Arla Foods Environmental Profit and Loss Account (E P&L) – Organisational LCA with Monetarisation

Jannick H Schmidt[1] and Anna Flysjö[2]

[1]2.-0 LCA consultants, Skibbrogade 5, 9000 Aalborg, Denmark
[2]Arla Foods, Soenderhoej 14, 8260 Viby J, Denmark
E-mail contact: js@lca-net.com

1. Introduction

Arla Foods is among the worlds largest dairy companies. To document the total life cycle environmental impact of their product portfolio, Arla Foods has conducted an Environmental Profit and Loss Account (E P&L) [1]. The E P&L expresses Arla Foods' environmental impacts in monetary units, in addition to the underlying physical units. The unit of analysis is the sum of all Arla's activities in 2014. Hence, the E P&L includes all environmental life cycle impacts from cradle to grave of the sum of all Arla's products for the financial year 2014, i.e. the product portfolio.

Arla Foods intends to using the results to evaluate their environmental strategy 2020 in order to assure that its focus is put on priority areas. Furthermore, the findings are intended to be used in various communications and it is an important step to show that Arla takes its environmental commitment seriously and takes responsibility for the whole value chain.

This paper discusses the results and learnings from the E P&L. Especially, the similarities and differences with product LCA as well as the added value of monetarising the impacts are discussed.

2. Materials and methods

An E P&L can be described as a means of placing a monetary value on the environmental impacts along the entire supply chain of a given business. An E P&L is generally equivalent to what the European Commission calls an Organisational Environmental Footprint (OEF) and what the UNEP/SETAC Life Cycle Initiative calls an Organizational Life Cycle Assessment (OLCA). The only difference is that E P&L uses monetarisation as weighting in the life cycle impact assessment, which is commonly not done in LCAs and OEF/OLCA.

2.1. Functional unit

The functional unit of an OLCA is defined as the product portfolio of a company in a given year. This is different from product LCAs in the way that such a functional unit cannot be directly compared with other companies. Therefore, the organisational LCA is limited to focussing on alternative ways to fulfil the functional unit within the scope of the company under study only. In that sense it is more narrow than product LCAs. But when it comes to the range of possible improvement options, OLCA will typically be broader. This is because improvement options are not limited to the ones that belong to the life cycle of a specific product. For an OLCA all activities under control of the company under study are included. This means an organsational environmental footprint can be reduced by any potential off-setting activity carried out by the company (however, this is not supported by all guidelines).

For the specific study, the functional unit is defined as Arla Foods' product portfolio in 2014, which includes 7.68 million metric tonne (wet weight) dairy products and 1.32 million tonne by-products (whey and former foodstuff that is sold as animal feed). Out of the 7.68 million tonne dairy products, 5.55 million tonne is fresh dairy products (milk, yogurts, cream etc.) and 0.68 million tonne is cheese. The rest is whey/milk powder, butter and spreads, and non-milk based products (mainly fruit juice).

2.2. System boundary

The system boundary for an OLCA is determined by the functional unit, which is the product portfolio. This means that an OLCA can be defined as the sum of a number of product LCAs corresponding to the company's product portfolio. In that sense, there are no differences between a product LCA and an OLCA.

The specific study includes all Arla foods production sites, distribution centres and administrative units (99 sites in 12 countries). Production and use of raw materials, energy carriers, packaging and transport (inbound and outbound) are included, as well as treatment and utilization of by-products and wastes. In

addition, products and services not directly used in production, such as computers, furniture and travelling are covered. The downstream parts of the life cycles (retail and consumers) are also included.

2.3. Life cycle inventory modelling approach

When calculating the life cycle emissions and resources, two different approaches for LCA is commonly used: the consequential and the attributional approach. The results are presented using both approaches. Consequential LCA gives an answer on the question: “what is the impact of a choice?” Consequential LCA is relevant when Arla wants to know the impacts of their actions. Attributional LCA gives an answer on the question: “what are the impacts from that part of the life cycle that it has been decided to include based on the normative allocation and cut-off rules?” Attributional LCA is relevant when Arla wants to report their impacts according to consensus-based guidelines/standards, in this case those of the International Dairy Federation. It should be noted that the consequential approach includes indirect land use changes while the attributional does not.

2.4. Life cycle impact assessment and monetarisation

When calculating the mid-point and end-point results, this is based on the Stepwise2006 method [2]. The Stepwise2006 method uses commonly acknowledged methods for calculating mid-points. When necessary, these mid-points are further modelled to Quality-Adjusted Life-Years, Biodiversity-Adjusted Hectare-Years and resource depletion, which are the three items for which a monetary value is applied.

3. Results and discussion

The monetarised results express the damage caused by externalities related to Arla Foods product portfolio. The monetarised impacts, i.e. the investigated externalities, can be compared to Arla Foods revenue at 10,600 million EUR2014, which indicate the created value. When monetarising the impacts, the consequential and attributional approaches show a contribution at 5852 and 4984 million EUR respectively. The main reason why the consequential result is higher than the attributional is that it includes indirect land use changes and thereby a significant impact on nature occupation (biodiversity).

The major impact categories are identified as global Warming (cased by CO_2, CH_4, N_2O), respiratory inorganics (caused by air emissions: particles, ammonia, NO_x, SO_2), and nature occupation (biodiversity impact caused by occupation of land). The majority of the impacts are related to agriculture: e.g. ~60% of the GHG emissions related to Arla Foods’ product portfolio were related to the production of raw milk.

4. Conclusions

The results show that both the value (Profit) and the impacts (Loss) of Arla Foods production and subsequent distribution and consumption of their products are high. The E P&L account gives a broad and deep insight in the impacts from the full life cycle of Arla Foods product portfolio and the underlying contributions. Hence, it provides a good basis for more comprehensive sustainability reporting and for identifying options for improving the performance and reducing the impact.

The contribution analysis of the causes of the overall monetarised impact shows that a very large share can be explained by few emissions, few impact categories and few life cycle stages. Hence, the E P&L can help focussing on the most important impacts. Furthermore, the account can be used as a baseline to which different improvement options are evaluated.

The E P&L account has been compiled using two different approaches: consequential and attributional. The results from each approach can be used for different purposes. The consequential approach should be used, when information from the E P&L is intended for decision support for improvements (directly or indirectly). The attributional results are relevant when results need to be reported according to a common normative reference; here the International Dairy Federation Guideline on life cycle assessment.

5. References

[1] Schmidt J H and de Saxcé M (2015) Arla Foods Environmental Profit and Loss Accounting 2014. Danish EPA, in press.
[2] Weidema B P. (2009). Using the budget constraint to monetarise impact assessment results. Ecological Economics, 68(6): 1591–98.

Acknowledgement - The authors thank the Danish EPA who has partly funded the study.