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# Household food waste behaviours, challenges, and opportunities in Kouvola

Bachelor's thesis

International Business

2021



South-Eastern Finland  
University of Applied Sciences

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Amanda Santamäki	Bachelor of Business Administration	September 2021
<b>Thesis title</b>		
Household food waste behaviours, challenges, and opportunities in Kouvola		58 pages 12 pages of appendices
<b>Commissioned by</b>		
No commissioner		
<b>Supervisor</b>		
Dr. Jagat Kunwar		
<b>Abstract</b>		
<p>Food waste is a problem of the entire food supply chain, and households are the most significant contributor to food waste. The purpose of this study was to look at the issue of household food waste and get a better understanding of behaviours, attitudes and challenges related to it in the study population.</p> <p>The thesis aimed to describe the behaviours, attitudes and challenges related to household food management and food waste of the population of Kouvola, and to uncover potential for future business opportunities and innovative solutions to household food waste.</p> <p>Quantitative methods were used to collect data from the sampling population, in the form of a self-administered online questionnaire. The data was collected through sharing the survey in social media, with voluntary random sampling as the chosen sampling strategy.</p> <p>The research showed that the studied population is generally respectful towards food and concerned for household food waste and tries to avoid creating unnecessary household food waste to a reasonable extent. The lack of food packaging size options in grocery stores and the wasteful treatment of food leftovers were discovered to be the main challenges for the population.</p> <p>Finally, the study also discovered the existing potential for future innovations and business opportunities, with the population showing significant interest in home composting and food donating.</p>		
<b>Keywords</b>		
Food waste, household food management, business opportunities, innovative solutions		

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# 1 INTRODUCTION

## 1.1 Background

Global warming is an ongoing global threat to all of humanity on Earth. Many factors contribute to global warming, and efforts in slowing down or stopping the warming of our climate is an ongoing endeavour undertaken by many countries and nations.

Food waste is one such contributor to climate change. It contributes to the impact that agriculture has on the climate change, as food production costs a lot of resources, accounting for approximately 10 per cent of global energy consumption. When that food goes to waste later, it creates a significant negative environmental impact; food waste rotting (through anaerobic digestion) in landfills creates methane, which is a major contributor to global warming. Furthermore, reducing the amount of food waste generated also reduces the amount of agriculture needed, which frees up land, water, and other resources. (FAO 2017.)

Food industry has a major issue in the amount of waste produced, especially in the amount of food being wasted, with some sources, such as Sitra (2019), estimating 31 per cent of all food going to waste, and the EU Parliament writing in its report that 2.5 billion tonnes of food get wasted annually (European Parliament 2016).

The EU Fusions project found out that on average 20 per cent of produced food - within the EU - goes to waste as food waste (Stenmarck 2016). That means after the food leaves the food processing sector of the food supply chain and enters the retailer-consumer-restaurant sector. In Finland we're already doing slightly better, as we waste only 15 per cent of produced food as food waste (Silvennoinen 2020).

Food waste can be regarded as a problem of the entire food chain, with consumers being the most significant contributor (Närväinen 2019) and in Finland 30 per cent of food waste happens in households, which amounts to 20-25 kilos

of annual household food waste per person (LUKE 2019). As such, Finnish households are the core subject of this study.

## **1.2 Research statement**

The purpose of this study is to explore and describe attitudes and behaviours that Finnish individuals have towards household food waste management, what kind of challenges and barriers are they facing, and to gain insight into the kinds of service or product or regulatory solutions that would be beneficial in the future for Finnish households in reducing the amount of food waste created.

## **1.3 Research objectives and research questions**

The **research objectives** of the study are: (1) To describe the existing attitudes and behaviours that consumers face regarding household food waste in Kouvola. (2) To describe the challenges and barriers that consumers face regarding household food waste in Kouvola. (3) To describe the potential for new innovations and business opportunities in the area of household food management in Kouvola.

The **research questions** of this study are: (1) What kinds of attitudes and behaviours do consumers have towards household food management and household food waste? (2) What kinds of barriers and challenges are consumers facing when it comes to household food management and household food waste? (3) Is there interest for future innovations, such as product or service design, or new business opportunities?

## **1.4 Research method**

The study is a descriptive research and household food waste attitudes and behaviours and challenges in Kouvola.

The main data collection method for this research is survey method, and the data will be collected using a self-administered online questionnaire. There are no secondary data collection methods. The chosen sampling strategy is voluntary

random sampling, as that strategy offers the best support for the research, when considering resource and time limitations.

The target population for the survey is any adult living in Kouvola subregion, regardless of their nationality or native language. By “Kouvola subregion” we mean that anyone living Kouvola itself, or in the neighbouring towns of Jaala, Elimäki, Valkeala, Kuusankoski, and Anjalankoski is also considered to be in the population and are eligible to respond to the survey. Kouvola was chosen as the sampling area, as it represents an average urban area in Finland, which makes it possible to generalize the survey findings. In addition to this, the global problem of household food waste in the food supply chain might require more local solutions.

Although this paper mentions Finnish households, they are only referred to in the most general sense, as every individual is naturally part of a household, and the issue of food waste exists and gets reported on a household level, but is, in reality, effective on an individual level.

The unit of analysis of the study is an individual as it would be difficult to track survey responses on a per-household basis, for example if two people living in the same household both responded in the survey. Extra effort would need to be made to ensure there is only one response per household, such as asking for location information during the survey, which would increase the length of the survey and lower its respondent security. The data analysis will also consider this, inferring and generalizing results on an individual level, rather than on a household level.

The main data collection of the research was survey method. The survey was designed as a self-administered questionnaire with no open-ended questions, and was distributed digitally, available in both Finnish and English languages. As there are no secondary or tertiary data collection methods for the research, which means that extra effort was put towards making the survey deliver quality data. Although voluntary random sampling cannot necessarily guarantee a great

sample size, quality data could still be gained if the survey is otherwise carefully and well designed.

Although the population of Kouvola is mainly Finnish-speaking, English language was added as an option to the survey to enhance the potential sample size. This leads to more care being added to the survey question design, so that the questions are the same in both English and Finnish and produce similar data.

**Scope of the study.** The food supply chain is far too massive to be researched in its entirety in one study, and as such, this study will focus on the **consumer** stage of the food supply chain (Figure 1). Therefore, this study is precisely about household food waste, and household food management, without further considering food waste or food loss at earlier stages of the food supply chain.

**Thesis structure.** The second chapter discusses the theoretical framework and the conceptual basis for the thesis. The third chapter contains the research methodology and the survey design considerations, and the fourth chapter presents and discusses the survey findings. Finally, the research conclusions and future development ideas are discussed in the fifth chapter.

## **2 HOUSEHOLD FOOD WASTE & MANAGEMENT**

### **2.1 Food waste – a problem of the entire food supply chain**

Food waste is a systemic problem of the entire supply chain, taking on a multitude of forms on different parts of the food supply chain. The largest portion of food waste is created at the very end of the food supply chain, manifesting as household food waste at the **consumer level**. Figure 1 shows the different stages of the food supply chain, and briefly describes the different forms food waste can take on each stage.



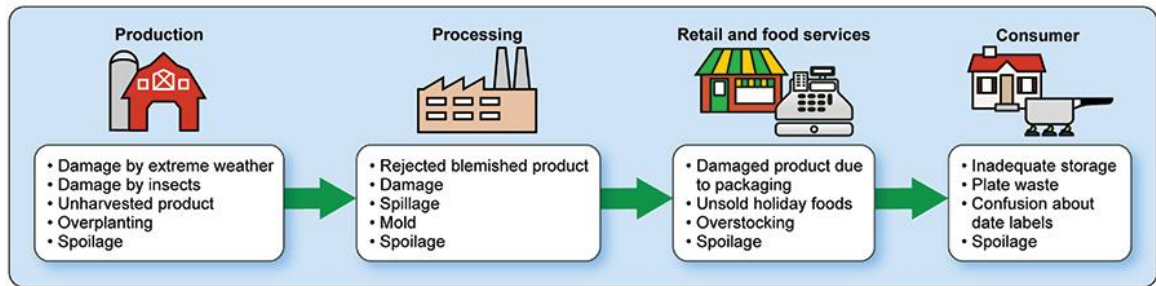


Figure 1. Food waste in the food supply chain. (U.S. Department of Agriculture 2019.)

Food is wasted in many ways; fresh produce can deviate from the optimal and thus get discarded, food items that get close to (or past) their “best before” or “sell by” dates is often discarded by retailers and consumers, and large quantities of food is often left unused and discarded from household kitchens and eating establishments. (FAO 2011.)

The concept of **food waste** is central to this study, and to define the concept of food waste we will use the description of the term as defined by the Food and Agriculture Organization of the United Nations, or FAO for short. FAO defines food waste as “food products that were directed for human consumption, that is, for eating or drinking, but end up being discarded as waste. Edible food products purposefully discarded by consumers, as result of consumer behaviour, are also food waste.” (FAO 2011.)

For example, a rotten banana, a discarded pre-packaged meal, a soured carton of milk, or plate leftovers after dinner are considered food waste. Food products discarded as waste due to expiration date are also food waste. On the other hand, things such as chicken bones, used coffee grounds or banana peels are not considered food waste, as they are not directed for human consumption. (FAO 2011.)

Household food waste is food waste that happens at home, and is the largest sector where food waste happens, amounting to 30 per cent of all food waste. Household food waste can take many forms, and it is important to distinguish what is considered household food waste, and what isn't. (Silvennoinen 2020.)

Household food waste means food products and food items that were intended for human consumption but were discarded as food waste for various reasons. For example, soured milk that gets poured down the drain, stale bread thrown in the trash, or an opened but unfinished and now expired package of sandwich ham that gets discarded are all considered household food waste, as they were originally edible and nutritious. Discarded plate leftovers are also household food waste. (Silvennoinen 2020.)

However, food-related items that weren't intended for human consumption aren't considered food waste when discarded at home. These items are, for example, coffee grounds, banana peels and chicken bones, to name a few.

## **2.2 Consequences of food waste**

### **2.2.1 Environmental impact of food waste**

Food production is very resource-driven and has significant environmental impacts. As mentioned in section 1.1, when food products turn into food waste, a negative environmental impact is created, and resources are lost. Rotting and decaying food waste further contributes to the climate change in the form of greenhouse gases and CO<sub>2</sub> from the putrefaction process. (FAO 2019; Silvennoinen 2020.)

Section 1.1 mentioned how roughly 30 per cent of the food produced in the world goes to waste. In Finland this number is somewhat smaller, where 10-15 per cent of food goes to waste. Finnish households are responsible for approximately 30 per cent of this food waste (Silvennoinen 2012). In America 40% of the food produced goes to waste, as a comparison (Foodprint 2018).

According to the final report from Foodspill project, published in 2012, food amounts to a third of the environmental impact in Finland when it comes to overall consumption. The project report also claims that when edible food turns into food waste, the environmental impact of producing it has been meaningless, and thus the process is unsustainable. (Foodspill 2012.)

The publication found out during a two-week study period that the annual avoidable food waste varied from 0 to 160kg per person, with an average Finn wasting 23kg of food per year. This was extrapolated to amount to 120 to 160 million kilograms of food waste per year in Finland. Majority of the food waste is fresh and edible, or leftovers from cooking. (Foodspill 2012.)

Vegetables were the most discarded food product, followed by home cooked food, milk products, bakery and grains, and fruits and berries. See Figure 2 for a more thorough overview of the findings (Silvennoinen 2012). Research done in Canada by Massow, M. et al. detailed similar findings, wherein vegetables were the most wasted food product category, followed by bread and cereals (Massow 2019).

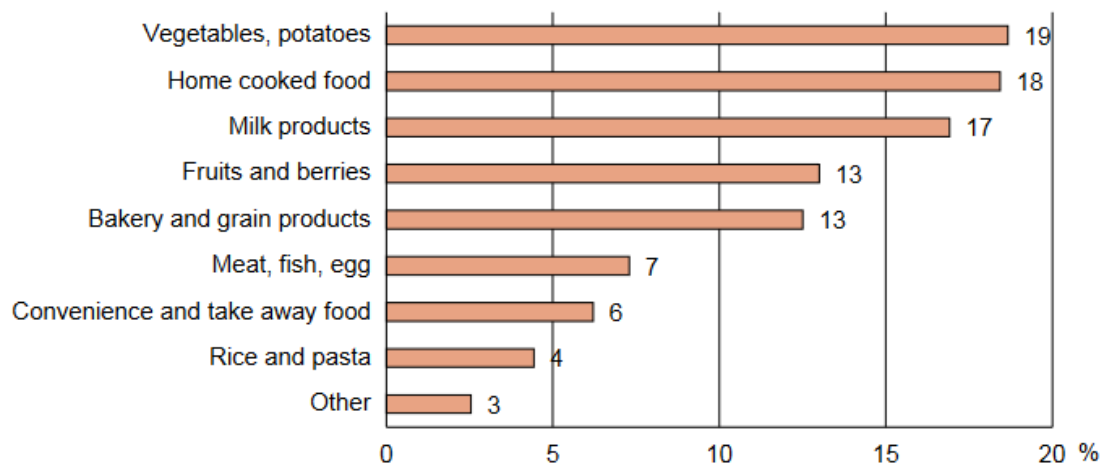


Figure 2. Percentages of wasted food in households during the study period. (Silvennoinen 2012)

According to a publication by Food and Agriculture Organisation of the United Nations, reducing food waste can directly impact environmental sustainability, because if less food ends up being wasted, then less of it needs to be produced and transported as well (FAO 2019). Finally, food waste in the later stages of the food supply chain have a more significant environmental and economic impact than food waste in the earlier stages of the food supply chain, as more resources are wasted (Silvennoinen 2020).

## 2.2.2 Other consequences of food waste

The environmental impact of food waste was already described in section 1.1 and further discussed in section 2.1, but other consequences of household food waste exist as well.

**Economic consequences.** As an economic consequence, food waste impacts poverty rates and the sustainable income growth of an affected area. Food waste also influences transportation costs, as first food is transported into the restaurant-retailer-consumer sector to be sold, and then possibly transported away as waste, after it goes unsold and turns into food waste. Therefore, the end result was just transporting waste back and forth, at the expense of resources and time. (FAO 2019).

Another economic consequence of food waste is the loss of resources during food production. As discussed in the earlier section, 10-15 per cent of all food produced in Finland goes to waste, 30 per cent of which happens in households, which amounts to approximately 120 to 160 million kilograms of household food waste per year in Finland. When food gets discarded as food waste, the resources utilized in its production get wasted as well, and this includes economic resources, such as money and time, in addition to the environmental resources of agriculture and water. (Silvennoinen 2020.)

Households themselves suffer from the economic consequences of food waste. Silvennoinen (2020) estimated that if households spend an average of 4200€ on food products per year, the amount of money lost to food waste would be roughly 210€ per household and 100€ per person.

**Nutritional consequences.** Food waste impacts the nutritional quality of food, as kilocalories are lost when food goes to waste. Silvennoinen (2020) estimated the loss of kilocalories due to food waste being 70 kilocalories per day and thus 25,500 kilocalories per year in Finland per person. This means a total of 136 billion kilocalories are lost in the whole of Finland in one year. If we assume that an average Finnish person eats approximately 2000 kilocalories per day, the

kilocalories lost to food waste would feed an extra 180,000 Finns every year (Silvennoinen 2020). Naturally, this has implications in the concerns of food security.

## **2.3 Household food waste – a problem at the consumer level**

In the following sections we will discuss the problem of food waste as it manifests at the end of the food supply chain, at the household and consumer level. The first subsection will consider the cause of household food waste, and the prevention of household food waste is discussed in the second subsection. Finally, the third subsection considers the behaviours relating to household food waste in a five-step model.

### **2.3.1 Causes of household food waste**

Household food waste results from buying more food than is consumed, but food is almost never discarded right after shopping. Rather, it is discarded after performing a set of behaviours, each of which increases the likelihood to waste. Therefore, household food waste is not a result of any intentional behaviour by the consumer. (Quested et al. 2013.)

Food moulding, food being past the date label dates, plate waste and overpreparation of food were explained as the main contributors to food waste in research done by Silvennoinen (2020) Reasons for discarding food product as food waste varied depending on the product in question. Vegetables were most often discarded due to spoilage, and the biggest reason for cooked food being discarded was overpreparation of food and unused leftovers. Milk products were most often discarded due to missed expiration dates. (Silvennoinen 2020.)

One major contributor to household food waste is food package sizes, as approximately 20-25 per cent of created household food waste can be related to packaging, and three major aspects can be identified relating to packaging-created food waste. These are oversized packaging, that the consumer cannot empty in time, packaging that otherwise is difficult to empty, and finally waste due

to passed “best before” or “use by” date (Williams et al. 2011). Consumers might be forced to buy more food than they need, due to larger package sizes, as there’s no smaller food package sizes available. This leads to some of the food being unused and ends up as food waste due to excess. (FAO 2019.)

According to a publication by Foundation for European Progressive Studies, 10 per cent of food waste in EU was linked to packaging date labelling issues and the resulting consumer confusion (FEPS 2018). Confusion over date labels of food packaging, and general lack of knowledge over food safety and food durability also cause household food waste. Many consumers can’t differentiate the meaning between the labels “best before” and “use by”, significant as they are, and often end up discarding the food product as food waste before either label’s date has passed. (Moller 2019.)

Consumers also have a habit of “playing it safe” when unsure about food safety and whether the food product is still safe to eat or not, which often leads to the food product being discarded, “just to be safe” (LUKE 2019). Silvennoinen (2020) discovered in research that approximately 40 per cent of the discarded food was not spoiled when it was discarded (Silvennoinen 2020).

Household food management planning behaviours also play a role in household food waste. With regards to purchasing behaviours, lack of proper planning, using meal plans or shopping lists, can result in excess or impulse buying, resulting in consumers more food products than they need. These excess food items might then go unused at home and get discarded as household food waste. Although, diligent planners aren’t immune to the whimsical occasional impulse purchase either, where a discount or a promotion is too desirable to resist. Lack of proper planning behaviours can also lead into poor knowledge of which food items already exist at home and don’t need to be purchased. (LUKE 2019; Foodprint 2018.)

Lack of meal planning behaviours can result in the consumer over-preparing (cooking) too much food, resulting in leftovers. Consumers might lack knowledge

of how to use these leftovers creatively, instead of discarding them as food waste. Alternatively, some consumers might not even care, lacking respect towards food. (LUKE 2019; Silvennoinen 2020; Nunkoo et al. 2016.)

Indifference towards food waste, or lack of respect towards food in general, is also a contributor to household food waste. It can also lead to unplanned restaurant visits or food home deliveries, which can cause some food already at home to expire unused, although sometimes life events and situations can play a role in these circumstances as well. (LUKE 2019; Nunkoo et al. 2016.)

### **2.3.2 Prevention of household food waste**

Encouraging people to reduce food waste at home, or their created household food waste, requires a thorough understanding of behavioural drivers and barriers to change (Närväinen et al. 2019).

However, consumers can be put off from engaging in waste prevention practices by the feeling that their own contribution is too small to make a difference, and as such there is no point in changing existing behaviour. Consumers, who haven't participated in household food waste prevention practices yet, can be put off by the perceived inconvenient of the practices, wherein the waste prevention practice are seen as more inconvenient and requiring of effort than they are. (Sharp et al. 2010.)

In the UK-based publication "Household waste prevention – a review of evidence" (Sharp et al. 2010), which centrally focused on customer behaviour change towards household waste, evidence suggests that the greatest change in household waste prevention can be achieved in the sectors of food waste, home composting and bulky waste. Modern culture and confusion between recycling and waste prevention - as though they were the same thing - among householders are mentioned as the major barriers of entry. (Sharp et al. 2010.)

The research in the publication focuses on the moments when householders deal with food waste, in other words the purchase and consumption of food, and

disposing of the resulting food waste. The publication offers solutions to the food waste problem, such as reusable shopping bags, re-usable and refillable packaging, and changing customer attitude towards second-hand goods or near-expiring food items. (Sharp et al. 2010.)

The publication researched household waste in general, but food waste is a significant part of household waste, and as such this publication is relevant to this study. It concludes that consumer behaviour is a significant factor in the prevention of household waste, and as such consumers should be engaged and encouraged to rethink their behaviour. According to the publication, donating items is the most practiced form of behaviour among the respondents of the study, and that other “low effort” food waste prevention behaviours are more popular than the behaviours that require more changes in consumer behaviour. (Sharp et al. 2010.)

Similar findings were concluded in the 2019 publication by Närväinen, E. et al. wherein it was posited that understanding the behaviours related to household food management is necessary to determine what future interventions should target (Närväinen et al. 2019).

### **2.3.3 Five stages of household food management behaviours**

Household food management behaviours can be sorted in five stages, which are: Planning, shopping, storing, preparing, and consumption. Household food management behaviours start before any food is even bought, in the planning stage. (Närväinen et al. 2019.)

Consumers decide what to buy in the **planning** stage, through meal planning and the use of shopping lists. Planning has been shown to reduce household food waste (Jörissen et al. 2015), as it increases purchasing accuracy (Quested et al. 2013) and lowers the likelihood of surplus food being purchased (Närväinen et al. 2019). Consumers’ own view of their household managing skills also influence planning behaviour (Stancu et al. 2016).



In the **shopping** stage, consumers engage in purchasing practices in a store, and these behaviours can also influence the level of household food waste. Consumers who are vulnerable to impulse buying also tend to waste more food (Parizeau et al. 2015), while consumers who are price oriented or attracted to special offers waste less food, according to recent findings. (Närväinen et al. 2019; Jörissen et al. 2015.)

How consumers **store** the food at home, after shopping stage, also influences the level of household food waste created. Proper storing practices improve the consumers' overview of what is already store at home in shelves (Quested et al. 2011), reducing food waste, as this knowledge assists in purchasing and planning decisions, and helps prolong the time food at home can be safely eaten (Närväinen et al. 2019). Without proper storage practices food might go past its expiration date at home, in a forgotten corner of a shelf, while a similar item was just purchased (LUKE 2019).

Food is cooked or otherwise prepared at home in the **preparing** stage. Cooking too much food unintentionally is a common contributor to household food waste, while saving and eating leftovers lowers the level of household food waste. Cooking too much food is less likely to happen if consumers properly measure ingredient quantities, and better cooking skills help avoiding accidents (Evans 2011; LUKE 2019), such as burning or otherwise wasting food in-preparation (Närväinen et al. 2019; LUKE 2019).

The final stage is the **consumption** of food and deals mainly in behaviours linked to food leftovers. Food waste levels are lowered if leftovers are stored for a later use, for example simply eaten later or used to cook a new meal. (Närväinen et al. 2019.)

Despite these five stages, sometimes household food waste is still unavoidable due to unforeseen, sudden changes in daily life (LUKE 2019).

## 2.4 Sociocultural meanings of food waste

Food waste creates a moral problem for the society, as food gets wasted in some countries while at the same time there's rampant malnutrition and widespread hunger in other countries. Food waste also increases food insecurity and widens the inequality gap between high-income and low-income people. (FAO 2017.)

Food waste in developed countries happens most visibly at the end of the food supply chain, being realized in the form of retail food waste and household food waste. In developed countries this is partially caused by the fact that people are well off enough to be able to waste food, as by contrast in still developing countries majority of food waste happens at post-harvest and processing stages of the food supply chain (Närväinen et al. 2019; FAO 2011). However, food waste presents a problem through actions and practices in the entirety of the food supply chain, even though that problem in developed countries is visible at its end (Närväinen et al. 2019).

Consumers are ultimately seen as the responsible party for the creation of household food waste, and the general approach in the past has been to encourage and mobilize consumers to partake in food waste reduction activities, for example through various information campaigns (Evans et al. 2017). However, retailers and food manufacturers are also responsible for consumer created household food waste, through various decisions made in their part in the food supply chain, for example in package design and labelling practices, and as such the reduction of household food waste is also question of corporate social responsibility (Devin and Richards, 2018). It is easy for manufacturers and retailers to put the blame and burden of food waste on the consumer, after their actions have made it difficult for consumers to avoid food waste (Närväinen et al. 2019).

Informational, awareness raising campaigns implemented in the past to encourage reducing food waste at home haven't always been successful, despite their significant outreach and multifaceted nature (Stöckli et al. 2018). These past

campaigns have often lacked clear theoretical basis, proper monitoring and effective measures, which makes it difficult if not impossible to determine which elements of the campaign have driven behavioural change (Närväinen et al. 2019).

The average consumer of food will not take part in any extra activity that is too inconvenient, time consuming or expensive for them, but this slightly varies depending on the environmental and moral views of the consumer (FAO 2019). One possibility is to normalize food waste reduction practices on a societal level through integrations in social media and activities by opinion leaders, and thus change consumer behaviour. Motivating consumers through sense of guilt hasn't been effective (Närväinen et al. 2019).

Food waste campaigns can be identified into five different initiatives: food waste redistribution, food waste reduction, awareness-raising campaigns, food waste reuse and the sale of short-dated products. Food waste campaigns and initiatives can be seen as a form of social marketing, which can change consumer behaviour. (Närväinen et al. 2019.)

Finally, household food waste is not intentional behaviour by consumers, but rather a consequence of everyday life. As such it is necessary to innovate new changes to elements of consumers' everyday life practices, such as materials, meanings and competences. (Närväinen et al. 2019.)

## **2.5 Actors and policy-makers role in food waste**

Solving the problem of food waste requires actions from the public sector, the private sector as well as third-party organizations, and will likely feature the use of both incentives and sanctions. This makes food waste a problem in the political sense as well, as new regulations need to be made both locally and Finland-wide. On the organizational level food waste can be linked more tightly with corporate social responsibility, shifting some of the burden of household food waste from consumers to retailers and manufacturers. For example, France and

Italy have set a legal obligation for retailers to donate food, and in South Korea households are charged by the food waste they create. (Närväinen et al. 2019.)

Changes to regulation, norms and societal standards can help reduce food waste on different actor areas. Informational campaigns, as already discussed in previous chapters, offer one such change in societal norms, (Närväinen et al. 2019) but they can also include other changes to legislation regarding food waste, such as better legislation with product standards or food labelling, and food donation (Gruber et al. 2016).

Improved regulation towards food waste can pressure different actors into action, such as retailers or food manufacturers, who might be aware of the problem without feeling responsible. In South Korea legislations have recently allowing the use of insects in converting food waste into animal feed. Finally, better monitoring of food waste can help focus the action taken to reduce food waste. (Närväinen et al. 2019.)

Actors taking action to reduce food waste in their area might create more food waste in another actor's area (Devin & Richards 2018), or somehow affect consumers. On the other hand, actors taking action to reduce food waste might also facilitate other actors to follow. For example, better packaging practices by manufacturers might influence the pricing strategies or consumer targeted communications taken by retailers (Aschemann-Witzel et al. 2016).

## **2.6 Business opportunities and innovative solutions of food waste**

Food waste reduction and prevention efforts can create new business opportunities for innovative solutions. Recently emerged new business opportunities have generally leaned on digitalization and platform technology, partially because increased technology helps in dealing with surplus, excess food (Mattila et al. 2018). However, although food waste can be turned into a resource with new innovations, the demand for food waste shouldn't increase, and food

waste reduction should always be the core concept and final goal, and there should be incentives to halt the emergency of food waste (Närväinen et al. 2019).

Food banks have existed for a long time, but historically their purpose has been to relieve food insecurity. Food banks and other sorts of social supermarkets can be key factors in the community and in reducing food waste (Michelini et al. 2018). Actors creating surplus food, such as retailers and restaurants, can be better linked with actors that operate off surplus food, such as food banks and digital supermarkets, and services that sell surplus food to consumers (Närväinen et al. 2019).

In Finland approximately half of the food meals consumed outside of home come from the communal food services sector, such as schools, day care centres, and workplace and student canteens (Silvennoinen 2020).

Food waste reducing apps, which redirect food waste from stores and restaurants to food donors, buyers or recipient organizations are a promising opportunity that's recently emerged around the globe. They are a low-cost technological solution that deal with unsold or surplus food, thus reducing food waste. These apps, in essence, can be seen as digital platforms that optimize different transactions, such as food pickup, purchase and delivery using real time information to match supply and demand, as well as plan the scheduling of pickup routes. (Närväinen et al. 2019.)

## **2.7 Theoretical framework**

This research study will be approaching the problem of household food waste through the lenses of the "Framework for Managing Food Waste" framework designed by Närväinen et al. (2019) displayed in Figure 3.

The framework characterizes food waste as a unstructured, cross-cutting and relentless problem, and offers four perspectives towards dealing with food waste. These four perspectives feature changing the behaviours of actors, connecting

actors and activities within systems, constituting sociocultural meanings and innovating solutions to food waste reduction. The framework was the result of a multidisciplinary project that combined research from the social sciences including business and media studies, consumer research, marketing, design thinking and environmental research. Food waste management is perceived as a multilevel, multi-actor effort to prevent and reduce food waste through various solutions and requires shared responsibility on all actor levels in everyday situations as well as in policymaking.

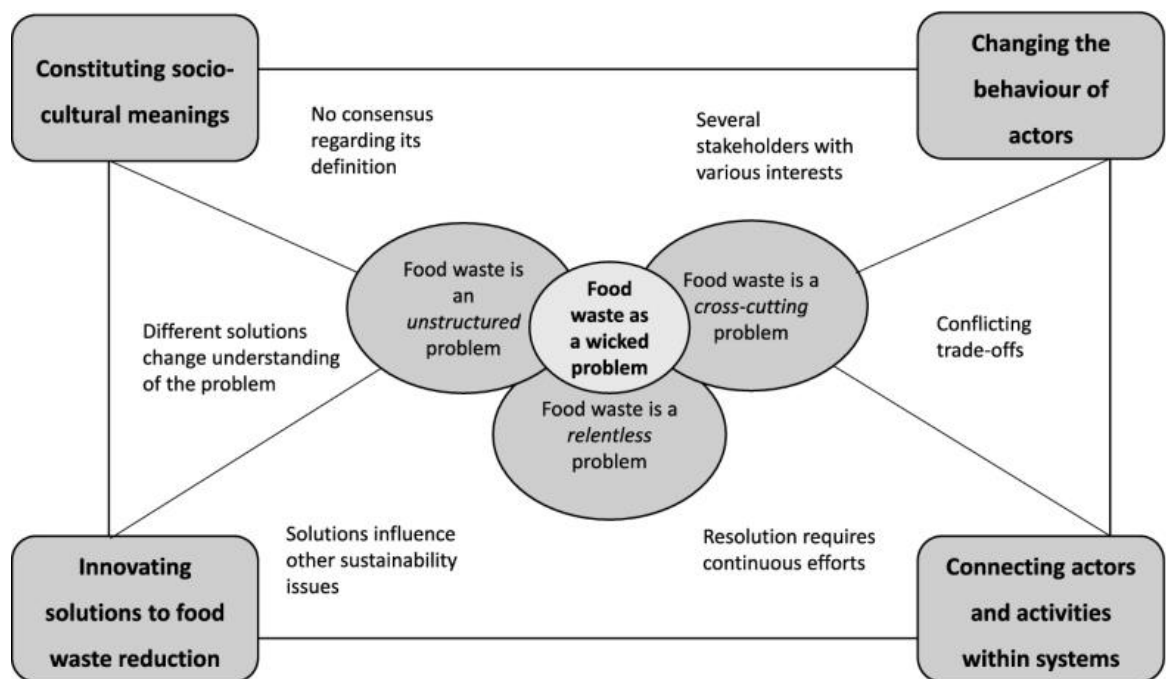


Figure 3. Food waste as a wicked problem framework. (Närväinen et al. 2019.)

### 3 RESEARCH METHODS

The survey will only collect quantitative data. Qualitative data collection was left out of the survey due to resource limitations, as the survey will be relatively short, hopefully ensuring better response rate and sample size. Also, the aim of the research is to describe the attitudes and perceptions on a more general level, and as such there is no need to seek for more individual perspectives, such as through qualitative methods. Using only quantitative data also makes it easier to analyse the data, improving accuracy and reducing researcher bias. As the survey questions are carefully designed to answer the research questions and support the goals of the research, so collecting only quantitative data will be sufficient.

The survey questions were developed based on the research material and research questions, and the survey itself was created in Webropol 3.0. The data collection period for the survey lasted from 20 October to 31 October. Due to the nature of the chosen sampling strategy, **voluntary random sampling**, no sampling size targets could be set, and the aim of the data collection was to get as many survey responses as possible.

#### 3.1 Survey development

In this chapter we will go over the reasoning and logic behind each survey question. The full questions, complete with their answer options, can be found in Appendix 1. The first seven questions find out information about survey respondent demographics. Questions eight and nine are about concern for the environment and environmental consciousness of the respondents. Questions 10 to 13 relate to the respondents' household food management behaviour, and the next questions from 14 to 19 are about the respondents' purchasing behaviour, decision-making and perceptions when grocery shopping. The final stretch of questions in the survey, from 20 to 28, relate to alternative ways of procuring food for the household and oneself and seek out possible sustainability-oriented choices, business opportunities and new innovations.

**Question 1.** *“I identify as...”* finds out information about survey respondent demographics, with an added third option for people who don't wish to answer or pick an uncomfortable option. Sophisticated and modern phrasing of “Identifying” rather than “Being” (“I am...”) might make some respondents feel more comfortable with the survey, and more likely to continue filling it.

**Question 2.** *“What is your age?”* finds out information about survey respondent demographics, which is important for the generalizability of findings, and household food management behaviours and practices likely vary depending on the respondents' age. Makes it possible to identify and sort out non-adult respondents, as the survey is aimed towards adults only.

**Question 3.** *“Where do you live?”* finds out yet more information about survey respondent demographics. This survey is aimed towards people living in Kouvola, so it is important to determine if the respondent is within the intended population or not. Respondents from outside of Kouvola will be sorted out during the data sorting phase.

**Question 4.** *“How big is your household?”* is another survey respondent demographics question. Household size influences household food management practices and purchasing practices. Next question (#5) is only visible to those respondents who answered anything else than the first option.

**Question 5.** *“Do you have any children in your household?”* is a follow up question from the previous one, only visible to people who aren't living alone on their own. Existence of children in the household influence household food management practices.

**Question 6.** *“Are you currently a student?”* is important because students generally have different spending habits from non-students, especially if they are also unemployed, which means they have a lot less money to spend than employed people and employed non-students.



**Question 7.** *“Are you currently employed?”* asks about the respondents’ employment situation. This influences spending behaviour, which in turn influences household food management behaviour and perceptions. Employed respondents have more money to spend.

**Question 8.** *“I’m worried about climate change.”* seeks to find out how environmentally concerned the respondent is. Environmental consciousness and concern can influence household food waste behaviour. The assumption is that environmentally conscious people waste less food.

**Question 9.** *“I sort biowaste separately from the general waste at home.”* finds out respondents’ waste sorting behaviour when it comes to biowaste specifically. Household food waste is biowaste, and the assumption is that respondents who sort their biowaste are more environmentally conscious and might waste less food.

**Question 10.** *“I feel it is difficult to avoid wasting food at home.”* Finds out if the respondents’ have trouble avoiding creating food waste at home. Household food waste often isn’t the consumers’ own fault and generates from a decision or an event somewhere else in the food supply chain, only to manifest at the very end of it as household food waste. This question sheds some light into the existence of such a possibility. It is assumed that consumers don’t intentionally create household food waste, but rather try to avoid it.

**Question 11.** *“I have good cooking skills.”* Cooking skills influence household food management behaviour and decision-making, and people with better cooking skills generally waste less food. Better cooking skills can lead into less food being wasted at home. A person with better cooking skills will burn less food during the food processing (cooking) phase and will more likely have creative uses for food leftovers, rather than simply discarding them.

**Question 12.** *“Leftovers from cooking often get thrown into waste.”* follows the mental flow from the previous question. The respondents have been activated to

consider their competency in the kitchen, and now they're primed to answer a more specific question of the same nature.

Leftovers contribute to household food waste and can result from multiple reasons, such as overproduction (cooking) of food, lack of household food management, lack of meal planning, or lack of respect towards food.

People with poor cooking skills are more prone to overproduction of food due to lack of competency and misestimation of ingredient amounts and might not be willing to creatively use leftovers.

**Question 13.** *“A food product you have at home is close to, or past, its expiration date label. Do you check its edibility and condition before deciding if it should be thrown away or not yet?”* Food date labels aren't perfectly accurate, and food products can last longer than either of the common “Use by” and “Best before” date labels imply. In essence, this question gauges the concern for food waste and respect towards food, as checking the quality of a seemingly expired food product is a voluntary action by the consumer.

**Question 14.** *“Do you plan meals ahead of the time?”* seeks to find out the respondents' meal planning behaviour. Meal planning is a planning behaviour that influences food waste, as people who plan their meals frequently into the future are less likely to buy impulse purchases when buying groceries and are more likely to use the food items they brought home from the store, rather than let them go to waste. Next question (#15) is only visible to respondents who answered something else than “Never”.

**Question 15.** *“How far ahead do you usually plan your meals?”* finds out the extent of meal planning behaviour. This question is only visible to respondents who picked something other than “Never” in the previous question.

**Question 16.** *“When going to buy groceries, I usually...”* asks about grocery purchasing habits relating to shopping lists. This is relevant, as people who plan

their grocery store visits, for example in the form of shopping lists, are less likely to fall prey to impulse purchases, surprise discounts, campaign promotions or exotic food item finds in the grocery store. As such, the habit of making a shopping list lowers the amount of food waste created back at home. Furthermore, act of writing down what to buy beforehand creates a mental commitment in the consumers' mind, and the bought food product is less likely to expire and get thrown into trash at home.

**Question 17.** *“I think the common expiration date labels of “Best before” and “Use by” are confusing”* Finds out about the respondents' perceptions towards food product date labels. Confusion over date labels and food safety was cited as being one of the leading reasons for household food waste in the research material. It is not always clear to the consumer what the exact meaning of the date label phrasing is and can lead to a food product getting erroneously discarded “just to be safe”, while it is still fully edible and nutritious. Naturally, this contributes to household food waste.

**Question 18.** *“I think there should be more options for food product packaging sizes.”* asks about perceptions towards food product package sizes. Food product package sizes can influence purchasing behaviour and decisions made while shopping for groceries, and indirectly lead to household food waste. For example, an “oversized” food product package runs the risk of expiring before it is fully emptied, creating food waste. Some consumers might make the decision of not purchasing a food product if they estimate this can happen.

**Question 19.** *“When I find a good deal on a food product, such as size, price per kilo, discount or a promotion, I buy the food item despite knowing some of it will go to waste.”* is about purchasing behaviour and decision-making when it comes to surprise discounts, promotions and the like encountered while shopping. The question seeks to find out how many respondents would buy an unplanned food item while knowing for certain that some of it will go unused at home and eventually get discarded. This is a decision made based on the respondents' sociocultural and economic values.

**Question 20.** *“Some restaurants sell surplus food at the end of service for a discount. Have you ever bought surplus food from a restaurant?”* asks whether or not the respondent has ever bought surplus food from a restaurant, and represents a planned food purchasing decision, and relates to household food management. This question connects together the ideas of sustainability choices, business opportunities and food waste. The next two questions (#21 and #22) are only visible to respondents who give a non-negative answer to this question.

**Question 21.** *“How often do you buy discounted surplus food from restaurants?”* Deepens the insight gained from the previous question, finding the frequency of such behaviour.

**Question 22.** *“Have you ever bought surplus food from a restaurant with an app like ResQ Cub or Lunchie Market?”* Finds out if the respondent purchases surplus food directly from the restaurant or uses an App for it, in essence finding out how popular these Apps are among the respondents.

**Question 23.** *“Have you ever used an online web-shop service that sells surplus grocery products at a discount, such as Fiksuruoka or Matsmart, or others?”* asks about another type of purchasing behaviour when it comes to surplus food. Surplus food products can be bought for a sizeable discount from some dedicated web-shops and presents a food-related purchasing decision for the consumer. Next question (#24) is only visible to respondents who gave this question a positive answer.

**Question 24.** *“How often do you use these web-shop services to buy surplus food online?”* deepens the insight gained from the previous question, discovering the frequency of behaviour.

**Question 25.** *“Have you ever obtained food from a charity organization?”* This question presents another way for a consumer to obtain food in a more economical way, in addition to discount food purchased from grocery stores,

restaurants, or web-shops. It also sets the respondents' mental state and mindset for the last questions in the survey.

**Question 26.** *“Would you be interested in home composting for household food waste, if it was easy and affordable?”* finds out about existing interest towards the possibility of home composting. This question features the keywords “easy” and “affordable”, as consumers are very likely to not engage in a new activity if it is troublesome, inconvenient, or expensive for them. This represents a sustainability-oriented approach to combating household food waste, which potentially benefits the consumer, and can result in a future business opportunity or an innovation.

**Question 27.** *“Would you be interested in donating your extra edible food if it was easy and convenient?”* seeks to find out interest that the respondents have towards the possibility of donating their extra edible food if it was easy and convenient. “Easy” and “Convenient” are keywords in this survey question, for the same reasons already discussed in the previous question. This represents a sustainability-oriented approach to combating household food waste, which potentially benefits the consumer, and can result in a future business opportunity or an innovation.

**Question 28.** *“Would you be interested in a food exchange service, where you can share your extra edible food product with others and get some other food product in return?”* is the final survey question and follows the spirit of the previous question, seeking to discover interest towards the possibility of trading excess edible food for another person's excess edible food, possibly through an app or a service. This represents a sustainability-oriented approach to combating household food waste, which potentially benefits the consumer, and can result in a future business opportunity or an innovation.

### **3.2 Survey design considerations**

It will be possible to complete the survey without answering all the questions. This is a conscious decision made during the survey design. The other possibility,

forcing answers to all questions before survey can be marked as complete, was seen as a worse option. Naturally, survey responders should answer all the survey questions, but it is preferable that questions are left empty, rather than filled with a “random filler” answer if an answer cannot be given for some reason. Some of these reasons might be misunderstanding or not understanding the question, or simply missing it in the survey.

It is important to keep in mind the cognitive processes the respondents must undergo while answering questions and design the questions to support these processes. Survey Methodology (Groves et al. 2009, 218) outlines and describes the most common understanding of cognitive processes in answering questions as the following four steps:

- Comprehension, which means how the questions get interpreted by the respondent
- Retrieval, which means how the respondents recall the correct information to answer the survey question
- Judgment, which means combining the information that gets recalled in the previous step
- Reporting, in which the correct answer is formed and formatted from the previous steps

The survey respondents do not always go through these four steps in order, sometimes a step is skipped, and often the respondent returns to a previous step during the process of forming the survey response (Groves et al. 2009, 219). Furthermore, instructions and navigational cues in the survey are also considered as being part of the cognitive process.

Groves et al. (2009, 219) posits that most survey respondents have no reason or inclination to work hard to answer complicated and drawn-out questions and will often take shortcuts to simplify their workload. This is taken into account while the questions for this survey were designed; the questions were kept as specific and as easy to *comprehend* as possible, using common and widely known words and

ideas, without compromising the data collection. The survey questions are laid out clearly and accurately, without any choice for false misunderstanding or misinterpretation, or without containing any faulty presuppositions (Groves et al. 2009, 227-228).

Issues regarding to social desirability and acquiescence are mitigated by design as the survey is a self-administered online questionnaire. There is no interviewer or any other third-party present while the respondent undertakes the survey and as such there is no error for social desirability, and the tendency for acquiescence is also lessened although not entirely eliminated due to human nature, and the assumption that respondents don't work too hard or put too much effort in answering the survey. Sometimes it's easier or preferable to "agree somewhat" rather than "disagree somewhat" (acquiescence or satisficing), and while it is difficult to adjust for this item response error (Groves et al. 2009, 224), we can acknowledge its existence all the same.

Groves et al. (2009, 237) goes into detail about attitude questions and their design. The author posits that the exact wording of the question or the question items can affect the respondents' final choice of response, and this is considered while designing the attitude-based questions for this survey; the question wording, and the wording of the question items, are kept as neutral and as unbiased as possible.

Attitude questions in the survey are designed to be answered with a 5-point Likert scale, offering the following answer options: "Strongly Agree", "Agree", "No agree nor disagree", "Disagree" and "Strongly Disagree". Too few options would lead into inaccuracy in identifying the respondents' true attitude, and too many options would lead the respondents' into failing to distinguish differences between the response options (Groves et al 2009). As such, 5 different response options should be distinct enough for the respondents' to be able to choose the correct one that resonates with their own opinion, without overwhelming the respondent with choice.

### **3.2.1 Validity, reliability, and response rates**

Validity, reliability, and response rates are important for the survey to be successful. Properly designed survey questionnaire helps improve all three of these aspects, and as such great care and effort is taken in the design and the order of the survey questions. One significant way to improve the response rates, and the validity and reliability of the survey results is to make the task of answering the survey as enjoyable and comfortable as possible for the survey respondent.

The survey should be easy for the respondent to follow and understand, and not be too cumbersome to answer. Quality of data is more important than quantity of data, because a smaller data set of high-quality data will be more efficient for the survey than a large set of low-quality data. Due to the design of the survey method, which is self-administered online questionnaire with random voluntary sampling, we have no sophisticated methods to improve response rates. Such methods, used in other survey projects, could include reminders for the survey respondents to answer the survey if they haven't done so yet, for example by email or through a phone call or an SMS message. Random voluntary sampling makes this method impossible to implement, as we have no prior knowledge of the survey respondents before they answer the survey, and the survey doesn't collect any truly identifying data.

It is important that the respondents have cooperative frame of mind so that they might answer the questionnaire honestly and conscientiously. Honest, positive, and cooperative survey respondents result in higher response rates, as well as better validity and reliability for the survey. The design, appearance, layout, length, and readability all influence survey response rates, and the survey layout is designed with these pointers in mind. (Punch 2003, 44.)



### 3.2.2 Ethical considerations

*“Because we rely on the goodwill of the target population in carrying out our work, protecting the interests of respondents is really a matter of principle.”* Groves et al. (2009, 317.)

It is the researchers' responsibility to protect the survey respondents' answers, information, and other collected data, and precautions must be taken during survey design and data collection stages to ensure that no harm can come to respondents after they've responded to the survey. The survey responses will be kept confidential and private, and the data will be kept safe so that no third-party can get access to it in any event. The survey will be designed online through a platform with suitable security and data encryption protocols.

Groves et al. (2009, 372) describes the following as “best practices” to implement while designing an ethical survey:

- Each member of the population should have an equal chance of being selected
- Follow-up of the selected respondents to achieve a suitable response rate
- Careful development and pretesting of the questionnaire
- Adequate training and supervision of the interviewers.

The questionnaire is carefully developed to collect only the very necessary amount of “identifying” data; the questionnaire only collects information about the respondents' gender, age range and city. The sparse amount of identifying data, as well as the cross-sectional nature of the survey (as opposed to longitudinal), puts the respondents at a minimal risk of reidentification. Furthermore, due to the lack of open-ended questions in the survey, a smaller amount of identifying data is collected to begin with. No pretesting or pilot testing of the questionnaire has been done, however.

The sampling method for this research is voluntary random sampling, and because of that it isn't possible to do follow-up reminders for the “selected respondents”, as no respondents are selected (or identified) on our end. There

are also no interviewers because the survey is a self-administered online questionnaire. Giving each respondent an equal chance of being “selected” can be somewhat helped simply by spreading the questionnaire around as much as possible during the data collection period, to make sure as many people as possible within the target population.

### **3.2.3 Survey briefing**

The following will read at the start of the survey, before any survey questions, for the respondent to read. The purpose of this briefing is to let the respondent know that the data is collected anonymously and for what purpose it will be used, and information on how to reach out for further contact regarding the survey, if questions arise.

**English survey.** *This survey is part of a bachelor's thesis work of a student at South-Eastern Finland University of Applied Sciences, in the degree of Bachelor of Business Administration, International Business. Responding to the survey is voluntary, and should take less than 10 minutes to complete. The data collected is anonymous, and is kept confidential and private, and only used for the purposes of thesis work. The survey findings will be published in my bachelor's thesis later this year.*

*If you have any questions about the survey, please contact me by email at [onisa023@edu.xamk.fi](mailto:onisa023@edu.xamk.fi). Thank you!*

**Finnish survey.** *Tämä kyselytutkimus on osa Kaakkois-Suomen Ammattikorkeakoulun (XAMK) opiskelijan kandidaatintutkielmaa. Kyselyyn vastaaminen on vapaaehtoista, ja vastaamiseen menee alle 10 minuuttia. Vastaukset kerätään anonyymisti, ja niistä saatua tietoa käytetään vain kandidaatintutkielman tuottamiseen. Tämän kyselytutkimuksen tulokset julkaistaan tutkielmassani myöhemmin tänä vuonna.*

*Jos sinulla on kysyttävää kyselyyn liittyen, ota yhteyttä sähköpostiini [onisa023@edu.xamk.fi](mailto:onisa023@edu.xamk.fi). Kiitos!*

### **3.3 Data collection and data analysis**

The survey seeks to ideally gather between 60 to 200 responses during its data collection phase, and the data collection phase was planned to be from 18 October to 31 October. The start of the data collection phase was delayed until 20 October due to delays in final survey feedback, and its implementation.

The self-administered online questionnaire was distributed as a web-link in social media with encouragement for respondents to share it further, and the survey gathered 310 responses during the data collection phase, exceeding expectations and guaranteeing a satisfactory sample size.

The data will be analysed through the following process in this quantitative research. First, the raw data is collected from the survey results after the data collection phase ends. The raw data is organized, and then sorted into relevant data by rejecting and discarding responses that are outside the intended sample. Finally, this relevant data is interpreted for results.

The data analysis was done with Excel, as Webropol 3.0 allows for convenient export of raw survey data into an Excel format.

## **4 RESULTS AND DISCUSSIONS**

In this chapter we will discuss the results of the survey and interpret the data considering the research goals and the research questions. The results provide insight into the household food managing practices and behaviour of the respondents, as well as information on what kind of challenges, barriers, and difficulties the respondents are facing as regards to household food waste. The results also discover future innovations and business opportunities.

The survey was completed by a total of **310** respondents during the data collection phase, exceeding expectations. 20 of these responses were rejected and discarded during the data sorting phase, due to being outside the sampling

population; 3 respondents were younger than 18 years old (question #2), 1 respondent didn't answer the age question (question #2) and 16 respondents were living outside of Kouvola (question #3). The original responses to these two questions are in Figure 4 and Figure 5. This leaves **290** relevant survey responses for further data analysis and interpretation.

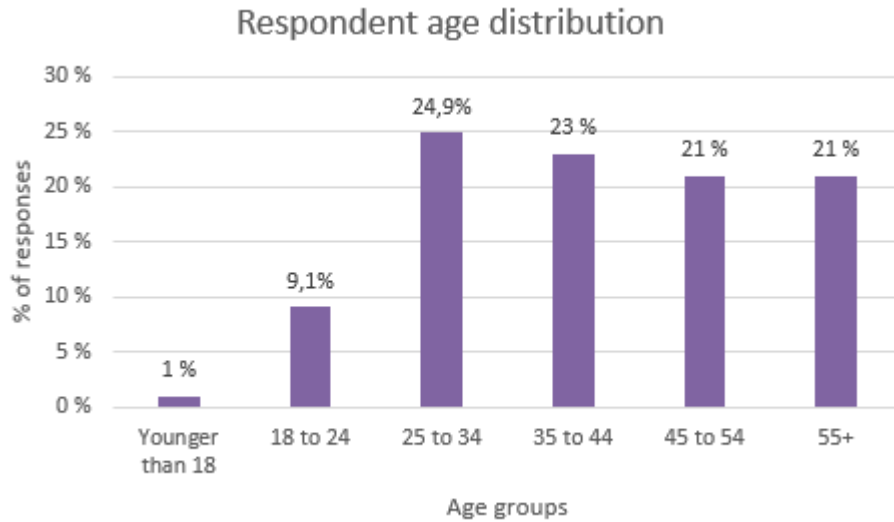


Figure 4. Respondent age distribution before data sorting.

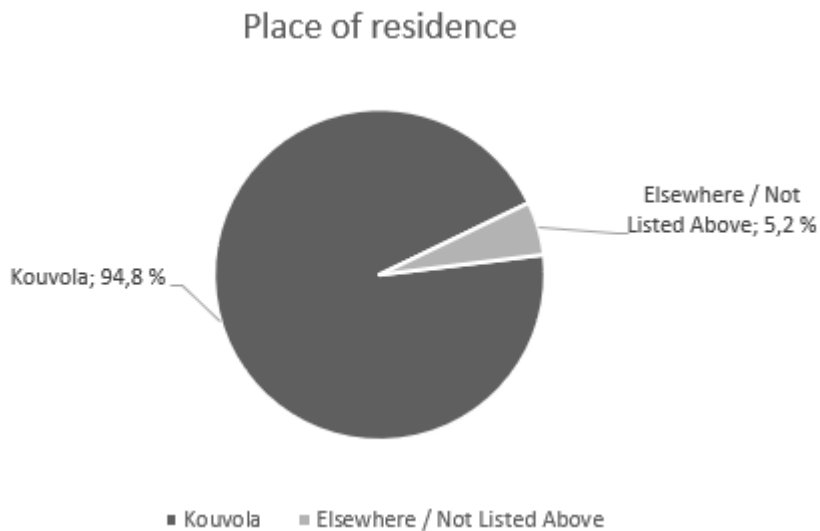


Figure 5. Respondent place of residence before data sorting.

The survey achieved a 91 per cent completion rate, as the survey was opened and the responding was started 339 times, and fully completed 310 times.

The data was analysed in Excel and will be discussed in section 4.2, going question by question. Each survey question has its results represented as a graph, either in the form of a pie chart or a column chart.

#### **4.1 Items missing data**

Item missing data is an empty cell in the data set, resulting from when a question is left unanswered for an unknown reason. The 290 survey respondents gathered a total data set of 7559 data points, and the amounts of items missing data in this data set was 12 data points. This sets the rate of item non-response at 0.16 per cent, and the rate of item response at 99.84 per cent.

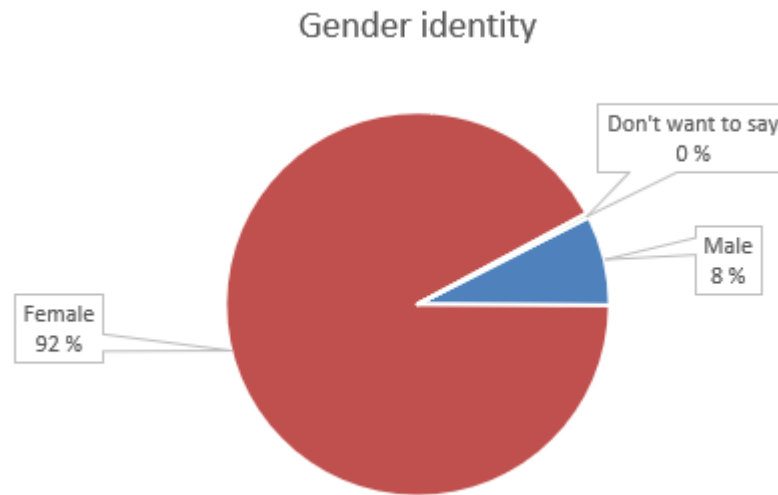
This means the survey design was a success; the respondents didn't have problems or challenges completing the survey, and the survey questions were easy to interpret and understand in majority of instances. The respondents had the option to simply not answer (resulting in an item missing data), but the survey questions were easy to understand, and the respondents were able to choose a satisfactory answer from the answer options.

#### **4.2 Survey results**

In this section we will look at the results of each survey question. The results are represented in different charts, a pie chart or a column chart. The responses add up to 100 per cent most of the time, but a perceptive reader might notice that this isn't the case for all the result figures. Sometimes the responses only add up to only 99 per cent: This is only a visual feature of the graphs, as the result percentages are rounded up or down to simplify the visualization of data.

The first question in the survey sought to find out the respondents' gender, and the results are displayed in Figure 6, showing a significant discrepancy in the gender of the survey participants: 92 per cent of the respondents identified as female, and only 8 per cent identified as male. No respondents chose the third option of "I don't want to say". This might be because women are more active than men in social media on average, where the survey web-link was posted, and

might be – on average – more interested than men in a survey relating to household food waste matters.



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Figure 6. Gender identity. N=290

The second survey question asked about respondent age distribution. During the data sorting phase, all survey responses where the respondent had chosen the option "Less than 18" were sorted out and disqualified. The results, displayed in Figure 7, indicate that only 9 per cent of the respondents are in the first age category of 18 to 24, and the rest of the responses were evenly spread in the next categories: 25 to 34 (26 per cent), 35 to 44 (24 per cent), 45 to 54 (21 per cent) and 55+ (21 per cent). Therefore, each age group is represented in the survey results.

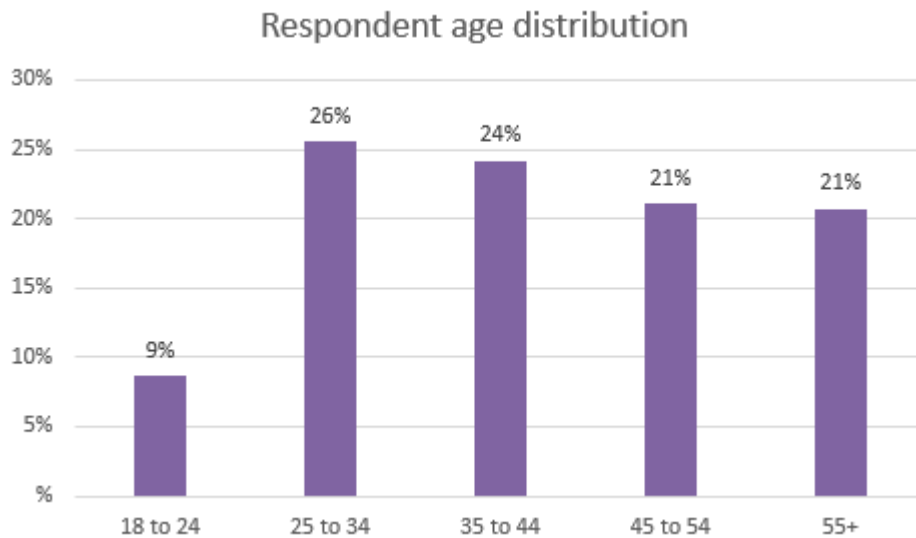


Figure 7. Respondent age distribution, after sorting. N=290

The third survey question asked for the respondents' place of residency. There were multiple answer options so as not to confuse the respondent, as seen in Appendix 1 and Appendix 2, but ultimately were for the purpose of sorting out responses from participants living outside of Kouvola. All original 310 respondents answered this question, of which 16 were sorted out and disqualified due to answering as living outside of Kouvola, as seen in Figure 4 in the earlier chapter. This survey question was one of the major reasons we ended up with 290 qualifying respondents.

The fourth survey question regarded the respondents' household size, with a follow-up question for the respondent if the answer was anything else than "1 person". The results, displayed in Figure 8, found out that 41 per cent of the respondents live in a household with two people, with one other person including themselves. Eighteen per cent of the respondents live alone, and 1 per cent of the respondents live in a household with 7 or more people. 34 per cent of the respondents' household size is 3-4 people, and finally, 6 per cent of the respondents live in a household with 5-6 people.

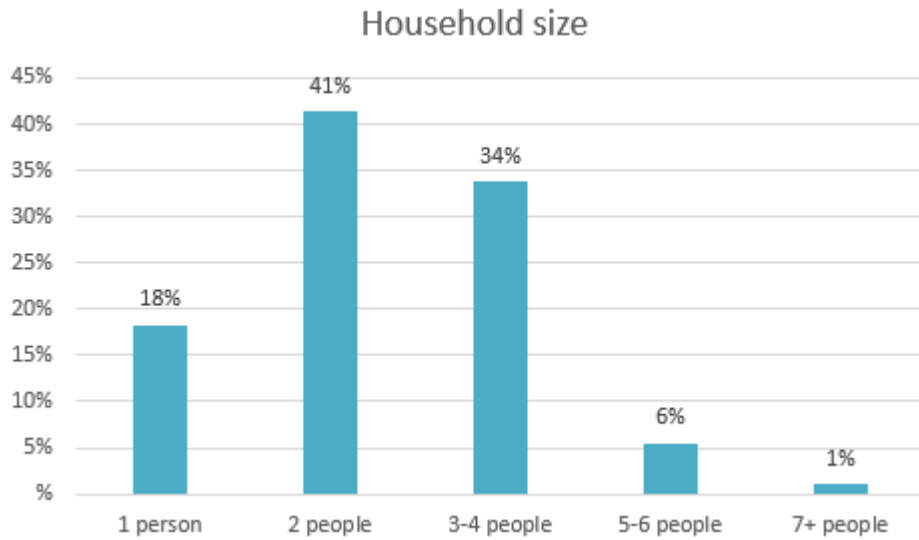


Figure 8. Household size. N=290

The follow-up question asked about whether the respondent had any children living in their household. These results are seen in Figure 9. This question was answered by all the respondents who were able to see it, gathering a total of 234 answers. The results are seen in Figure 9 and are as follows: 51 per cent of the respondents have no children in their household, while 19 per cent of them have exactly 1 child. Twenty-two per cent of the respondents have two children, 6 per cent have three, and only 2 per cent of the respondents have four or more children. This means that 51 per cent of the respondents who don't live alone also don't have children, and 49 per cent of the respondents who don't live alone do have children, one or multiple, in their household.

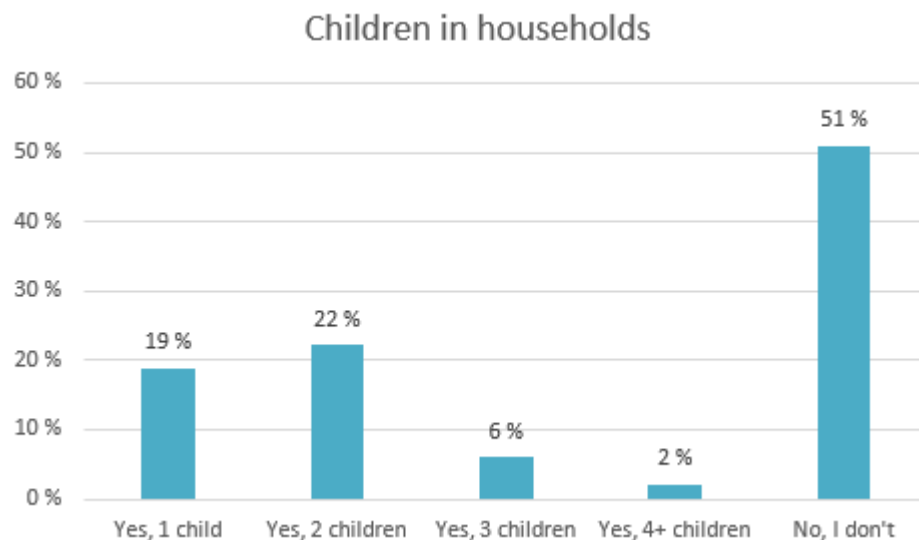


Figure 9. Children in households. N=234



The next two questions asked about the respondents' student and employment status, and the results are seen in Figures 10 and 11. The results to these questions discovered that 24 per cent of the respondents are students, and 76 per cent are not. Following this, 67 per cent of the respondents are employed and 33 per cent are not.

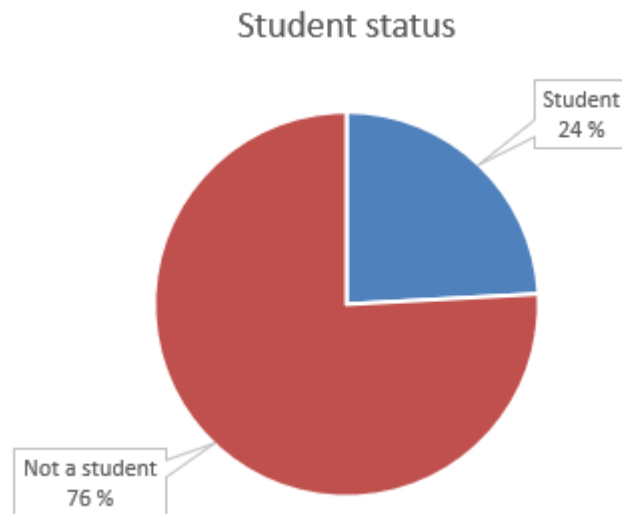


Figure 10. Student status. N=290

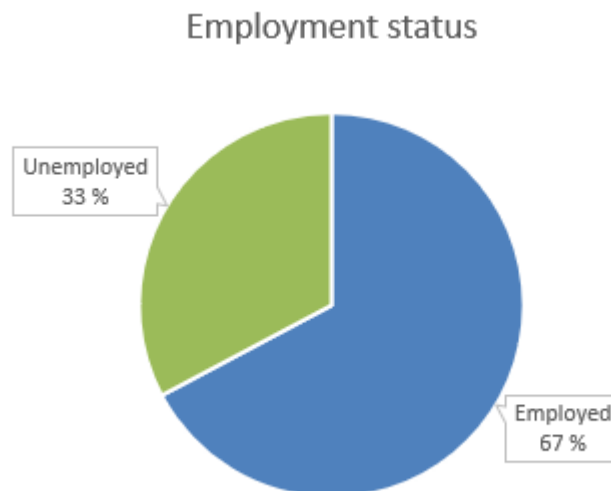


Figure 11. Employment status. N=290

The survey question #8 is a Likert-scale question and seeks to find out the respondents' concern for the global climate change, and the results are seen in Figure 12. Fifty per cent of the respondents are worried for the climate change,

and a further 16 per cent are strongly worried. Twenty-three per cent of the respondents chose the neutral middle option, and a total of 11 per cent of the respondents either disagreed or strongly disagreed with the statement. As such, we can interpret that most of the respondents are worried about the global climate change.

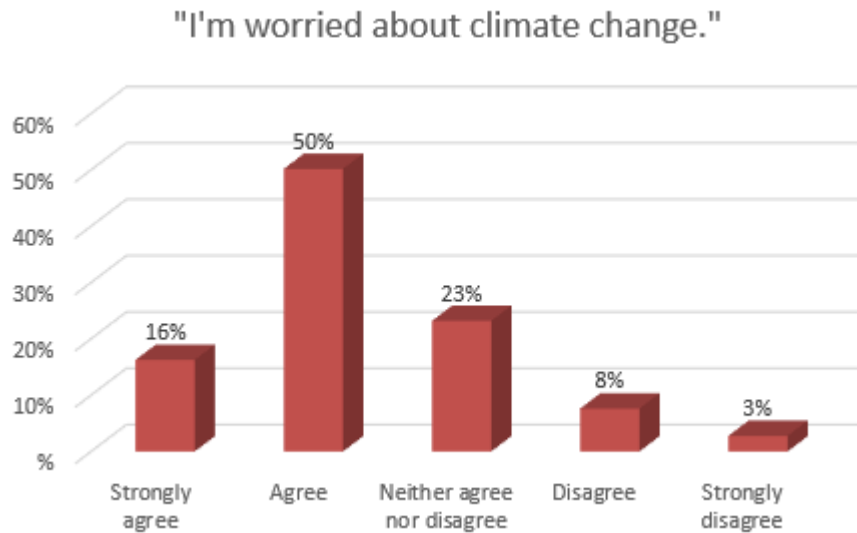


Figure 12. Climate change concern. N=290

This is followed by a question regarding the respondents' biowaste sorting habits at home, the results of which are seen in Figure 13. Forty-nine per cent of the respondents always sort their biowaste separately from their general waste at home, 20 per cent do this practice sometimes, and 31 per cent of the respondents never do it. We can conclude that always sorting biowaste is more popular than never doing it among our respondents.

"I sort biowaste separately from the general waste at home."

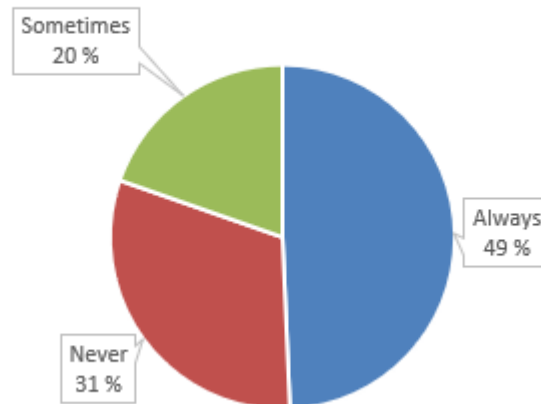


Figure 13. Biowaste sorting habits. N=290

The next survey question, question #10, features a Likert-scale and asks how much difficulty the respondent has avoiding creating food waste at home, seen in Figure 14. Forty-five per cent of the respondents disagreed with the statement, having no trouble avoiding food waste at home. Seventeen per cent of the respondents strongly disagreed with the statement, but 4 per cent strongly agreed, having significant difficulties, and 26 per cent simply agreed. Finally, 8 per cent chose the neutral middle option. From the results we can interpret that most of the respondents, a total of 62 per cent, have no trouble avoiding the creation of unwanted food waste at home, but some respondents, a total of 30 per cent of them, are still facing this challenge.

"I feel it's difficult to avoid wasting food at home."

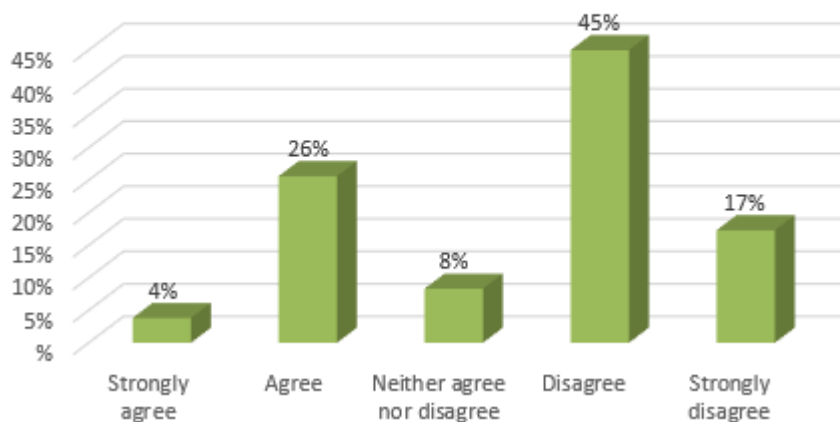


Figure 14. Household food waste difficulties. N=289

Figure 15 represents the results of survey question #11, which sought to uncover the respondents' perceptions about their own cooking competence. The respondents were offered answer options in a Likert-scale form. Most of the respondents, a total of 52 per cent of them, feel they have good cooking skills, and a further 30 per cent strongly agreed so. Eleven per cent of the respondents gave the neutral middle option as their answer, and a 6 per cent disagreed with the statement. Only 1 per cent of the respondents strongly disagreed. This means that most of the survey respondents have confidence in their cooking skills.

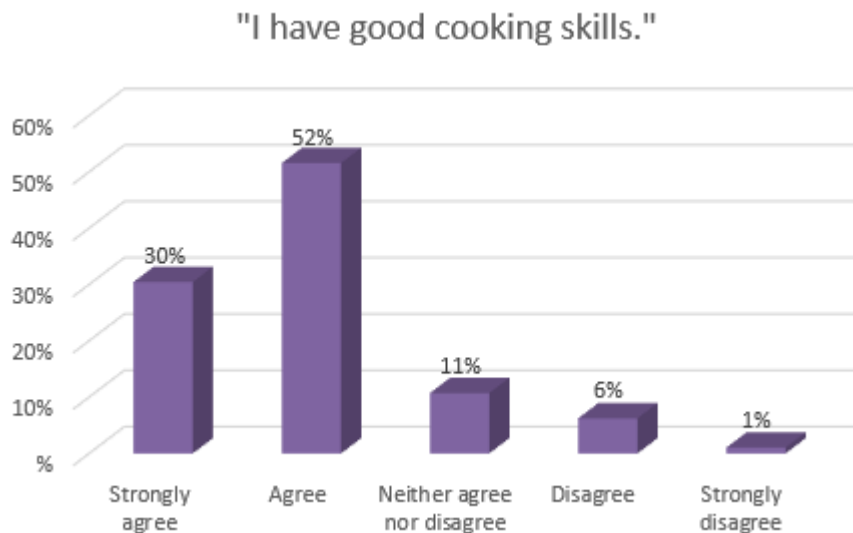


Figure 15. Confidence in cooking skills. N=289

The next question follows in the mental mindset of cooking and asks about how leftovers are used in the respondents' home, whether they get thrown into waste or not. The results are seen in Figure 16. Forty per cent of the respondents disagree and 22 per cent go so far as to strongly disagree with the statement, not discarding leftovers. Nine per cent of the respondents chose the neutral middle option, and a total of 29 per cent of the respondents agreed with the statement in some way: 23 per cent agreed and 6 per cent strongly agreed. We can infer from this that most of the survey respondents, most of whom have are confident in their cooking skills as according to the previous question, do not generally let

leftovers go into waste, but find creative uses for them, or store them for eating later.

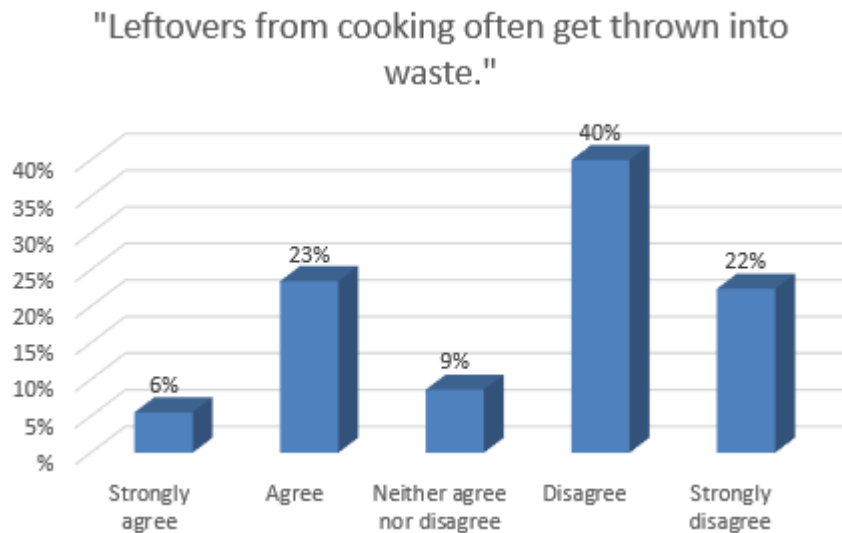


Figure 16. Leftovers get discarded. N=290

In Figure 17 we can see the results of survey question #13, which asked how the respondents deal with expired or almost expired food products at home. The question discovered that 77 per cent of the respondents check the food quality of a seemingly expired food product *before* deciding whether to discard it yet or not. Another 21 per cent of the respondents do this sometimes, and only 2 per cent never do it. From these results we can interpret that our respondents do not follow the food date labels as absolute truth and realize they're only approximations. The action of checking expired food quality and edibility before deciding on its fate also indicates respect towards food.

### Check food quality before discarding due to expiration

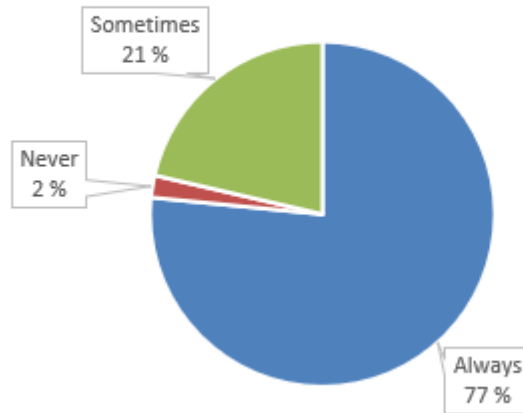


Figure 17. Perceptions of expired food quality. N=290

The question #14 asked about meal planning habits and the results are seen in Figure 18. Furthermore, the respondents who answered “Always” or “Sometimes” move on to a follow-up question after this one.

Most of the respondents do some form of meal planning, with 46 per cent always and 52 per cent sometimes planning their meals. Only 2 per cent of the respondents never engage in meal planning.

### "Do you plan meals ahead of the time?"

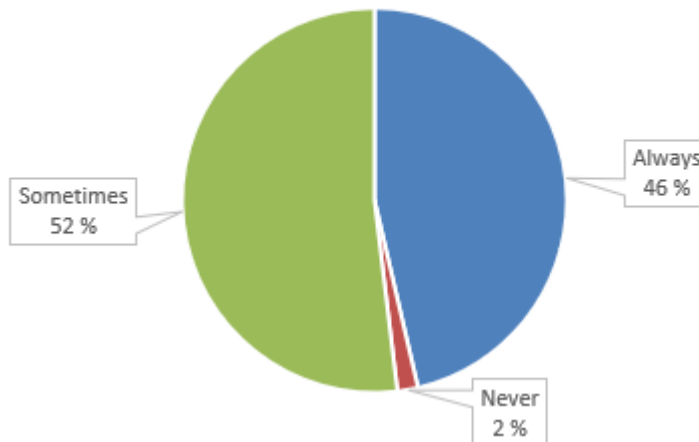


Figure 18. Meal planning habits. N=289

The next question was a follow-up question for those respondents who answered “Always” or “Sometimes” to the previous question regarding meal planning habits. This question was answered by all the respondents qualifying for it, for a total of 284 answers, and the results are seen in Figure 19. Most respondents, 44 per cent plan their meals for the next few days, and 30 per cent plan for most of the week. 13 per cent of the respondents plan meals for the entire week, and 14 per cent plan only tomorrow’s meals. These results make sense, as meal planning is likely done alongside planning for grocery store visits, and it can be assumed that most respondents shop for groceries a couple of times a week, not every day. As such, meal planning is mainly done for a few days ahead as well.

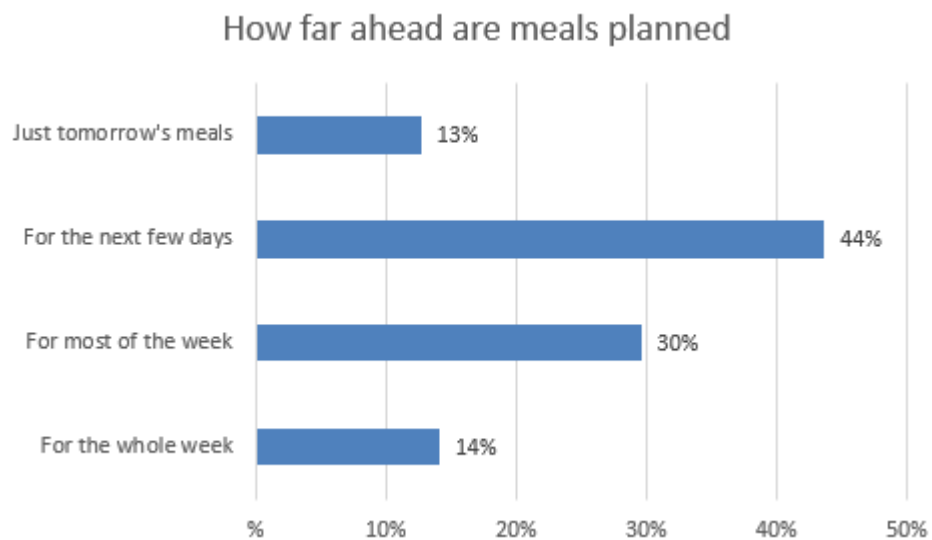


Figure 19. Extent of meal planning. N=284

Figure 20 displays the results of respondent grocery shopping planning behaviour, asked in question #16. Unsurprisingly, 61 per cent of the respondents answer they make a shopping list, and another 28 per cent try to memorize everything in their mind and then remember while at the store. Ten per cent of the respondents simply buy impulsively, with no forethought.

## Memorizing what to buy at store



Figure 20. Grocery shopping planning behaviour. N=290

Following the idea of grocery shopping, the question #17 sought to discover how the respondents perceive the most common date labels of “Use by” and “Best before”, and the results are displayed in Figure 21. This question was structured as a Likert-scale.

Most respondents don't find the common date labels confusing: 44 per cent disagreed and 29 per cent strongly disagreed with the statement. Thirteen per cent of the respondents chose the neutral middle option, and 11 per cent agreed that the labels are confusing. Only 2 per cent of the respondents strongly agreed with the statement. Confusion over date labels and food safety instructions was a frequently cited reason for household food waste in the research material, so this is an interesting find: Our respondents generally have no trouble distinguishing between the date labels and have no trouble discerning their meaning.



"I think the common expiration date labels are confusing."

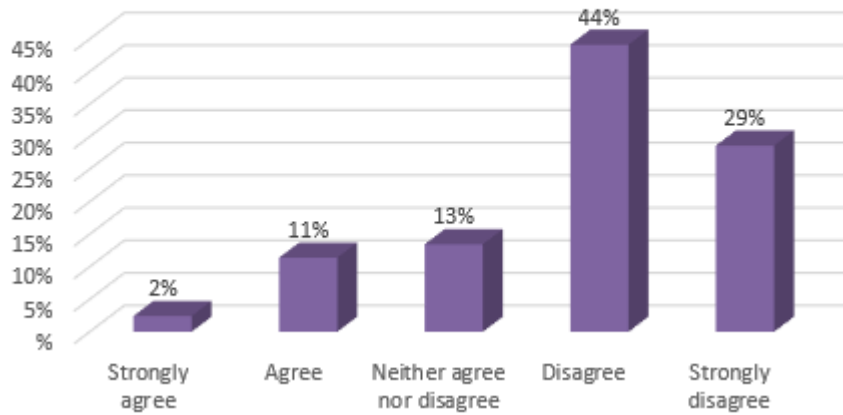


Figure 21. Perceptions towards date labels. N=290

Figure 22 displays the results of question #18, wherein the respondents were offered a Likert-scale to answer the question statement about whether there should be more food product packaging size options available. Most of the respondents (43 per cent) agree that there should be more options, with a further 19 per cent of the respondents strongly agreeing with the notion. Twenty-two per cent of the respondents chose the neutral middle option, another 16 per cent disagreed with the statement, and only 1 per cent strongly disagreed. Food product packaging sizes often came up in the research material as a contributor to household food waste, as discussed in section 2.3.1, and the majority of the respondents agree that there should indeed be more options for them.

"I think there should be more options for food product package sizes."

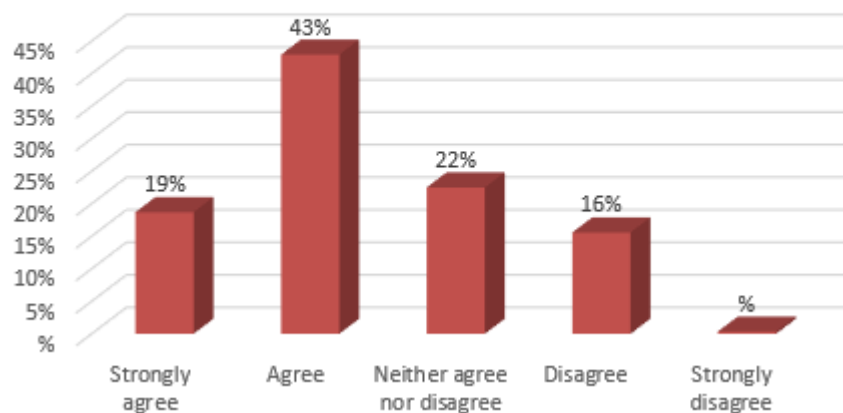


Figure 22. Perceptions towards food packaging sizes. N=289

The survey question #19 sought to uncover how the respondents perceive surprise deals, promotions, and the like when doing grocery shopping, with the assumption that some of the food goes to waste afterwards, and this is known to the respondent at the moment of purchase, and the results are shown in Figure 23. The most popular answer was Never (68 per cent): Most of the respondents would not make such a wasteful purchasing decision, and 32 per cent of them sometimes might. None of the respondents chose the "Always" answer option. From these results we can interpret that our survey respondents are generally concerned for food waste, and don't wish to partake in outright wasteful behaviour when it comes to food, even if would mean saving money with a discount purchase.

"When I find a good deal on a food product, I buy it despite knowing some of it will go to waste."

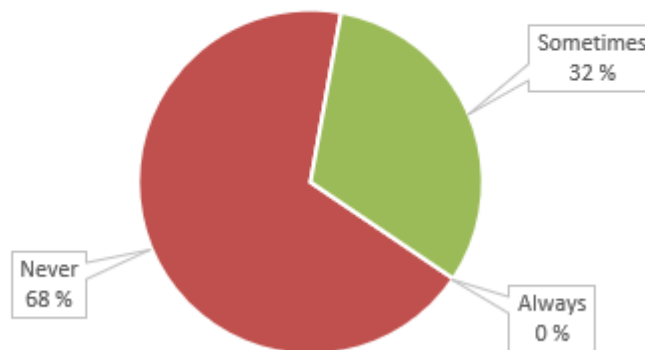


Figure 23. Expression of wasteful food purchasing behaviour. N=290

Figure 24 displays the results for the survey question #20, with the purpose of finding out how many respondents have purchased surplus restaurant food. The results for this question were split in half: 47 per cent of the respondents have purchased surplus restaurant food before, while 50 per cent haven't. Three per cent of the respondents chose more specific negative option, answering they haven't bought surplus restaurant food because they didn't know it was possible. The respondents who answered "Yes" to this question are offered a follow-up question about the frequency of this behaviour.

"Some restaurants sell surplus food after service.  
Have you ever bought any?"

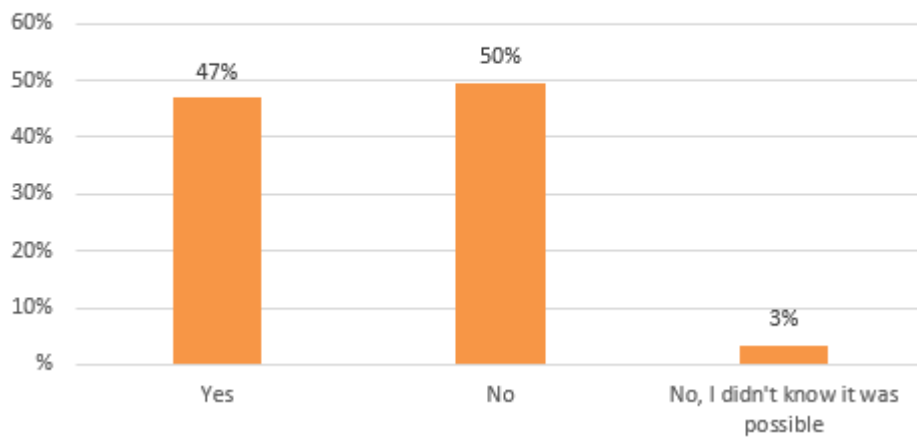


Figure 24. Expression of purchasing surplus restaurant food. N=290

Figure 25 displays the frequency of behaviour of the respondents who answered positively to the previous survey question. This question was answered by all 136 of the qualifying respondents. While having bought surplus restaurant food before, 50 per cent of the respondents rarely do so, and 40 per cent do it sometimes. It is only somewhat common for 9 per cent of the respondents: 1 per cent answered purchasing surplus food from restaurants very often, and 8 per cent often. Exactly one respondent chose the "Never" answer option. This could mean that the respondent has purchased surplus restaurant food exactly one time. Overall, the practice of purchasing surplus restaurant food is a quite well-known possibility for the respondents, but the majority of those who do so don't do it on a regular basis.

### "How often do you buy discounted surplus restaurant food?"

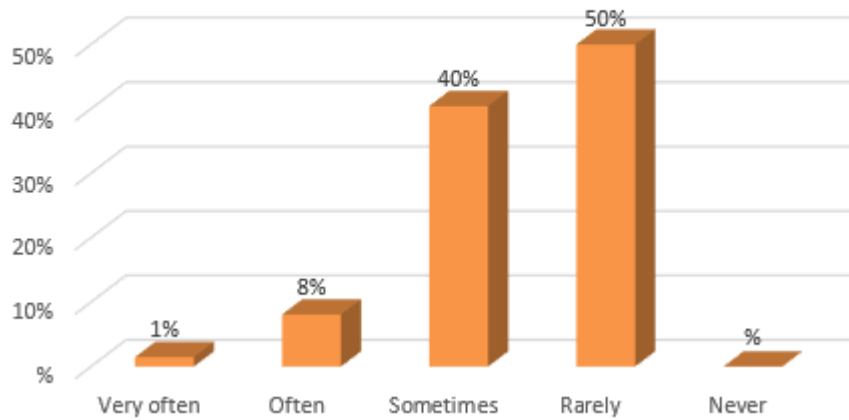


Figure 25. Frequency of purchasing surplus restaurant food. N=136

The next question was another follow-up to the question #20, trying to further specify through which channels the respondents make the surplus restaurant food purchases: Directly from the restaurant, or through a dedicated app. The results are displayed in Figure 26, and this question was answered by all 136 of the qualifying respondents. Eighty-two per cent of the respondents have used an App before to buy surplus restaurant food, and 18 per cent haven't done so. These results indicate that the use of such Apps is quite popular and well-known among the respondents who have purchased surplus restaurant food before.

### "Have you ever bought surplus restaurant food with an App?"

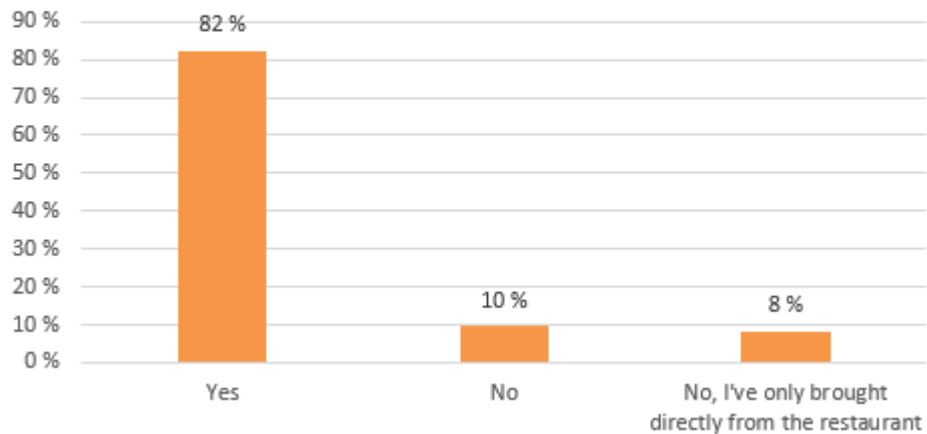


Figure 26. Use of Apps when purchasing surplus restaurant food. N=136

Following in the theme of surplus food purchasing, the survey question #23 sought to find out how many respondents have purchased discounted groceries from web-shops that sell them. The results are displayed in Figure 27, and 63 per cent of the respondents have not bought groceries from dedicated web-shops before, with further 3 per cent answering that they didn't know such a thing was even possible. Thirty-three per cent of the respondents have purchased discounted surplus groceries from dedicated web-shops, and these respondents were offered a follow-up question.



Figure 27. Expression of surplus grocery purchasing behaviour. N=289

Figure 28 shows the results from the follow-up Likert-scale question offered to the respondents who answered positively to the survey question #23, and all the qualifying 93 respondents answered this question as well. Although having purchased surplus groceries before, 49 per cent of the respondents rarely do so, and another 44 per cent do so sometimes. Only 1 per cent of the respondents purchase surplus groceries very often, while 5 per cent do so often. The last 1 per cent of the respondents chose the "Never" option, again possibly inferring that the respondents have purchased surplus groceries exactly one time, qualifying them for this follow-up question. These results indicate that while some respondents have purchased surplus groceries before, most of the respondents who do so don't do it regularly.

"How often do you buy surplus grocery items from these web-shops?"

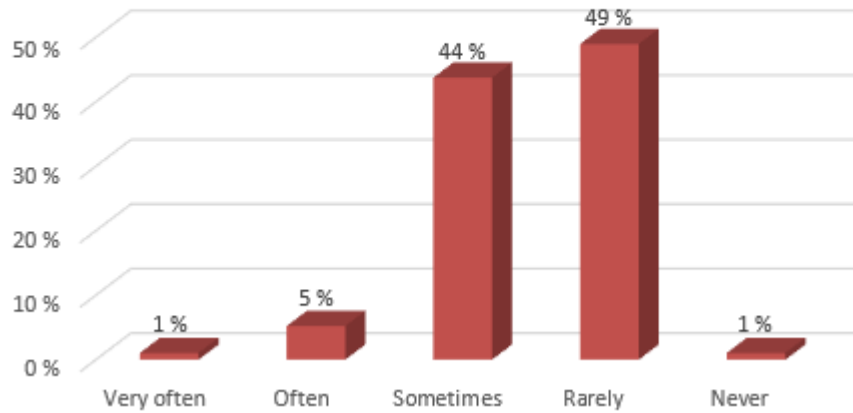


Figure 28. Frequency of purchasing surplus groceries. N=96

The next question asked whether the respondent has ever obtained food from a charity organization, and the results are displayed in Figure 29. Only 1 per cent of the respondents often obtain food from charity organizations. Another 3 per cent do so sometimes, 11 per cent rarely and the majority of respondents, 85 per cent have never done so.

"Have you ever obtained food from a food charity organization?"

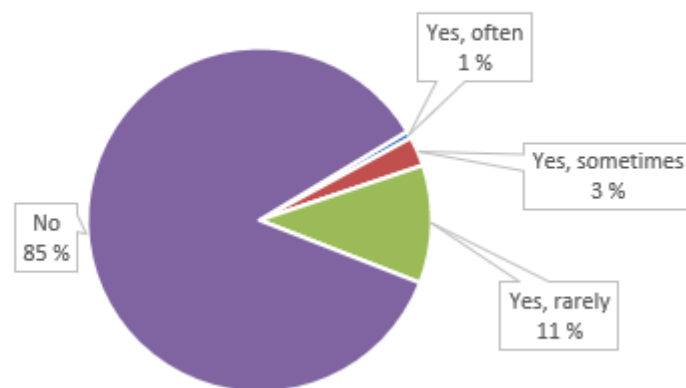


Figure 29. Food charity organization popularity. N=289

Figure 30 displays the respondents' interest towards home composting, referring to survey question #26. The question used keywords of "easy" and "affordable" to help the respondent form their opinion, and the response options were offered as

a Likert-scale. Most of the respondents would be interested in home composting, at least to an extent: 41 per cent answered that they would be interested, another 27 per cent would be interested quite likely, and 14 per cent of the respondents chose the neutral middle option. Finally, 12 per cent of the respondents aren't likely interested in home composting, and 7 per cent have no interest towards it whatsoever.

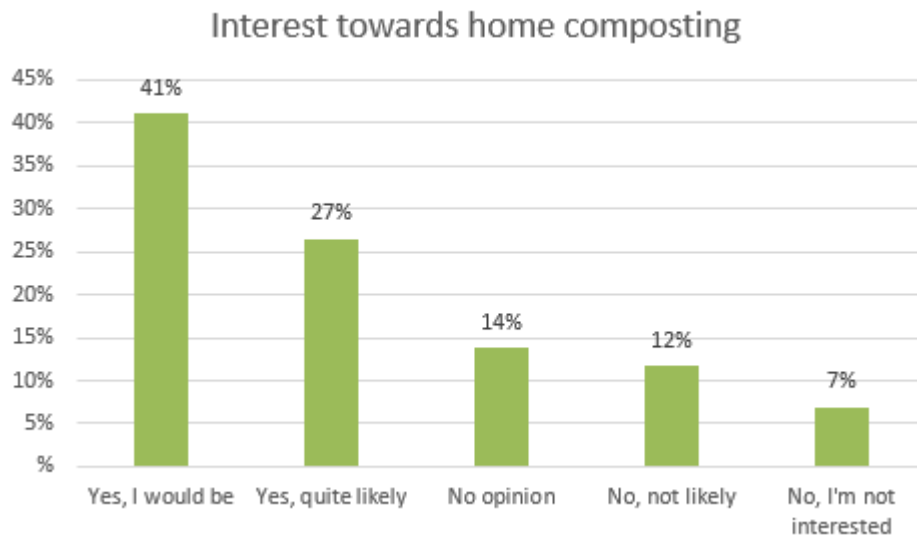


Figure 30. Interest towards easy and affordable home composting. N=290

Figure 31 displays the interest the respondents have towards the possibility of donating their surplus extra food, and the survey question had the keywords of “easy” and “convenient” to help form the respondents’ opinion. Thirty-four per cent of the respondents would be interested in donating their extra food, and 28 per cent would quite likely be interested in such an activity. Seventeen per cent of the respondents chose the neutral middle option. Some respondents aren't interested in donating food: 12 per cent are not likely interested and 8 per cent have no interest whatsoever. In general, most of the respondents have interest towards the possibility of donating their extra edible food away, for no financial gain.

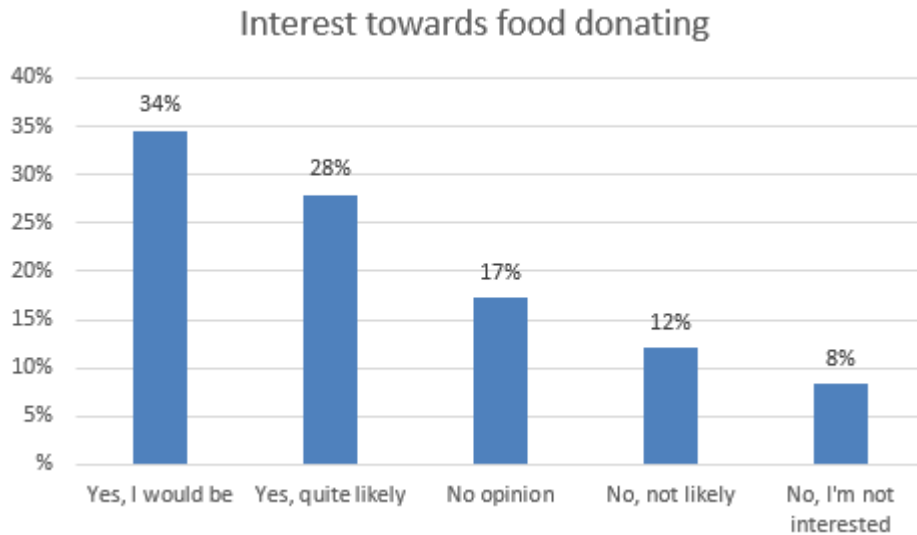


Figure 31. Interest towards easy and convenient food donating. N=290

The last question in the survey, question #28, sought to uncover interest towards a food exchange service, wherein the respondent could exchange their own extra edible food for another person's extra edible food items. The results, seen in Figure 32, are leaning more towards the negative than in the previous food donation question: 21 per cent of the respondents are disinterested in such a possibility, 23 per cent likely aren't interested, and another 23 per cent chose the neutral middle option. Even still, 20 per cent of the respondents would likely be interested in such a service and 12 per cent answered they are interested. The results indicate that food exchange would be less popular than the option to simply donate your food away. This could be because of a few different reasons. Exchanging extra food away doesn't get rid of the existence of food surplus, it simply gets replaced with another surplus food item, whereas donating food gets rid of the surplus food that the original owner wouldn't use to begin with, assuming that the motivation is to reduce household food waste.



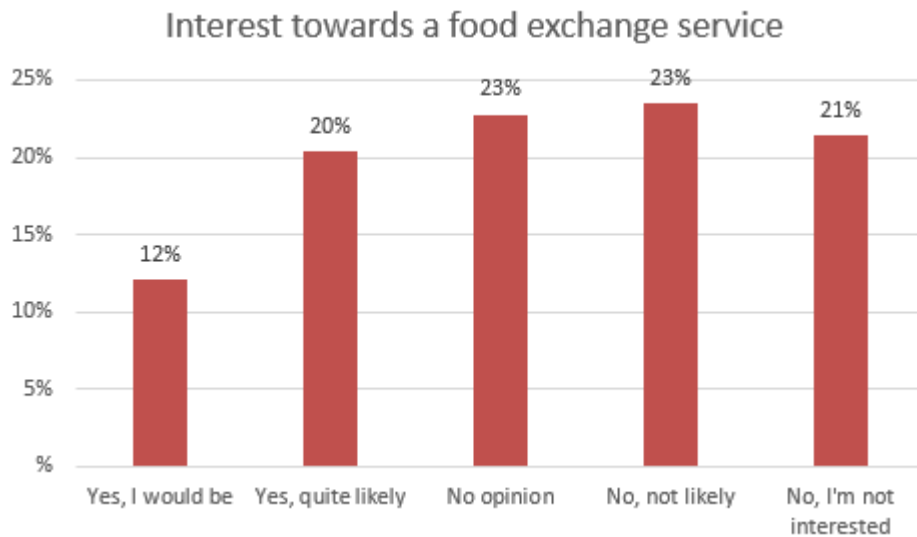


Figure 32. Interest towards a surplus food exchange service. N=290

## 5 CONCLUSIONS

In this chapter of the thesis, we discuss the key results and findings of the research, as well as their validity, reliability, and applicability. Ideas for future development and research, based on the findings, are discussed at the end of the chapter.

### 5.1 Key results and findings

The survey set out to answer the research questions, which were based on the research objectives, both of which were defined in section 1.3.

The first research objective was to discover what kinds of attitudes and behaviours people of Kouvola have towards household food management and household food waste. The second objective set out to discover any existing barriers and challenges people living in Kouvola have towards household food management and household food waste, and the purpose of the third research objective was to discover any existing potential for future innovations and business opportunities. The three research questions mirrored these three research objectives, with the survey was designed to answer them.

The survey results uncovered that *people living in Kouvola* (henceforth “Kouvola citizens”, to simplify) are generally environmentally conscious, with more than half of the respondents being concerned about the global climate change. Kouvola citizens don't live alone; they're most likely to live in a household with one another person, perhaps their spouse or a relationship partner, and there is a 50-50 chance of the household having children or being childless. Most of the respondents are employed in working life, and students represented one fourth of the sample size.

When it comes to household food management, Kouvola citizens are conscious about food waste, and try to avoid it on a reasonable level. Most of the households don't have trouble avoiding unnecessary food waste, but some households do struggle with this. The sorting of biowaste separately from general waste is a common practice. Kouvola citizens are generally confident in their cooking competence, and food that is leftover after cooking finds its use sometime later, more often than not, avoiding unnecessary household food waste. However, some households still have challenges with finding uses for leftovers, instead of discarding them.

Kouvola citizens plan their meals ahead of the time, most often for a few days ahead, corresponding with visits to the grocery store. When shopping for groceries, Kouvola citizens prefer to make written shopping lists about planned purchases, and generally avoid impulse purchases, especially if such a purchase would lead into inevitable extra food waste back at home, although this does happen to some Kouvola citizens occasionally. Kouvola citizens also have no trouble discerning the meaning of the most common food expiration labels of “Use by” and “Best before”.

In the event that a food product has seemingly expired, at least according to its date labelling, Kouvola citizens make sure of the product's quality and edibility with a sensory inspection, before deciding on its fate. The survey discovered that Kouvola citizens wish there were more options for packaging sizes: Different household sizes have different food package size preferences.

Based on these results we can conclude that Kouvola citizens have a respectful attitude towards food and don't wish to create unnecessary household food waste. Kouvola citizens are more likely to choose the sociocultural and moral option, rather than the economical one, when making decisions towards food purchases. Finally, Kouvola citizens aren't facing many challenges and barriers regarding household food management or household food waste.

Buying surplus food from restaurants is a fairly common occurrence among Kouvola citizens, with half having done so at least once. However, those who have purchased surplus meals from restaurants don't do it very often, the frequency of behaviour for this activity is quite low among Kouvola citizens. Lastly, Kouvola citizens are generally aware of the various Apps that simplify the act of purchasing surplus meals from restaurants.

Purchasing surplus grocery products from dedicated web-shops is a somewhat rarer phenomenon among Kouvola citizens, with only some of them having done so in the past. The frequency of behaviour for this activity is quite low as well, just as with purchasing surplus meals from restaurants. Lastly, only a small amount of Kouvola citizens have obtained food from food charity organizations.

From these findings we can conclude that alternative ways of obtaining food products or meals aren't very popular among Kouvola citizens yet, but the survey wasn't designed to find out the reasons why.

Food waste, even if it can't be completely nullified, can be utilized in some other creative way, for example by using it as a resource for another endeavour. Kouvola citizens showed significant interest towards home composting if it was easy and affordable. The possibility to donate one's extra food items away also gathered a lot of support from Kouvola citizens. Conversely, Kouvola citizens were less interested in the possibility to take part in a food exchange service, wherein one might exchange their extra surplus food for another user's extra surplus food. Composting would utilize unavoidable household food waste for the

user's benefit, and a system to facilitate the easy donating of food would make it easier to get rid of surplus food and avoid contributing into household food waste, while also providing positive moral feedback to the donation-maker.

In conclusion, the results found out potential future innovations and business opportunities in the forms of more easy and affordable home composting, and in the creation of a platform or a service to make food donations more accessible and convenient.

## **5.2 Implications and development ideas**

The main goal of this research was to discover how Kouvola citizens experience household food management and household food waste, from the perspectives of attitudes, behaviours, challenges, as well as reveal potential for future innovations and opportunities.

The survey results indicated a general displeasure towards the current range of options for food package sizes. Food industry businesses operating in the Kouvola area can use this information in their future product development regarding food packaging sizes and options. Offering more food packaging options for the consumers can increase revenue, as some consumers will potentially refuse a food product purchase if a desired package size or option is not found and there is an identified risk that food waste might be created on the household level.

The possibility to purchase surplus meals from restaurants was quite well known in the survey population but wasn't a frequently done activity even among those who have done such purchases in the past, despite different Apps being widely available to facilitate and streamline the surplus restaurant food purchasing process.

The same goes for the possibility to buy surplus grocery products from dedicated web-shops. The possibility to purchase surplus groceries online, at a discount,

was well known to the respondents, but just like purchasing surplus restaurant food, this activity also lacked an active customer base.

These findings can be utilized by restaurants, surplus food selling Apps, and surplus grocery item web-shops to develop their platforms and increase their popularity and frequency of use among their customers. There is certainly interest towards these purchasing activities, but for some reason they aren't very popular among consumers yet.

The survey results also uncovered interest towards household food waste composting and food donations as potential future activities in the survey demographic. These findings can be used to develop new innovations and future business ideas, as a potential customer base already exists.

### **5.3 Future development**

#### **5.3.1 Validity and reliability**

The concepts of reliability and validity were touched upon in section 3.2.1, as the survey instrument was designed with these considerations in mind. The survey gathered a total of 310 responses and achieved a completion rate of 91 per cent. The rate of item non-response in the survey was found out to be only 0.18 per cent, across 7559 data points. Based on these results we can conclude that the survey was successfully designed with high reliability.

As for validity, the logic and reasoning behind each survey question was carefully considered, and the full reasoning for each question is detailed in section 3.1. Each survey question was designed based on the research problem and the research questions, as well as research methodology discussed at length in chapter 3.

However, significant gender-related respondent bias was discovered through the first survey question, as only 8 per cent of the respondents were men, and the

rest 92 per cent were women. Therefore, the collected survey data is mainly from the female perspective, with only few male respondents.

There are several possible explanations for this bias. As the chosen sampling method was **voluntary random sampling**, it wasn't possible to carefully control the sampling process and ensure a more balanced split for the first survey question. It is reasonable to assume that women might be more interested, on average, in topics related to household food waste and household food management, and as such are more inclined to respond to a voluntary online survey with "Household food waste" in its title. Women might also use social media more actively than men, which also contributes to the bias in the survey.

Finally, it can't be said for certain how relevant this gender-related bias is for the survey results. As it turns out, only 18 per cent of the respondents live alone, and in the households with more than one person, it can be assumed there is one person in charge of household food management related decision making. As such, this decision-maker being a woman and answering the survey still represents the household as a whole.

It is important to recognize possible biases in survey results, but in this case not much else can be done to correct it.

Next, we will discuss the external validity of the survey results. Kouvola, the chosen sampling area, ranks 11<sup>th</sup> largest city in Finland by population (Kuntaliitto 2021) and as such is neither a strictly rural area, nor part of the larger metropolitan area around Helsinki. As such, Kouvola can be thought of as representing the "average Finnish" urban area. The city also contains a university campus, several large industry companies, as well as a multitude of small and medium sized enterprises, hinting at a mixed representation of people within the sampling population. In this regard, the results of the survey could be generalized to represent a larger area than simply Kouvola itself.

However, as discussed earlier, significant sampling bias was discovered in the form of gender bias in the survey results. This does impact the external validity of the survey findings, as the gender bias implied that only women's perspectives, attitudes, and experiences were collected in the results. Therefore, while the survey findings can be generalized outside of Kouvola, as discussed earlier, they still only truly represent the women's perspective on the research problems.

### **5.3.2 Future research**

As discussed in the earlier sections, the survey discovered that many consumers wished there were more options for food packaging sized at grocery stores. However, the survey didn't ask for more details on this issue. As it is, we do not know how exactly the current food packaging options are lacking from the consumers' perspective, and which food product categories have the most need for a wider range of packaging options. This could be explored further in future research, and possibly uncover more precise consumer needs, and facilitate future product development in food product packaging in the food industry.

Another finding of the survey was that the respondents were generally knowledgeable of the possibilities of purchasing surplus restaurant meals and purchasing surplus grocery items online. Neither of these purchasing activities were very popular among the respondent base, as the survey found out.

However, the survey didn't seek to find out **why** the respondents didn't do these purchasing activities more often than generally "Rarely", and what could be done to encourage the respondents to engage in the activities more often than they currently do, or what kinds of future improvements would the respondent prefer that would increase the frequency and popularity of these purchasing activities.

These questions could also be explored further in future research and try to understand how to develop the areas of restaurant surplus meal purchasing, and online purchasing for surplus groceries, and what can be improved to make it easier and more popular for consumers to engage in these activities more often than they currently do.

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## **APPENDICES**

### **Appendix 1 – Survey questions in English**

#1 I identify as...

- Male
- Female
- Don't want to say

#2 What is your age?

- Younger than 18
- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55+

#3 Where do you live?

- Kouvola
- Kuusankoski
- Anjalankoski
- Elimäki
- Jaala
- Valkeala
- Elsewhere / Not listed above

#4 How big is your household?

- 1 person (me)
- 2 people
- 3-4 people
- 5-6 people
- 7+ people



## Appendix 1/2 – Survey questions in English

#5 Do you have any children in your household?

- Yes, 1 child
- Yes, 2 children
- Yes, 3 children
- Yes, 4+ children
- No, I don't

#6 Are you currently a student?

- Yes
- No

#7 Are you currently employed?

- Yes
- No

#8 I'm worried about global climate change

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

#9 I sort biowaste separately from the general waste at home

- Always
- Never
- Sometimes

#10 I feel it is difficult to avoid wasting food at home. Here by "wasting food" we mean throwing out food that was purchased to be eaten, but wasn't, such as expired food items and leftovers after cooking.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

## Appendix 1/3 – Survey questions in English

#11 I have good cooking skills.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

#12 Leftovers from cooking often get thrown into waste.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

#13 A food product you have at home is close to, or past, its expiration date label.

Do you check its edibility and condition with your senses before deciding if it should be thrown away or not yet?

- Always
- Never
- Sometimes

#14 Do you plan meals ahead of the time?

- Always
- Never
- Sometimes

#15 How far ahead do you usually plan your meals?

- For the whole week
- For most of the week
- For the next few days
- Just tomorrow's meals

## Appendix 1/4 – Survey questions in English

#16 When going to buy groceries, I usually...

- Write a shopping list of what I need to buy
- Try to memorize everything and remember at the store
- Buy impulsively

#17 I think the common expiration date labels of “Best before” and “Use by” are confusing.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

#18 I think there should be more options for food product packaging sizes.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

#19 When I find a good deal on a food product, such as size, price per kilo, discount or a promotion, I buy the food item despite knowing some of it will go to waste at home.

- Always
- Never
- Sometimes

#20 Some restaurants sell surplus food at the end of service for a discount. Have you ever bought surplus food from a restaurant?

- Yes
- No
- No, I didn't know it was possible

## Appendix 1/5 – Survey questions in English

#21 How often do you buy discounted surplus food from restaurants?

- Very often
- Often
- Sometimes
- Rarely
- Never

#22 Have you ever bought surplus food from a restaurant with an app like ResQ Club or Lunchie Market, or others?

- Yes
- No
- No, I've only bought directly from the restaurant

#23 Have you ever used an online webshop service that sells surplus grocery store products at a discount, such as Fiksuruoka or Matsmart, or others?

- Yes
- No
- No, I didn't know it was possible

#24 How often do you use these webshop services to buy surplus food online?

- Very often
- Often
- Sometimes
- Rarely
- Never

#25 Have you ever obtained food from a food charity organization?

- Yes, often
- Yes, sometimes
- Yes, rarely
- Never

## Appendix 1/6 – Survey questions in English

#26 Would you be interested in home composting for household food waste, if it was easy and affordable?

- Yes, I would be
- Yes, quite likely
- No opinion
- No, not likely
- No, I'm not interested

#27 Would you be interested in donating your extra edible food if it was easy and convenient?

- Yes, I would be
- Yes, quite likely
- No opinion
- No, not likely
- No, I'm not interested

#28 Would you be interested in a food exchange service, where you can share your extra edible food or food product with others, and get some other food product in return?

- Yes, I would be
- Yes, quite likely
- No opinion
- No, not likely
- No, I'm not interested

## Appendix 2 – Survey questions in Finnish

#1 Koen olevani...

- Mies
- Nainen
- En halua vastata

#2 Minkä ikäinen olet?

- Nuorempi kuin 18
- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55+

#3 Missä kaupungissa asut?

- Kouvola
- Kuusankoski
- Anjalankoski
- Elimäki
- Jaala
- Valkeala
- Muualla / En missään yllämainituista

#4 Kuinka monta henkilöä kotitalouteesi kuuluu?

- 1 henkilö (minä)
- 2 henkilöä
- 3-4 henkilöä
- 5-6 henkilöä
- 7+ henkilöä

#5 Kuinka monta lasta (alle 18v) kotitalouteesi kuuluu?

- Yksi lapsi
- Kaksi lasta
- Kolme lasta
- Neljä lasta tai enemmän
- Ei lapsia

## Appendix 2/2 – Survey questions in Finnish

#6 Oletko tällä hetkellä opiskelija?

- Kyllä
- En

#7 Käytkö tällä hetkellä töissä?

- Kyllä
- En

#8 Globaali ilmastonmuutos huolestuttaa minua.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

#9 Erittelen biojätteens sekajätteestä kotona.

- Aina
- En koskaan
- Joskus

#10 Mielestäni on hankalaa välttää ruokajätteen syntymistä kotona. Tässä "ruokajätteellä" tarkoitamme ruokaa, joka oli tarkoitettu syötäväksi, mutta päätyikin biojätteeseen. Esimerkiksi vanhenneen päivämäärän, tai ylijäämän takia.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

#11 Minulla on hyvät ruoanlaittotaidot.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

## Appendix 2/3 – Survey questions in Finnish

#12 Ruoantähteet päätyvät usein roskeen.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

#13 Ruokatuote kotonasi on melkein vanhentunut päivämäärämerkinnän mukaan. Teetkö aistinvaraisen tarkistuksen tarkistaaksesi ruokatuotteen kunnan, ennen kuin päätät meneekö se roskeen vai ei?

- Aina
- En koskaan
- Silloin tällöin

#14 Suunnitteletko ateriasi etukäteen?

- Aina
- En koskaan
- Silloin tällöin

#15 Kuinka pitkälle aikavälille suunnittelet ateriat?

- Koko viikoksi
- Suurimmaksi osaksi viikkoa
- Muutamalle seuraavalle päivälle
- Vain huomisen ateriat

#16 Kun menen ruokaostoksille, useimmiten...

- Kirjoitan kauppailistan tuotteista mitä tarvitsen
- Yritän painaa ostettavat tuotteet mieleen ja muistaa kaupassa
- Ostan impulsiivisesti



## Appendix 2/4 – Survey questions in Finnish

#17 Mielestäni ruokatuotteiden päivämäärämerkinnät ”Parasta ennen” ja ”Viimeinen käyttöpäivä” ovat sekavia.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

#18 Mielestäni ruokapakkauksien ko’oissa voisi olla enemmän vaihtoehtoja.

- Vahvasti samaa mieltä
- Samaa mieltä
- Ei samaa eikä eri mieltä
- Eri mieltä
- Vahvasti eri mieltä

#19 Kun teen hyvän löydön ruokaostoksilla, kuten koko, kilohinta, alennus tai tarjous, ostan ruokatuotteen vaikka tiedän että osa siitä päättyy ruokajätteeksi kotona.

- Aina
- En koskaan
- Silloin tällöin

#20 Jotkin ravintolat myyvät hävikkiruokaa tarjoilun päätyttyä. Oletko koskaan ostanut hävikkiruokaa ravintolalta?

- Kyllä
- En

#21 Kuinka usein ostat hävikkiruokaa ravintoloilta?

- Erittäin usein
- Usein
- Silloin tällöin
- Harvoin
- En koskaan

## Appendix 2/5 – Survey questions in Finnish

#22 Oletko koskaan käyttänyt hävikkiruokasovellusta, esimerkiksi ResQ Club tai Lunchie Market, ostaaksesi ravintolan hävikkiruokaa?

- Olen
- En
- En, olen ostanut vain ravintolalta

#23 Oletko koskaan ostanut hävikkiruokaa hävikkiruokaverkkokaupoista?

Esimerkiksi Fiksuruoka tai Matsmart.

- Kyllä
- En
- En, en tiennyt että se on mahdollista

#24 Kuinka usein ostat hävikkiruokaa hävikkiruokaverkkokaupoista, esimerkiksi Fiksuruoka tai Matsmart?

- Erittäin usein
- Usein
- Silloin tällöin
- Harvoin
- En koskaan

#25 Oletko koskaan saanut ruokaa hyväntekeväisyysjärjestöltä?

- Kyllä, usein
- Kyllä, silloin tällöin
- Kyllä, harvoin
- En

#26 Olisitko kiinnostunut kotikompostoinnista ruokahävikin avuksi, jos se olisi helppoa ja edullista?

- Kyllä, olisin
- Kyllä, melko varmasti
- En osaa sanoa
- En, en usko että olisin
- En ole kiinnostunut

## Appendix 2/6 – Survey questions in Finnish

#27 Olisitko kiinnostunut lahjoittamaan ylimääräiset ruokatuotteesi ruoka-apuun, jos se olisi helppoa ja vaivatonta?

- Kyllä, olisin
- Kyllä, melko varmasti
- En osaa sanoa
- En, en usko että olisin
- En ole kiinnostunut

#28 Olisitko kiinnostunut ruoan vaihtopalvelusta, jossa voit vaihtaa ylimääräiset ruokatuotteesi tai ruokasi johonkin muuhun ruokatuotteeseen?

- Kyllä, olisin
- Kyllä, melko varmasti
- En osaa sanoa
- En, en usko että olisin
- En ole kiinnostunut