 16 environmental categories



By area of consumption and products



Against Planetary Boundaries

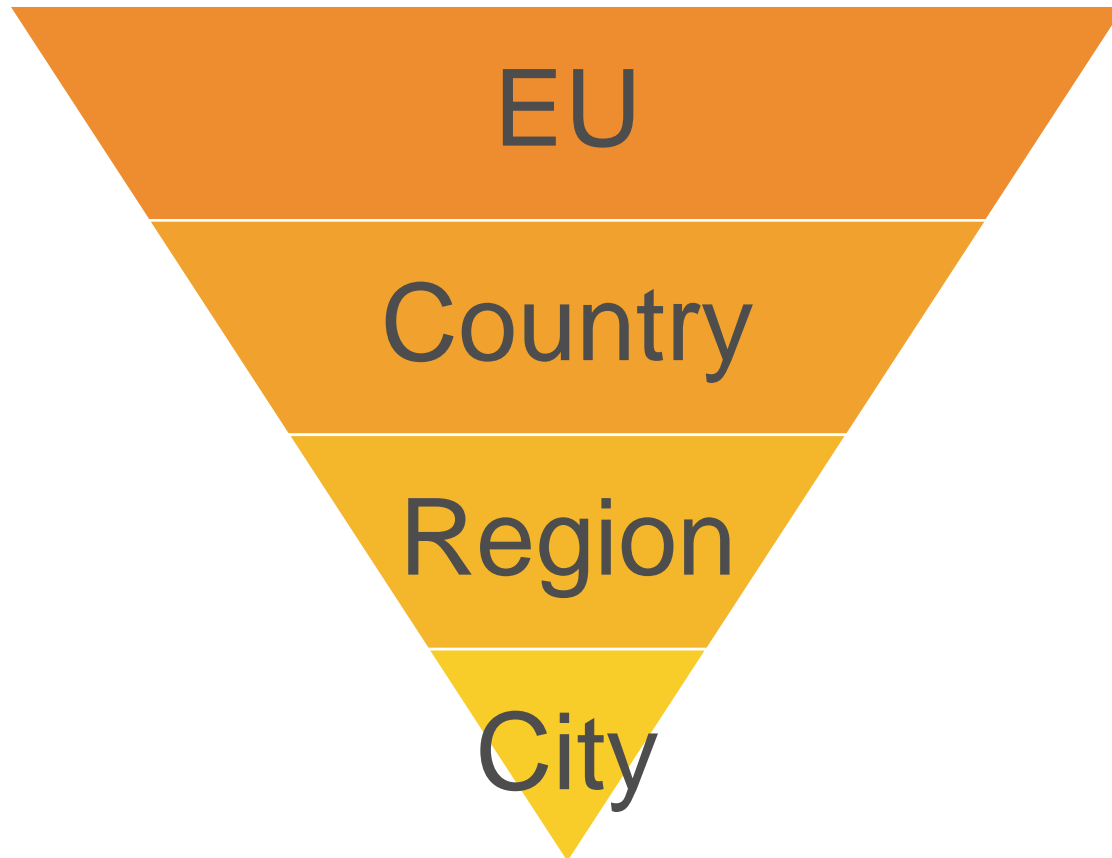


Compared with the average EU citizen



Adaptability of Consumption Footprint

Geographical scale



Data sources

EU-wide data (both aggregated or Member State-level)

EU-wide Member State-level data
Individual Member State data

EU-wide region-level data
Individual region data (combination with Member State data)

EU-wide city-level data
Individual city data (combination with Member State and region data)

Take home messages

- LCA-based indicators are comprehensive and allow evaluating trade-offs in policy-making (between impact categories and life cycle stages)
- The Consumption Footprint enhances a consumption perspective in policy-making and can support policy e.g. monitoring, testing scenarios and policy options, identifying hotspots etc
- This indicator can be adapted to different geographical scales and employ different types of data sources
- Specific tools can help improve consumers' awareness, e.g. Consumer footprint calculator

Thank you

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<https://eplca.jrc.ec.europa.eu/>



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