



Sweden – Country Report on national food waste policy

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Colophon

Title	Sweden – Country report on national food waste policy
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Definitions and abbreviations

Glossary

National strategies on food waste prevention are a method, strategy or plan specifically addressing food waste prevention as required by the 2008 Waste Framework Directive. Key sectors addressed in the plan should include local authorities, households, the hospitality industry, the retail supply chain, businesses and institutions (such as schools and hospitals).

Market-based instruments are policy tools that encourage behavioural change through market signals rather than through traditional regulations. Examples include environmentally related taxes, charges and subsidies, emissions trading and other tradable permit systems, deposit-refund systems, environmental labelling laws, licenses, and economic property rights.

Regulations and regulatory instruments are governmental or ministerial orders having the force of law. Regulatory instruments are sometimes called "command-and-control"; public authorities mandate the performance to be achieved or the technologies to be used.

Voluntary agreements are alternative courses of actions such as self-regulations developed by the industry generally aimed to deliver the policy objectives faster and/or in a more cost-effective manner compared to mandatory requirements.

Technical reports and main scientific articles refer to publications that report results of experimental and/or theoretical scientific investigations to enhance the body of scientific knowledge (in this case about food waste and losses).

Communication and campaigns include national "umbrella" campaigns; campaigns; short campaigns and festivals; education and training activities; contests and competitions; exhibitions, whose aim is to raise awareness on food waste. Communication include seminars and lectures; vocational trainings; books and manuals.

Projects and other measures refer to initiatives like neighbourhood projects, food sharing platforms, platform/networks, labelling, applications, etc... that contribute and/or are connected to food waste reduction.

Food waste policy mix highlights refers to negative and positive highlights and analytical data emerging from the analysis of the policies of each country.

Abbreviations






FWM = Food waste management

FWG= Food waste generation

FWR= Food waste reduction

OFU= Optmization of food use

Legenda

A1 	Primary production pre-harvest
A2 	Primary production ready for post-harvest
A3 	Processing and manufacturing
A4 	Wholesale, retail and marketing
A5 	Food preparation and consumption

Structure of the country report

- A) National strategy on food waste prevention
- B) Market-based instruments
- C) Regulations and regulatory instruments
- D) Voluntary agreements
- E) Technical reports and main scientific articles
- F) Communications and campaigns
- G) Projects and other measures
- H) Food waste policy mix: highlights

References

A) National strategy on food waste prevention

Sweden has not implemented a specific strategy or national plan for food waste reduction. However, reducing food waste is included in the **Swedish Waste Management Plan**, in the **Swedish Waste Prevention Programme** as well as in the **Swedish environmental policy** (in the form of proposed milestone targets for food waste). In the different strategies different targets are identified.

The Swedish Waste Management Plan 2012-2017¹ introduced national targets for food waste reduction:

- Food waste shall decrease.
- By 2018 at least 50% of food waste from households, canteens, shops and restaurants shall be collected separately and treated biologically to secure the recovery of nutrients, of which 40% is treated in a way that also energy is recovered”.

Types of implications: food waste management and food waste reduction.

Food supply segments involved/addressed: all but focus on the user part of the value chain.

The target identified by the Swedish Waste Prevention Programme² is not specifically defined since it is limited to the indication of a reduction compared to 2010.

Types of implications: food waste reduction.

Food supply segments involved/addressed: all.

The **Swedish environmental policy** looks at food waste with a proposal for a milestone target.

Sweden has defined environmental objectives in its overarching environmental policy. The generation goal – the overall goal of Swedish environmental policy – defines the direction of the changes in society that need to occur within one generation if the country’s environmental quality objectives are to be achieved. All in all, Sweden has defined sixteen environmental quality objectives that describe the state of the Swedish environment and which environmental action it should result in. The Swedish Government formulates milestone targets on an ongoing basis, which define steps on the way to achieving the environmental quality objectives and the generational goal.

Milestone targets proposed by the Swedish Environmental Protection Agency (Swedish EPA) in 2013 relate to food waste:

- Food waste shall be reduced by at least 20% by 2020 compared to 2010 throughout the entire food value chain (except for primary production).
- There shall be an action plan for reduced food wastage in the primary food production by 2016.

Types of implications: food waste reduction.

Food supply segments involved/addressed: all, although with a differentiated approach for primary production.

¹ From waste management to management of resources - Swedish Waste Management Plan 2012-2017. In Swedish: Från avfallshantering till resurshushållning - Sveriges avfallsplan 2012-2017.

² Together we win by a non-toxic and resource efficient society – Sweden’s programme for waste prevention 2014-2017. In Swedish: Tillsammans vinner vi på ett giftfritt och resurseffektivt samhälle - Sveriges program för att förebygga avfall 2014-2017.

B) Market-based instruments

There are no national market-based instruments for reducing food waste in Sweden.







C) Regulations and regulatory instruments

The body of laws that have major implications on food waste includes the regulation on food labelling and presentation (LIVSFS 2004:27) and the one on landfill (Ordinance 2001:512).

The regulation addressing food labelling establishes the responsibility for selling food after the best-before-date. The fact that the regulation allows for some exceptions from the labelling requirements results in differing responsibilities for donating or selling food after the best-before-date. One exception from the labelling requirements is bakery products (they are usually sold within 24 hours). These products do not need to be labelled with a best-before-date and can therefore be donated to charity without carrying full responsibility for the safety of the product (opposed to products labelled with best-before-date).

The Ordinance on Landfill of Waste regulates waste treatment and forbids (among other things) landfill of organic waste. As a result, landfill of food waste is not allowed. However, it is not expected that the regulation significantly influences the amounts of food waste generated since it only regulated the treatment of generated food waste.

Table 1. Sweden's regulations and related implications on food waste along the food chain

Law	Description	Types of implications	Main FSCS involved
The Swedish Food Agency's regulation (LIVSFS 2004:27) regarding labelling and presentation of food	The regulation regulates (among other things) the responsibility for selling food after the best-before-date.	OFU	A4 
Regulation (2001:512) regarding landfill of waste	The regulation forbids (among other things) landfill of organic waste.	FWM	A1  A2  A3  A4  A5 

D) Voluntary agreements

There are no nationwide voluntary agreements for reducing food waste in Sweden.

E) Technical reports and main scientific articles

Several reports and studies have been published or commissioned by Swedish governmental agencies and a number of articles, books and reports published by universities, foundations, research centres and non-governmental organizations.

Jensen, C., Stare, M., Stenmarck, Å., Dunsö, O. & Sörme, L. (2014), Method for calculation and follow up of the milestone target regarding management of

resources in the food value chain, biological treatment (Beräkningsmetod för uppföljning av etappmålet om resurshushållning i livsmedelskedjan, biologisk återvinning), SMED, [in Swedish]

During 2012 and 2013 on behalf of the Swedish Environmental Protection Agency, SMED proposed a methodology to follow up the interim objective, both in a quality assured and cost efficiently way. The objective is "by 2018 at least 50 percent of food waste from households, institutional kitchens, shops and restaurants must be sorted and treated biologically so that plant nutrients are utilized, with at least 40 percent being treated so that the energy is also utilized."

Types of implications: food waste management - in particular the identification of the quantities of food waste that is generated and treated biologically.

Food supply segments involved/addressed: food preparation and consumption.

Stenmarck, Å., Jensen, C., Sundqvist, J.-O., Sörme, L. & Szudy, M. (2011), Proposed methodology for improved food waste data from the service sector and households (Förslag på metodik för förbättrade matavfallsdata från tjänstesektorn och hushåll), SMED, [in Swedish]

The report proposes new or improved methods to be implemented within the future waste data collection projects.

Regarding the retail and wholesale sectors, the authors hope that a project funded by the Nordic Council of Ministers will produce enough data to develop refined waste factors.

Regarding restaurants, the authors estimate that municipalities with weight-based tax and separate collection of food waste are the appropriate data source in order to derive new waste factors, basing on the ratio waste/employee for different types of restaurants.

Regarding large-scale kitchens, municipalities are seen as an appropriate data source. The best option is to calculate waste factor on total served portions. The data per serving from a kitchen depends on the presence of preparation and/or serving. The authors believe that it can be very difficult to obtain data on the total amount from large scale kitchens in other sectors such as health and elderly care.

Regarding households, the authors recommend that an effort is made to participate in some municipalities picking analysis in order to get good data on the quantities of food waste and also divided on edible/ inedible food waste.

Types of implications: food waste management.

Food supply segments involved/addressed: food preparation and consumption.

Jensen C., Stenmarck Å., Sörme L. & Dunsö O. (2011), Food waste from acre to table 2010 (Matavfall 2010 från jord till bord), SMED, [in Swedish]

The report presents data on generated amounts of food waste throughout the food chain in Sweden in 2010 including both sorted waste streams and separately collected food waste. The authors used several methods to generate data. Many parts of the chain are covered by waste factors. In addition, existing statistics were used.

In total the report indicates 1.010.000 tonnes of food waste generated in food industry, grocery stores, restaurants, school canteens and households in Sweden in 2010. No data were collected from farming and from hospital canteens. Home-composted food waste was not included. According to the study, food waste from households corresponds to 67% of the total food waste generated. 35% of the food waste from households was considered as avoidable. In total 169 000 tonnes of food waste were collected separately, thereof 134 000 tonnes from household.

The study concludes that there are very large amounts of food waste, mostly coming from households, while only residual amounts are separately collected. It seems that there is greater proportion of unavoidable food waste generated by households – for restaurants and large-scale kitchens but no data are available.

It should be noted, however, that significant changes took place in food waste management in Sweden since 2010.

Types of implications: food waste management.
Food supply segments involved/addressed: all.

Andersson T. (2012), From field to stomach - A study of unavoidable and avoidable food waste (Från Hage till Mage - En studie av oundvikligt och onödigt matavfall), University of Lund, [in Swedish]

This report aims at estimating the avoidable fraction in Swedish food waste and determining what kind of food and in what state it is discarded, through an analysis on more than 5.000 households.

Avoidable food waste corresponded to 297 000 tons, which is 35% of the total. A relevant difference was found between residents in apartment buildings (40% avoidable waste) and houses (29% avoidable waste). The state of avoidable food waste was unexpectedly good: 20% was classified as raw and 35% was in its original packaging, while 45% were leftovers. Vegetables and greens constituted the largest part (38%) followed by leftovers (27%) and bread (15%). There was a larger proportion of food in its packaging in unsorted waste than in separated waste, which in turn consisted of a larger share of raw food. The reason can be found in the supplementary effort required to separate food from its packaging in the case of separated food waste.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing; food preparation and consumption.

Stenmarck Å., Hanssen O.-J., Silvennoinen K., Katajajuuri J.-M. & Werge M. (2011), Initiatives on prevention of food waste in the retail and wholesale trades, IVL report B1988

The report focuses on food waste data, causes, and reduction initiatives in the retail and wholesale sector, in order to provide recommendations for improvement measures. The results are based on a literature review and interviews with representatives from the retail and wholesale sector in the Nordic countries.

The most common product groups present in the waste flows from retail and wholesale chains are: fresh fruits, vegetables, and fresh bakery products. At the bottom of the list there are products with a long shelf lives (canned, dried and frozen food). The main reason for food waste generation observed in interviews is that food becomes "un-saleable". Causes for this are related to customers' behaviour or to the shop-owners selling priority (which means to provide full shelves and a broad variety of products). Other reasons are related to how the shops are operated or how the food is handled.

A number of initiatives have already been taken within the sector: for example, optimisation of sales, better order management, improved handling of food and increased education of personnel. The interviews showed that one of the important obstacles in reducing food losses is the notion that customers expect full shelves with a great variety of "fresh" food. No one in the sector would introduce measures which might decrease the sales. Much could be achieved if the behaviour and desires of the customers could be changed.

The authors conclude that it is not efficient for authorities to develop regulations that directly interfere with the work being done in companies to limit food waste, but three types of actions should be given priority: 1) actions aimed at changing customers' behaviour and demands; 2) prevention of regulations and policies that might increase the amount of food waste in the retail sector; 3) actions that lead to the best treatment of food waste and facilitates food donation, etc.

Types of implications: food waste management.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Sörme L., Johansson M. & Stare M. (2014), Food and beverages disposed to the drain (Mat och dryck via avloppet), SMED, [in Swedish]

The report presents the results of a study, commissioned by the Swedish Environmental Protection Agency, carried out to quantify the amounts of food and drink disposed to the drain, in Sweden in a year, in total and per person. Additional goals were to find out the frequency of different food and drink types thrown away, reasons for disposal and the differences in quantities between different types of households.

A paper questionnaire for households was developed and sent out to a random sample of 2.050 people in Sweden. Households measured and recorded quantities of edible and drinkable food waste disposed to the drain during four days. There were seven fixed categories of food and drink; dairy, coffee/tea, other beverages, sweet (ice-cream, smoothie etc.), sauce and soup, other liquid food waste and solid food waste. The respondents also recorded the reasons why they disposed food and drink down the drain. Only edible and drinkable food was recorded.

A total of 515 responses were used to calculate the results. Results show that around 224.000 tonnes of food and drink, about 26 kg/person/year, were disposed down the drain. The comparison with quantities of food and drink disposed with municipal solid waste collection (incineration and biological treatment) shows that approximately 23% of the total quantity of food and drink waste is disposed by households via drains. In solid waste collection both unnecessary and unavoidable food waste is included. Earlier studies estimated that about 35% (270.000 tonnes) of household food waste going to incineration and biological treatment is unnecessary. If the 224.000 tonnes found in this study are included, about 50% of household food waste can be considered unnecessary.

The largest quantities of food and drink disposed to the drain were coffee/tea (40%), dairy products (25%) and other beverages (10%), followed by solid food waste (such as rice, pasta and cereals) sauce and soup. Results further showed that 70% of the waste was discarded because of leftovers from cooking etc., 26% were discarded because the item was old or had expired date, and 4% was discharged for other reasons.

Highest disposal rates per person were found in one-person households (32 kg/person and year), followed by two- and three-person households (26–27 kg/ person and year). Households with four and five person disposed 24 and 15 kg/person and year respectively.

Types of implications: food waste management.

Food supply segments involved/addressed: food preparation and consumption.

Eriksson M. & Strid I. (2013), Reduced food wastage in retail stores – Effects on quantity, economy and climate impacts (Svinnreducerande åtgärder i butik – Effekter på kvantitet, ekonomi och klimatpåverkan), Report 6594, Swedish Environmental Protection Agency, [in Swedish]

The report presents the results from a project aimed at describing and estimating the economic and environmental (greenhouse gases emissions) effects of six waste reduction measures that could be implemented in supermarkets. The six stores that participated in the main research project wasted on average 86 tons per year (including reclamations). The waste reduction potential for each measure was calculated and related to the total waste, in order to derive the waste reduction effect. The cost efficiency per kg waste and per kg saved CO₂-eq. was estimated. The evaluated measures were (reduction potential in brackets): to limit the possibility to reclaim fresh fruits and vegetables (35 ton), to donate food to charities (30 ton), to increase the activity with the ordering system (6 ton), to freeze and sell meat on a second hand market (1,5 ton), to ban promotions on fresh fruits and vegetables (0,6 ton) and to sell minced meat as frozen instead of chilled (0,3 ton).

In comparison, limiting the possibility to reclaim fresh fruits and vegetables and give food to charities were the two measures with the largest ability to reduce the wasted mass. Increase the activity with the ordering system and limiting the possibility to reclaim fresh fruits and vegetables were the two measures with the largest ability to reduce the greenhouse gas emissions. The most cost efficient measures regarding wasted mass was to sell the special assortment of minced meat as frozen instead of chilled and to freeze and sell meat on a second hand market. Regarding reduction of greenhouse gases the most cost efficient measures were limiting the possibility to reclaim fresh fruits and vegetables (for the supplier) and increase the activity with the ordering system. Several of the

investigated measures have a potential to increase the profit for the supermarkets. Many of the measures can be combined, but there will be less food to give to charities and to sell on a second hand market, if waste is prevented on an earlier stage.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Eriksson M. (2015), Supermarket food waste - Prevention and management with the focus on reduced waste for reduced carbon footprint, Doktorsavhandling 2015:119, SLU, Uppsala.

Food waste occurs along the entire food supply chain and gives rise to great financial losses and waste of natural resources. The retail stage of the supply chain contributes significant masses of waste. Causes of this waste need to be identified before potential waste reduction measures can be designed, tested and evaluated. This work quantified retail food waste and evaluated selected prevention and valorisation measures, in order to determine how the carbon footprint of food can be reduced by decreasing food waste in supermarkets. Food waste was quantified in six supermarkets in the Uppsala-Stockholm region of Sweden. Data were recorded over five years between 2010 and 2014 by the retail company in a daily waste recording procedure. In addition, suppliers contributed data on deliveries and rejections. The main suppliers contributed data on wholesale pack size and shelf-life, which allowed the relationship between these and their effect on waste to be analysed. Life cycle assessment was used to investigate the carbon footprint associated with production and distribution of food and managing the waste. The wasted mass was dominated by fresh fruit and vegetables and rejection on delivery was the main reason for this food being wasted. Expressed in terms of carbon footprint rather than mass, the relative importance of meat waste increased and that of fruit and vegetables decreased. A reduction in storage temperature to prolong shelf-life proved to have the potential to reduce waste in all supermarket departments studied. If food waste cannot be prevented, donation to charity and anaerobic digestion of the waste were found to have the greatest potential to reduce the carbon footprint, depending on the substituted bread value and biogas potential, respectively.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Eriksson M., Strid I., Hansson P-A. (2015), Carbon footprint of food waste management options in the waste hierarchy – a Swedish case study, Journal of Cleaner Production, 93,115-125

This study compared the effect on greenhouse gas emissions of different food waste management scenarios representing different levels in the waste hierarchy in the city of Uppsala, Sweden. A life cycle assessment was performed for six waste management scenarios (landfill, incineration, composting, anaerobic digestion, animal feed and donations), using five food products (bananas, grilled chicken, lettuce, beef and bread) as examples when treated as individual waste streams. For all five waste streams, the established waste hierarchy was a useful, but approximate, tool for prioritising the various options, since landfill proved to be the worst option and donation, anaerobic digestion and incineration with energy recovery the best options, for easily handle products, wet products and dry products, respectively, taking into account the GHG emissions. The greatest potential for reducing greenhouse gas emissions was in the bread waste stream, since bread is an energy-rich product with a relatively low carbon footprint, increasing the possibilities for replacing fossil energy carriers. Lettuce, with its high water content, had the least potential to reduce greenhouse gas emissions when the waste management method was changed. Waste valorisation measures should therefore focus on food products with the potential to replace production of goods and services, rather than on food products that are wasted in large quantities or have a high carbon footprint.

Types of implications: food waste management; food waste reduction.
Food supply segments involved/addressed: all.

Eriksson M., Strid I., Hansson, P-A. (2014), Waste of organic and conventional meat and dairy products: A case study from Swedish retail, *Recourses, Conservation and Recycling*, 83, 44-52

This study examined if organic food products have a higher level of waste, which thereby risk to counteract the environmental ambitions behind offering these products. The study also examined to what degree differences in waste level could be explained by turnover, shelf-life and wholesale pack size. In the study, six Swedish supermarkets provided data on all articles sold or wasted in the deli, meat, dairy and cheese departments during 2010 and 2011. 24 organic products were compared to their conventional counterparts; 22 of these had higher waste levels (from 1.5 to 29 times higher). Differences in wastage were also compared across departments; in all four departments, organic products as a group had higher waste percentage at all four departments. There was a negative correlation between the total mass sold of a product and the percentage waste. Also, longer shelf-life was associated with decreased waste, but only for products with low turnover. The systematic problem of retail food waste – particularly of organic products and other products with a low turnover – may be mitigated by increasing turnover, by stocking products with longer shelf-life or by decreasing the ordered volume (e.g. through decreased wholesale pack sizes).

Types of implications: food waste management; food waste reduction.
Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Strid I., Eriksson M. (2014), Losses in the supply chain of Swedish lettuce – wasted amounts and their carbon footprint at primary production, whole sale and retail, 9th International Conference LCA of Food, San Francisco.

The waste flow of Swedish iceberg lettuce was followed through the value chain from field to retail shelf. The study also included estimations of the carbon footprint of the waste at the different stages. At the farm level 3 tons of high quality lettuce heads were wasted per ha and year (compared to 19 tons harvested), corresponding to ca 1100 tons CO₂-e per year at a national level. Ca 50% of the lettuce sold in Swedish retail stores is domestically produced and 50% imported. The carbon footprint of the wasted Swedish iceberg lettuce at retail level was estimated to 1500 tons CO₂-e per year at a national level. The conclusion was that the losses at the retail stage were of higher importance than the losses occurring during primary production for the lettuce supply chain, and that measures therefore should be target- ed primarily to the retail sector.

Types of implications: food waste reduction.
Food supply segments involved/addressed: primary production, processing, wholesale, logistic, retail and marketing.

Eriksson, M., Strid, I., Hansson, P-A. (2012), Food losses in six Swedish retail stores: Wastage of fruit and vegetables in relation to quantities delivered. *Recourses, Conservation and Recycling*, 68, 14-20.

Flows of fruit and vegetables at six Swedish retail stores were analysed in this study, both by analysing recorded data and by performing physical measurements. Total wasted fresh fruits and vegetables were 4.3% of delivered quantity. The largest category was pre-store waste (goods rejected at delivery; 3.01%), followed by recorded in-store waste (0.99%) and unrecorded in-store waste (0.3%). A positive correlation between unrecorded in-store waste and total waste was found, indicating that a thorough recording of waste could be an effective way to reduce retail waste of fresh fruits and vegetables. The praxis allowing large amounts of reclamations of delivered goods was recognised as the main reason for waste, since pre-store waste contributed with the majority of the waste flow. Initiatives to reduce fresh fruit and vegetable waste in the studied retail chain thus need to focus on the pre-store waste to be efficient.

Types of implications: food waste reduction.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Marklinder, I., Eriksson, M. (2015), Best-before date – food storage temperatures recorded by Swedish students, British Food Journal, 117,1764 - 1776.

The purpose of this paper is to investigate the food storage temperature in Swedish household refrigerators, to determine whether students use the best-before-date label to determine food edibility, and to examine if the study increased the students' interest and knowledge regarding these issues. In total, 1,812 students, enrolled at 72 Swedish schools, analysed the temperature on different shelves in their family refrigerator using thermometers (Moller-Therm (+0.5/−0.1°C) and instructions provided by their teachers. A questionnaire dealing with the issues of date labelling, food safety, refrigerator storage and food wastage was completed by the teachers. The temperature at the back of middle shelves was coldest (average 4.8 °C; SD 3.1). A relatively high proportion of food items were stored at higher temperatures than recommended. The use-by date had been exceeded for 30 per cent of products, but the students did not rate these as inedible. According to the teachers, the investigation increased interest and knowledge among their students of date labelling, food hygiene, refrigerator storage and food waste.

Types of implications: food waste reduction.

Food supply segments involved/addressed: food preparation and consumption.

Lindbom I., Esbjörnsson C., Forsman J., Gustavsson J. & Sundström, B. (2013), Measures to reduce food wastage in the food industry - An industry and value chain perspective (Åtgärder för minskat svinn i livsmedelsindustrin - Ett industri- och kedjeperspektiv), Report 6595, Swedish Environmental Protection Agency, [in Swedish]

The report presents the results of a study carried out by SIK (the Swedish Institute for Food and Biotechnology). The total amount of food wastage in the Swedish food manufacturing industry was estimated to 224.000 tonnes in 2011, which represent 3% of the edible parts of incoming raw materials. SIK also estimates that food wastage in industry, in a first step, can be reduced by 50%. In a second step, further reduction to 25 % of current level may be possible if proper long term prerequisites can be arranged on a national level. The suggested control instruments are designed to create the long term prerequisites needed for achieving a total reduction of food wastage by 50-75 %. The control instruments suggested by the authors are governmental-financed programs addressed to the food industry, research within the areas of Food Production and Supply Chain Management, dissemination of knowledge and a platform/arena designed for operational collaboration on improvements of the supply chain with a holistic view.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: processing; wholesale, logistic, retail and marketing.

Strid I., Eriksson, M. (2013), Valorization of meat waste from retail stores, The 6th International Conference on Life Cycle Management, Gothenburg.

The aim of this study was to test if, and how, a retail meat waste prevention measure could work in reality. A retail store cooperated, by selling meat that otherwise would be wasted, with a catering company that purchased and used the meat for cooking. Together they managed to save 35 kg meat during 8 weeks in May-June 2012. The measure proved to work in reality and was estimated to have a large potential to save meat, if fully implemented in the whole retail sector. Freezing of the meat was a key success factor, for logistic reasons. Not all types of meat can be saved this way, due to current authority regulations of the food sector.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

Jensen S., Båth, K. & Lindberg U. (2013), What effect would a lower temperature in the cooling chain have on food wastage? (Vilken effekt skulle sänkt temperatur i kylkedjan få på matsvinnet?), Report 6596, Swedish Environmental Protection Agency, [in Swedish]

The report was carried out by SP (Technical Research Institute of Sweden) and SIK (the Swedish Institute for Food and Biotechnology) and financed by the National Food Agency on behalf of the Swedish EPA in preparation of the Swedish Waste Prevention programme. The study affirms that a reduced temperature in the cold chain could allow food manufacturers to extend the shelf life date on their products. Longer shelf life, combined with modified date marking of products could reduce store waste of foods with date indication. A reduced temperature in the cold chain in combination with extended shelf life marking could reduce food waste for consumers who do not eat food that passed date indication.

Types of implications: optimization of food use.

Food supply segments involved/addressed: wholesale, logistic, retail and marketing.

F) Communication and campaigns

Stoppa matsvinnet (Stop food waste)

It is an initiative of the Food Administration, the Environmental Protection Agency and the Swedish Board of Agriculture. The aim is to inform and inspire people to throw away less food. During 2013-2015 the campaign told consumers in Sweden about what they can do to reduce their own food waste. The campaign also involves who cultivates, produces, sells and serves food to do their fair share.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: all.

G) Projects and other measures

SaMMa - Samverkansgruppen för minskat matavfall (Collaboration Group for Reduced Food Waste)

It is a national network with actors from the entire food waste value chain.

Established in 2012, it involves different actors in the value chain including researchers, authorities and actors throughout the entire value chain.

SaMMa is a network for authorities, researchers, industrial interest groups etc. Everyone is welcomed to join. The objective of the network is to exchange information and to act to reduce food wastage.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: all.

Klimatsmart (Climate smart)

Lunch is a municipal responsibility in Sweden. It was introduced in the 1940s, and occurs within nursery, primary school (age 7-15) and secondary school (age 15-18). Household waste and bio-waste is also a municipal responsibility. The municipalities are responsible for collecting and taking care of household waste, except the waste covered by the manufacturer's responsibility.

The national law states that municipalities must serve school lunches to all pupils and that it must be for free (Sweden and Finland are the only two countries in the world that offer

this) and nutritious. The latter was added when the law was amended in July 2011. The municipalities have autonomous power to decide how much to spend on the meals and they also determine to which extent they want to offer different types of vegetarian food. Halmstad municipality launched a campaign to decrease food wastage in school canteens hereby reducing the environmental impact of CO2 emission. To achieve this the municipality wanted the pupils to discover and reflect on their own behaviour in order to ultimately change it. Therefore, the campaign "Klimatsmart" was launched. By changing behaviour additional and latent objectives such as decreasing CO2 emissions and decreasing meat consumption in favour of more sustainable vegetarian and locally produced food would also be achieved. Additionally less food waste would also save money. Halmstad municipality is one of many examples of municipalities and other large scale kitchens (like hospitals etc.) that are working with reducing food waste.

Types of implications: food waste management; food waste reduction.

Food supply segments involved/addressed: food preparation and consumption.

There are on-going projects working with best before dates and redistribution in order to tackle food waste. Such projects are financed by the Nordic Council of Ministers.

There are several information campaigns currently running, school materials developed, many large scale kitchens (both municipal and private) that are working on food waste.

H) Food waste policy mix: highlights

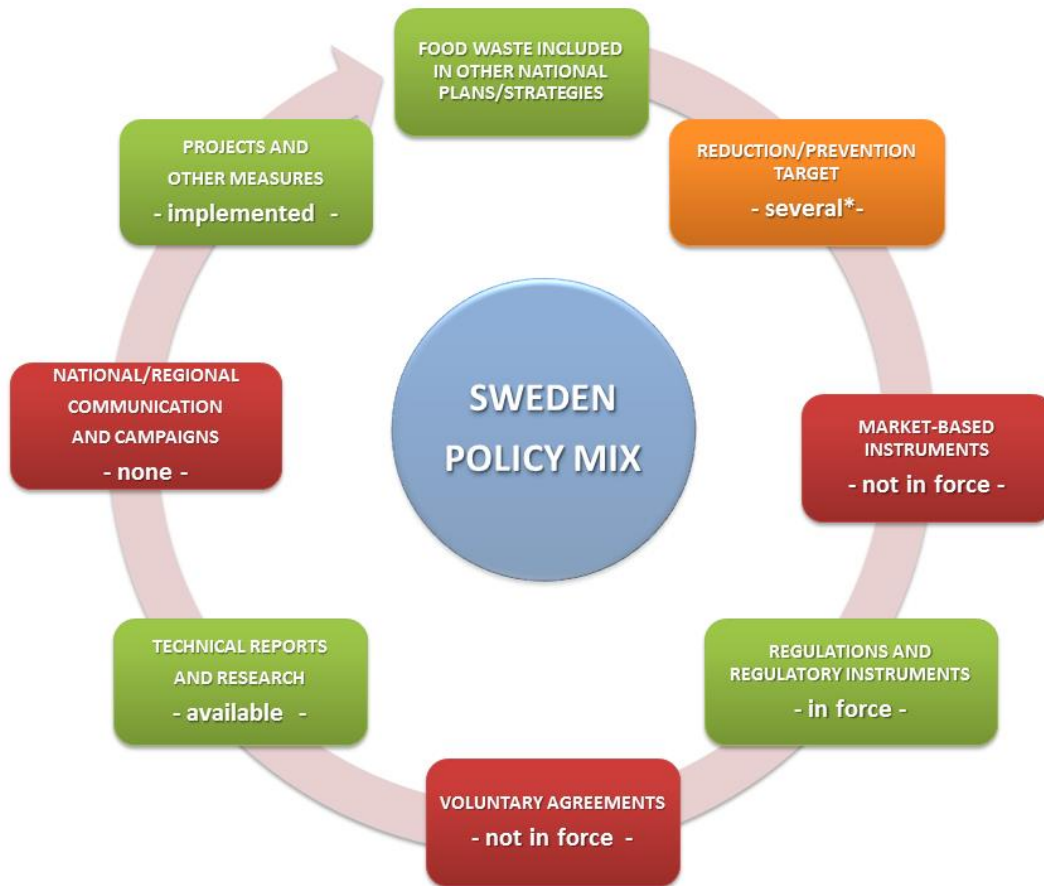
The overarching goal of the Swedish food waste policy-mix is to reduce the amount of food waste which is produced on a whole. Priority is given to the management of resources and the biological treatment of waste.

Environmental priorities have steered Sweden towards greener waste management practices a process in which the country's municipalities have played a key role.

However Sweden has not implemented a specific strategy or national plan for food waste reduction. Food waste reduction is included in the Swedish Waste Management Plan (according to which by 2018 at least 50% of food waste from households, canteens, shops and restaurants shall be collected separately and treated biologically), in the Swedish Waste Prevention Programme (according to which food waste within the entire food value chain shall be reduced compared to 2010) as well as in the Swedish environmental policy (in the form of proposed milestone targets for food waste).

An important innovation in regulatory terms is represented by the ordinance concerning the responsibility for selling food after the best-before-date. For example bakery products (usually to be sold within 24 hours) do not need to be labelled with a best-before-date and can therefore be donated to charity without carrying full responsibility for the safety of the product (opposed to products labelled with best-before-date). The attention on food labelling is emphasized also by the results of a research report (Jensen, S., Båth, K. & Lindberg, U., 2013) that suggests how a reduced temperature in the cold chain could allow food manufacturers to extend the shelf life date on their products. Longer shelf life, combined with modified date marking of products could reduce store waste of foods with date indication.

Figure 1. Sweden's Policy Mix at December 2014



* There is not a unique national target, different strategies identified different targets.

The attention on food waste is relatively high both among public institutions and private stakeholders as suggested also by the Collaboration Group for Reduced Food Waste (SaMMA - Samverkansgruppen för minskat matavfall) that consists in a national network with actors from the entire food waste value chain whose aim is to exchange information and act to reduce food wastage, and by this also food waste.

An important role is played by municipalities that are responsible for collecting and taking care of household waste, with the exception of the waste covered by the manufacturer's responsibility.

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None

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