



Elements affecting food waste in the food service sector



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ABSTRACT

Avoidable food waste is produced in the food service sector, with significant ecological and economical impacts. In order to understand and explain better the complex issue of food waste a qualitative study was conducted on the reasons for its generation in restaurants and catering businesses. Research data were collected during three participatory workshops for personnel from three different catering sector companies in Finland. Based on synthesized qualitative content analysis, eight elements influencing production and reduction of food waste were identified. Results revealed the diversity of managing food waste in the food service sector and how a holistic approach is required to prevent and reduce it. It is crucial to understand that food waste is manageable and should be an integral component of the management system. The model of eight factors provides a framework for recognition and management of food waste in the food service sector.

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1. Introduction

One third of the environmental impact of Finnish consumption is related to food (Seppälä et al., 2011). Avoidable food waste is produced at all stages of the food chain with significant ecological and economic impacts (Williams et al., 2015). It has been estimated (Katajajuuri et al., 2014) that the total climate impact of food waste in Finland, including households, retailers, restaurants and the food industry, is approximately 1000 million kilograms of CO₂-equivalent per year. This is more than one percent of the Finnish total annual greenhouse gas emissions. Further, the value of food discarded by Finnish households is estimated to be €400–550 million annually. It is ecologically, socially and economically unsustainable to waste edible food rather than consume it, because in addition to wasted money the environmental impacts of producing the raw materials and processing them into food are considerable.

The volumes of food waste produced have been increasingly studied internationally, especially at the household level, but also for the entire food supply chain and system (e.g. Betz et al., 2015; BMELV, 2012; European Commission, 2010; Evans, 2012; Hanssen and Schakenda, 2011; Jones, 2005; Kantor et al., 1997; Parfitt et al., 2010; Schneider and Obersteiner, 2007; Wrap, 2008, 2009; Dias-Ferreira et al., 2015). It is estimated that roughly one-third of food produced is lost or wasted globally, which amounts to about 1.3 billion tonnes per annum (Gustavsson et al., 2011).

Comprehensive, detailed and reliable studies, especially for the entire food chain, are yet very few. Furthermore, concern has been growing for the environment and food sufficiency, making food waste an important research topic and fuelling social debate (Koivupuro et al., 2010). Also, the issue of responsibility is considered to play a significant role in the minds of consumers and regarding business strategies among companies in the food production chain (Lindgreen et al., 2009; Beer, 2009).

The food service sector is a notable part of the food chain because in Finland, around 889 million food portions are cooked in food service businesses every year (Taloustutkimus, 2011), which corresponds to around 395 million kilos of food. This figure is exceeded because some food is already wasted at the storing and cooking stages. Minimizing food waste improves resource efficiency and sustainability in the food service sector. Workplace restaurants and canteens serve 14% of all food in the Finnish food service sector. One-third of the population uses public food services on a daily basis.

The volumes of food waste in the food service sector have been studied over the last fifteen years in Europe and the United States (Silvennoinen et al., 2015; Wrap, 2011; Schneider and Obersteiner, 2007; Karlsson, 2001; Marthinsen and Bjorn, 2004; Adams et al., 2005; Jones, 2005; RVF Utveckling, 2006). For example, it is estimated that in 2009 UK hotels, pubs, restaurants and QSRs (e.g. quick service restaurants) produced just over 3.4 million tonnes of waste (Wrap, 2011). According to the United States Department of Agriculture (USDA) households and food service operations (restaurants, cafeterias, fast food, and caterers) together lost 39 billion kilograms (86 billion pounds) of food in 2008 (Gunders, 2012).

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In Finland about 20% of all food produced and served in licensed restaurants is discarded (Silvennoinen et al., 2015), which roughly corresponds to 79 million kilograms. The estimation is based on the Foodspill project where the kitchen staff weighed edible food waste in 72 restaurant outlets (Silvennoinen et al., 2015). An American study (Jones, 2005) reveals that (in fast food restaurants) the amount of food waste varies significantly from 5 to 50% of all food prepared, depending on the business concept. A questionnaire study conducted by Agrifood Research Finland (MTT) revealed that food waste is monitored during the preparation and service phases in communal food services (Risku-Norja et al., 2010). The amount of food waste was estimated to vary from a few per cent up to 20% of all food produced, depending on the food offered. The majority of the respondents estimated the loss to be slightly larger than for the food service at the manufacturing stage.

On the whole, studies on wastage of food in food service institutions have produced variable results and it is difficult to assess the amount of food that is wasted based on published studies. Moreover, existing studies, both Finnish, European and American, have focussed on the amount of food waste and not on the reasons behind it. Thus an illustrative framework of the dimensions of avoidable food waste is still lacking. The aim of this research is to contribute to this research gap and explain the complex issue of food waste and the reasons behind its generation in the food service sector. In order to gain a holistic view of food waste in the food service sector, a qualitative research approach was applied. In this study the food service sector is defined as one part of the food system, business or institutional activities, responsible for any food or meal prepared and served outside the home. The sector includes different types of food service outlets that serve and prepare food, such as school day-care centres and restaurants. Avoidable food waste is defined in this study as wasted food and raw material that could have been consumed had it been stored or prepared differently. So it does not contain other organic waste like vegetable peel and coffee grounds.

2. Materials and methods

A qualitative research approach was applied in this study because it enables the illustrating of unstructured phenomena, unlike quantitative approach. In order to gain a holistic view of avoidable food waste, a deep understanding of the involved details in the food service sector is required (Malhotra and Birks, 2003). The research was based on participatory action research, with features of the focus group method. Data were analysed with an inductive approach and it has characteristics of grounded theory where qualitative data is systematically categorized and a model or formal theory can be formed about the phenomena (Birks and Mills, 2011).

In participatory action research the interaction between participants and a research group is essential. The participants role is active and it can be described as “co-researchers” (Cornwall and Jewkes, 1995). Participants are involved to generate knowledge about issues that affect them in their daily lives (Park, 2001). Participatory methods are often described as reflexive, flexible and iterative (Cornwall and Jewkes, 1995). The participatory approach was implemented by organizing and facilitating participatory workshops to generate knowledge and viewpoints about the content of avoidable food waste, especially where it is produced. The workshops had features of the focus group method where interaction among participants forms a relevant part of the method (Onwuegbuzie et al., 2009). In focus groups people are encouraged to talk to one another, ask questions, and comment on each other's experiences. The focus group method is particularly useful for exploring knowledge and experience (Kitzinger, 1995). The role

of the workshops was to provide an open, inspiring and interactive forum for discussion.

The research data was collected from three case companies. Two of the case study companies represented communal food services and one company was responsible for catering for the restaurants of Helsinki University. 61% of the meals eaten outside home are served by food service outlet types like day-care centres, schools, hospitals, elderly service centres, and workplace restaurants and canteens (The Nielsen Company, 2008). The case companies represented all these outlet types, providing the observational richness (Yin, 1994) that is needed for understanding the relative, contextual concept of food waste in restaurants.

2.1. Workshop structure and material gathering

Three participatory workshops, lasting two to three hours, were organized in March 2011 and included a total of 34 participants. The participants were chosen and invited to the workshops by contact persons from the case companies based on the following criteria: (1) they were interested in the theme of food waste (2) they had positive attitude towards change, open mind and willingness to develop restaurant performance. The participants were divided into groups in the workshops (6–9 persons per group), and they represented either kitchen staff or company management. Kitchen staff (chefs, cooks) represented the operational level of the company whereas management the planning level responsible for division of financial resources. The idea was to bring together different company-level representatives to jointly discuss the topic. Participants were encouraged to speak openly about the theme without worrying about the company hierarchy. Representatives were aged 24–60 and 2/3rds of them were women. The majority of the participants represented operational-level workers. Each group had a moderator running it and a secretary to document the discussion. The role of moderators (projects researchers and authors of this article) were facilitative; they asked questions (for instance “Why during food preparation did edible food end up being wasted”) and kept the conversation on topic.

In small groups participants discussed reasons for three avoidable food waste categories: kitchen waste, serving loss and plate leftovers. Kitchen waste in this study is defined as waste produced before or during the cooking process (e.g. cook's mistakes or passed best before day), serving loss as edible, served food which cannot, for one reason or another, be reserved later and plate leftovers as edible food which diners have taken but have not eaten. This division of food waste categories (comprising kitchen waste, serving loss and plate leftover) was chosen as the framework of the workshop exercises and data gathering because it has been workable in a quantitative food waste study in Finland (Silvennoinen et al., 2015) and it describes the raw-material flow within the kitchen process and it was logical from the perspective of workshop participants.

In the workshops, participants produced thoughts about the reasons for food wastage on post-it notes like “doesn't taste good”, “kitchen processes not planned” and “estimating the amount of customers”, which were stuck on the blackboard. There were three sections on the wall for the different waste categories: kitchen waste, serving loss and plate leftovers. After the workshops the post-it notes were photographed and converted into electronic form.

2.2. Analysis

The qualitative content analysis with inductive approach was deployed in order to interpret the workshop outputs. In content analysis, data are observed and categorized with the aim of finding similarities, differences and connections within phenomena. The overall aim is to generate a summary description of the phenomena (Miles and Huberman, 1994).

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