

# Understanding the motivations of individuals and organizations to prevent food waste

Ilona Rac, Nataša Poklar Ulrih and Ilja Gasan Osojnik Črnivec<sup>1</sup>

**Abstract** – Food loss and waste are important environmental and social issues gaining increasing amounts of attention. However, while its causes are relatively well-researched and understood, national research on this topic is relatively scarce for Slovenia. Furthermore, research on motivations and barriers to reduce its amounts is especially lacking. The national research project Food not waste aims to fill this gap and provide information to decisionmakers and practitioners on appropriate points of intervention. Preliminary results show a low level of mutual understanding between actors, a lack of cooperation and a high degree of shifting responsibility onto the 'unconscious' consumer.<sup>1</sup>

## INTRODUCTION

Food loss and waste (FLW) are environmental and social issues that have been gaining increasing amounts of societal, political and scientific attention. Worldwide, an estimated 1.3 billion tonnes of edible food are wasted annually (FAO, 2011). If FLW were a country, its carbon footprint would be third only to the USA and China (FAO, 2013). Furthermore, the food wasted could feed the world's undernourished several times over (WFP, 2020). In light of its environmental and social repercussions, the increasing necessity to curb greenhouse gases, wasteful resource use and food scarcity, FLW represents a field that must be addressed in any endeavours to achieve sustainability. The importance of common action is recognized in the UN's Sustainable development goal 12.3, which sets out to halve per capita global food waste, as well as at the heart of the EU's Green Deal and the Farm to Fork Strategy.

In Slovenia, an estimated 143.570 tonnes of food were wasted in 2020, equalling about 68 kilograms per capita (SORS, 2022). While the distribution and amounts are not yet known precisely, owing to issues in reporting, research shows that generally, about half of food waste can be attributed to households, while the rest happens in the earlier stages of the food chain, with every next stage carrying a bigger environmental footprint due to additional inputs in terms of processing, packaging, transport and labour (Osojnik-Črnivec et al., 2021). The first Slovenian systemic actions to combat food waste is set in the Strategy for less food losses and food waste in the food supply chain (MAFF, 2021).

While the reasons for the occurrence of FLW are now relatively well-known, the motivations of various food chain actors to reduce it are not as well researched, and are hardly researched at all in Slovenia. Here, we present an early attempt at elucidating the motivations of the successive food chain actors (primary production, processing and packaging, retail, food service) to reduce food waste; while the research is still ongoing, we can already present some preliminary results. The end aim of this research is to identify key interventions that are both effective and acceptable to stakeholders.

## METHODOLOGY

When an explicit theoretical framework is employed in FLW motivation research, especially research tackling consumer food waste, it is most often Ajzen's Theory of planned behaviour (1991). Thus, we divided our own research into two main parts, segmenting the food chain into the pre-consumer and consumer stage, first explored using interviews (analysed inductively) and followed by quantitative surveys.

To gain a first insight, we first conducted in-person semi-structured interviews (n=46) with food chain actors (8 in production, 9 in processing, 11 in food service and 11 in final consumption), yielding the preliminary results presented below.

In the subsequent part of the research (still ongoing), the two separate online surveys are being applied to the two distinct segments described above. They include questions on approximate amounts of food lost or wasted, their causes and factors affecting volumes of FLW, actions taken to tackle FLW, awareness of available options for this, readiness to change practices, and attitudinal variables relating to environmental and social effects of FLW. Since the response to the survey has yielded a small sample (n=62; only 41 finished the survey) so far, we only present results for consumers, and this descriptively.

## RESULTS

### Causes of FLW

The main identified causes of FLW in *agriculture* are poor production planning, deliberate production of larger quantities of produce than expected sales, adverse production conditions affecting crop quality, and market fluctuations. In food *processing*, large quantities of food waste (FW) are not cost-effective, so production processes are already streamlined away from edible FW generation, with some leeway in feedstock and product expiration dates, mobilising side-streams and underutilised production lines, input quality control and strategic control point management. In *retail*, FW is generated due to the differences between planned and actual sales, damaged packaging, as well as withdrawals and expirations; partly it is also due to sales practices (internal sales deadlines, constant product availability, large ranges of similar products, and promotions). In food *services*, FW occurs because of: consumer preferences and behaviour, improper handling, stock management, food preparation planning and service type; public institutions also mentioned a need to upgrade the public procurement system (Osojnik Črnivec et al., 2021).

At the consumer level, the most commonly stated reasons by consumer representatives in interviews include a lack of awareness of the food production process and consumer preferences, as well as planning of purchases and food preparation, and lack of knowledge with regard to food reuse, storage and preservation, and on expiration dates (ibid.). On the other hand, the surveyed consumers selected 'unpredictable eating behaviour in the household' and

<sup>1</sup> The first author is from the Department of Animal Science, Biotechnical Faculty, University of Ljubljana, Slovenia (Ilona.rac@bf.uni-lj.si).  
The second and third authors are from the Department of Food Science and Technology, Biotechnical Faculty, University of Ljubljana, Slovenia (natasia.poklar@bf.uni-lj.si, gasan.osojnik@bf.uni-lj.si)

'lack of time' as the most important reasons for household FW, followed by the 'wish to provide good nutrition for family' and 'lack of planning'.

### Barriers to reducing FLW

The obstacles to reducing FLW and mobilizing excess food at different stages of production and consumption that were highlighted in interviews can be classified into three broad (interrelated) categories: costs and logistics, awareness and education, and legislative and administrative barriers (including food safety concerns). Another factor spanning the entire food supply chain (as well as public bodies) is a lack of horizontal and vertical cooperation.

**Costs and logistics** are a concern both in terms of harnessing additional financial and labour capacities needed for storing, transporting and/or distributing excess food, both in terms of alternative forms of valorisation and donation of food.

**Awareness and education** mainly refer to the lack of awareness regarding the inputs of resources required to produce food, but also to the lack of skill of staff handling food during storage, transport and production, and of consumers when handling and storing food at home. This also includes reluctance to donate food due to fear of liability and potential misinformation regarding the relevant legislation.

Finally, **legislative and administrative barriers** refer on the one hand to legislation on food safety that is intended to protect consumers from food unfit for consumption and food-borne diseases, but also other aspects (rigidity) of legislation, such as e.g. taxation and regulation of economic entities and NGOs, which hamper the redistribution of excess food.

The consumer survey again contradicts some of these results, showing that limited time and planning, in addition to disposable income and food prices, are considered the most important factors.

### DISCUSSION AND CONCLUSIONS

Results of interviews so far largely confirm research findings published in international journals, as do the suggested practices and points of intervention, such as awareness-building campaigns, stimulating the adoption of novel technologies, social innovation, cooperation between value chain actors and a more favourable and flexible regulatory environment (see e.g. Pfeifer et al., 2016; Canali et al., 2016).

However, something notably missing from the interviewees replies but apparent from the consumer survey, was the precedence to consumers of *convenience* over awareness (cf. Graham-Rowe et al., 2014; Hebrok and Boks, 2017). Research on environmental issues in general shows that there is often misalignment between stated attitudes and actual action, referred as the attitude-behaviour gap (e.g. Schanes et al., 2018). It may follow from this that awareness and other psychological factors, cited many times by interlocutors, while undoubtedly important, may actually be secondary to practical aspects of consumers' everyday lives, such as e.g. time constraints or socio-economic characteristics; at any rate, their importance should not be overlooked.

The issue of FLW is still relatively poorly understood in Slovenia, especially in terms of motivations and contribution of different segments. This is manifested *i.a.* in a lack of understanding of processes at other stages of the food supply chain emanating from the interviews, and, more tangibly, in the paucity of long-term contractual relations and information-sharing. This indicates the need for a higher level of communication and cooperation (cf. e.g. Priefer et al., 2016) between different actors to

tackle the problem in a comprehensive way, while the discrepancy between the results of the interviews and the survey indicates a strong need for further research.

### ACKNOWLEDGEMENT

The described activities were performed within the targeted research programme "Food, not waste" (CRP V4-2011), which is funded by the Slovenian Research Agency and the Ministry of Agriculture, Forestry and Food of Slovenia.

### REFERENCES

- Canali, M., Amani, P., Aramyan, L., Gheoldus, M., Moates, G., Östergren, K., Silvennoinen, K., Waldron, K., & Vittuari, M. (2016). Food waste drivers in Europe, from identification to possible interventions. *Sustainability*, 9(1), 37.
- Food and Agriculture Organization of the United Nations (FAO). *Food Wastage Footprint. Impacts on Natural Resources; Summary Report*; FAO: Rome, Italy, 2013.
- Graham-Rowe, E., Jessop, D. C., & Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. *Resources, Conservation and Recycling*, 84, 15–23.
- Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., Meybeck, A., (2011). *Global Food Losses and Food Waste: Extent, Cause and Prevention*. Food and Agricultural Organization of the United Nation (FAO)
- Hebrok, M., & Boks, C. (2017). Household food waste: Drivers and potential intervention points for design – An extensive review. *Journal of Cleaner Production*, 151, 380–392.
- MAFF (2021). Strategy for less food losses and food waste in the food supply chain. Available at [https://www.gov.si/assets/ministrstva/MKGP/PODR\\_OCJA/HRANA/Zavrski\\_odpadna\\_hrana/Strategija\\_izg\\_uba\\_hrane\\_odpadna-hrana.pdf](https://www.gov.si/assets/ministrstva/MKGP/PODR_OCJA/HRANA/Zavrski_odpadna_hrana/Strategija_izg_uba_hrane_odpadna-hrana.pdf) (accessed 3.5.2022)
- Priefer, C., Jörissen, J., & Bräutigam, K.-R. (2016). Food waste prevention in Europe – A cause-driven approach to identify the most relevant leverage points for action. *Resources, Conservation and Recycling*, 109, 155–165.
- Osojnik Črnivec, I. G., Korošec, M., Maček, K., Rac, I., Juvančič, L., Poklar Ulrih, N. (2021). Analiza stanja in vzrokov nastajanja odpadne hrane v Sloveniji [Analysis of the situation and causes of food waste generation in Slovenia]. Ljubljana, Biotehniška fakulteta: 110
- SORS (2022). Nastajanje odpadne hrane po izvoru in ravnanje z njo. [Sources of food waste per source and its management]. Available at <https://pxweb.stat.si/SiStatData/pxweb/sl/Data/-/2780705S.px> (accessed 25.4.2022)
- World Food Programme (WFP). (2020). 5 facts about food waste and hunger. Available at <https://www.wfp.org/stories/5-facts-about-food-waste-and-hunger> (accessed 26.4.2022)