Eaternity Database References
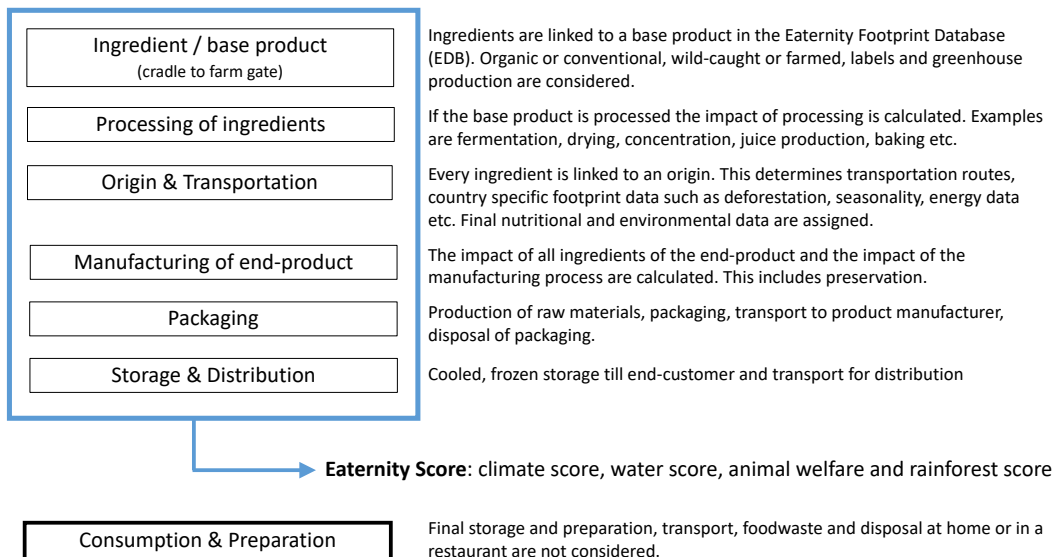# [2022-03-21]

This list contains main external data sources used in the Eaternity Database. Eaternity works with the LCA software Brightway to adjust and improve datasets to fit best the purpose of our solutions. The scope of our data currently covers food products from farm to gate.
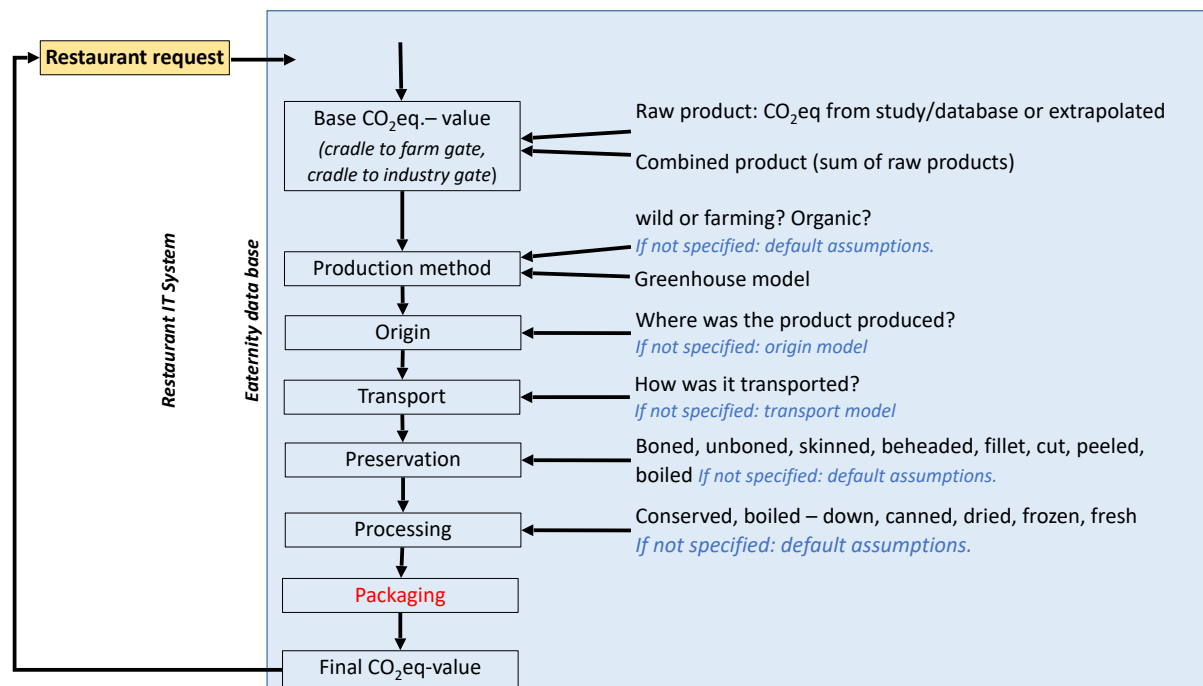
The calculation routine covers 3 different cases. While the „Eaternity Score" is the most detailed, it currently requires the manual exchange of questionnaires, that go into details of the individual production method a product. The „Eaternity Lean" case, is working on automatizing this data exchange to reduce costs and efforts for the calculation by 20x. It heavily relies on that the correct primary data for the production processes are provided without manual request and that they are complete. Theoretically could the precision of „Eaternity Lean" be identical to the „Eaternity Score" - yet in practice this is not yet the case. Therefor only calculation done with the „Eaternity Score" method are allowed to be printed on the package of the product. While the „Eaternity Lean" calculations can only be used everywhere else (website, price-labels, strategy planing, etc.). The „Eaternity Gastro" calculation allows for an efficient, heavily automized solution for the assessment of recipes and restaurants.

Eaternity Score

Calculation steps for the Eaternity Score

Ingredient / base product (cradle to farm gate)	Ingredients are linked to a base product in the Eaternity Footprint Database (EDB). Organic or conventional, wild-caught or farmed, labels and greenhouse production are considered.
Processing of ingredients	If the base product is processed the impact of processing is calculated. Examples are fermentation, drying, concentration, juice production, baking etc.
Origin & Transportation	Every ingredient is linked to an origin. This determines transportation routes, country specific footprint data such as deforestation, seasonality, energy data etc. Final nutritional and environmental data are assigned.
Manufacturing of end-product	The impact of all ingredients of the end-product and the impact of the manufacturing process are calculated. This includes preservation.
Packaging	Production of raw materials, packaging, transport to product manufacturer, disposal of packaging.
Storage & Distribution	Cooled, frozen storage till end-customer and transport for distribution

Eaternity Score: climate score, water score, animal welfare and rainforest score

Consumption & Preparation	Final storage and preparation, transport, foodwaste and disposal at home or in a restaurant are not considered.

EDB, Nov. 2020

Eaternity Gastro

Restaurant request → Restaurant IT System | Eaternity data base

Base CO$_2$eq.– value *(cradle to farm gate, cradle to industry gate)*
- Raw product: CO$_2$eq from study/database or extrapolated
- Combined product (sum of raw products)

Production method
- wild or farming? Organic? *If not specified: default assumptions.*
- Greenhouse model

Origin
- Where was the product produced? *If not specified: origin model*

Transport
- How was it transported? *If not specified: transport model*

Preservation
- Boned, unboned, skinned, beheaded, fillet, cut, peeled, boiled *If not specified: default assumptions.*

Processing
- Conserved, boiled – down, canned, dried, frozen, fresh *If not specified: default assumptions.*

Packaging

Final CO$_2$eq-value

1. Databases

LCI

Ecoinvent – https://www.ecoinvent.org

Agribalyse – Ademe – https://www.ademe.fr/en/expertise/alternative-approaches-to-production/agribalyse-program

Agri-food Database – ZHAW – www.zhaw.ch/IUNR/agri-food

Agri-foodprint database - Blonk Consultants - http://www.agri-footprint.com

WFLDB World food database - Quantis - https://quantis-intl.com/tools/databases/wfldb-food/

BONSAI – Big Open Network for Sustainability Assessment Information - http://bonsai.uno

Hestia - Harmonized Environmental Storage and Tracking of the Impacts of Agriculture http://www.hestia.earth

Other

Food and Agriculture Organization of the United Nations (FAO) - http://www.fao.org/faostat/en/#data/TP/metadata

Meteonorm Software Version 7.0 - Meteotest AG - https://meteonorm.com

EcoTransIT World - Ingenieurgesellschaft für Verkehrs-und Eisenbahnwesen mbH (IVE mbH) - https://www.ecotransit.org

Nutrients

Schweizer Nährwertdatenbank - Bundesamt für Lebensmittelsicherheit und Veterinärwesen BLV - http://www.naehrwertdaten.ch

EuroFIR - European Food Information Resource Network (EUROFIR) - http://www.eurofir.org/foodexplorer/

2. Reports & Publications

2.1 Climate Score

Ecoinvent, Zurich, Switzerland

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8>

ZHAW Institute of Natural Resource Sciences, Wädenswil, Switzerland

Berli, C, Scharfy, S, Stucki, M (2014). Wie ökologisch sind Milch-Ersatzprodukten? ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Camezind, P, Itten, R, Stucki, M (2016). Life cycle inventory datasets of pastries. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report. ZHAW Agri-food Database, www.zhaw.ch/IUNR/agri-food. LCIA also available at the Eaternity Database (EDB - edb.eaternity.org).

Eymann, L, Kreuzer, S, Stucki, M & Scharfy, D (2014). Ökobilanz von Milch und Milchproduktion. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report. ZHAW Agri-food Database, www.zhaw.ch/IUNR/agri-food. LCIA also available at the Eaternity Database (EDB - edb.eaternity.org).

Eymann, L, Frei, S, Stucki, M. (2014). Treibhauspotenziale von Gewächshaus-Gemüse. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Eymann, L, Stucki, M, Looser, F (2016). Ökobilanz von Schokolade. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Hirsiger, E, and Stucki M, (2015). Umweltbelastung von Schweine- und Lammfleisch. Ökonomische Allokation auf der Stufe von Fleischstücken. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report. ZHAW Agri-food Database,

www.zhaw.ch/IUNR/agri-food. LCIA also available at the Eaternity Database (EDB - edb.eaternity.org).

Hirsiger, E, and Stucki M, (2015). Ökobilanzierung von Bouillon. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report. ZHAW Agri-food Database, www.zhaw.ch/IUNR/agri-food. LCIA also available at the Eaternity Database (EDB - edb.eaternity.org).

Itten, R (2016). Ökonomische Allokation von Pouletfleisch. ZHAW Zurich University of Applied Science, Wädenswil, unpublished document.

Itten, R, Eymann L, Stucki M. (2017). EAT-IT - Modeling Life Cycle Environmental Impacts of Food and Beverage Items. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Kreuzer, S, Eymann, L & Stucki, M (2014). Ökobilanzen von Kalb- und Rindfleisch. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report. ZHAW Agri-food Database, www.zhaw.ch/IUNR/agri-food. LCIA also available at the Eaternity Database (EDB - edb.eaternity.org).

Kreuzer, S (2016). Ökobilanz von Fohlen- und Pferdefleisch aus der Schweiz und Kanada. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Scharfy, D, Itten, R & Bischof, T (2016). Organic LCA and allocation data for the Eaternity Database. Work Package A4 of the Organic Footprint project. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Scharfy, D, Itten, R & Bischof, T (2016). Life cycle assessment of different organic certification schemes. Work Package A2/A3 of the Organic Footprint project. Unpublished report. ZHAW Zurich University of Applied Science, Wädenswil.

Schwab, S, Scharfy, D, Stucki, M (2014). Ökobilanzdatensatz für IP- und Bio Olivenöl, Italien. ZHAW Zurich University of Applied Science, Wädenswil, unpublished report.

Quantis

Thierrin, R. Meat and Egg LCI. Documentation of LCI dataset for beef, chicken, pork, trout meat and egg production created for the Eaternity database., (2017). Quantis, Zürich, unpublished report.

Other

Wolff, V, Alig, M, Nemecek, T & Gaillard, G (2016). Ökobilanz verschiedener Fleischprodukte. Geflügel-, Schweine- und Rindfleisch., 1-51. Agroscope, Reckenholz, Zürich.

Koch P. and Salou T. 2015. AGRIBALYSE*: Rapport Méthodologique – Version 1.2. (March 2015). Ed ADEME. Angers. France. 385 p.

2.2 Water Footprint

Scherer, L & Pfister, S (2016). Global Biodiversity Loss by Freshwater Consumption and Eutrophication from Swiss Food Consumption. Environmental Science and Technology, 50, 7019-7028.

O'Connor, I, Ellens, J (2018). Which indicators in addition to the carbon footprint are most important to consider when we evaluate the impact of food consumptions? Unpublished summary report. Eaternity AG, Zurich. Engagement Migros development fund.

Pfister, S. et al., (2011). Environmental impacts of water use in global crop production: Hotspots and trade-offs with land use. Environmental Science and Technology, 45(13), pp.5761–5768.

Hoekstra, A.Y., (2016). A critique on the water-scarcity weighted water footprint in LCA. Ecological Indicators, 66, pp.564–573. Available at: http://dx.doi.org/10.1016/j.ecolind.2016.02.026

2.3 Animal Welfare Label

O'Connor, I, Ellens, J (2018). Which indicators in addition to the carbon footprint are most important to consider when we evaluate the impact of food consumptions? Unpublished report. Eaternity AG, Zurich. Engagement Migros development fund.

2.4 Rainforest Label

O'Connor, I, Ellens, J (2018). Which indicators in addition to the carbon footprint are most important to consider when we evaluate the impact of food consumptions? Unpublished report. Eaternity AG, Zurich. Engagement Migros development fund.

2.4 Health Score

GBD 2015 RISK FACTORS COLLABORATORS (2016). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet,* 388**,** 1659-1724.

INSTITUTE FOR HEALTH METRICS AND EVALUATION (IHME). (2016). *GBD Compare Data Visualization -* https://vizhub.healthdata.org/gbd-compare/

Nutrients – losses through cooking processes

BOGNÁR, A. 2002. *Tables on weight yield of food and retention factors of food constituents for the calculation of nutrient composition of cooked foods (dishes)*. Karlsruhe, BFE.

OBRIST, L. 2015. Tabelle: Ausbeutefaktoren Ruestabfall. Schweizer Bauerverband, Agristat.

VASQUET-CAICEDO, A. L., BELL, S. & HARTMANN, B. Report on collection of rules on use of recipe calculation procedures including the use of yield

and retention factors for imputing nutrient values for composite foods. European Food Information Resource (EuroFIR).

Nutrients – recommended daily amounts

SCHWEIZERISCHE GESELLSCHAFT FÜR ERNÄHRUNG. 2017a. *DACH-Referenzwerte* – http://www.sge-ssn.ch/grundlagen/lebensmittel-und-naehrstoffe/naehrstoffempfehlungen/dachreferenzwerte/

SCHWEIZERISCHE GESELLSCHAFT FÜR ERNÄHRUNG. 2017b. *Empfehlungen BLV* – http://www.sge-ssn.ch/grundlagen/lebensmittel-und-naehrstoffe/naehrstoffempfehlungen/empfehlungen-blv/