

REDUCING THE CONTRIBUTION OF FOOD WASTE TO AUSTRIA'S GHG EMISSIONS

LITERATURE REVIEW: FOOD WASTE MATTERS

Schanes, K., Dobernik, K., and B. Gözet (2018): Food waste matters - A systematic review of household food waste practices and their policy implications, *Journal of Cleaner Production*, 182, 978-991. doi: 10.1016/j.jclepro.2018.02.030

RESEARCH CONTEXT

Globally, nearly one third of food produced for human consumption is lost or wasted, which equals a total of 1.3 billion tonnes of food per year (Gustavsson et al., 2011). From a climate perspective, according to calculations conducted by the FAO (2013), 3.3 GtCO₂e can be attributed to global food waste per year.

Private households represent the largest food-waste fraction in the whole food supply chain (BIOIS, 2010). However, little is still known about the determinants of consumer food waste and the underlying factors that encourage, drive or impede food waste prevention behaviours (Graham-Rowe et al., 2014).

METHOD

Applying a systematic literature review, we have assessed the still modest but rapidly growing body of empirical studies on households' food waste behaviours and distilled factors that foster and impede the generation of food waste on the household level.

All in all, a list of 60 articles were selected on which the systematic literature review is based.

OBJECTIVES

First, we review and analyse evidence on the factors impeding or promoting the prevention of consumer food waste.

Second, based on this analysis, we provide insights into policy approaches as well as business and retailer options for tackling the issues raised by such evidence.

The overall aim of this systematic literature review is to deepen the understanding of household food waste behaviour.

SOCIO-DEMOGRAPHIC FACTORS

AGE	negative correlation between food waste and age; people > 65 years waste less food
GENDER	no clear effects of gender on food waste
INCOME	potential positive correlation between income and food waste
EMPLOYMENT STATUS	employed people waste more compared to individuals not in the labour force
HOUSEHOLD SIZE	food waste per capita decreases with increasing household size; households with children waste more

UNDERSTANDINGS & PERCEPTIONS OF FOOD WASTE

LACK OF AWARENESS about amount of food wasted
INSUFFICIENT CONCERN about food waste
MISSING LINK between food waste and environmental consequences
LACKING OF TRUST in own ability to reduce food waste
FEELING THAT WASTING FOOD IS THE NORM

FOOD-RELATED HOUSEHOLD PRACTICES

PLANNING
LACK OF CORRECT PLANNING of food shopping and meals
LACK OF INFORMATION ON FOOD SUPPLY and location at home
SHOPPING
OVERSIZED PACKAGING
Shop food only from MAJOR SUPERMARKET CHAINS
LACK OF ACCEPTABILITY of imperfect food
STORAGE
IMPROPER AND UNSYSTEMATIC STORAGE PRACTICES
COOKING
OVERPREPARATION due to insufficient cooking skills
LACK OF KNOWLEDGE for better utilizing food creatively
EATING
UNPREDICTABILITY of appetite / eating patterns
LARGE PLATES
MANAGING LEFTOVERS
LACK OF KNOWLEDGE about leftovers' edibility
PROCRASTINATION
ASSESSING EDIBILITY
CONFUSION about date labels
LACK OF KNOWLEDGE about shelf-life of food and how to extend it
Concerns about FOODBORNE ILLNESSES AND FOOD SAFETY
DISPOSAL
Justifying food waste due to composting, feeding pets, recycling
Food sharing is NOT SOCIALLY ACCEPTED

REFERENCES

BIOIS, 2010. Preparatory Study on Food Waste Across EU 27. European Commission - Directorate C - Industry, Paris, France.
 FAO, 2013. Food Wastage Footprint. Full-cost accounting - Final report. Rome.
 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. Food and Agriculture Organization of the United Nations, Rom.
 Stenmarck, A.S., Jensen, C., Quested, T., Moates, G., Buksti, M., Cseh, B.Z., Juul, S., Parry, A., Politano, A., Redlingshofer, B., 2016. Estimates of European food waste levels. IVL Swedish Environmental Research Institute.

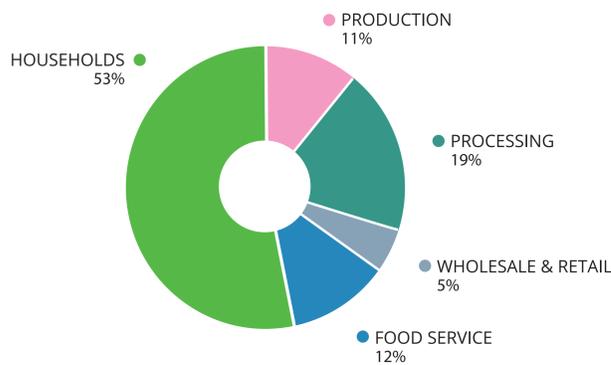


FIGURE 1: SPLIT OF EU-28 FOOD WASTE IN 2012 BY SECTOR INCLUDES FOOD AND INEDIBLE PARTS ASSOCIATED WITH FOOD (STENMARK ET AL., 2016)

HOUSEHOLD STUDY: CONTEXTUAL FACTORS OF FOOD SHOPPING AND STORING ROUTINES

Dobernik, K. Schanes, K. (working paper): Domestic Spaces and Beyond: Exploring consumer food waste in the context of shopping and storing routines

RESEARCH CONTEXT

Policy initiatives aimed at reducing and preventing food waste in households largely center on information campaigns and economic incentives. This paper focuses on how contextual aspects – such as objects, materials, technologies, and infrastructures – shape food routines, in particular shopping and storing practices.

METHOD

- Qualitative study in two Austrian neighbourhoods
- 24 participants from 24 households
- 8 focus group meetings over 16 weeks
- 24 FOOD WASTE DIARIES for 14 days each



KEY FINDINGS

ACCESSIBILITY AND TYPE OF FOOD RETAIL OUTLETS

- Overprovisioning as key reason for superfluous food in households.
- Physical and temporal accessibility of food retail outlets allows shopping according to current food preferences.
- Higher frequency of shopping allows low purchase volumes per trip and less stock-piling food.
- Shopping in supermarkets: little control over quantities of food purchased; marketing efforts as "traps" for consumers
- Shopping at farmer's market: food with higher symbolic quality; is "more difficult" to throw away.

DOMESTIC INFRASTRUCTURES

- Food storage practices depend on the outlay of the living situation.
- Space and storage conditions (e.g. temperature, lighting conditions) to ensure that food stays fresh.
- Cool, dark, and dry places (e.g. cellar and pantry) optimal for storing potatoes, onions, and beer to prolong lifespans.

TECHNOLOGIES OF STORING PRACTICES

- Domestic technologies (i.e. fridge, freezer) require consumer knowledge (e.g. on cooling zones, ideal food storage temperatures).
- Right storage of food products (e.g. eggs) steered by design of the technology.
- Fridge and freezer as technological fixes that can be up-graded and optimized.
- Mundane equipment (glass containers, plastic boxes) support storage strategies.

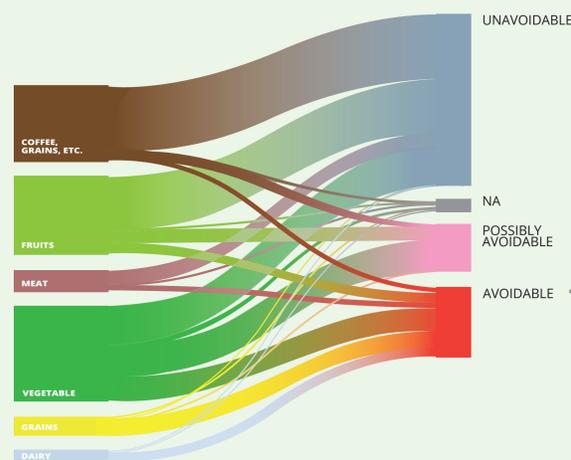


FIGURE 2: Split of household food waste by type of food

CASE STUDY: FOODSHARING IN AUSTRIA

Schanes, K., Stagl, S. (under review): Food waste fighters: What motivates people to engage in food sharing? *Journal of Cleaner Production*.

KEY FACTS

- initiative established in spring 2013
- foodsharing mediated and organized via the online platform foodsharing.at
- based on foodsharing.de, established 2011 in Berlin, Germany
- no monetary transactions
- exclusive reliance on volunteers

MAIN GOALS

- save food from being landfilled
- prevent food surplus creation
- reinvigorate a new consciousness around food
- trigger political action around rules and regulations to foster food redistribution and enhance food waste prevention

IMPACT

- 2699 foodsavers
- 48 ambassadors
- 788 108,5kg of food saved (until March 2018) since its establishment in spring 2013



MOTIVATIONS TO ENGAGE IN FOODSHARING

Emotions: Still edible food going to landfill provokes feelings of anger, frustration and indignation. Foodsavers are unsatisfied with the current situation and feel that responsible institutions and actors are unable or unwilling to respond. Saving and sharing food also creates positive emotions associated with the activity itself i.e. a sense of delight and satisfaction from sharing saved food with others.

Social network: The majority of foodsavers became involved through their personal connections (family, personal friendship circles, fellow students, neighbours) already involved in foodsharing.

Material incentives: Whilst a minority mentioned that their engagement in foodsharing was driven primarily by financial necessity, all agreed that it is a pleasure to get access to free food for self-supply.

FOOD WASTE DIARIES

METHOD

A "Food Waste Diary" study was conducted in November 2016 and February 2017. In sum, 16 households in Neumarkt/Styria and 8 households in Vienna completed a food waste diary for two weeks in which they documented the food waste occurring in their household in terms of weight, type and disposal stream. Households were also asked to report the reason for throwing away the respective food. To calculate the greenhouse gas emissions due to disposal, the amounts of food waste were multiplied by emission factors for the specific disposal stream. The emission factors were taken from a review of the literature on life-cycle assessment studies (LCA) corrected for the Austrian energy mix and transport distances. The emission factors include emissions saved by the substitution of fossil energy if the stream produced energy (e.g. burning of waste in Vienna) and fossil fertilizer if the stream produced compost. In addition, the GHG emissions from the potential reductions in food production were estimated using emission factors from the GEMIS LCA database corrected for the Austrian energy mix.

RESULTS

The emissions saved from waste disposal in semi-rural Austria are about 1,200 t CO₂e/a, while reducing waste in large cities can potentially increase emissions (i.e. negative) due to the practice of burning waste for energy. On the other hand, the potential emissions saved from the reduction in food production are 256,000 t CO₂e/a (Figure 3). However, this represent a maximum value because these emissions will be subject to market effects (e.g. rebound) and only occur if the farmers actually produce less food.

GHGs FROM THE PRODUCTION OF AVOIDABLE FOOD WASTE IN AUSTRIA

256,000 t CO₂e/a

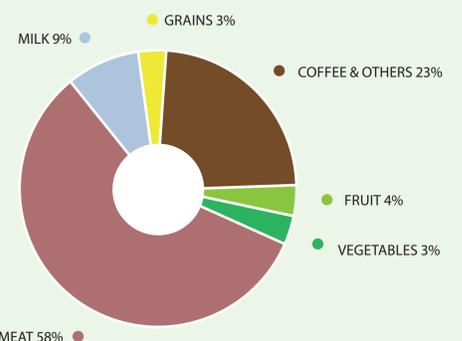


FIGURE 3: An estimate of the greenhouse gas emissions from the production of avoidable food waste in Austria. Avoidable meat waste has a large value even though the amount of waste is small due to the high emission factor for its production.