ABSTRACT - LCA AS A SUPPORTING TOOL FOR SUPERMARKET FOOD WASTE MANAGEMENT - A CASE STUDY IN A SWEDISH SUPERMARKET

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Key Words: food waste; life cycle assessment; waste management; supermarket

This work aims to investigate the environmental and economic impacts related to supermarket food waste. The environmental assessment and cost indicators will form the basis of the information that will be given to the supermarket leadership. This will support the introduction of measures within the supermarket regarding waste prevention and waste treatment routes that will lead to lower environmental and economic costs. The measures will prioritize products with high environmental footprint per functional unit and high waste quantity.

The life cycle was modelled for the products from cradle to grave. The system boundary includes all relevant processes, such as primary production, packaging production, transportation, industrial processing, retail and final disposal. The functional unit is one kilogram of food waste disposed by the supermarket. Calculations were performed using the SimaPro 8 software.

The data of wasted food products was provided by a supermarket located in the city of Borås, Sweden. The store is considered to represent a typical mid-size urban store, with a sales area of approximately 400 m^2. The supermarket had established a routine for monitoring food waste prior the study. Products that are considered unsellable due to defects or expired best before dates are scanned by a bar code reader. Products that are sold without a bar code, such as fruits and vegetables, are weighted and the mass of the waste is entered manually in the system. Pre-store waste which is generated due to rejection upon delivery is not included in this study. The study focuses on food items that frequently generate large quantities of waste. The waste produced in the store was analysed from 2014 to 2015. During that time 22.5 tons of food waste was produced. The environmental impacts were assessed for bread, meat waste, banana, strawberry, apple, melon, lettuce, tomato, cabbage and potato. These products correspond to around 48% in mass of the total waste produced at the store.

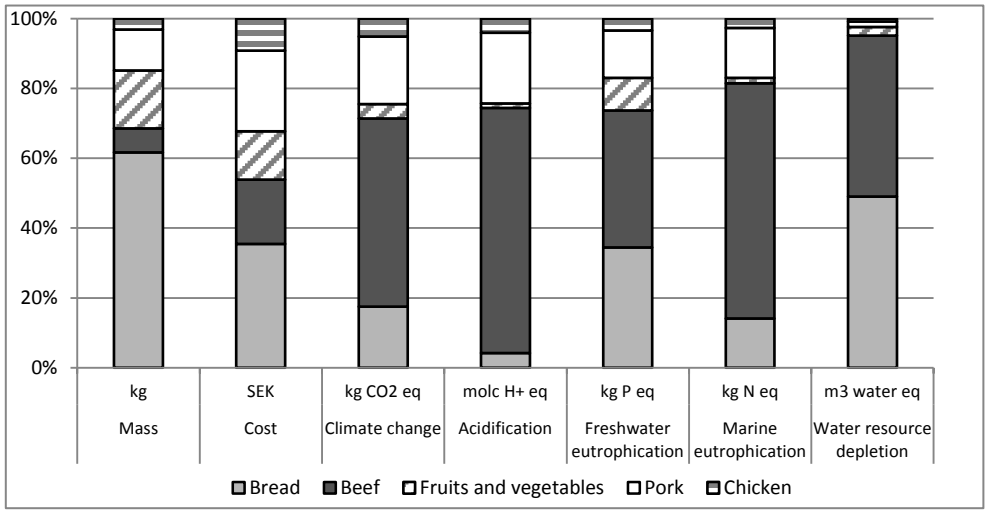

Figure 1 – Relative distribution of wasted mass, cost and environmental impact categories of the waste generated in one year

The waste products analysed were responsible for the emission of 42.2 tons of $CO2eyr^{-1}$.As can be seen from Figure 1, the difference between the distribution of the environmental footprint and the wasted mass for each product highlights the importance of not only measuring the food waste in terms of mass, but also in terms of environmental indicators and costs. The relation between the mass of the waste and the costs will be analysed as part of this work.

A measure that is currently under investigation is the benefits of source separation of the food waste from its packaging before its disposal. Currently, the packaged food waste is sent to an anaerobic digestion plant, where it is pressed through a mechanic filter. The organic fraction is sent to a biological reactor with biogas production and the remaining part is sent to an incineration plant with energy recovery. The work aims to quantify the environmental footprint that could be avoided by an alternative treatment route where the packaging would be separated from its organic content and send to a material recycling facility.