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Take-back agreements in the perspective of food waste generation at the supplier-retailer interface



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ABSTRACT

Food waste must be minimised to make food supply chains sustainable. This is especially relevant since food waste valorisation measures, such as energy recovery, have limited possibilities to fully recover the resources invested in food production. However, waste minimisation is costly when it includes new infrastructure or technology. Policy measures, on the other hand, can provide a low-cost option. Food rejection practices in supermarkets, such as take-back agreements (TBA), have long been identified as risk factors for food waste generation at the supplier-retailer interface, but given the relational, and often discreet, nature of these agreements, there is little evidence of their impact. In this study we provide, concrete evidence of different rejection practices. This is done by studying three types of food chains – those for bread, fresh fruit and vegetables, and milk – with different rejection practices in Sweden. Based on a combination of primary company information and stakeholder interviews, we found that a full TBA is in operation for bread. The retailer only pays for bread that is sold and any bread left unsold three days before the best-before date is returned to the supplier. For fresh fruit and vegetables, only goods of ‘inadequate’ quality are returned, but supermarkets have sole rights of determination on quality, posing a risk of categorising unsold fruit and vegetables as inadequate quality and returning them to suppliers. In the case of milk, suppliers take back unsold items, but only for waste management. The trend found in this study was that bread had the highest waste, and the most extensive take-back policy. Fresh fruit and vegetables had medium levels of waste, partly due to unverified rejections, while milk had a very low level of waste combined with an even lower level of rejections. It can be concluded that a food supply chain system where the direct costs of waste management or incentives for waste reduction are separated from the organisation responsible for generating the waste poses a significant risk factor in food waste generation and is therefore a potential hotspot for waste-reducing measures.

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1. Introduction

1.1. The problem of food waste

Waste, loss or spoilage of food is an issue that has attracted attention from the media, researchers, politicians, companies and the general public in recent years. Although food waste seems like a simple problem, the solution “to just stop throwing it away” is much more complex than would appear at first glance. For instance, wasting food maximizes profits when recovering any economic value is costly. Unless very carefully conducted, reusing wasted food can also pose health risks. Moreover, food is wasted for a large num-

ber of reasons and by different actors, which makes it difficult to find a ‘quick fix’. In some countries food waste creates a problem if it is dumped in landfills and generates methane. In other countries, Sweden included, landfilling of organic waste is prohibited (Ministry of the Environment and Energy, 2001) and surplus food is considered a resource that can be used for biogas production or for feeding people in need (Eriksson et al., 2015). It is therefore not the wasted food that should be the main concern, but the wasteful behaviour that results in unnecessary food production.

The complexity of this issue also links it to the three pillars of sustainable development: economic, social and environmental. Not necessarily food waste reduction results in sustainable development, but reducing avoidable food waste can be beneficial. Food waste has been related to a waste of money (FAO, 2013) and natural resources (Steinfeldt et al., 2006; Garnett, 2011; Scholz et al., 2015), but it also has moral implications in relation to food security

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(Stuart, 2009; FAO, 2012). In recent times, all the important actors such as companies (Tesco, 2014), governments (Rutten et al., 2013) and international organisations (UN, 2016) have adopted goals for food waste reduction. As pointed out by Godfray et al. (2010) and Garnett (2011), reducing food waste is not the only way to make the food supply chain more environmentally sustainable, but it has the added potential to save money and is less controversial than e.g. reducing meat consumption or extending the use of genetically modified organisms.

1.2. What to do about food waste

The EU waste hierarchy is established in the European Waste Framework Directive (WFD) (EC, 2008). It ranks waste prevention and management options in order of priority from the most favourable: prevention, re-use, recycling, recovery to the least favourable: disposal. The WFD also obliges member states to encourage options that deliver the best overall environmental outcome from a life cycle perspective, even when this differs from the waste hierarchy. However, since the environmental outcome is not defined in the WFD, this goal can be achieved in several ways. The US Food Recovery Hierarchy (USEPA, 2015) agrees with the general principles of the EU waste hierarchy (EC, 2008), but has one important difference: it separates the prevention stage into what can be seen as two sublevels. The preferred sub-level is source reduction and the less preferred sub-level is feeding hungry people. This is important, since it implies that even though the food is eaten in the latter option, which corresponds to its intended use, it is better to be proactive and reduce food production. Van Ewijk and Stagemann (2016) also argue that prevention is fundamentally different from waste management. One important difference is that waste management (or valorisation) options are carried out by agencies handling waste management facilities, such as municipal departments (or even charity organisations), but prevention measures can only be handled by persons that handle the food, e.g. food industry professionals, supermarket staff or logistics departments in retail and wholesale companies, but also consumers. This means that supermarket staff have hardly any influence over what happens with food after it leaves the supermarket. On the other hand, waste management professionals have little influence over what happens with food before it becomes waste. This is in conflict with practical definitions of prevention, which according to Corvellec (2016) can include re-use or recycling.

Eriksson (2015) uses a narrower definition and describes the highest level of the waste hierarchy in greater detail (Fig. 1), by including four separate levels that could be defined as prevention (EC, 2008) or recovery of surplus food for human consumption (Garrone et al., 2014). These levels are: source reduction, where production of new food is prevented; economic valorisation, where the food is sold at a reduced price; conversion, where the food is used to produce new sellable food products; and donation, where the food is given away to charity. According to Eriksson (2015), it is the substituted system (which produces a product or service) that should be considered when prioritising among valorisation and prevention measures. This is because substitution is likely to be the most important process in the life cycle of food waste management (Eriksson et al., 2015, 2016a; Eriksson and Spångberg, 2017). The emissions- or cost-reducing effect of the substitution can be expected to be much larger than the cost of management (in terms of both money and emissions from different operations such as transport, processing and administration). This can also be described with the expressions used by Garrone et al. (2014) in the conceptual model called ASRW (Availability-Surplus-Recovery-ability-Waste), where measures can be ranked due to the expected “degree of recoverability”. This degree of recoverability depends on the “intrinsic recoverability” of surplus food and the required

“management intensity”, simply meaning that an efficient waste-reducing measure should be able to reduce food waste greatly at a low cost.

1.3. Identifying prevention targets with high potential

In order to prevent food waste, or at least reduce its negative effects by valorisation measures, there is a need to identify “hotspots of wastage” (Eriksson et al., 2017; Priefer et al., 2016). These hotspots represent the leverage points in the food supply system where large waste reduction effects could be achieved with less effort, e.g. the idea of using the cheap and communicative power of social media to influence consumers to change behaviour and thereby waste less (Young et al., 2017). The same principle is discussed by Mourad (2016), who draws a distinction between “weak” and “strong” prevention measures. She claims that only strong measures can change the standpoint on what a desired surplus comprises and, beyond the optimising processes, limit the production and consumption of unnecessary food. Thus in order to achieve sustainability in food chains, strong prevention measures are needed to fundamentally change the practices of today.

It is debatable whether particular prevention measures actually have the best potential, whether they work in practice and whether they have the desired effect, but as long they are not tested and evaluated in practice this remains a theoretical argument. The fact that it is difficult even to measure waste prevention (Zorpas and Lasaridi, 2013) may explain why only a few of the leverage points in Priefer et al. (2016) are connected with any claims of successful waste reduction. Therefore they cannot be compared with the hotspot for food waste reduction identified by Eriksson et al. (2012), namely reclamations (where the supermarket reject the delivered products and reclaim the cost for it) of fresh fruits and vegetables (FFV) at the supplier-retailer interface. In a follow-up study (Eriksson, 2015), it was found that FFV reclamations contributed 67% of the wasted mass from six supermarkets during five years of investigation. It can therefore be argued that even though this is a hidden problem it is a potential hot spot for waste reduction.

1.4. Food waste at the supplier-retailer interface

According to Eriksson (2012), product reclamation is an easy way for a supermarket to reduce the cost of waste, simply by letting the supplier pay instead. Reclamation is when the supermarket reclaims the value of some delivered goods that was not fulfilling the requirements in the contract between the supplier and supermarket, and can include a physical rejection of the goods at delivery to the supermarket. A possible waste-reducing measure could be to limit the scope for reclamations. The potential of this measure was evaluated by Eriksson and Strid (2013) who found that of the six measures they evaluated, limiting rejections (that take place at delivery due to non-compliance with quality requirements) was the measure with the lowest cost or management intensity and had the highest prevention potential or intrinsic recoverability. Eriksson and Strid (2013) also evaluated a reduction from 4.2% reclamations in relations to sold mass to 2.3% reclamations, since this corresponded to the difference between the store with lowest reclamation level and the average for the other five stores investigated, which would potentially lead to a waste reduction of 35 ton FFV per supermarket and year. Since the cost in terms of both money and natural resources was low for this measure, the net saving potential was calculated to be kSEK 470 per store and year (Eriksson and Strid, 2013), which corresponds to approximately €50 000 per store and year. The problem with this measure is that the potential saving is not made by the supermarket but by the supplier, although the supermarket staff do the extra work. There is even a risk of the supermarket losing money if it can no longer

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