Project title: How does the environmental footprint of food vary between diets and individuals?
Level: Master
Start: anytime
Project duration: 20-24weeks
Project form: Data analysis of life cycle assessment (LCA) results in the form of a Monte-Carlo analysis done in R
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Background

Worldwide, the predominant source of environmental damage brought about by humans is consumption. Food production has been identified as a major contributor to environmental impacts resulting from private consumption, both at the national and international levels. Multiple studies have been conducted to assess the environmental impacts of different food items and diets, mainly by making use of life cycle assessment (LCA). However, the variability between different consumers has not been addressed explicitly.

Aim and approach

In this study, you will quantify the variability in environmental impacts of Dutch food consumption. To achieve this, the impacts of individual food items will be quantified using existing life cycle assessments, such as the study of Dekker et. al (2019) as well as databases like Ecoinvent or Agri-footprint. This data will be supplemented by a literature analysis if needed. Those impacts will be grouped into diets and final food intake using nutritional advice and consumer behavior data. Using the R programming language, a Monte Carlo analysis will be conducted to assess the variability between individuals caused by differences in diets and calory intake. Mitigation strategies will be identified, prioritized, and recommendations will be provided. Figure 1 shows some preliminary results from a BSc project.
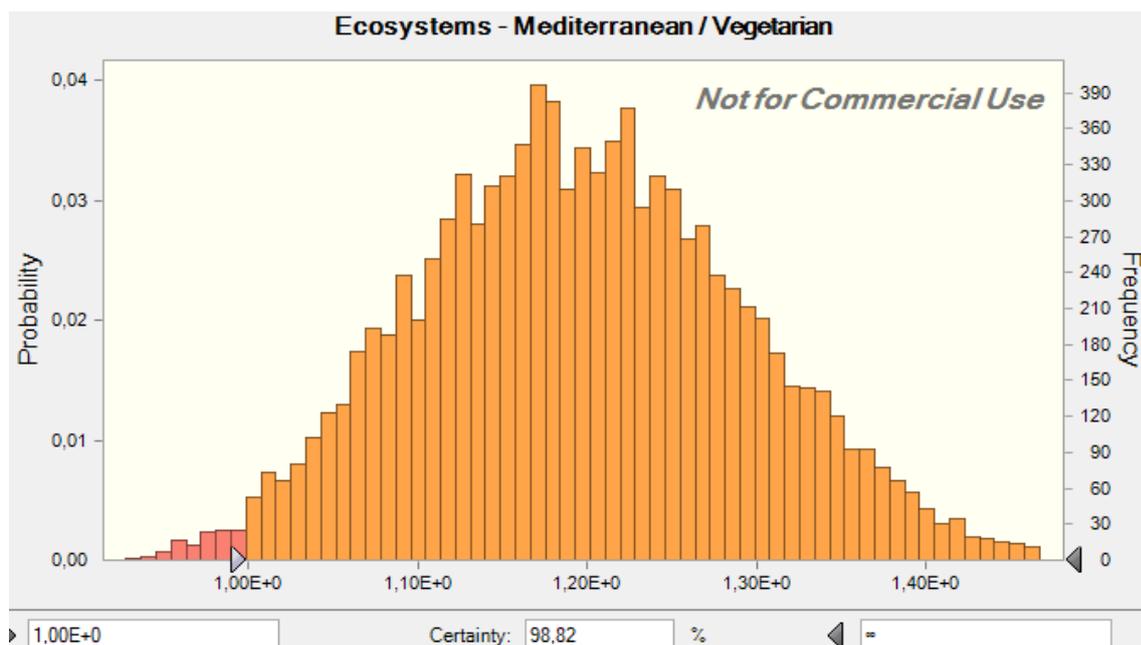

Figure 1: Comparison between the impacts on ecosystems of a Mediterranean and a vegetarian diet. The y-axis shows the probability that the impacts of a Mediterranean diet divided by the impacts of a

vegetarian diet are a certain value. The variation is caused by variations in foods and caloric intake consumed. This analysis shows that there is a 98.8% chance that a Mediterranean diet causes more environmental impacts

Reference

Dekker, E., Zijp, M. C., van de Kamp, M. E., Temme, E. H. M., & van Zelm, R. (2019). A taste of the new ReCiPe for life cycle assessment: consequences of the updated impact assessment method on food product LCAs. The International Journal of Life Cycle Assessment, 25(12), 2315–2324. https://doi.org/10.1007/s11367-019-01653-3.