bio Intelligence Service

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Directorate C - Industry

PREPARATORY STUDY ON FOOD
WASTE ACROSS EU 27
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Executive Summary

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EXECUTIVE SUMMARY

Addressing a lack of information about food waste in Europe

Food waste is composed of raw or cooked food materials and includes food loss before, during or after meal preparation in the household, as well as food discarded in the process of manufacturing, distribution, retail and food service activities. It comprises materials such as vegetable peelings, meat trimmings, and spoiled or excess ingredients or prepared food as well as bones, carcasses and organs.

Although it constitutes a large proportion of bio-waste, no overall view of the situation of food waste in the European Union had been available. More information on the issue was necessary to determine the scale of the problem and to identify appropriate measures that could be taken. This study aims at providing this information to the European Commission.

Objectives and methodology of this study

Covering the many facets of the problematic at European level, the objectives of this study were to:

➔ Identify the key causes of food waste in all sectors

➔ Establish a baseline of food waste data for the EU27

➔ Quantify the environmental impacts of food across its lifecycle

➔ Inventory existing food waste prevention measures

➔ Forecast food waste generation levels over fifteen years (2006-2020)

➔ Develop policy recommendations for prevention and analyse their impacts

A stakeholder consultation was launched to solicit input from stakeholders on food waste data, prevention measures and policy options. The methodologies for elaborating the study objectives are outlined below.

Four sectors were addressed in each task: Manufacturing, Wholesale/Retail, Food Service and Households. Although Agricultural food waste was not within the scope of the study, there may be important causes and quantities of food waste to tackle in this sector through further research.

A multitude of causes for food waste, predominantly sector specific

The study demonstrates the diversity of causes of food waste, within each of the four sectors investigated. Causes in the Manufacturing, Wholesale/Retail and Food Service sectors are expected to be similar across Europe and will vary according to product specificities. Causes of household food waste identified are predominantly based on UK research, and while they provide a guideline for Europe, this will vary more than other sectors as a result of cultural practices, climate, diet, and socio-economic factors (average size of household, household income, frequency of eating out etc). The UK Waste and Resources Action Programme (WRAP), which leads UK investigations on food waste, recommends conducting Member State level research on causes so that awareness campaigns and other policy measures can be effectively targeted.

Key causes for each sector are outlined below.

Manufacturing sector

➔ Food waste at this level is **largely unavoidable** (bones, carcasses and certain organs in meat products for example)

➔ **Technical malfunctions** such as overproduction, misshapen products, product and packaging damage

Household sector

Food waste from meal preparation, leftovers, and purchased food not used in time comprise food waste in the household sector. Causes for this waste involve:

➔ Lack of **awareness** of (1) the quantity of food waste generated individually, (2) the environmental problem that food waste presents, and (3) the financial benefits of using purchased food more efficiently

➔ Lack of **knowledge** on how to use food efficiently, e.g. making the most of leftovers, cooking with available ingredients

➔ **Attitudes**: food undervalued by consumers, lack of necessity to use it efficiently

➔ **Preferences**: many (often nutritious) parts of food are discarded due to personal taste: apple skins, potato skins, bread crusts for example

➔ **Planning issues**: 'buying too much' and 'lack of shopping planning' frequently cited as causes of household food waste

➔ **Labelling issues:** misinterpretation or confusion over date labels is widely recognised as contributing to household food waste generation, leading to the discard of still edible food

➔ **Storage:** suboptimal storage conditions lead to food waste throughout the supply chain, including in the Household sector

➔ **Packaging issues:** packaging methods and materials can impact the longevity of food products

➔ **Portion sizes:** includes issues such as "making too much food" hence leading to uneaten leftovers as well as purchasing the correct portions of food; individually sized portions can minimise food waste but often create additional packaging waste

➔ **Socio-economic factors**: single person households and young people generate more food waste

Wholesale/Retail sector

➔ **Supply chain inefficiencies:** better coordination between retailers, distributors, wholesalers and manufacturers can reduce food waste and avoid it being shifted across the supply chain

➔ **Stock management**: difficulties anticipating demand resulting in overstocking; lack of incentive for higher accuracy in stock management due to take-back provisions in contracts with suppliers and low cost of discarding food

→ **Marketing strategies**: two for one deals can shift potential food waste to consumers by encouraging them to purchase more than needed – discounting of excess stock and food near expiry is preferable

→ **Marketing standards**: aesthetic issues or packaging defects cause some products to be rejected, although neither food quality or safety is affected

→ **High product specificity:** particular issues affect the longevity of specific food products (exposure to light increases in-store food wastage for example)

→ **Temperature sensitivity:** meat and dairy products are particularly vulnerable to temperature changes during transportation and storage, risking premature spoilage and impacting food safety

Food Service sector

→ **Portion sizes**: the one size fits all approach to food service is a major cause of food waste. Self-service in cafeterias (consumers eat 92% of food they serve themselves) and a choice of portion size in restaurants can redress this.

→ **Logistics:** difficulty anticipating number of clients leads to overstocking – increased reliance on reservations can help

→ **Attitudes:** the practice of taking leftovers home from restaurants is not universally accepted across Europe (France for example) – strong potential to reduce restaurant food waste

→ **Awareness** of food waste as an issue is currently low but rising with environmental awareness as a whole

→ **Preferences**: school cafeterias have particular difficulty meeting preferences of schoolchildren – work to improve quality would reinforce signals to schoolchildren about the value of food

Around 90 million tonnes of food waste are generated in the EU each year

The principle source of data on food waste generation was EUROSTAT, which provides data for Manufacturing, Household and 'Other Sectors' for all MS with few exceptions. An estimate of food waste for these three sectors is presented by MS using both EUROSTAT and available national data. The base year is presented as 2006, the year for which the most recent EUROSTAT data is available.

On this basis, the study estimates annual food waste generation in the EU27 at approximately 89Mt, or 179kg per capita (please see below table).

**Total Food Waste Generation in EU MS: Best estimate by Member State**

	Manufacturing	Households	Other sectors	Total
EU27	34 755 711	37 701 761	16 820 000	89 277 472
Austria	570 544	784 570	502 000	1 858 000
Belgium	2 311 847	934 760	945 000	4 192 000
Bulgaria	358 687	288 315	27 000	674 000
Cyprus	186 917	47 819	21 000	256 000
Czech Republic	361 813	254 124	113 000	729 000
Denmark	101 646	494 914	45 000	642 000
Estonia	237 257	82 236	36 000	355 000
Finland	590 442	214 796	208 000	1 013 000
France	626 000	6 322 944	2 129 000	9 078 000
Germany	1 848 881	7 676 471	862 000	10 387 000
Greece	73 081	412 758	2 000	488 000
Hungary	1 157 419	394 952	306 000	1 858 000
Ireland	465 945	292 326	293 000	1 051 000
Italy	5 662 838	2 706 793	408 000	8 778 000
Latvia	125 635	78 983	11 000	216 000
Lithuania	222 205	111 160	248 000	581 000
Luxembourg	2 665	62 538	31 000	97 000
Malta	271	22 115	3 000	25 000
Netherlands	6 412 330	1 837 599	1 206 000	9 456 000
Poland	6 566 060	2 049 844	356 000	8 972 000
Portugal	632 395	385 063	374 000	1 391 000
Romania	487 751	696 794	1 089 000	2 274 000
Slovakia	347 773	135 854	105 000	589 000
Slovenia	42 072	72 481	65 000	179 000
Spain	2 170 910	2 136 551	3 388 000	7 696 000
Sweden	601 327	905 000	547 000	2 053 000
United Kingdom	2 591 000	8 300 000	3 500 000	14 391 000

Source: 2006 EUROSTAT data (EWC_09_NOT_093), Various national sources

Certain national studies covered retail and food service sector food waste, providing more detail than EUROSTAT's 'Other Sectors'. A further estimate of food waste was then made, breaking down food waste by Manufacturing, Household, Retail and Food Service sector data. This approximate percentage breakdown is presented below, and more detail can be found on page 63 of the report. Please bear in mind that agricultural food waste was not included in the scope of this study.

This breakdown is not intended to draw a comparison between household and manufacturing sector data, as the reliability of estimates for certain sectors differs. A cross-sector comparison would be more instructive when data available for all sectors is considered more robust.

Percentage breakdown of EU27 food waste arisings by Manufacturing, Households, Wholesale/Retail, and Food Service/Catering sectors (best estimate)
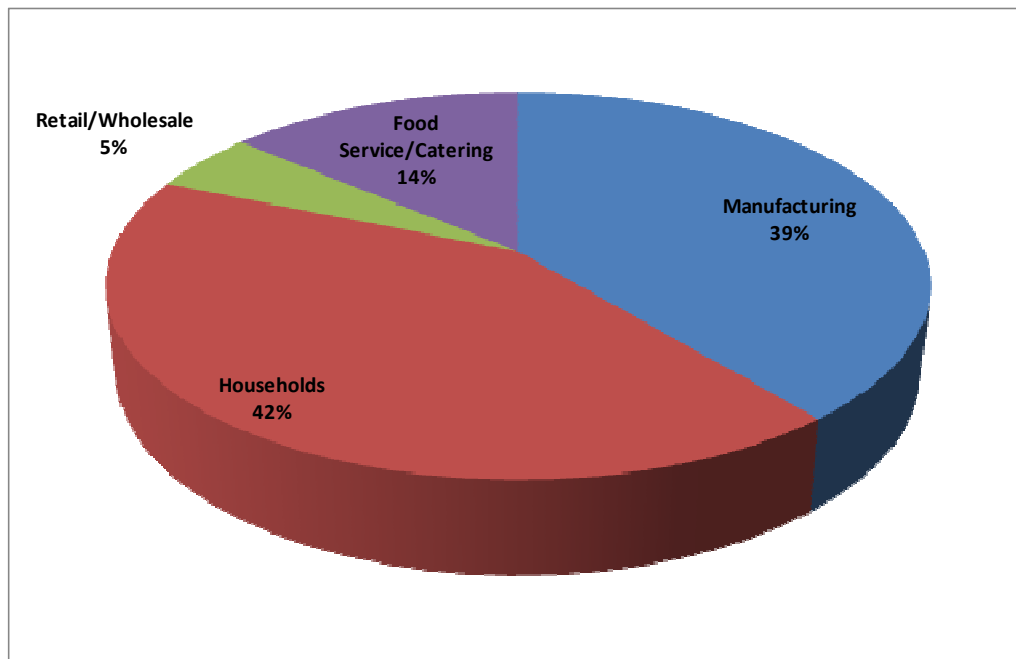
Source: 2006 EUROSTAT data (EWC_09_NOT_093), Various national sources

Households produce the largest fraction of EU food waste among the four sectors considered, at about 42% of the total or about 38Mt, an average of about 76kg per capita.

Manufacturing food waste was estimated at almost 35 Mt per year in the EU27 (70kg per capita), although a lack of clarity over the definition of food waste (particularly as distinct from by-products) among MS makes this estimate fragile.

Once again, the main estimate of this study relies more heavily on EUROSTAT data to estimate manufacturing, household and 'other sector' food waste. A further estimate on the breakdown between retail and food service sector food waste (in place of 'other sectors') relies more heavily on extrapolations, at times from a limited number of sources. According to this further estimate, the following sectoral detail can be presented:

➔ Wholesale/Retail sector: close to 8kg per capita (with an important discrepancy between MS) representing around 4.4 Mt for the EU27

➔ Food Service sector: an average of 25kg per capita for EU27, at 12.3 Mt for the EU27 overall. There is a notable divergence between the EU15 at 28kg per capita (due to a higher trend of food waste in the restaurant and catering sector) and 12kg per capita in EU12.

Food which ends up as being discarded by households represents 25% of food purchased (by weight), according to studies completed by WRAP. For the UK, the avoidable portion of this food waste represents a total annual loss per household of approximately £480 or 565 Euros[1].

Important limitations accompany this work of quantification, resulting from the variable reliability of EUROSTAT and national data. Methodologies for collecting and calculating the food waste data submitted to EUROSTAT differs between MS, who are free to choose their own methodology. Limitations in the reliability of EUROSTAT data, due to a lack of clarity on

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[1] WRAP (2009) *Household Food and Drink Waste in the UK*

the definition and methodology, may be significant. Implications may involve the inclusion of by-products, green waste or tobacco in the data disclosed in some instances. Additionally, data is missing for some sectors in some MS, and the 'Other Sectors' category is too broad to give a clear insight into the Wholesale/Retail and Food Service sectors. It was not possible to confirm that by-products were not included in some instances in Manufacturing sector data. These issues have been ameliorated using national studies, plausibility checks and informed assumptions as far as possible in an effort to present the best available data; however, these limitations nevertheless present an important issue for data reliability. Food waste data is synthesised in table on page 12 for each MS in manufacturing, household and 'other sectors'; please see table 12 on page 62 of the main report for the sources or assumptions used.

Food waste generates about 170 Mt of CO2 eq. in the EU each year

In order to assess all the environmental benefits of food waste reduction initiatives, one must consider not only the fact that food waste treatment is reduced but that the food processing and other upstream steps of the life cycle are avoided too. For that reason, the environmental impacts of the life cycle of food waste were quantified, not only those linked to the treatment of food waste but also those generated during the other steps of the life cycle before they become waste.

A life cycle approach was used. Without carrying out new life cycle analysis (LCA), the approach focused on identifying available research and extracting data from which extrapolations could be made using the findings of this study.

The results are presented for each of the four sectors considered in this study. The system boundaries for each of them are summarised in the figure below. It should be noted that while agricultural food waste is outside of the scope of this study, the environmental impacts of agriculture in the food supply chain were nevertheless taken into account when assessing the life cycle environmental impacts of food waste generated by the four relevant sectors (see diagram below).

Life cycle steps considered for each sector
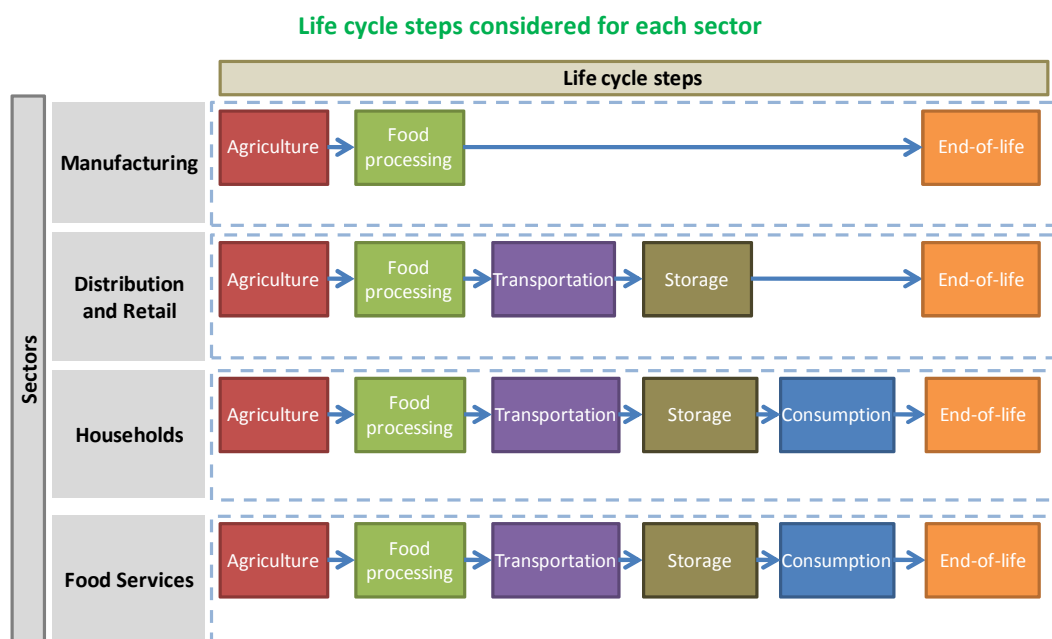
The environmental impacts calculated using the selected data are summarised below (only GHG emissions are mentioned here as it is the only environmental indicator, among the four presented in this study, which is quantified in all the studies analysed).

Greenhouse gas emissions of food waste by sector

Sector	Waste amounts in EU27 t/yr (rounded figures)	Greenhouse gases emissions	
		t CO_2 eq./t of food waste	Mt CO_2 eq./yr in EU27
	a	b	a x b / 10^6
Manufacturing	34 756 000	1.71	59
Households	37 703 000	2.07	78
Others	16 820 000	1.94	33
Total	**89 279 000**	**1.9**	**170**

Source: calculated based on EUROSTAT data, national sources and ETC/SCP working paper 1/2009

An average of <u>at least</u> 1.9t CO_2 eq./t of food wasted is estimated to be emitted in Europe during the whole life cycle of food waste. At European level, the overall environmental impact is <u>at least</u> 170 Mt of CO_2 eq. emitted per year (close to the total greenhouse gas emissions of Romania or of the Netherlands in 2008, and approximately 3% of total EU27 emissions in 2008[2]). This figure includes all steps of the life cycle of food waste, namely agricultural steps, food processing, transportation, storage, consumption steps and end-of-life impacts.

Considering the performance of respective sectors, the Household sector presents the most significant impact, both per tonne of food waste (2.07 t CO_2 eq./t) and at the European level (78 Mt CO_2 eq./yr), at 45% of estimated annual GHG emissions caused by food waste. Food waste generated in the Manufacturing sector is responsible for approximately 35% of annual GHG emissions.

Limitations of these estimations relate to the reliability of the food waste quantities calculated earlier in the study, as well as to the nature of environmental data available in existing studies: no data was available about the specific food products which constitute food waste for instance. Only environmental data about the food sector in general (production, consumption) in Europe were available and thus used.

Wide range of food waste prevention initiatives – recently established, diffuse and mostly small scale

Measures to prevent food waste in the EU were identified principally through a literature review, with some valuable contributions from stakeholders provided via questionnaire. Over one hundred initiatives were inventoried.

Typology of initiatives:

➔ awareness campaigns (of which WRAP's Love Food Hate Waste is the key example)

➔ informational tools (e.g. sector specific prevention guidelines and handbooks)

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[2] EUROSTAT

- ➔ training programmes (e.g. food service staff prevention skills, waste-free cooking workshops for consumers)

- ➔ logistical improvements (e.g. stock management improvements for retailers, reservation requirements for cafeterias, ordering flexibility in hospitals)

- ➔ waste measurement activity (e.g. hands-on quantification and composition analysis of food waste by households, restaurants or schools)

- ➔ research programmes (development of new sector/product specific prevention methodologies, such as Time Temperature Indicators)

- ➔ regulatory measures (such as separate collection of food waste requirements in Ireland)

- ➔ food redistribution programmes (diverting otherwise discarded food to charitable groups)

- ➔ development of industrial uses - turning food waste into by-products for other purposes (only one example identified – the production of fish chips from manufacturing sector fish waste, although other examples are likely to be available)

Quantitative results were difficult to attain, because measurement of impact had often not been carried out, particularly at local level. Many initiatives had been recently launched and had not yet been measured, underlining the early stage of development of food waste prevention activity.

Research showed the usefulness of a concerted approach, as currently used in the UK and in development in Austria. Initiatives demonstrate important pockets of interest in the issue throughout the EU, although awareness is currently at a preliminary level, suggesting the usefulness of best practice and resource sharing at the EU level.

Food waste is expected to rise to about 126 Mt by 2020 without additional prevention policy or activities

Using the previous findings of the study, EUROSTAT projections and via a literature review, the impacts of the following factors on food waste from the baseline year 2006 to 2020 were considered:

- ➔ population growth
- ➔ disposable income
- ➔ possible policy impacts
- ➔ existing prevention initiatives

Impacts of population and disposable income

Based on anticipated EU population growth and increasing affluence only, food waste is expected to rise to about 126 Mt in 2020 from about 89 Mt in 2006. Through the literature review and using EUROSTAT statistical trends, the assumption is made here that, with an increase in disposable income, there is an associated increase in food waste generation. The methodology incorporates growth in food waste for EU12 and EU15 that progresses at different rates.

Impacts of prevention activity

Earlier findings of this study, namely that the majority of initiatives are very recent and very few have measured results, result in a profound difficulty in accurately forecasting their

future impacts. On this basis, no impact due to food waste prevention initiatives has been applied to the data in the forecasting.

Environmental impacts

The above forecast would result in an additional 70Mt of carbon dioxide equivalent emitted in 2020 as a result of food waste, an additional 40%. This brings the estimate of annual food waste related emissions to about 240Mt in 2020.

Policy and other issues

It should be noted that policies to divert food waste from landfill will not tackle the bigger issue of food waste generation. The impact of waste policy, such as the waste prevention specifications of the revised Waste Framework Directive, the Landfill Directive, and the Communication on future steps in bio-waste management in the European Union, on food waste is considered to be neutral in terms of the absolute amounts of waste generated. Waste policy does, however, have a considerable impact on the treatment of food waste once it has been generated. This study forecasts that by 2020 the amount of food waste sent to landfill will decrease from about 40.5 million tonnes to about 4.0 million tonnes in compliance with policy.

This leaves an estimated 122 million tonnes of food waste across the EU27 by 2020 still to manage via other residual treatment technologies.

Without successful long-term pan-EU waste prevention activities achieving notable behaviour change in the way people buy and use food, the treatment capacity required to handle food waste will need to increase by more than a factor of two. The challenge this poses for raising capital, securing permission to build and planning (or extending existing facilities) will be considerable.

Limitations

Limitations in food waste quantities, based principally on inconsistent definitions of food waste and methodologies for calculation, presented a major difficulty in the accurate identification of trends, in addition to the unavailability of time series data. The main conclusion that can be drawn from this exercise is that statistical improvement and time series data are needed in all MS to provide reliable data on food waste generation that could form a basis for more robust and reliable estimations and forecasting.

Five policy recommendations identified for their prevention potential

The investigation of food waste prevention measures and the development of food waste quantities and forecasts informed this task, which involved the identification of five policy options for implementation at EU level to strengthen existing efforts to prevent food waste.

The following five policy options were examined alongside a business as usual scenario:

Policy Option 1: EU food waste data reporting requirements

Option 1: EUROSTAT reporting requirements for MS on food waste and a standardisation of methodologies for calculating food waste quantities at MS level to ensure comparability. A feature of this is the clear exclusion of by-products from food waste data reporting.

The lack of reliable data on food waste has been a recurring obstacle in this study, impacting the assessment of the environmental impacts of food waste, the anticipated developments in food waste generation over time, and the setting of targeted policies for waste prevention.

This policy option enables legislators at European and national level to direct action on food waste by providing a quantitative basis for policymaking and target setting.

The food waste reduction potential of this initial policy option is considered negligible, as it serves as a basis for further action. Food waste quantities will indeed directly inform the choice of further policy options.

The cost for the EU enacting this policy option is considered negligible by EUROSTAT. The administrative costs for MS are estimated at €1,000 to €3,000 by the Irish Environmental Protection Agency, though these may vary somewhat between MS. The cost of undertaking bin characterisation study is estimated by the Irish Environment Agency at €30,000. The Danish Environment Agency conducts a major national food waste study every ten years, at a cost of €270,000. These data suggest a possible range of costs for MS for meeting new data reporting requirements. Some investment in data collection and analysis will improve the level of reporting accuracy.

While difficulties defining food waste and separating out by-product volumes were highlighted, this policy option was overall considered practical by stakeholders at European and national level.

Policy Option 2: Date labelling coherence

Option 2: The clarification and standardisation of current food date labels, such as "best before", "sell by" and "display until" dates, and the dissemination of this information to the public to increase awareness of food edibility criteria, thereby reducing food waste produced due to date label confusion or perceived inedibility.

The function of food product labelling is to ensure consumer safety and inform their decision making. Research on date labelling undertaken in the UK shows that 45-49% of consumers misunderstand the meaning of the date labels "best before" and "use by" (WRAP 2010). WRAP's Household Food Waste Programme Manager, Andrew Parry, furthermore estimates that 1 million tonnes of food waste or over 20% of avoidable food waste in the UK is linked to date label confusion. These results show that food product labelling in this case is not functioning optimally and makes date labelling a principle issue in household food waste prevention.

An EU level date labelling coherence policy would involve the addition of a requirement on harmonised date labels to the Food Information Regulation, currently being debated in the European Parliament.

The development and diffusion of guidance to businesses on which food products should carry which data label is recommended. An increased emphasis on storage guidance is further suggested, in particular its importance for the lifespan of the product and the validity of its date label. Lastly, the dissemination of information to the public on the meaning of the harmonised date labels will be an important contributor to the success of this policy. This includes an understanding that "best before" dates are primarily related to quality rather than safety, and that using their own judgement (visual, olfactory and taste) is adequate for many food products.

The food waste reduction potential of this policy option can be estimated at up to 20% of avoidable food waste, based on UK research.

The cost for the EU and for MS is considered to be negligible. The costs for industry based on familiarisation costs with new regulations is estimated at €232,000 per EU15 Member State and at €47,000 per EU12 MS, based on UK Food Standards Agency data.

Policy Option 3: EU targets for food waste prevention

> **Option 3:** The creation of specific food waste prevention targets for MS, as part of the waste prevention targets for MS by 2014, as recommended by the 2008 Waste Framework Directive. This policy option relies upon improved MS food waste data reporting (as proposed in policy option 1).

This policy option quantitatively addresses anticipated increases in food waste generation, aligns with broader European targets for waste prevention and can be adapted easily to MS specificities. Methods for achieving targets would be set at MS level, possibly as part of national waste prevention programmes.

The food waste reduction potential of this policy option will depend on the percentage target adopted and the level of success in achieving the target.

Costs for the EU are considered negligible; costs for MS will be determined by the waste prevention strategy adopted to meet the target.

Policy Option 4: Recommendation and subsidy on the separate collection of food waste in the MS

> **Option 4:** Recommendation of MS adoption of separate collection of food waste or biodegradable waste, for the household and/or food service sector. Subsidy for the development of separate collection and treatment infrastructure.

Multiple stakeholders noted the "waste prevention effect" of separating food waste from household or food service waste for separate collection, although this relationship has not yet been proven quantitatively. The act of separating food is important in increasing awareness effectively among participants, by confronting them directly and regularly with the quantity of food waste they generate. It is especially effective where accompanied by an awareness campaign on the need to reduce food waste.

This policy option also supports the EU policy objective of "using waste as a resource" and enables the separate recovery of a valuable waste material.

The food waste reduction potential of this policy option cannot be estimated at this time, given that previous research has not addressed the potential "waste prevention effect" of separate collection and because a clear link was not apparent in the available data, due to discrepancies and changes across time in the scope of materials collected, and the type of collection methods employed.

The costs for separate collection vary according to MS differences and treatment differences, but are comparable to the treatment costs of mixed waste according to a 2007 UK study (see below).

Estimated costs of food waste separate collection

Costs of implementing separate food waste collection	
Cost of separate collection followed by composting	35-75 €/tonne
Cost of separate collection of bio-waste followed by anaerobic digestion	80 to 125 €/tonne
Compared with landfill and incineration	
Cost of landfill of mixed waste	55 €/tonne
Cost of incineration of mixed waste	90 €/tonne

Source: Eunomia 2007

Policy Option 5: Targeted awareness campaigns

> **Option 5:** Targeted awareness campaigns, aimed at the household sector and the general public, to raise awareness on food waste generation, environmental and other impacts of biodegradable waste, prevention methods and practical tips to encourage behaviour change and a long-term reduction in food waste generation.

Households are responsible for the greatest proportion of avoidable food waste, and principle causes of household food waste have been identified as lack of awareness, lack of knowledge on methods for avoiding food waste, date label confusion, inappropriate storage and portion mis-sizing, among others. These causes can be directly addressed through awareness campaigns, and it is recommended that MS adapt campaigns to correspond with locally identified causes of food waste.

The EU role in such a policy might involve a web-based resource hub on food waste prevention, including sample communications materials, good practice examples, and informational tools for specific sectors. This might build on the existing European Week for Waste Reduction website. Potential for an EU network of interested policymakers on food waste, for policy level best practice sharing and discussion, is also highlighted as part of this policy.

The food waste prevention potential of this policy option can be estimated at 1.8% of total food waste or 3% of avoidable food waste, based on the UK Love Food Hate Waste campaign's results so far. With continued investment in the campaign, this should be expected to rise along with an increase in MS consciousness of the issue.

The cost of the policy for the EU is estimated at between €90,000 and €180,000, based on the website and network costs of the Green Spider Network. The cost for MS campaigns is estimated at €0.04 per inhabitant, based on the WRAP Love Food Hate Waste campaign, approximately € 20 million for EU27. Shared resources and best practices provided by an EU web-based resource hub may, however, reduce costs for MS.

➔ **Policy selection**

The environmental and economic costs and benefits of the five policy options and the business as usual scenario were analysed via an impact assessment matrix (presented hereafter)**,** enabling the delineation of three options providing important waste prevention benefits at limited cost.

The impact analysis concluded that the three priority options are data reporting requirements, date labelling coherence, and targeted awareness campaigns.

The assessment demonstrated that option 1 (data reporting requirements) had limited food waste reduction potential, but facilitated the development of targets and strategies that would not be possible without robust baseline data. Costs for MS and industry were identified as moderate, in most cases focusing on the harmonisation of methodologies rather than the sourcing of previously uncollected data.

Option 2 (date labelling coherence) was selected for its expected food waste prevention potential, based on its capacity to improve consumer information on food edibility across the EU, and the evidence on existing uncertainty in this area. The comparatively limited cost of this policy option, and the possibility to integrate it into the Food Information Regulation currently being debated, were also considered.

Option 5 (awareness campaigns) was selected due to stakeholder agreement on its necessity and essential role in behaviour change. Its potential to reduce food waste will be linked to the budget invested in awareness-raising, though this is expected to be consistently less than the potential financial savings to households through more efficient use of purchased food. The EU role might involve the sharing of best practices and informational tools across MS.

Options 3 and 4 were not considered priority actions.

Option 3, given its dependence upon the effective implementation of option 1, was not prioritised in this assessment, in consideration of EUROSTAT's warning on potential delays in the implementation of option 1. However, it should be noted that this policy option could be integrated into national waste prevention programmes required to be developed by MS not later than the end of 2013, under Article 29 of the revised Waste Framework Directive.

Option 4 was not selected at this time given a current lack of robust quantitative evidence on the "waste prevention effect" of separate collection, although widely observed. The practical nature of separating food waste from general household or workplace waste reminds individuals regularly of the quantities of food waste they are responsible for. This increased consciousness of food wasting behaviours can lead to prevention at source, according to several stakeholders. Additionally, the subsequent environmental benefits of the separation collection and proper treatment of food waste are ample, providing a robust means of using waste as a resource for energy or soil regeneration purposes. However, given that prevention would not be the primary aim of a major policy of this kind and that implementation costs are significant, it has been left open to development by other avenues for its substantial recycling opportunities.

Overall, an EU approach to food waste, particularly regarding data, was considered essential.

Synthesis of policy analysis

	Sectors targeted	Cost inputs			Summary of cost inputs	Estimated food waste prevention potential	Additonal expected benefits
		Implementation costs for EU institutions	Implementation costs for MS	Implementation costs for industry			
Option 1: EU food waste reporting requirements	All	0 to -	-	- to --	Principle costs linked to research and enforcement required to achieve standardisation	0 to +	Possible business prevention effect; makes subsequent strategies possible
Option 2: Date labelling coherence	All	-	-	- to --	Principle costs for industry for potential repackaging	+ to ++	Financial savings for households
Option 3: EU targets for food waste prevention	All	- to --	- to --	- to --	Costs fall primarily to MS for implementation of national food waste prevention initiatives to meet targets	+ to ++	Financial savings for households
Option 4: Requirement on separate collection of food waste in the MS	Households and Food Service	-- to ---	-- to ---	- to +	Costs for the EU and for MS will depend upon the level of subsidy and investment. Implementation costs to industry may be followed by profits from separate bio-waste treatment in the longer term.	+	Separates a valuable waste stream from municipal waste, with significant opportunities for environmental benefits
Option 5: Targeted awareness campaigns	Households	-	- to --	0	Costs are primarily linked with use of various communication mediums such as advertising, website development etc.	+	Financial savings for households; targets behaviour change; potential brand advantage for retailers