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FACTORS THAT INFLUENCE THE HOUSEHOLD FOOD WASTES

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Abstract

Food waste is one of the most global political issues of the twenty-first century due to increasing the world's population and consumption. According to the Food and Agriculture Organization, approximately one-third of food is wasted from the hundreds of million tons of available food. Food waste occurs at every point of the agri-food supply chain, from field to fork (primary production, storage, manufacturing, transport, distribution, food services, wholesale, retail, household consumption). The household consumption phase is one of the most significant sources of food waste. Numerous factors have a considerable correlation with household food waste production. Among the factors influencing the source of food waste, some factors can be delineated, such as age, gender, education, employment status, income, household size and type, inadequate planning of shopping, marketing strategies, cooking, etc. In addition, more food is pushed onto households than they need because of the competitiveness in the market, a situation that generates food waste. Even if there is an increasing tendency in research related to food waste at the household level, relatively little is known about the factors that influence food waste generation in households. The main aim is to briefly review the socio-demographic and household food management factors that promote household food waste.

Keywords: food waste household, socio-demography, household food management.

1. Introduction

The world's population will be nearly 10 billion in 2050, which expose the food system to a considerable challenge to feed a rapidly growing population (Ahmad *et al*., 2021; Alexander *et al*., 2017; Babbitt *et al*., 2021; FAO, 2017; The Economist, 2011; WWF, 2017). About a third of food produced for human consumption is lost or wasted globally, equalling a total of 1.3 billion tonnes per year (FAO, 2011, 2019, 2020). Food losses (FL) and food waste (FW) occur in all points of the food supply chain (FSC), from farm-level production to our homes (the last point of the FSC) (Bajzelj, 2019; Dhir *et al*., 2020; Fao, 2011, 2019; Nicastro and Carillo, 2021; Pocol *et al*., 2020; Schanes *et al*., 2018; Usmani *et al*., 2021; Wang et al., 2021). In industrialized (higher-income) countries (e.g., European, Asian, American), the largest FW fraction occurs during consumption (households, HoReCa services) (Dusoruth and Peterson,

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2020; Nicastro and Carillo, 2021; Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018; Slusarczyk and Machowska, 2019; Stancu et al., 2016; Talwar et al., 2021), as shown in Figure 1 (Jansen and van de Hei, 2018).

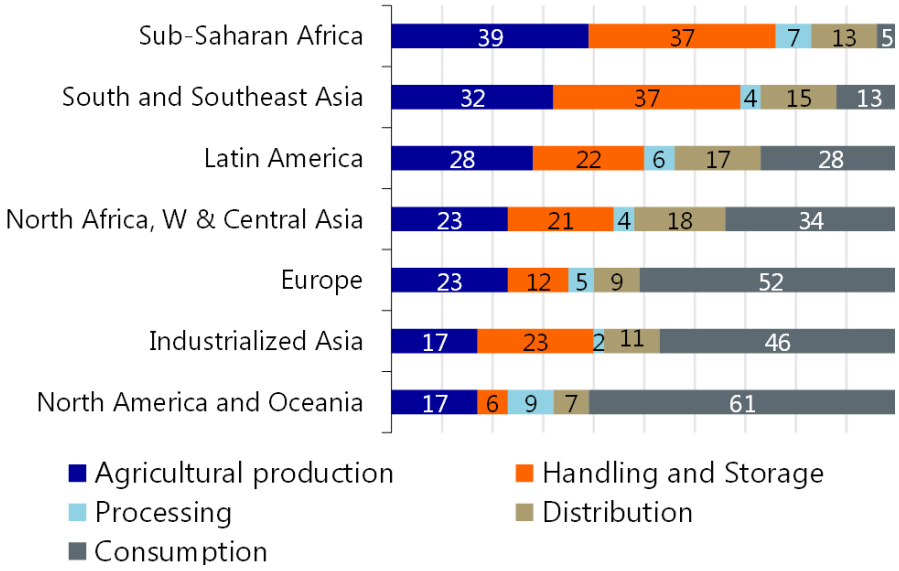

Figure 1. Non-industrialized countries waste more foods (in kcal) during agricultural primary production; instead, industrialized countries waste more foods during consumption (Jansen and van de Hei, 2018)

The households are regarded as the primary source of FW (Attiq *et al*., 2021; Dusoruth and Peterson, 2020). Households dispose of more than half (53%) of the total food waste in the EU (Figure 2), fresh fruit and vegetables (highly perishable and relatively cheap products) contributing to almost 50% of the food waste generated by EU households (FUSIONS, 2016; JRC, 2018; SGS, 2017)

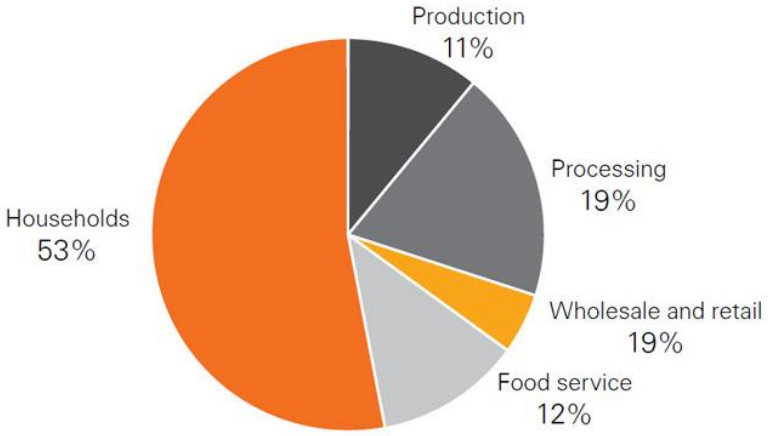

Figure 2. EU-28 food waste in 2012 by sectors (SGS, 2017).

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Households are a complex structure of FW management, FW being a complex issue influenced by many critical distinct factors on the individual-level (e.g., age, gender, education, employment status, income, household size and type, inadequate planning of shopping, marketing strategies, cooking, etc.) (Bozdag and Cakiroglu, 2021; Dusoruth and Peterson, 2020; Heng and House, 2021; Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018). Given the significance of reducing FW in terms of food security and sustainability, it is necessary to be aware of the factors that generate consumer FW, which can serve as input for the advancement of strategies to attenuate such waste. This paper presents a short literature review on the socio-demographic and household food management factors that promote household FW.

2. Methodology

The general objective of this article is to consult a database necessary to provide important up-to-date information on why FW appears in our households. The review can help specialists in various fields by addressing managerial issues (by constructing a well-founded knowledge base through collecting findings from a series of studies) and opening new vistas for further research. Data were collected from various databases (e.g., Web of Science, Scopus, and EBSCO), such as ISI or BDI articles (English only), book chapters, and websites.

3. Results and discussion

The FW literature identifies multiple factors influencing household FW, categorized into three broad groups: socio-demographic, household food management, industry practices (affecting individual food behaviour) (Ananda *et al*., 2021; Secondi *et al*., 2015). In the following sub-sections, emphasis will be laid only on the first two categories of household-related FW factors.

3.1. Socio-demographic factors

Socio-demographic factors include age, gender, education, employment status, income, household size and type. The FW phenomenon at the household level may depend on the people living there, especially their age (Przezbórska-Skobiej and Wiza, 2021). There is no consensus on how FW production is influenced by age. While most papers show a negative association between FW and age, others point out that the elderly waste more. Anyway, in general, people over the age of 65 tend to waste less food, which is usually explicated through various attitudes towards food and restraint, as well as a better understanding of the influence of FW compared to younger (Heng and House, 2021; Schanes *et al*., 2018). In addition, elderly people are generally more conservative in their habits (Stoica and Alexe, 2016). Evidence is also combined in terms of gender: while some papers report that women generate less FW, others show that gender has no noticeable influence, that women waste more, or that if a woman is responsible for purchasing food in the household, there is more food lost (Cantaragiu, 2019; Heng and House, 2021; Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018). In terms of education, there is no significant association between education and FW (Dusoruth and Peterson, 2020; Schanes *et al*., 2018). However, it appears that people with higher education tend to waste more (Heng and House, 2021; Secondi *et al*., 2015). The employment status is potentially correlated with the generation of FW, i.e., employees are inclined to create more FW than those who are

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not in the workforce. Also, full-time employees don't have much time to panic about FW. Time constraints due to large workloads are also viewed as factors that cause FW (Schanes *et al*., 2018). Some researchers find a positive association between income and FW or report that households with different income levels differ, especially in their attitude towards reducing FW and the type of wasted food. Other researchers, however, find no correlation between income and FW or income and FW attitudes (Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018). Other studies show that individuals with higher income tend to waste more (Heng and House, 2021; al., Secondi *et al*., 2015). Smaller private households generate less FW than larger ones, whilst the level of FW generated per capita decreases as the size of the household increases (Dusoruth and Peterson, 2020; Koivupuro *et al*., 2012; Schanes *et al*., 2018; Setti *et al*., 2018). Households with children are disposed to generate more FW, potentially due to time and money constraints, parents paying significant care to food quality, feeling less knowledgeable about how to avoid FW, or due to unpredictable eating behaviour and preferences of children. Single-person households waste the most, the fact being related to the lifestyle of a single person (Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018). Larger households produce more waste than smaller ones, but larger households produce less waste per capita (Heng and House, 2021).

3.2. Household food management

Meal planning, food shopping routines and food handling are significant predictors of FW (Dusoruth and Peterson, 2020). Busy consumers are unwilling to look into the fridge before shopping and are more likely to buy something they already have at home. Anyway, while some papers reveal that meal planning results in less FW, other studies have not found a precise association between proper planning and low levels of FW. However, firmer planning routines are linked to lower unplanned purchases and large packages (Heng and House, 2021; Schanes *et al*., 2018). Even though most consumers buy proper amounts of food, some of them have a routine of buying more food than they need, overprovisioning of food, one of the most important reasons for FW including the good provider identity (good parent/partner/host - characterized by the desire to offer plenty of proper food), differences in taste (buying plenty of food to suit various preferences), offsetting effect (buying plenty of healthy and perishable foods to alleviate guilt for unhealthy meals), time constraints (buying more products than one can consume on time), bulk purchases (promotional offers encourage consumers to buy more than needed, buying discounted food), and oversized packaging (prices of smaller packages are comparatively high). The type of store and shopping frequency also seems to influence the FW (Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018). The FW is highest when people go shopping in big supermarkets, it is decreased when buying takes place in small shops / local markets, and lowest when people grow their own food. Less FW in households when the people buy more often (Schanes *et al*., 2018).

Ultimately, the suboptimal quality aesthetic foods also impact the FW, taste, freshness, and safety (Dusoruth and Peterson, 2020; Heng and House, 2021; Minor *et al*., 2020; Schanes *et al*., 2018). Some studies found that younger people are more likely to purchase suboptimal foods (de Hooge *et al*., 2017). Discounts provided by retailers may inspire customers to buy more than they need, but the impact of special offers on FW is unclear (Heng and House, 2021). Improper storage practices, lack of knowledge on where to best locate specific types of food, and set to a higher temperature than recommended may indirectly impact FW. People who

throw away food after being kept in the refrigerator for a few days tend to produce more FW in general than others (Dusoruth and Peterson, 2020; Schanes *et al*., 2018; van Geffen *et al*., 2020). Research into the role of cooking practices in FW has highlighted several key issues. First of all, too much food is often prepared and thrown away. Secondly, it is difficult for families to predict whether their children will eat at home. Eventually, larger plates cause people to eat more and increase their waste. Relatively fixed recipes and not improvised with ingredients left in the fridge or buffets could cause FW. A barrier to cooking FW is that cooking with what is in the refrigerator requires time, knowledge and cooking skills to make better use of food creatively; family members may also dislike new recipes. Consumers who mostly rely on convenience foods, both ready-made and take-away, are wasting more food than others (Przezbórska-Skobiej and Wiza, 2021; Schanes *et al*., 2018; van Geffen *et al*., 2020). People with inadequate cooking and food management skills or lessened food storage knowledge announce greater amounts of FW (Dusoruth and Peterson, 2020). Managing leftovers also affects FW generation; those who steadily eat leftovers generate less FW (Schanes *et al*., 2018; van Geffen *et al*., 2020). However, consumers' perception of health risks and the loss of quality and freshness are significant hurdles for leftover intake (Heng and House, 2021).

4. Conclusions

Food waste is a complex subject, with many factors influencing food waste from farm-level to consumption along the food supply chain. Food waste at the consumption level is generally a significant origin of food loss in industrialized countries. A good understanding of socio-demographic and household food management factors can minimize food waste in households. The prevention of food waste during the consumption phase of the supply chain is very important to enhance sustainability in the food system. However, socio-demographic factors play less of a predictive role in explaining food waste at the consumer level compared to socio-psychological factors (motivation to avoid food waste, attitudes, knowledge, intentions, family norms, habits). Of particular importance are several factors related to consumer awareness, knowledge and ability to manage purchasing, food selection, handling, storage, meal planning and meal preparation and the organization of reuse or disposal. However, the responsibility for food waste in households is not the sole responsibility of consumers, and they are not the only factors contributing to food waste in households. Food waste on the household level also results from other factors, such as industry practices (packaging, date-labelling), retailer options, economic instruments (the price of food, price promotions, median disposable income).

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