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A Comparison of Databases to assess the climate impact of labeled foods

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1. INTRODUCTION

Food production is among the largest drivers of global environmental change. Efforts must be made to provide a healthy and accessible diet for the population that is also sustainable for the planet (Willett et al. 2019). A large and increasing number of carbon and sustainability labels for food can be found in retail (Sonntag et al. 2023). However, all these labels for assessing the sustainability of food are based on different data sources. The aim of our investigation was to find out whether the use of many different data sources reduces the informative value and reliability about the climate and environmental claim of labels. This paper provides an overview over databases which are used in current carbon and sustainability food labels in Europe.

2. METHODS

This work is designed as desk research. The most common labels and their underlying data sources were collected by an internet search of homepages, as well as a literature review of background and methodology reports. From the data sources (databases, primary sources, own calculations, other sources) used for creating the labels, only free and commercial databases were considered here. Table 1 shows the databases used by selected carbon and sustainability labels in Germany and Europe. As an example, the carbon footprints of conventional whole milk, are calculated using the free databases from table 1 and are shown in figure 1.

3. RESULTS AND DISCUSSION

The publishers of the labels obtain their data from many different databases (table 1) with varying data quality and scopes. The number of databases used varies between labels and is often not evident for an individual product, as is the origin of the data source. The databases differ from each other in terms of the number of certified food items, the impact categories, the reference unit, the geographical reach, the time reference and the calculation method. The data contained in the databases refers to different countries and regions. The system boundary can only contain agriculture or can go up the entire value chain. The carbon footprint of a food item like cow´s milk depends on many different aspects (figure 1). Up to farm gate there is an average of 1,05 +/- 0,16 CO_2e /kg milk, up to supermarket the values fluctuate around 1,59 +/- 0,27 CO_2e /kg milk. The carbon footprint in agricultural production can vary greatly due to many factors, like feeding (Mottet et al. 2017), the farming system and the

management strategies (Kristensen et al. 2011). Later in the supply chain, milk processing and transportation will influence the carbon footprint, as well as packaging and the electricity mix (ifeu 2014). It is often not possible to see the assumptions that the free databases are based on. An exception is Agribalyse, which is very transparent about their assumptions for calculations. However, free databases at least provide an indication of the carbon footprint of foods.

4. CONCLUSIONS

The comparability of the statements made by climate and sustainability labels is limited because of different data sources and system boundaries. When labels are based on data from primary sources, empirical values and own calculations, the comparability of the results becomes even more limited. Depending on the choice of database, production factors and allocation, the result of an LCA can vary. Calculations of carbon footprints should be carried out with comparable methods. Moreover, assumptions and calculations need transparency and generally accepted standards. A uniform, comprehensive database in Europe is necessary for the comparability of foods in terms of their ecological balance.

5. ACKNOWLEDGEMENTS

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Table 1. The use of databases in sustainability and climate labels

Database *(Institution)*	County	Charges apply	Used by labels
Agribalyse *(ADEME, INRAE)*	FR	no	Climatepartner, Eaternity Score, Eco Impact, Eco Score (Beelong), Eco Score, Planet Score
Agri-Footprint *(Blonk)*	NL	yes	Climate Partner, Eaternity Score, Eco Impact, WASA CO2 neutral
Bonsai *(Aalborg University)*	DK	no	Eaternity Score
ClimateHub *(CarbonCloud)*	SE	yes/no	Oatly Climate Footprint, Climatepartner
Ecoinvent *(Ecoinvent Association)*	CH	yes	Climatepartner, Climateline Zukunftswerk, Eaternity Score, Eco Impact, Eco Score (Beelong), Klimaneutral Fokus Zukunft, M-Check, MyClimate, WASA CO2 neutral
Hestia *(Oxford Martin School, WWF, Login 5 Foundation)*	UK	no	Eaternity Score
Ifeu *(Ifeu)*	D	no	Climateline Zukunftswerk
ProBas (under revision) *(UBA)*	D	no	Climateline Zukunftswerk, Klimaneutral Fokus Zukunft
WFLDB *(Quantis)*	CH	yes	Eaternity Score, Eco Impact, Eco Score (Beelong), M-Check
RISE *(RISE)*	SE	yes/no	Eaternity Score

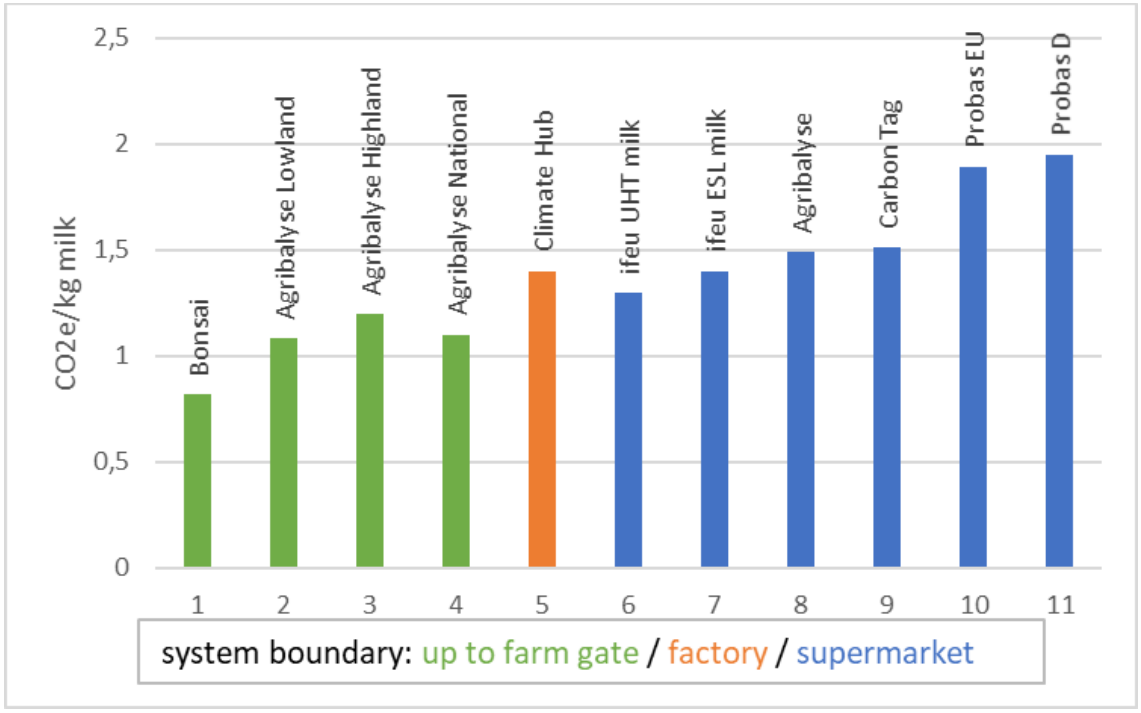

Figure 1. Carbon footprint of whole milk calculated with different free databases