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## Surplus food donation – A retail contribution to increased sustainability

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**Abstract:** Food waste is a global issue resulting in unnecessary environmental burdens, financial loss, and food insecurity. A vast amount of food waste is generated in Sweden, both through food overconsumption (0.5 million tons/year) and discard (1.3 million tons/year) (1,2). Retail is a significant contributor generating 100 000 tons/year of food waste consisting of unsellable, but often edible food (2–4). In order to reduce this food waste, there is an increasing trend of food donations among Swedish retailers and wholesalers, which is well aligned with the food waste hierarchy, adopted by the European Union (5). The food waste hierarchy states that food waste should be prevented at its source, and when prevention is not possible, redistributed for human consumption. However, since Sweden does not have a long history of large-scale surplus food redistributions, only about 2 400 tons of surplus food/year is donated to people in need (6). Despite the priorities advocated by the food waste hierarchy, the majority of food waste is treated according to lower priority options, such as incineration (62%) and anaerobic digestion (33%) in Sweden (6). In fact, the political ambition is to increase anaerobic digestion as a food waste treatment to cover at least 75% of household, retail, and catering-related food waste by 2023 (7).

The preference for biogas production over food donation is according to Johansson (6) a result of the framing of food loss and waste as a *waste issue* with a focus on the environmental and economic perspectives, excluding the social ones. This is supported by the general assumption of the non-existence of food insecurity, as Sweden is among the most affluent societies in the world (8). However, a recent survey showed that 1.9% of Swedish people did not always have enough food to eat (9). Further, 6% of the Swedish population has a low-income standard, while the at-risk-of-poverty rate is increasing, and the income gap is widening in Sweden (10). Civil society, represented by charity organizations that organize food donations, plays an important role in reducing food insecurity among these groups, but the whole system is highly dependent on retailers and wholesalers supplying the charity organizations with food free of charge. However, even though it is known that surplus food donations are very important to vulnerable groups in society, there is so far a lack of knowledge of how large and what kind of values are transferred from retail and wholesale to society through food donations. Therefore, the aim of the present study was to conduct a sustainability assessment of surplus food donations, including all three dimensions, environmental, economic, and social sustainability.

To conduct the study, a Swedish non-profit organization, Uppsala City Mission, was chosen as a case. Their work is aimed at supporting people living in social and financial vulnerability in Uppsala City by redistributing surplus food obtained from local retailers. The operations were run by a mixture of employed and voluntary labor working in two sub-units: a food bag center handing out weekly food bags, and a soup kitchen serving daily cooked meals. These redistribution operations were financed by donations and grants from private donors, companies, and foundations, alongside the municipality and government. In 2020, the food bag center received surplus food from 48 retailers, of whom almost half were weekly or daily donors, and the soup kitchen had nine regular donors. In total, 237 tons of surplus food were redistributed, where the food bag center received 208 tons and the soup kitchen 29 tons (11). The value of the received food was approximately 11 MSEK (retail prices), and as 78% of the redistributed food was eaten, the charity organization managed the handling of food products with short shelf life effectively (11).

The environmental benefits created through food donations were calculated using life cycle assessment. In the analysis, applying a functional unit of 1 kg surplus food prepared for transportation at the retail gate and system expansion was used for substituted products, the results of which were credited to the net results. In addition, rebound effects arising from the re-spending of accrued savings were accounted for. The net economic values were calculated by weighing costs against benefits in accordance with the framework provided by Caldeira et al. (12). The benefits and costs were investigated from a key stakeholder perspective, where stakeholders, such as retailers and private persons, were accountable for the cost (investment) or received the benefits of the food donations, respectively. To assess the social impacts, the social life cycle assessment methodology was applied for the goal, scope, and stakeholder definitions (13). The goal of the assessment was to examine the *actual* social impacts created through food donations for the key stakeholders, recipients, employees, job trainees, volunteers, and the local community based on primary data.

Preliminary results showed that considerable environmental benefits were gained through food donations, despite substantial rebound effects. Moreover, social value was added to the recipients, in terms of relieving their food insecurity and personal economy. However, food donations required economic investments from stakeholders, such as retailers that provided the food banks with surplus food. The system of food donations can therefore be seen as a transfer system, where economic values are transferred from retailers and converted by the food banks to social and economic benefits for the recipients (people in need). More detailed figures of these transfers reveal the often-hidden contribution to a sustainable development provided by retailers to society.

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