

Technical Report - Final Draft

Including contributions from participants of the Biowaste Cluster meeting held in Brussels on
12th March 2008

ACR+ BIOWASTE CLUSTER

Reduction of Municipal Organic Waste



European campaign
for waste reduction



NOTE TO THE READER

This working document has been developed by the *Biowaste Cluster* in the framework of the Association of Cities and Regions for Recycling and Sustainable Resource Management (ACR+)’s *European Campaign for Waste Reduction*.

This Campaign launched in 2007 aims to encourage commitment in favour of waste reduction at the local and regional levels, notably via the formulation of guidelines and waste reduction quantitative targets.

Within its 4 line of actions, the Campaign envisages the drawing up of reference points. With this aim, 4 groups of experts or *Clusters* have been set up for the four main municipal waste flows: organic waste, waste paper, packaging and bulky waste.

Cluster groups are ACR+ working groups composed by the Campaign Participants and open to technical experts on the subject (with the approval of the Cluster’s President) representing the academic world, NGOs, private companies, etc. Within each Cluster where a meeting has already taken place, a report on has been elaborated.

The present document, a report elaborated as output of the Biowaste Cluster meeting, is intended to be one of the four main chapters of a more comprehensive report covering the main waste streams mentioned above which would give a wider picture of how to prevent waste in Europe. A key aspect of the present report is to summarize recommendations on packaging waste prevention at European level.

The Packaging cluster meeting on Waste Prevention was held on March 12th in Brussels. A list of participants can be found in Annex.

An important fact to underline is that this document has been subjected to the Biowaste Cluster participant’s appreciations, suggestions and remarks, which we have encouraged to express. Contributions from participants have been made following two modalities: either by modifying directly the draft document text (updating data, expanding explanations, adding new cases, etc.), either through documents that have been annexed to the final report.

Where contributions have been made though modifying the draft document text, the final text is considered to be under ACR+ responsibility. Thus, reflecting the subjective view of ACR+ Secretariat. The documents annexed are, on the contrary, under the participant’s direct responsibility.

Finally, also important to underline is that in this report the terms “reduction” or “prevention” are used as synonyms to cover the following levels:

- suppression or reduction of production
- reuse of products

More information regarding this Campaign can be found at: <http://www.acrplus.org/-kg>

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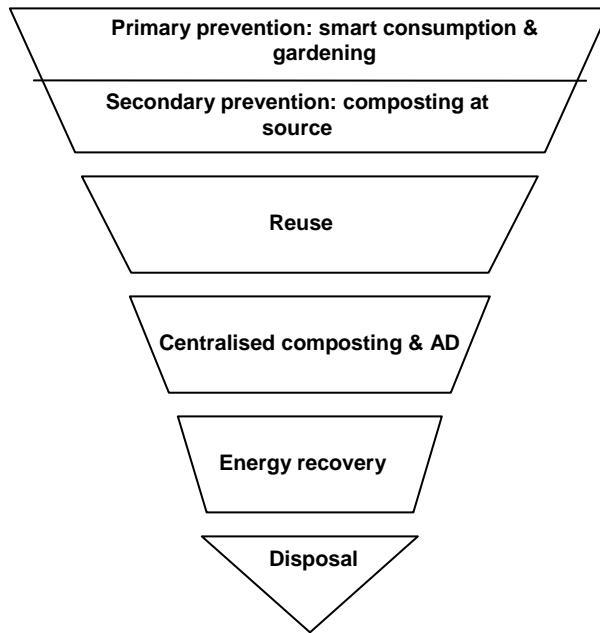
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1. INTRODUCTION

According to European waste legislation, basic principles of waste management are to reduce environmental and health impacts and to save resources.

Waste prevention is a priority matter of waste management policies. More precisely, waste prevention means measures aiming at the reduction at source of the quantity and the harmfulness of diverse waste streams.

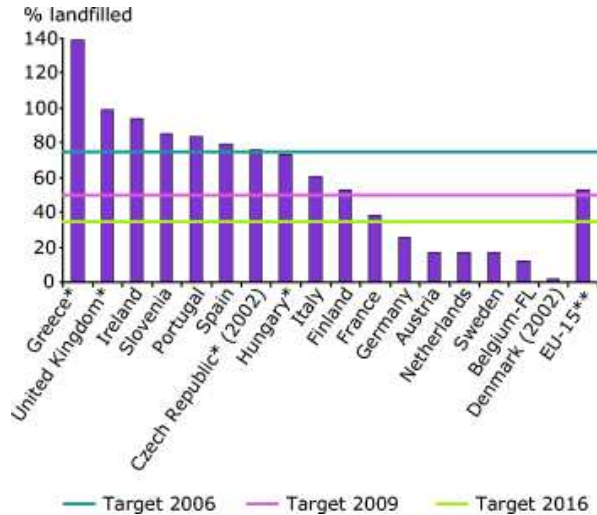
Figure 1.1: 5-level hierarchy of waste management (adaptation J.J. Dohogne)



The most significant fraction of municipal solid waste quantities produced at European level is the organic material. Too much of this biodegradable waste is still being landfilled (Fig.1.2).

In response to these facts, the Landfill Directive 1999/31/EC obliges Member States to reduce the amount of biodegradable waste that they landfill to 35% of 1995 levels by 2016.

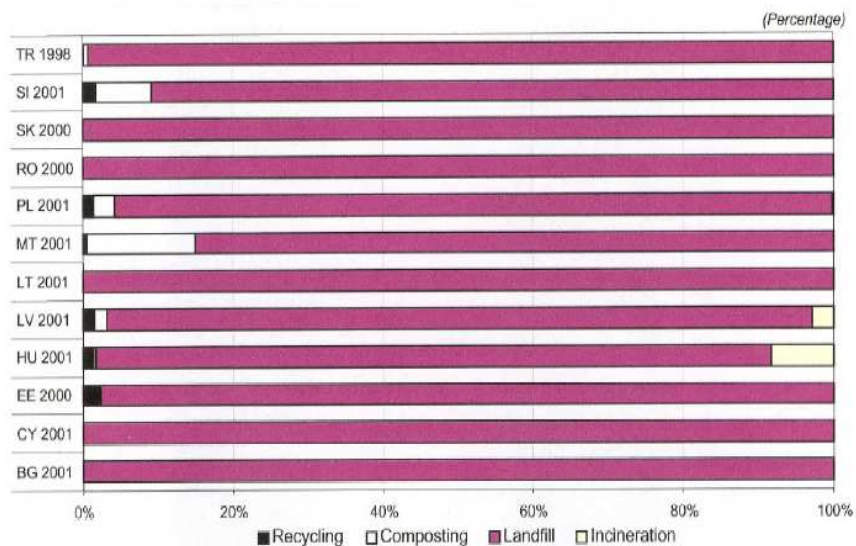
Figure 1.2: Biodegradable Municipal Waste landfilled in 2003 compared to generation in 1995
 (Source: EEA, 2007)



* Marks countries with different target years (2010, 2013, 2020). The figure shows BMW landfilled in 2003 as a percentage of BMW generation in 1995, which is the reference year for the reduction targets set in the Landfill Directive. Most EU-10 countries are not represented in the graph due to lack of recent data.
 ** Excluding Luxembourg and the Belgian regions Wallonia and Brussels.

Also in the new member states landfill is the most common treatment for MW if compared with other possible treatments.

Figure 1.3: Treatment of municipal waste in the new member states
 (Source: Eurostat/OECD)





Food waste and green waste are perceived to be natural and inert as a waste stream by much of the general public, but in fact is the opposite.

The main environmental threat from biodegradable waste is the production of methane (CH₄) when decomposes in landfills. This accounted for some 3% of total greenhouse gas emissions in the EU-15 in 1995 (Livestock account for 18% of greenhouse gas emissions globally (FAO, 2006).

Important to consider is that prevention of organic waste is located at production level as well as at consumption level. Concerning the production level, prevention actions can be applied to the conception of products, the production itself and the distribution of these organic products. Regarding consumption, it can involve the purchase of products, the use and the diversion of the organic waste (c.f. section 2.1 page 9,10).

In what carbon footprint (CF) is concerned, food comprises between 22 to 31% of household's CF (European EIPRO study, 2005 is missing in bibliography), food should be used more effectively for human consumption to have a benefit for all resources (animals, land, water, energy and others) expenses which are necessary for food production and processing.

According to a life cycle assessment study, food products rank among the five most resource-demanding and polluting product groups in Sweden. For other countries similar results are obtained. Different studies about energy use indicate that food is the second most energy demanding group after housing (Engström, 2004).

In this sense, the prevention of organic wastes (or if prevention is not possible, the separate collection and composting of organic wastes, especially at source) would help fight climate change.

2. THE ORIGINS AND QUANTITIES OF MUNICIPAL ORGANIC WASTE

2.1. Definitions and organic fraction composition

Biodegradable waste or “biowaste” comprises kitchen & garden (yard) waste from households. According to ACR+ (C. Saintmard, 2005) they are characterized as:

- a source of nuisance in the household bin (odours, percolation, insects, etc.)
- a source of pollution in landfills (methane emissions and the subsequent greenhouse effect, groundwater contamination, and contamination of surface waters by leachates)
- a fraction easily contaminated by other substances
- a fraction in which humidity is variable and which can reduce the overall energetic efficiency of the waste incineration process

However, if the biowaste is properly separated, collected/ treated and the end product (compost) utilized then the benefits of using this compost have become more evident and measurable. The following benefits of using compost can be highlighted:

- Improves the soil structure, porosity, and density, thus creating a better plant root environment.
- Increases moisture infiltration and permeability of heavy soils, thus reducing erosion and runoff.
- Improves water-holding capacity, thus reducing water loss and leaching in sandy soils.
- Supplies a variety of macro and micronutrients.
- May control or suppress certain soil-borne plant pathogens.
- Supplies significant quantities of organic matter.
- Improves cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use.
- Supplies beneficial micro-organisms to soils and growing media.
- Improves and stabilizes soil pH.
- Can bind and degrade specific pollutants.

The **organic fraction** of household waste is composed of:

1. A **fermentable fraction** commonly called “**kitchen waste**” that includes:

- What is covered by “VFG-waste”¹: Kitchen waste: peels and leftovers, waste from preparation of meals, such as fruit and vegetables, coffee filters, tea bags and eggshells, and non-meal-related materials such as cut hair and flowers
- Meat and fish residues.
Interesting to highlight here is that in most cases meat, fish and even cooked food are not included in source separated biowaste collections. In the case of meat and fish it is mainly

¹ VFG-waste: vegetable, fruit and garden wastes

because of their high level of putrescibility, and in the case of cooked meals mainly due to their high salt content. This is the case for the Flanders Region in Belgium.

On the contrary in Germany, the separated biowaste collection scheme allows those to collect products. This has to do with the way organic waste is processed (anaerobic digestion in this case).

2. A “green fraction” which is composed by:

- Garden waste (known as yard waste in some place) comprises greenery, lopping, and waste from hedge trimming and lawn mowing (Krogman,1998). A slightly ligneous fraction of garden waste: dead leaves, lawn cuttings, hedge and shrubs trimmings, etc. The slightly ligneous fraction is sometimes collected with the “kitchen waste” if separated collection is applied.
- A fraction called “green, yard or garden waste” which is made of the ligneous fraction of garden waste, such as grass, tree pruning, hedge trimmings, dead leaves, dead branches, tree trunks, vegetal residues, etc. An average figure for garden waste could be 3 kg /m² (Saintmard, 2005). In the Brussels Capital Region the green fraction is 80% grass.

For many European cities, the average quantity of food waste from households varies between 200 and 300 grams per person and per day, depending on standard of living, general living and cooking behaviour.

General characteristics of food waste are the followings² :

1 Tonne

- Difficult to characterise (so variable)
- Constituents:
 - Sugars
 - Cellulose
 - Hemicellulose
 - Fats
 - Proteins
 - Lignin

} 35-45% C (as % dry matter)

} 65% C (as % dry matter)

- Moisture usually high (70% or so)
- Total C - 12.5% or so fresh matter (125 kg per tonne)
- Varying N, P, K content
- Net Calorific Value from 3 - 5 GJ/tonne

Paper is also part of the biodegradable fraction. It is commonly felt that paper recycling is a better option than the application of biological treatment, but depending on the local conditions and the existing infrastructure and outlets for paper recycling, paper and cardboard waste may sometimes serve as a valuable source of carbon to allow the composting of food waste. Elsewhere, kitchen towels, paper napkins and tablecloths, or certain papers that have been spoiled by food or that are not acceptable to the paper recycling industry, can be treated by anaerobic digestion (AD) or composting.

This part of the biodegradable fraction will be treated in a specific report dedicated to the paper waste stream.

² D.Hogg – Eunomia. Options for dealing with food waste. Conference: Food, Consumers and Resource Efficiency. November 6-7, 2007. London. is missing in bibliography

➤ **Some specific biowaste flows:**

- *Biodegradable plastics*

The European standard EN 13432:2000 was adopted at the EU level as an ancillary measure to the Packaging Directive. It specifies requirements and procedures to determine the degradation potential, in aerobic and anaerobic conditions, of packaging and packaging materials, according to four criteria: biodegradability, disintegration during biological treatment, the effect on the biological treatment process, and the effect on the quality of the resulting compost. EN 13342 requires 90% biological degradation within 6 months.

In the Netherlands, some bioplastics (marked with the “plant germ” logo) have been collected and treated along with garden, fruit and vegetable waste since 1st May 2004. The Afval Overleg Orgaan (the Dutch waste management council including municipality representatives) acknowledged that the use of bioplastics is better for the environment than other plastics, and that they have no adverse effects on compost quality. Biodegradable plastics in biowaste selective collection, seems also a positive experiment in Kassel (Germany).

In Austria, bioplastics are used successfully for the source separated collection of kitchen waste. Bioplastic sacks which are certified according to EN 13432 are supported by some waste management authorities to the households to lighten the separate collection within the household. As the bioplastic sacks are permeable to air, the biowaste can dehumidify and thus the nuisance of odour and mould can be reduced (Klammer, 2002).

- *Nappies*

Nappies as waste can be also considered in this fraction but will be treated in the report dedicated to Bulky waste and other wastes.

➤ **Composting**

Composting has been defined as a biological process that submits biodegradable waste to aerobic (mostly) decomposition and that result in a product (OECD/Eurostat Joint Questionnaire on waste)³.

A more extensive definition of *Waste Composting* is presented in the Working document on Biological Treatment of Biowaste elaborated by the working group of the DG ENV.A.2 of the European Commission. This document refers to the concept of *Composting* as the **autothermic and thermophilic biological decomposition of separately collected biowaste**. This decomposition is carried out in the presence of oxygen and under controlled conditions by the action of micro- and macro-organisms in order to produce compost.

The final process result, the compost, is as indicated above, seen as an opportunity to provide a material that can be used as a component in growing media or as an organic fertiliser or structure soil improver. As a parameter to measure the positive effects of compost humic acids can be used. Humic acids are a measurable part of humic substances well known in soil sciences. As an easy measurement method for this parameter Fourier Transform Infrared (FTIR) spectroscopy was adapted in the last years by the

³ Source: <http://waste.eionet.europa.eu/definitions/composting> should be included into the bibliography

Institute of Waste Management, University of Natural Resources and Applied Life Sciences, Vienna (Meissl et al., 2007a; Meissl et al., 2007b).

Composting process dissimilates the carbon of the input material mainly into carbon dioxide (CO₂)⁴. The remaining organic matter in the compost is relatively stable and further degradation is rather slow. Other gaseous emissions include water vapour, ammonia (NH₃), volatile organic compounds (VOC), bioaerosols and particulates. Also some CH₄ emissions are present as it is often not possible to guarantee that all material will be kept under aerobic conditions at all times.

Well known is that CH₄ emissions (predominant in landfills due to anaerobic conditions) are relevant for the climate change impacts while, in this case, CO₂ emissions are considered as climate-neutral because they originate from biomass (EC DG JRC, 2007).

The working document mention above also defines different sub-categories of composting as follows:

- **'windrow composting'** as the composting of biowaste placed in elongated heaps which are periodically turned by mechanical means in order to increase the porosity of the heap and increase the homogeneity of the waste;
- **'in-vessel composting'** is the composting of biowaste in a closed reactor where the composting process is accelerated by an optimised air exchange, water content and temperature control;
- **'home composting'** means the composting of the biowaste as well as the use of the compost in a garden belonging to a private household;
- **'on-site composting'** is the composting of the biowaste where it is generated;
- **'community composting'** means the composting of biowaste by a group of people in a locality with the aim at composting their own and other people's biowaste in order to manage the supplied biowaste as close as possible to the point at which it was produced.

In the present report, only the last 3 categories representing decentralized composting at source (home composting, on-site composting and community composting) will be considered as waste prevention actions due to the fact they allow less biodegradable waste to be collected by local authorities, reducing then the general collection and treatment costs for the municipality. In the other two cases, composting is considered just as an organic waste treatment method.

The concept of biowaste considered in this text refers to the food waste and the green waste described above.

Food wastes come not only from households, but also from communities such as administrations, companies and schools canteens. Food wastes also come from the HORECA sector, retailers and supermarkets.

Green wastes are issued from households and from local and regional authorities, meaning in this last case that they come from places such as parks, cemeteries and other green spaces. Other green spaces are for example businesses such as golf clubs that could compost their grass and branches.

⁴ The carbon converted into CO₂ depends on the nature of the input material i.e. 2/3 for kitchen waste.

2.2 General figures: quantification of biowaste generation and collection

2.2.1 Quantification biowaste generation

The biowaste potential will depend on following factors:

- Type of building
- Number of floors/ building
- Number of household/ floor
- Number of persons/ household
- Growth of plants
- Size of garden are / building
- Food pattern
- Season
- Standard of living

In most countries in the world, organic materials are the main contributors to municipal waste. Depending on local conditions, food and drink habits, climate, and degree of economic development, between 30% and 40% by weight and volume of municipal solid waste (MSW) consist of food and garden waste. This proportion is much larger (up to 80%) in Mediterranean countries.

In Mediterranean areas, high percentages for fermentable waste can be explained by:

- a large use of vegetables and fruits in the daily diet and in the preparation of meals;
- the effect of tourism generating waste from meals; and
- the lower presence of packaging because of a less wealthy economy, and the lower use of pre-cooked or frozen products

In Italy, for instance, the contribution of food waste alone by door-to-door segregated systems accounts for 60 to 90 kg per inhabitant per year. Green waste ranges between 30 to 150 kg per inhabitant and per year.

According to ASCOMADE (2006), the average of biowaste (green waste and kitchen waste) produced in France is 90 kg/inhabitant/year.

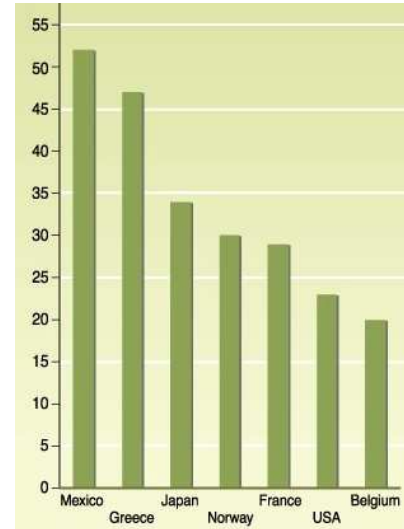
A modelling study on biowaste flows for life-cycle assessment – a calculation of the potential and collected weight of kitchen and garden waste (Sonja Schmidt and Claudia Pahl-Wostl, 2007) reveals that the weight of kitchen waste depends on the standard of living, food preparation and consumption patterns, the 'inhabitants views of ecological beneficial behaviour and the number and age of people living in the household. The values range between 30 and 90 kg/inh/y. A default value of 75kg/inh/y is retained as the average kitchen waste potential. The assumption that the weight of kitchen waste increases with the frequency of the consumption of fresh food could not be proven.

For EU, depending on the local conditions, municipal solid waste is made up of between 22% (UK) and 49% (Greece) of food and garden waste. Barth (2000) suggests an EU average figure of 32%.

Table 2.1: The organic fraction of municipal solid waste (Source: Barth, 2000)

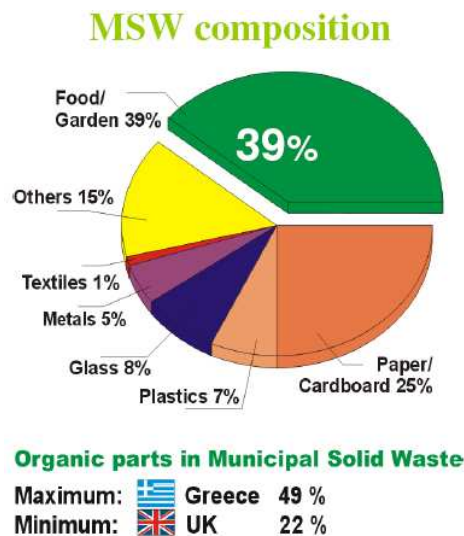
Country	Percentage organic material (%) (year)	
Austria	29	(1991)
Belgium	48 Flanders	(1996)
Denmark	37	(1994)
Finland	35	(1998)
France	29	(1993)
Germany	32	(1992)
Greece	49	(1987/1993)
Ireland	29	(1995)
Ital	32 - 35	(1999)
Luxembourg	44	(1994)
Netherlands	46	(1995)
Portugal	35	(1996)
Spain	44	(1996)
Sweden	40	(1996)
UK	22	(1997)
EU Average	32	

Figure 2.2: % of solid organic waste generated in 7 OECD countries (Source: OECD, 2002)



According to a study carried out in 2004⁵ this average has been recalculated to 35%. Three years later, (2007?) the Joint Research Centre estimated that the organic waste fraction in the municipal solid waste composition rose to 39% (Figure 2.2), remaining Greece as the highest organic waste generator and UK as the lowest.

Figure 2.3: Municipal solid waste composition and its organic part (Source: Joint Research Centre cited by Bill Duncan, Porto Conference⁶, 2007)



⁵ Source: Table 1-1: Waste generation in the EU and organic fraction therein in Heavy Metals and Organic Compounds from Wastes Used as Organic Fertilisers. WG: Amlinger, Pollak, Favoino, 2004 is missing within bibliography

⁶ Porto Conference: "25 Years, 27 Countries, 27 Cases – The Management of Solid Waste in Europe", Porto, 24th to 26th of October 2007, <http://www.liporeuropeanconference.com/>

Recent and extensive data gathered from ACR+ internal working groups (2006) indicated that a European average of organic waste produced accounts for 220 kg per inhabitant and per year. reference?

2.2.2 Quantification biowaste collection

The biowaste collection will depend on following factors:

- provided volumes of dustbins/ capita wk
- configuration of charges
- separate collection
 - o type of collection of biowaste
 - o length of collection period
 - o provided volume/ capita
 - o rules of eligibility
 - o number of participants
- actual use of home composting
- ecological awareness of participants
- lifestyle
- public relations, information
- constraints on using a collection type

In a survey among 23 municipalities in Europe, ACR+ has found that organic waste selective collection varies from 21 to 227 kg/inhabitant with an average of 95 kg. Ten out of 23 municipalities collect 100 kg/inhabitant or more. Five collect more than 125 kg.

The graphic below presents selective collection results. It also illustrates the share between organic waste from garden and from kitchen for certain cities.

In Italy, for instance, the contribution of food waste alone by door-to-door segregated systems accounts for 60 to 90 kg per inhabitant per year. Green waste ranges between 30 to 150 kg per inhabitant and per year.

In 2004 the average proportion of biowaste (green waste and kitchen waste) within Austrian residual waste from households was 37% or 63 kg/inhabitant and year. In addition, 67 kg of biowaste (green waste and kitchen waste) per inhabitant and year were collected source separated from households (BAWP, 2006). Thus, in sum the amount of generated biowaste in Austria is about 130 kg/inhabitant and year (without consideration of home composting).

The biowaste potential can be collected in at least 4 different ways (**see annexe 2**). If private gardening is possible the biowaste could be composted and recovered as fertilizer in the garden (1). Without separate collection, the biowaste is collected in the dustbins of the households and forms the organic portion of the residual waste (2). If a separate collection system is introduced, it could be organized by curbside collection (3) and/or as a bring system (4).

Even when there is separate collection of biowaste, a minimum portion of biowaste remains as an organic portion in the residual waste.

Both the potential kitchen waste and the potential garden waste are in general present in the four collection types (if offered), but their proportion vary.

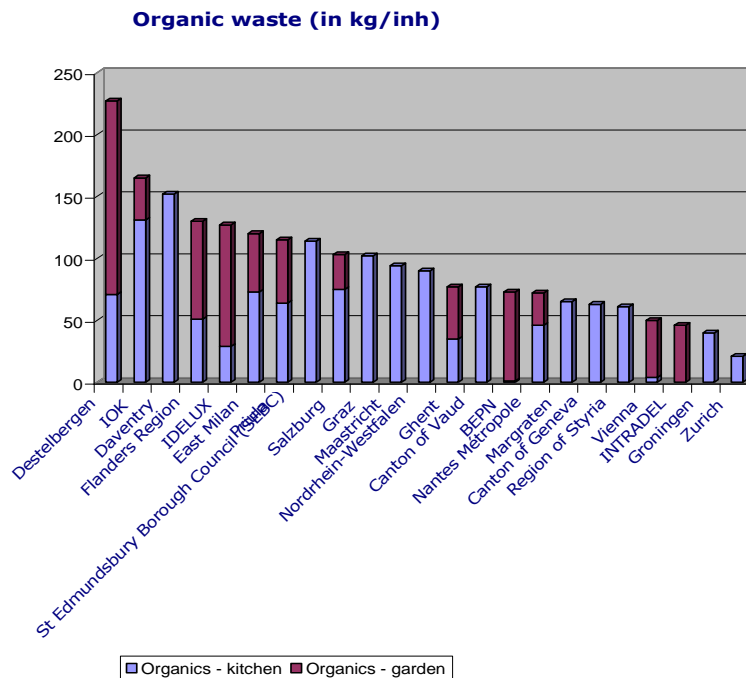
The weight of the garden waste collected by the bring system depends on the design of the collection system. Values between 5 and 60 kg/inh/y have been found in the literature (Doedens, 1996; Wiemer

1989; Schmitt et al. 1999). The literature analysis shows that the weight of the organic portion in residual waste correlates with the provided volume of the waste dustbin, the design of charges, and the degree of private gardening. This weight varies between 20 and 190 kg/inh/y (Ketelsen and Doedens, 1996; Sheffold 1998; Wiemer and Sprick, 1996).

The literature shows that the weight of the separately collected biowaste depends on the garden waste potential, as well as the type and the design of the separate collection system (Sheffold 1998; Farrell 2001). Sheffold (1998) provides a formula for a rough estimate of separately collected biowaste materials in the biowaste dustbin. If a biowaste dustbin is introduced voluntarily, up to 150 kg of biowaste is collected by each participating person per year. If the biowaste dustbin is compulsory for every household, up to 100kg per participating per person is collected every year. If the biowaste dustbin is introduced but households are allowed to request an exemption if they prove that they use home composting, up to 120 kg is collected separately per participating person per year.

Finally the weight of home-composted biowaste is estimated after the weight of biowaste of the bring system, the biowaste of curbside collection, and the organic portion of residual waste have been calculated.

Figure 2.4: Organic waste (kitchen and garden) selective collection (ACR+2006)



Where there is no separate data, it is not possible to estimate whether this organic fraction is made of kitchen waste or of garden waste. Where separate data are provided for garden and for kitchen organic waste, it shows that quantities are quite comparable with averages of 58 kg/inhabitant/year for kitchen waste and 64 kg/inhabitant/year for garden waste. For example, according to Austrian Waste Management Plan 2006, the figures for Vienna which are shown below include both kitchen and garden waste because both wastes are collected within the separate collection of biowaste.

Table 2.2: Estimations of different fractions of biodegradable waste in France⁷

	Total arising/inhabitant
Household waste	135 kg
Green waste	135 - 200 kg / person
Urban sewage sludge	165 kg / person
Organic waste from services	25 kg / person
Problematic organic wastes from agricultural industries	50 kg / person
Organic wastes from the paper industry	30 kg / person
Organic wastes from other industries	13.5 kg / person

Those variations explain that some local authorities collect selectively up to 220 kg of organic waste/inhabitant/year. However, the bulk of analysed cities collect between 100 and 150 kg of organic waste per inhabitant and per year.

2.2.3 Factors influencing garden biowaste and green waste generation

Whereas kitchen waste represents a rather constant fraction, garden waste production and collection will vary significantly according to:

- the rural or urban character of the city considered
- the organization or not of a kerbside collection
- the promotion of home composting
- the period of the year considered

In contrast to the kitchen waste potential, the literature reports that the weight of garden waste potential/inh/y greatly varies. Values from 20kg/inh/y (Ketelsen and Doedens 1992) to more than 700kg/inh/y (Wiemer and Sprick 1996) have been reported. This seems to be due to a number of factors, such as the season, the growth of different plant types, the type and extent of land use for building, the garden area/inh, and the use of garden area. For example, the growth of plants varies between 0.5 and 4kg garden waste potential/m²/y (Doedens 1996; Fricke et al. 1994; Sheffold 1998; Wiemer and Sprick 1996).

Besides those variations, the actual amount of municipal organic waste will depend as well of the inclusion or not in municipal waste collection of waste from other origin such as:

- green waste from parks
- waste from agricultural industries
- waste from restaurants and services
- urban sewage sludge

⁷ Source : Estimations ADEME (F) 2004 dans Projet de Guide pratique à l'attention des élus locaux "Valorisation des déchets organiques : comment mettre en place vos débouchés ? », AMORCE

2.3. Food waste

2.3.1. From citizens (households food waste)

➤ People's perceptions and factors that influence household's food waste production

A study carried out in UK by WRAP (2007) showed that people believe more food is thrown away after it has been prepared than as raw ingredients. Almost a third of people (32%) say they throw away a significant amount of food left on the plate and almost a quarter (24%) say they often throw away significant amounts of food prepared but not served, or products opened but not finished.

This perception doesn't fit with other evidence, which suggests that there is more raw food in the bin than cooked food. In fact, peelings, offcuts and by-products like tea bags that are thrown away as inedible elements of food waste not being perceived as "a waste" in the same way as waste from food prepared but not eaten.

In Austria, waste sorting analyses of over 800 samples of residual waste⁸ from households indicate a proportion of:

- 3 to 9.5 % of preparation residues (e.g. peels, offcuts,...),
- 1.5 to 6.1 % of leftovers (cooked or prepared for eating but not eaten),
- 2.3 to 6 % of original food (food which package was not opened or unpacked sold, raw food which was not eaten) and
- 2.2 to 5.9 % of partly used food (products opened but not finished).

The lower figures were found in rural areas whereas the higher values could be found in urban areas (Schneider and Obersteiner, 2007). On the one hand, the method of waste sorting analyses is a better way to measure amounts than interviews as the interviewed people often can not estimate amounts the right way. On the other hand it should be kept in mind, that those figures do not represent other disposal paths such as biowaste collection, home composting, sewer or pets.

In the mentioned WRAP study (2007), it is suggested that factors that influence household's food waste to be considered are resumed as follows:

- *Pre-shop planning*

Underlines the importance of food management such as preshop preparation, including menu planning, checking of what ingredients are in stock and compiling and a shopping list are all routes leading towards less food being wasted. Indeed, less than half (48%) of people in the UK who do write a list (or make a mental list) sticks to it most of the time and only a quarter of people buy unplanned items. The figure is higher for families with children; 44% of shoppers with children stray from the list at least sometimes. Also, it has been shown that elderly people are much more likely to make lists and waste less.

⁸ residual waste is waste which is generated at households and kerbside collected by municipality without consideration of recyclables

- *Impact of Lifestyle Choices and Confusion about Dates*

The trend towards healthier eating can have unforeseen impacts on food waste. There is evidence that the focus on the health advantages of fruit and vegetable consumption encourage to buy an increasing amount of fresh products, a significant proportion of which is wasted.

The 'use by' date is an instruction applied to foods, such as fresh meat and fish, where serious forms of food poisoning are a real risk; whereas a 'best before' date is advisory and tends to be applied to low risk foods and those with a longer shelf life. While food quality is likely to decline after the 'best before' date has passed, health issues are not likely to be a problem. The Food Standards Agency (FSA) found that only one-third of people correctly interpreted these terms and more than one quarter thought that food past its "best before" date could be unsafe and should be thrown away.

Furthermore, waste sorting analyses carried out in Austria indicate that even if the "best before" or "use by" date has not been reached or exceeded, food items are wasted. The found products were e.g. eggs, beverages, sweets, butter, yoghurt, convenience food, meat, frozen food, tinned food and so on. Sometimes the time span to reach the "best before" date is more than one year (Schneider and Obersteiner, 2007).

- *Post-shop storage*

In general, they found evidence of poor understanding of storage requirements in the home. Fridges are often too warm and many people have a poor grasp of stock control skills and an inability to make use of existing food stocks before going out and buying more. The combination of these factors, along with a dramatic increase in the amount of fresh and chilled food on sale, is increasing the amount of food being wasted in UK homes.

- *The age of people*

Older people tend to prepare more from scratch and plan better, making just the right quantities. Young people do not show much interest in culinary skills, with 50% of those under 24 saying they do not cook anything from scratch and have no skills to make use of leftovers. Families with children buy with the children's tastes in mind and often cook separate meals for children and adults in the family, exacerbating waste problems.

Also, the influence of children on food waste seems to be significant. Families with young children prefer to over- rather than under-purchase, so they don't run out of provisions. Young families consistently report higher levels of wastage: almost half (47%) say they throw away food left on the plate after a meal compared with 32% of households in general. In addition, young families among us are more sensitive to food hygiene concerns and dates on labels. They are more likely to say they ruin food in preparation, and much more likely to cite children's dislike of the food as a factor in wasting food.

Similar results were also found within a study which was carried out in different parts of the City of Vienna. In sum 424 interviews could be used for statistical analysis which demonstrated only very slight differences between the 0 to 30, 31 to 40 and 41 to 50 age group. Within those groups around 18 % of the interviewed people stated that they never waste food whereas more than 60 % of interviewed people aged over 60 years said they never threw food away. A possible reason for this significant statistical correlation was suggested by Homburg and Matthies (1998) who argued that the particular system of values of the "post war generation" where saving and recycling were particularly important, exerted a considerable influence. However, financial restrictions of retirees or an increasing amount of time spent at home may also be a factor of influence (Wassermann and Schneider, 2005).

- *Change of habits*

In many households mealtimes are no longer a central part of family life. This has been dubbed the “casualisation” of meals. For example, in 1994 a meal took us on average 30 minutes to prepare, in 2004 we took just 19 minutes. And we eat together as a family less than we used to. In 1994 34% of meals were eaten alone compared with 54% in 2004. And there is no doubt that unpredictable eating patterns make planning meals – and therefore planning shopping trips and minimising food waste – more difficult.

Considering habits and education, an element to add to these factors is the fact that younger families allow more and more their children not to finish their plates, creating behaviours difficult to modify during adolescence and adulthood.

➤ **Some figures: quantification of food waste generation**

In **Belgium**, in the Walloon Region, 50 to 70 kg of kitchen waste is produced per person and per year (approximately 170,700 – 239,000 ktonnes/year⁹) (RDC, 2007).

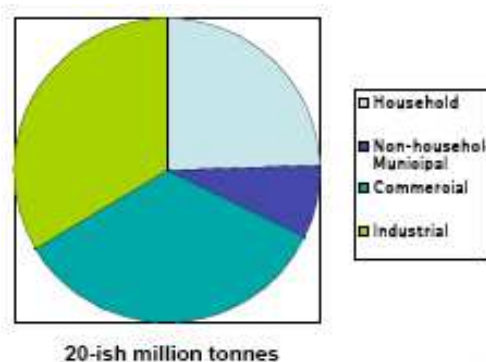
The part of the organic (compostable) waste in household dustbins was 54 % as average of the years 2003-2004, this included food and green wastes. Wood wastes represented 0.7%¹⁰.

In the Brussels Region, the food waste produced by householders is estimated to 25,000 - 30,000 tonnes/year. This represents between 25 and 30 kg per inhabitant each year (60,000 tonnes organic wastes are produced in an annual basis by householders, representing around 60 kg/person/year) (RDC, 2007).

In the **UK** approximately 20 million tonnes of food are thrown away: ~1/3 household + municipal (200 kg/hhld/yr – 3-4 kg per pick-up), ~1/3 commercial sector (Small deli – 140 l bin/week approx. 70-80 kg per pick-up) and ~1/3 industrial sector (25,000 tonnes per annum 100 tonnes per day). 6.7 million tonnes of food are thrown away by householders each year, most of which could have been eaten (1 tonne for every 9 people) or, in other words, 1/3 of the food bought is thrown away (16.5 kg/hh/wk bought and 5.2 kg/hh/wk thrown away).

Main reasons for this are the fact that people cook or prepare too much food (1/3) and that food is let to go past its "use by" date and that it is forgotten and goes off (2/3). 90 % of people do not realise how much good food they thrown away.

Figure 2.3: Who and How Much? (Source: D. Hogg, Eunomia, Conférence WRAP 2007)



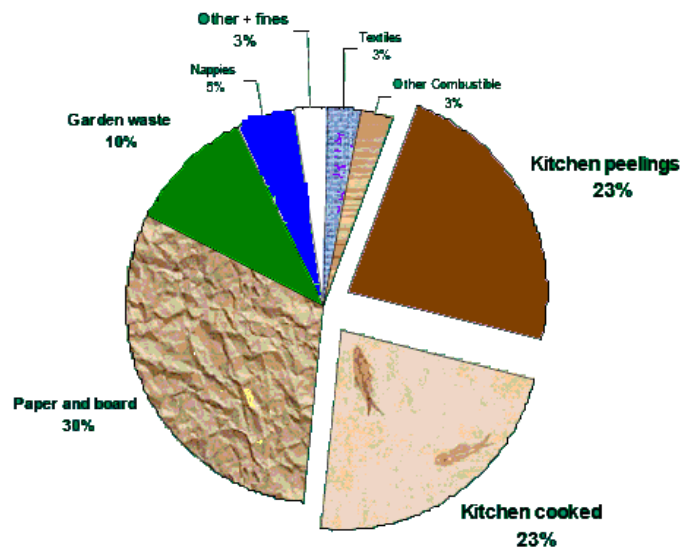
⁹ Walloon Region Population: 3,413,978 (January, 2006)

¹⁰ Portail environnement de Wallonie; <http://environnement.wallonie.be/> , 25/01/2008

A study based on compositional analysis of organic waste carried out by 115 local authorities in England¹¹ showed that the proportion of food wasted by households can be much higher than the 1/3 national average. Estimations showed that the kitchen waste regularly collected from households (not currently separated for recycling) at the kerbside for disposal represents 46% (Fig 2.4.) i.e. 14050 million tonnes/year collected in dustbins for landfill or incineration. 23% are composed by peelings and the other 23% by cooked food.

Data about the proportion of kitchen waste within Austrian residual waste are shown at the beginning of this chapter. If one only has a look at the composition of kitchen waste fraction (preparation residues, leftovers, original and partly used food) within residual waste, approx. 34 % are preparation residues, about 19 % leftovers, 15 to 25 % is original food and 25 to 32 % is partly used food. These figures are based on over 1,200 samples of residual waste bins from households (Schneider, 2008). This means that approx. 43 kg of original and partly used food is wasted per capita and year in urban areas in Austria.

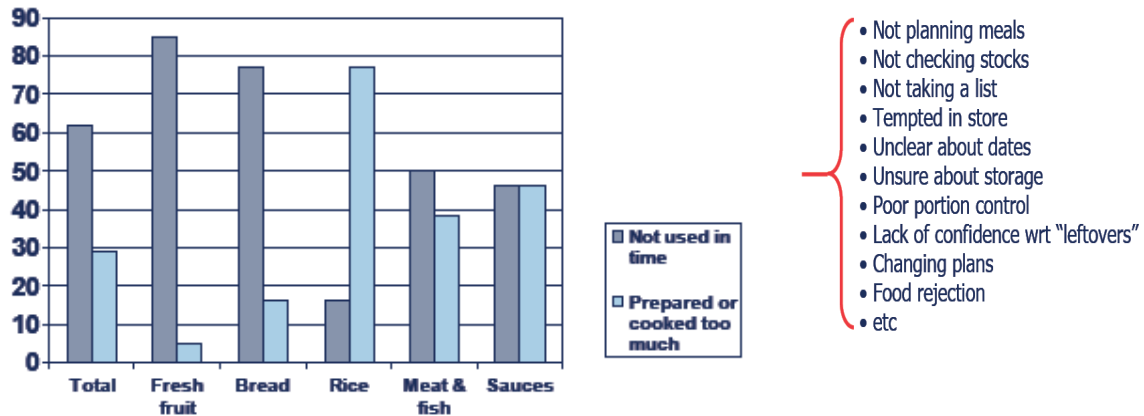
Figure 2.4: 'Dustbin' residual waste - biological municipal waste (BMW) composition 2005/06
 (Source: J. Parffit - ECT Group, 2007¹²)



Most of the food thrown away ends up in landfill sites (5.9 mt go to landfill and 0.8 mt get diverted by home composting, collected for treatment, fed to pets, down sink, etc.). The food wasted in this way costs at least GBP 8 billion every year to consumers. Producing, transporting and storing food uses high quantities of energy, water and packaging which is wasted if the food gets thrown away uneaten (A. Parry, 2007).

¹¹ There are no data for the rest of the UK as there is no regular UK-wide programme for compositional analysis (J. Parffit).
¹² J. Parffit - ECT Group. Conference: Food, Consumers and Ressource Efficiency. November 6-7, 2007. London. Slide n7

Figure 2.5: Why is Food That Could Have Been Eaten Thrown Away? (Source: A. Parry, Eunomia, Conférence WRAP 2007)



2.3.2. From others sources

▪ Schools

Belgium

In 2004, around 379 tonnes of organic waste was produced by Brussels Region schools¹³. The Region measured that food wasted amounted to 6 kg/pupil/year. This represents some 23% of the weight of the total school waste¹⁴.

Sweden

A study analysed two restaurants and two school kitchens to measure the various kinds of food losses, storage (improper storage) and preparation losses, serving losses (left on serving dishes, in bowls) and discarded leftovers (not served) as well as plate waste. The results indicate that about 16 % of the purchased food was cooked and ready to eat but ends up as loss. Plate waste was the largest proportion with 10 % (Engström and Carlsson-Kanyama 2004).

▪ Canteens of offices and public administrations

Belgium

In the Brussels Capital Region, 12,600 tonnes/year of food waste are produced by canteens of offices and public administrations (43% of 4,500kg waste produced by a canteen employee per year is food waste; there are 5731 canteen employees in the region) (RDC, 2007).

¹³ Analyse de la pubelle des écoles en Région de Bruxelles-Capitale, 2004 cited by RDC, 2007

¹⁴ Van Bambeke-IBGE, 2006



HORECA

Belgium

In the Brussels Capital Region, a study carried out by RDC Environnement (2006) affirms that the food waste produced by the HORECA sector is 11 500 tonnes per year (approximately 65% of the 18 000 tonnes of the total waste produced every year by this sector).

Portugal

In the framework of the Organic Valorization Strategy, the “Intermunicipal Service for Waste Management of Grande Porto” (LIPOR)¹⁵ is implementing collection schemes for organic waste in Porto Greater Region. These collection schemes focuses on big producers of organic waste (restaurants and canteens) addressed to a mixture of kitchen and food waste. In this context it has been estimated that each restaurant produces an average of 20-25 kg of organic waste/day.

Within the waste prevention project designated “Less 100 Kg/inhabit./year”, LIPOR is developing a pilot project for restaurants. The main idea is to propose to the restaurants, the elaboration of menus that do not generate “food waste”. For that, information meetings were held regarding the different aspects and possible approaches, allowing communication (ideas and suggestions) between all interested parties. The pilot project has been already launched in a restaurant and monitored the effective quantity of food residues being produced. This monitoring consists on weighting the leftovers of customers’ plates and dividing them into three categories (vegetables, carbohydrates and proteins). This distinction allows to get an idea of the right quantities of these categories to be used in the menu (right portion) therefore, “food waste” is consequently reduced. Strong awareness campaigns will be developed to encourage other restaurants to join this pilot project. According to LIPOR, this action could bring economic advantages not only for the restaurants but also for the city in which waste transportation concerned.

Retailers and supermarkets

➤ **The influence of retailers: special offers and big packs**

According to WRAP (2007), retailers are extremely influential in peoples purchasing decisions and will be a key stakeholder in solving the problem of unnecessary food waste. Supermarkets clearly dominate food shopping trips. Many people in UK agreed in being tempted by special offers to buy either more than we need or to impulse buy an unplanned item. Though they are presented as money-savers, they often end up thrown away uneaten. Bigger packs are another temptation that can lead to increased food waste.

➤ **Some figures**

Belgium

- *Retail sector:* Data from the Brussels Capital Region shows that food waste from the retail sector amounted to 40,000 tonnes in 2006. This is the equivalent to 40 kg of waste produced per inhabitant and per year¹⁶.

¹⁵ LIPOR: www.lipor.pt

¹⁶ Van Bambeke-IBGE, 2006)

- *Wholesalers:* The European Centre of fruit and vegetables (ECFV)¹⁷ generates approximately between 5,000 and 6,000 tonnes of waste of fruits and vegetables a year (this includes all importers together)¹⁸. According to RDC Environnement (2007), the ECFV together with the national markets in Belgium produce around 10,000 tonnes food waste.
- *Big distribution sector:* Moreover, the total volume of food wastes issued from the big distribution sector (all sizes and food kinds of shops and supermarkets) accounts for 2,800 tonnes¹⁹. Officially, this waste stock is not considered as a Brussels waste stock because it is transported to distribution platforms located in the Flanders and Walloon Regions (RDC, 2006).
- *Small shops, markets:* Small shops (1,300 t/y), markets (1,000 t/y) and the “Heysel site”²⁰ (450 t/y) account together for 2,075 tonnes per year.

Austria

- *Retail sector:* A ten week lasting case study was conducted at two stores operated by a discount supermarket chain in Vienna. It was found that an average of 45 kg per day (13.5 t per year) of second-grade food products still suitable for consumption were disposed of by each retail food store (Schneider and Wassermann, 2004; Salhofer et al., 2007). Extrapolating from this amount to the total number of supermarket stores operated in Austria in 2007 (over 4,100 stores), a prevention potential of 55,600 t per year (7 kg/cap/yr) can be calculated for Austria.
- *Bakeries:* It is estimated that about 12 to 17 % of the daily output of a bakery is not sold to customers but in a large part wasted. Based on an environmental report of a Viennese bakery chain, it was calculated that 38 kg per day and store (11.6 t per year and store) of wasted bakery products would have still been edible. Thus, a total prevention potential of about 3,900 t per year (2.5 kg/cap/yr) of bakery products was roughly estimated, taking into consideration the 340 stores of the 13 largest bakery chains in Vienna (Salhofer et al., 2007).

Portugal

Following the collection schemes established for organic waste, the “Intermunicipal Service for Waste Management of Grande Porto” (LIPOR) has implemented the selective collection of fruit and vegetables for the distribution sector in Porto Greater Region.

From 9 different retailers an average of 500 tones/year of vegetables and fruits were collected in 2007 and addressed for composting.

In what markets are concerned, the major market in Porto generated in 2007 around 1,000 tones of fruits and vegetables that were also addressed for composting by the same collection schemes.

2.4. Green waste

It is interesting to highlight the fact that garden waste amounts highly varies according to the rural or urban character of the municipality in opposition to kitchen wastes where quantities show less variation. As an average at EU level, garden waste generation in cities can be considered between 20 and 30 kg/inh/year. Concerning rural areas, this can rise up to 250 kg/inh/year.

¹⁷ European Centre of fruit and vegetables <http://www.cefl-ecfg.be/en.htm>

¹⁸ Pers. Com. Mrs. Marion Van Cauteren, Assistant Manager, European Centre for fruits and vegetables, marion.vancautereren@cefl-ecfg.be

¹⁹ This estimation does not include the quantities of food donated to the association “Restos du Coeur” (<http://www.restosducoeur.org/>) that offers diary meals to people in need.

²⁰ Heysel site



2.4.1. From citizens

Belgium

- In the Brussels Capital Region, the “Agence Bruxellois de la Propreté” collects door to door (in 10 of the 19 municipalities) and through containers about 20,000 tonnes of garden waste yearly (RDC, 2007). This can be used as an indicator of green waste generation by householders.

According to a study carried out by the IBGE in 1997, green waste from garden was estimated to 70 kg/are/year.

- In the Walloon Region, 50 to 100 kg garden wastes are produced per person and per year, that is to say 170,700 – 341,400 ktonnes/year²¹.

- In the Flanders Region, garden waste poorly woody (faiblement ligneux) represents 46.5% of the fermentable fraction of the household waste.

Germany

In Germany it was found that on average 79% of the garden is used for gardening including 55% lawn, 12% flower garden, 9% trees and hedges, and 3% fruit & vegetable garden (Rupper and Haas 1989).

Flanders (BE)

In Flanders, 30% of garden owners have more than 75% lawn (OVAM, 2007).

UK

The green waste regularly collected from households (not currently separated for recycling) at the kerbside for disposal (landfill or incineration) represents 10% (Fig. 2.2).

2.4.2. From LRAs (green spaces, cemeteries, etc.)

Portugal

Included on the strategy to assure inputs into the Composting Plant of the “Intermunicipal Service for Waste Management of Grande Porto” (LIPOR), a campaign for the green waste was launched. Private companies can deposit free of charge the green waste on LIPOR’s facilities as long as they assure the quality parameters established for the green waste.

In 2007 around 1,050 tones of green waste from private companies were received in Lipor facilities.

Within the Integrated Waste Management System of LIPOR, the 22 Ecocenters of Porto Greater Region allowed in 2007 to receive a total of 7,500 tones of green waste.

Another project within the strategy to assure inputs to the composting plant was to process the green waste from cemeteries. This flow was before addressed with the municipal solid waste into incineration.

With the current collection schemes, LIPOR assured in 2007 to compost 1,671 tones of green waste from 40 cemeteries in Porto Greater Region.

Belgium

- The *Brussels-Capital Region* has jurisdiction over the territory made up of the 19 communes of Brussels. This territory covers 162 km². Woods, parks and the forest (Forêts de Soignes) totalise a surface area greater than 5 500 ha of which 2 800 ha are public spaces. This is the equivalent of more than 50 sq. meters per inhabitant. (Source: FRA- ACR+).

²¹ Walloon Region Population (January 2006): 3,413,978

The maintenance of green spaces in the region is in charge of the Brussels Environment Administration IBGE-BIM (+/- 350 ha) and of about ten private enterprises. In 2006, the IBGE-BIM collected 697 tonnes of green waste and 23.30 tonnes of stumps²², making a total of 720.30 tonnes of biodegradable waste issued from green spaces. Data from the private companies concerning the quantities collected are difficult to obtain, and no estimation is available.

Data gathered by the IBGE (1997) shows the following figure for green waste from parks

	Surface	Waste in tonne/inhabitant/year	Waste in tonnes/an
Herbs	487	14	6800
Wood	487	13	6300
Bushes (Arbustes)	160	9	1400
Streets (lines of trees)	479	3	1400

²² Pers. Com. M Soetens, Chef de sous-division Adjoint entretien - IBGE-BIM, ps0@ibgebim.be

3. THE POTENTIALS OF WASTE PREVENTION CAMPAIGNS – LESSONS FROM LRA'S EXPERIENCES

3.1. Preventing food waste

Management seems to be crucial to avoid food waste. More food can be eaten instead of wasted if it is managed better. This is possible mainly through: buying according to demand, correct storing, used in time and cook correct quantities.

In order to fight against food waste, different initiatives have been developed. For instance in the UK, WRAP is working with stakeholders and partners to reduce consumer food waste by 100 000 tonnes by March 2008. They are launching a consumer-facing food waste campaign called "Love food, hate waste" which aims to reduce consumer food waste and to increase food waste recycling. WRAP is also working with retailers and manufacturers (through the Courtauld Commitment) to develop new approaches to help consumers get the most out of their food²³.

But it should be kept in mind that buying, eating and wasting behaviour is an habitual behaviour and therefore the decisions are driven by automatic actions and are not scrutinised by the consumer. The consequence is that those behaviour patterns hardly can be changed immediately. In addition, also situational factors such as smell, hunger, appetite, attractive special offers cause to act on impulse during shopping tours (Lebersorger 2004). Thus, prevention measures regarding food waste should be designed for long term application with a comprehensive and integrative approach (Schneider, 2008).

3.1.1. At the level of citizens

In Brussels Region (BE), simple guidelines were used to reduce 10kg/inh/year wasted food

Brussels Region has measured from bin analysis that waste food from households amounted to 15,000 tonnes (equivalent to 15 kg per inhabitant per year, or to 12% of the weight of ordinary sacks). Pilot schemes where citizens were provided with simple recommendations and guidance resulted in a reduction of food wastage by 10 kg/person/year²⁴.

From collective catering

Italy

In Turin 36 tonnes of bread and fruit waste were saved

The Azienda Multiservizi Igiene Ambientale Torino (AMIAT) has started the collection of bread and fruit still edibles from 120 school canteens (31,000 pupils) in Turin for a total of 36 tonnes in an academic year with a total savings exceeding 86.000 €.(data 2007). This collection allows to prepare every day more than 260 bread portions and 160 fruit portions for people in need who go to the canteens managed

²³ M. Bartel – WRAP, Conference on Food, Consumers and Resource Efficiency. November 6-7, 2007, London; Love food, hate waste Campaign : <http://www.lovefoodhatewaste.com/>

²⁴ Van Bambeke J. (2006) 100kg less waste: organic waste – preventing food waste (IBGE) Powerpoint Presentation Slide #3

by ecclesiastic organisations. The law that governs this kind of collection is called in Italy "Good Samaritan Law".

AMIAT has started also the collection of other kind of food still edibles issued from supermarkets (cheese, meat ...) for a total of 350 kg collected every day²⁵.

3.1. 2. At others levels

Austria

Concerning the waste generated from commerce itself, **Vienna** estimates a reduction potential of edible food waste from commerce of about 45 kg/commerce/day. A suggested approach was to design a network between supermarkets and social welfare institutions to donate and distribute the edible food to people in need (Salhofer et al., 2005). This approach is similar to international cooperations such as food banks, food rescue programs or so called "Tafeln".

In eight of the nine federal states of Austria so called social supermarkets were established which sell mainly food products to people in need at a very low price (approx. 1/3 of the common price). The products have been donated by industry and retail and would otherwise be wasted due to different reasons such as damaged packaging, storage surplus, over production, incorrect labelling and others. Since the people have to pay for the products they receive, they do not depend on alms. On the one hand this is an important issue for strengthen the self-confidence of the people, on the other hand the products maintain to a certain value (Schneider and Wassermann, 2005). Unfortunately there is a lack of data about prevented food waste due to the donation of food to people in need for larger regions. But the data from one of the 19 Austrian social supermarkets indicate an amount of 260 t of edible food which was given to people in need in 2007²⁶. To support the transfer of those products to people in need, a clear political statement and appropriate legal conditions (e.g. the Italian law "La Legge del Buon Samaritano") should be provided by authorities.

Italy

Based on a pilot experience in a supermarket in **Turin** -which allowed to produce about 500 meals per day distributed on the same day to social organisations- the Azienda Multiservizi Igiene Ambientale Torino (AMIAT) estimates the potential reduction of about 1,400 tonnes of food waste per year if the collection waste extended to the 8 supermarkets of the area²⁷.

UK

Another interesting experience is carry out **in Dundee and Edinburgh**, where **2,000 tonnes of food could be diverted from landfill disposal**.

FareShare is a national organisation in UK that works to minimise food waste by redistributing high quality surplus fresh food collected from over 100 food businesses (retailers, supermarkets, sandwich bars and others). This food is redistributed to a community food network of 300 organisations. In 2005, 2 000 tonnes of food were diverted from landfill disposal and thus contributed to over 3.3 million meals to 12000 disadvantaged people each day in 34 cities and towns across the UK. Saving food waste allowed helping

25 AMIAT – 24SANMARTINO Powerpoint slide n°9, 14, 16. ACR+ Working group in Milano; AMIAT <http://www.amiat.it/>; Project updates: http://www.amiat.it/pagine.cfm?SEZ_ID=22; http://www.amiat.it/pagine.cfm?SEZ_ID=22&PAG_ID=114&PD_ID=77 http://www.amiat.it/pagine.cfm?SEZ_ID=22&PAG_ID=114&PD_ID=79

²⁶ personal information

²⁷ AMIAT – 24SANMARTINO Powerpoint slide #28 ACR+ Working group in Milano



business to reduce CO² emissions by 13,000 tonnes²⁸. At present FareShare provide a service in 60 cities and towns across the UK, including London and over 5 million meals are provided in an annual basis. The scheme relies on a 280 volunteer's network that redistributes the collected food to hostels and day centres. Homeless and ex-homeless people are encouraged to participate as volunteers.

According to the Food and Drink Federation, the services provided by FareShare have enabled Nestlé UK to reduce its landfilling of surplus food by about 95% between 2005 and 2006. This has also reduced its disposal costs by 40% per pallet²⁹.

FareShare own research suggests that 100 000 tonnes of food could be captured and redistributed from the Retail sector alone in the UK³⁰.

Concerning supermarkets themselves, an example is the one carried out by Sainsbury's³¹ which prevents food waste in different ways. To reduce food waste, possibilities envisaged are to sell food close to their "use by" or "best before" dates at reduced prices. Food is also used by canteens or sold to colleagues. Sainsbury's also donates food (6 600 tonnes since 1998, 325 sores). Not avoidable food waste is composted (1 700 tonnes in 12 years, 23 stores) and landfilled (57 000 tonnes in the same period). To prevent food at the level of their customers, campaigns for educating and inspiring them are also considered. For instance the inspiration campaign "TRY" encourages customers with simple tips to cook meals with 3 ingredients. It also involves defining more clearly how much to cook/eat through packs-portion control and advices for an effective storage (right temperature, right container, right place). In response to the possible food waste effects of promotions, Sainsbury's have refocused their promotions to be fewer and bigger. For instance, they offer multibuy when fresh products are in season (e.g. mix fruit packs).

3.2. Composting at source

3.2.1. Individual composting (home composting)

An alternative to selective collection of organic waste is to involve citizens in treating their waste, which may involve information and education actions, as well as technical and financial support. Home composting can thus contribute considerably to waste prevention via reuse on site.

In most or the European countries no statistical data about the home composting are available, so an estimation about full extent of the potential of organic waste is very difficult.

The Waste & Resources Action Programme's (WRAP) own statistics show that 35% of UK households with gardens now home compost, and that more people are using their compost bins for peelings, vegetable scraps and tea bags as well as for garden waste. Higher-income, older participants are more likely to be aware of the benefits of composting while take-up of composting is most notably low among young low-income families and students because fewer have gardens or an interest in Gardening (WRAP, 2007).

²⁸ Waste prevention guide, your opportunity not to waste. Case Study: Crisis Faire Share – Dundee and Edinburgh. Ch. 5, p. 13.; ENVIROS National Resource & Waste Forum : Towards a UK Framework for Household Waste Prevention – Phase 1 Final Report

²⁹ D. Bellamy – UK FDF. WRAP Conference on Food, Consumers and Resource Efficiency. November 6-7, 2007. London. Powerpoint slide n° 15

³⁰ Tony Lowe – FareShare. WRAP Conference on Food, Consumers and Ressource Efficiency. November 6-7, 2007. London.

³¹ J. Sahota- Sainsbury's, Delivering Resource Efficiency in Food Supply Chains. WRAP Conference on Food, Consumers and Ressource Efficiency. November 6-7, 2007. London.

WRAP estimates that the potential of organic waste reduction for households who perform home composting may reduce waste by 100 – 340 kg/household /year (between 40 and 150 kg/inh) according to the garden size³².

Belgium (Flanders)

- The average garden surface per household is 517.92m².
- 49% of the garden owners compost at home. 57% of people composting at home compost more than 75% of their garden waste. 52% of the people composting at home compost more than 75% of the kitchen waste.
- 70% of the people composting at home will use a compost heap, 16% one or more compost boxes and 15% a compost bin.
- 82% of people composting at home mention that they experience no problems when composting or with regard to the quality of the produced compost.
- 77% of the people composting at home will use the produced compost in their garden, 22% in their plantpots and 18% will donate it to a third party (neighbour, family).
- Nearly 60% of the people composting at home will use appropriate methods of home composting (regular mixing and proper build up). 84% of the people composting at home will use one of both methods.

In the Eunomia's report "Household Waste Prevention Policy Side Research Programme" (Eunomia, 2007), waste prevention implications of a policy which support the inclusion of home composting in the mass balance calculations used to determine performance under the Landfill Allowance Trading Scheme (LATS) in England and Landfill Allowance Schemes (LAS) elsewhere in the UK are analysed. The policy

is targeted at local authorities, and aims to both reward local authorities for efforts made to incentivise home composting and to encourage further levels of home composting to be undertaken.

The variables that are likely to influence home composting diversion rates are considered to be followings:

- Garden size
- Climate & regional factors (mean net soil moisture deficit)
- Waste collection services offered
- Material home composted
- Types of home composter used
- Demographics
- Whether people receiving home compost bins are new or existing home composters
- Whether home compost bins are given away or must be purchased by householders; and
- Opt-in versus opt out schemes (opt-in: where everyone gets a bin unless they explicitly refuse)

In terms of potential of reduction, the analyses based on pilot area models shows that 220kg/hhd per year of organic waste can be diverted from the municipal waste stream, where households that receive a

³² Parfitt J., HCUK – Initial Results from WRAP Research Powerpoint slide #7

home compost bin were not previously home composting ('New Recruits'). Also, 60kg/hhd per year of additional organic waste can be diverted from the municipal waste stream where households receive a home compost bin but where they were previously home composting ('Enhanced Existing').

In England the ratio of 'New Recruits' to 'Enhanced Existing' composters is estimated to 50:50. For Scotland the ratio is estimated to be 60:40.

Calculations on the environmental impacts of the policy based on the inclusion of Home Composting in the LA(T)S estimated that by 2019/20, some 1 400 000 tonnes of organic waste could be diverted, through home composting, from MSW collection for the UK³³.

Home composting initiatives

➤ Rising awareness and technical support on home composting

In England and Scotland (UK) the WRAP's "Home Composting Programme" involved 73 partners to promote home composting and diverted 40,000 tonnes from landfill

In the aims to divert 40,000 tonnes of organic waste (kitchen and garden waste) from landfill, 2 million homes composting bins were provided across the UK between 2004 and 2006. This was done in the framework of the WRAP's "Home Composting Programme" which also provided both short-term and long-term support to already existing and news home composters. To promote home composting, WRAP (Waste & Resources Action Programme) worked with 73 partners in England and Scotland, closely with local authorities to support householders in the use of their bins. This was done by bi-annual newsletters sent to each participant along with support literature, and by the services offered by the WRAP's 24 "Home Composting" Advisors (workshops, road shows, talks and other events). Householders also had access to on-line and telephone support³⁴.

The Terra-a-Terra LIPOR's project expects a reduction of 300 kg/year of organic waste per household (PT)

In Porto Greater Region LIPOR is distributing 10,000 home composters for households. Based in the projections of the Terra-a-Terra (Land to Land) project, it is expected a reduction of 300 kg/year of organic waste per household. This project is promoting home composting practices and is working as an awareness tool in order to promote the prevention of organic waste at the level of households. To join the project, citizens must be over 18 years old and have a garden. After a 3 hours training in composting, citizens receive a free composter. Registrations are mandatory and can be made through internet (www.hortadaformiga.com) or phoning for free to a green number. The project is supported by LIPOR in partnership with their associated municipalities and free of charge for participants.

Aberdeen in Scotland (UK) reached 4,600 tonne organic waste reduction in 3 years

The North East Master Composter Programme was launched in 2003. It is funded by Aberdeen Forward, Recycling Advisory Group Scotland (RAGS), Transforming Waste Scotland and the three local authorities: Aberdeen City, Aberdeenshire and Moray. With a total grant of 310,000 pounds (from

³³ Source: WRAP and Parfitt (2006) Home Composting, Opportunity or Threat? Presentation to Composting Association Conference, cited by Eunomia, 2007.

³⁴ Waste prevention guide, your opportunity not to waste. Case Study: WRAP Home Composting Programme – Scotland. Ch. 6, p. 5. & ENVIROS National Resource & Waste Forum : Towards a UK Framework for Household Waste Prevention – Phase 1 Final Report.

Transforming Waste Scotland and landfill tax revenues) and the support of 2 project officers and 100 volunteers, a composting support network was established across the area. The distribution of 17,000 home composting units at subsidised prices reduced the amount of waste going to landfill by up to 4,618 tonnes during the 3 year project (2003-2006).³⁵

Several provinces and municipalities of different EU countries like the **Netherlands and Belgium** have stimulated home composting by making available composting equipment for a reduced price to households, or by organising educational activities³⁶

Brussels Capital Region (BE) has achieved a 44% fall in the grey bag mainly thanks to home composting

In 1999, a pilot project to reduce waste involving a building of 25 apartments in the municipality of Ixelles was carried out by Inter-Environnement Bruxelles. A specific eco-team was in charge to inform households about the issues. As a result a radical fall was observed in the content of the residual waste bag (up to 44%) mainly thanks to composting of organic material (vermicomposting)³⁷.

Also the Brussels Capital Region's experience showed that efficient information on home composting may lead to 10% less of household waste

In 2001 and during 3 months, the non-profit group Eco-Action carried out community awareness actions in an entire neighbourhood of a total of 470 houses in Woluwe-St-Lambert. The evolution of the weight of the households' grey bag showed that the informed households produced 10% less waste than the uninformed households. This would be due to composting and input of garden waste³⁸.

In France, some actions reduced of almost 100kg/inhabitant/year the household waste

The number of households composting their biowaste in the traditional way (compost heap) previous to promotion operations organised by communities would be around 5 millions, but this number is constantly decreasing. Between 2000 and 2006, the French Environment and Energy Management Agency

(ADEME), supported 729 promotion operations succeeding to distribute 640 000 composting bins to an equivalent number of households. During this period each operation concerned 15 000 inhabitants in average. Currently the ADEME financially supports home composting promotion operations regarding to equipment (20%) and communication and training (30%). Generally speaking, even if the participation rate is rarely more than 10% of the concerned households the impact of operation can be significant. This is based on the fact that putrescible fraction represents 1/3 in weight of householders waste; green waste represents also 30% of waste at waste reception centres (déchetteries). Particularly succeeded operations regarding home composting were able to reduce household waste of approximately 100kg/inhabitant/year (householders not previously home composting)³⁹.

³⁵Waste prevention guide, your opportunity not to waste. Case Study: North East Master Composter Programme, Aberdeen. Ch. 6, p.8.

³⁶ Examples include the (mostly rural) municipalities of Ermelo, Soest and Roosendaal in the Netherlands and Tremeloo in Belgium. See for instance: <http://www.soest.nl/smartsite19044.dws>, <http://www.roosendaal.nl/dspage.asp?objectid=13517>, <http://www.ermelo.nl/index.asp?p=http://www.ermelo.nl/tDocumenten/detail.asp?pKey1=20919148>

³⁷ IBGE-BIM, Les Cahiers de l'IBGE 23, 2004. Evaluation. One pilot building. p.44

³⁸ IBGE-BIM, Les Cahiers de l'IBGE 23, 2004. Evaluation. One pilot neighbourhood. p.45

³⁹ ADEME, 2007. Prévention & gestob des déchets dans les territoires. Compostage domestique : un nouvel élan. Recueil des interventions.

➤ **Home composting and tax break**

In Martellago and Santa Giustina (IT) home composting initiatives and tax break together reduced respectively 53 % and 70 % organic waste

Since the mass of organic waste mixed with the municipal waste was 30-35 % of the annual total of around 450 kg/person, initiatives of home composting started in the mid 1990s. A pilot experience carried out in the cities of Martellago and Santa Giustina (Lombardy) were based on the free distribution of compost bins (300, 400 and 600 litres), explanatory brochures and a tax break offered on the remaining portion of waste. A significant level of participation was achieved and the remaining organic waste that required collection was reduced by 70 % in Santa Giustina and by 53 % in Martellago⁴⁰.

➤ **Close to cost/free/subsidized distribution of Home composting equipment**

Asti (IT) distributed compost bins and reduced 30kg waste per inhabitant

The Province of Asti in Italy has distributed compost bins to more than 15% of households, each one composting about 200 kg of organic waste per year. It estimates that those efforts contributed to reduce waste by more than 6,000 tonnes (equivalent to about 30kg/inh) for a net financial saving on disposal costs approaching 1M^o€ for 2005 alone⁴¹.

In Milton-Keynes (UK) 100 kg less waste production per year was achieved through home composting

Residents of Milton-Keynes for example, can buy home composting bins made of HDPE plastic from the Council (produced in the Council's recycling factory) at close to cost price. An information campaign has been carried out through the Council's "Messenger" magazine, demonstration gardens and through their internet website. As a result, between 1997 and 2003, 11,000 residents bought home composting bins and reduced their waste production by about 100 kg/year/household⁴².

In France the purchasing of Home composting units at reduced price ended by a reduction of between 60 to 70 kg waste

In 2000, 218 associations of municipalities (Etablissements Publics de Coopération Intercommunale - EPCI) initiated individual composting, by offering the purchase of individual composting units at reduced price. For some of the participants, it could be determined a reduction of 60 to 70 kg/year of domestic residual waste, and a total reduction of 7 %⁴³.

Also in France, in Seine-Saint-Denis 1,030 tonnes of fermentable waste were diverted from landfill by ¾ help in the price home composting unit

The SEAPFA (Syndicat d'Équipement et d'Aménagement des Pays de France et de l'Aulnoye), in the Seine-Saint-Denis department, regroup five municipalities: Aulnay-sous-Bois, Blanc-Mesnil, Sevran,

⁴⁰ IBGE-BIM, Les Cahiers de l'IBGE 23, 2004. Martellago, Santa Giustina in Colle and the Veneto Region reduction of tax for citizens and municipalities. p. 129.

⁴¹ Gotta Compostaggio Domestico Powerpoint slide #4

⁴² IBGE-BIM, Les Cahiers de l'IBGE 23, 2004. Milton-Keynes : subsidies and demonstration. p.127.

⁴³ ASCOMADE. Programme Régional. Prévention de la production de déchets : Etat récapitulatif –années 2005 et 2006. Annexe 2 : Catalogue des actions de prévention, Plan de prévention interne, p.41.

Tremblay-en-France and Villepinte. This syndicate initiated the installation of individual composting units in 1999. The inhabitants can choose their composting units according to financial and aesthetics criteria, while municipalities (la collectivité) supports financially 3/4 of the individual composting unit basic price (wooden ones are bought at 58 € and plastic ones at 42 €, and sold to citizens at 12 € and 9€ respectively). To reach the population, direct mail advertising was made in anticipation, with mail of the mayor, documents of sensitization and order form. Eight months later, 21 % of the population had been reached, is 3,624 distributed ticket-stamping machines. So, 1,030 tonnes of fermentable waste are diverted from collection every year. By taking into account all financial parameters, this operation was amortized over 5 years⁴⁴.

The **Worcestershire County Council**, in London (UK) promotes the sale of cut price compost bins. 18000 bins were sold in 2006/07 and 71 500 were sold since 2004. They also work with WRAP's Home Composting Advisor and link in with national events, e.g. Compost Awareness Week. They also develop composting in schools and run a "Master Composter" scheme with currently 37 volunteers⁴⁵.

➤ Home composting and PAYT systems

Landkreis Schweinfurt (DE) estimates that home composting can reduce about 50 kg/inh/year

The county of Landkreis Schweinfurt estimates that the promotion of home composting (with the introduction of PAYT systems) allowed to reduce the amounts of organic waste collected door to door from 13,350tonnes to 7,400 tonnes that is a reduction of about 50 kg/inh/year⁴⁶

Porto Greater Region (PT) is implementing a pilot project based on PAYT Systems

In order to evaluate how the financing incentives or penalties can be a way to reduce waste generation, a pilot project will take place in the municipality of Maia based on the PAYT system (the amount that citizens are to pay hasn't been defined yet) This project will be held initiated in 2007 with the previously studies, it will be implemented in 2008 with MAI AMBIENTE (Local Authority) as a partner. It will imply the delivery of home composter and awareness campaigns to promote waste prevention actions and behaviors. The project is currently on a pre-phase (composters delivery only). It has been estimated the reduction potential at 50%, that is to say 80,5 kg/hab/year.

➤ Including Home composting in National Plans

France assures that domestic composting can annually reduce waste up to 70 kg per inhabitant

Composting can allow reducing the quantities of organic waste in charge of municipalities. Reduction can go until 70 kg per inhabitant and per year, according to the ministry of Ecology and Sustainable Development (MEDD in French). In the end of 2006, the French Environment and Energy Management Agency (ADEME) launched a national plan in support of domestic composting in order to reduce the total volume of household waste intended for discharge in landfills or for incineration was launched. The objective is to involve 100,000 additional homes every year in domestic composting in all its forms.

⁴⁴ ASCOMADE. Programme Régional. Prévention de la production de déchets : Etat récapitulatif –années 2005 et 2006. Annexe 2 : Catalogue des actions de prévention, Plan de prévention interne, p.41.

⁴⁵ J. Orme - Worcestershire County Council. WRAP Conference on Food, Consumers and Ressource Efficiency. November 6-7, 2007. London.

⁴⁶ D. Hogg (2006) Working Group on Waste Prevention and Recycling – Impacs of Unit-based Waste Collection Charges Eunomia, Pdf Document p.18

Notably in the countryside, domestic organic waste management is done in a traditional manner, often by simple pile up of waste, but nowadays it has rather tendency to diminish. At present, according to the ADEME, only 5 million homes are equipped with individual composting units among which 650,000 are equipped by the territorial collectivities (collectivités territoriales) in the framework of awareness rising actions⁴⁷.

3.2.2 Community composting initiatives

Edinburgh, Scotland (UK) composted 250 tonnes/year of garden waste

Colinton Community Compost (CCC) is based at a disused quarry owned by the City of Edinburgh Council (CEC), near Colinton. CCC is one of Tiphereths activity projects which was set up in 1995. The Tiphereth Camphill initiative provides social care for people with learning difficulties in addition to a household composting service in the Colinton area. CCC is run by 5 Tiphereth Care Workers with the help of clients and volunteers and offers advice on home composting, a disposal site for garden waste from local garden contractors and offers a weekly kerbside collection service for garden waste to around 200 local residents. The project composts around 250 tonnes of garden waste each year⁴⁸.

Projects of Community Composting in Porto Greater Region

Community composting is an easy and environmental friendly way to reduce organic waste, its transportation and treatment. Within the waste prevention project designated “Less 100 Kg/inhab./year” LIPOR is promoting free technical support to the community to improve the composting process both in home composting and in agricultural composting. In the park S. Pedro de Rates community composting is promoted for those who cannot do it at home. Citizens and farmers will have the possibility to deposit their green waste in the park and participate to the community composting activities. The project will also work as a tool to promote different environmental awareness campaigns.

Sutherland, Scotland (UK) composted 40 tonnes of green waste a year

Among other projects, Golspie Recycling and Environmental Action Network (GREAN) run a Community Composting site and a Community Garden. The GREAN composts around 40 tonnes/year of green waste and use it on the adjacent Community Garden. The work involves local schools and community groups in the composting and growing of organic vegetable activities. Both the garden and composting area are rented by the Highland Council at 1 pound/year⁴⁹.

In Brussels (BE) 9kg food waste per inhabitant were composted in one month by 30 householders

An initiative of community composting destined to 350 householders without possibilities of in-site composting is being carried out in the area of “Le Logis” in Watermael-Boitfort. A 5-liters bucket is provided to be filled with household food waste. On the lid participants can find a list of wastes accepted. In October 2007, ten households initiated the project and other 20 joined later. In four months, the 30 households have reduced of 673kg the amount of organic waste through composting which is carried out in a demonstration site. This represents more than 9kg/inhabitant/month. Approximately, between 100kg and 120kg of food wastes per inhabitant and per year are produced in Belgian big cities. To compensate

⁴⁷Actu Environnement, « Le MEDD lance un plan national de soutien au compostage domestique » (published 05/12/2006) <http://www.actu-environnement.com/ae/news/2110.php4> (01/08/2007).

⁴⁸Waste prevention guide, your opportunity not to waste. Case Study: Colinton Community Compost, Edinburgh. Ch. 7, p. 4.

⁴⁹Waste prevention guide, your opportunity not to waste. Case Study: Golspie Recycling Action Network – GREAN. Ch. 7, p. 10.



participant's efforts, compost is exchanged by waste for free⁵⁰. Related to this initiative, a workshop on vermicomposting is being organised.

Rennes Métropole (FR) estimates that the treatment of 1,100 tonnes of waste can be avoided by its 11,800 participant households

In Rennes Métropole the first collective composter was installed at the beginning of 2006 in Saint-Jacques-de-la-Lande. For August 2007 there were already 25 of collective composters installed gathering approximately 300 households (representing a participation rate of 30%). Householders interested in collectively compost their organic waste are addressed to FC-Environnement, a contractor who apart from following the installation of composters and the good deterioration process of the compost, promotes commitment between householders interested. FC-Environnement is also in charge of providing householder participants with a "bio-bucket" and composting guides in exchange of a signed participation charter. During a period of 6 months a regular monitoring of the composter is guaranteed by the contractor. After that a "master composter" takes over the management of the site. In Rennes Métropole, the organic fraction of household waste is estimated to 100 kg/household/year. Considering that cost of collection and treatment are currently 150 EUR/tonne, the 11,800 households together that participate in the collective composting are theoretically avoiding the treatment of 1,100 tonnes of waste i.e. reducing costs of 165,000 EUR/tonne/an⁵¹ and reducing waste of more than 93kg/household/year.

3.2.3. Composting in public green spaces

No results have been found about the reduction resulting from on site composting of waste from urban parks and green spaces. The potential will vary according to the size of green spaces (waste stock: 30 - 40 kg/inh, prevention potential: 3 kg/inh).

⁵⁰ Projet de compostage des déchets des habitants des immeubles du Logis sur le site de démonstration installé Av. Georges-Benoît - Bruxelles. Benoît Salsac, bsalsac@hotmail.com

⁵¹ From "Le compostage collectif sur le territoire de Rennes Métropole", 2007 transmitted by Sylvain SEGAL, Responsable du pôle traitement et prévention des déchets – Rennes Métropole, s.segal@agglo-rennesmetropole.fr

3.2. Study cases summary

Study cases	Waste amount	Prevention Potential
Prevention of food waste		
AT THE LEVEL OF CITIZENS		
BE: Simple guidelines	15,000 tonne, i.e.15 kg/inh/year	10 kg/pers/year
AT THE LEVEL OF THE RETAIL SECTOR		
AU: Food waste from commerce		45 kg/commerce/day
AU: Social supermarkets		260 tonnes/2007
IT: Working with supermarkets		1 400 tonnes/year
UK: Fresh food redistribution		2 000 tonnes/year
FROM COLLECTIVE CATERING		
IT: School food waste collection		33 tonnes/academic year
Composting at source		
INDIVIDUAL COMPOSTING		
UK: Providing homes composting bins		40 000 tonnes between 2004-6
UK: Composting support network		4 618 tonnes/3 year
PT: Composters for householders		300 kg/hhld/year
BE: Vermicomposting		44%
BE: Efficient information		10%
FR: Home composting actions		100 kg/inh/year
IT: Home composting + tax break	135-157 kg/inh/year	53 et 70%
IT: Compost bins distribution		30kg/inh/year
UK: Information/education actions + technical/financial support		100 kg/year
FR: Home composting units at reduced price		60-70 Kg/inh/year
FR: ¾ help in cost of composting units		1 030 tonnes/year
DE: Home composting promotion		50 kg/inh/year
FR: National Plan		70 kg/inh/year
COMMUNITY COMPOSTING		
UK: Colinton Community Compost		250 tonnes/year garden waste
UK: Community Composting site + Community Garden		40 tonnes/year green waste
BE: Community Composting in demonstration site	100-120kg/inh./year	208kg/25householders/month
FR: Collective Composting	100kg/inh/year	93kg/hhld/year

4. RECOMMENDATIONS

4.1 A FIRST DISTINCTION TO DO: PRIMARY PREVENTION AND SECONDARY PREVENTION

We should make a difference in the terminology used regarding organic waste prevention/reduction between “Primary Prevention” and “Secondary Prevention”.

Primary prevention: this is prevention in the strict meaning of the term (to act up-stream in order to avoid the waste generation).

a) Primary prevention of Food waste

This concept can be used in the sense of a “*smart consumption*” meaning by this the consumer’s attitude in two precise moments:

- At the moment of buying food

The preference of food products that generate as less food waste amount as possible. In this choice, not only quantities (or portions needed) and menu planning are essential to be taken into account but also the understanding and good use of “best before” and “use by” dates.

- At the moment of consuming the food

Further education on how to “smart consume” once products is needed. Food left on the plate and food prepared but not served, or products opened but not finished are thrown away and represent significant amounts in terms of food waste that could be prevented (see 3.2.1). Allowing children not to finish their plates as a general rule creates behaviours difficult to modify during adolescence and adulthood; that is why child education regarding these issues should be also covered at family and school level.

b) Primary prevention of Green waste

Regarding the prevention of green waste, primary prevention will in this case refers to “*smart gardening*”. This concept involves two main aspects:

- The planning in terms of green waste susceptible to be generated by plants (type of grass, bushes, trees, etc.) used in gardens, parks, private business such as golf courses, public areas, etc., meaning with this the use of species or varieties with slow growth such as slow growing grass mixtures. Nevertheless, a close analyse regarding the effect of these varieties on the local biodiversity (fauna and flora) should be first carried out in order to avoid negative or undesirable interactions.

- The appropriate management, such as:

- remove leaves only when necessary
- reuse branches (wattle work, wall of branches, insect walls,...)



- grass cycling
- use of mulching materials (grass, woodchips, compost,...) in between bushes, trees
- composting
- reduce use of chemicals

An interesting aspect to highlight regarding green areas management more or less independently of their size is the fact that the current concept of gardens and green spaces is very often related to an extension of regularly cut grass... with the consequent green waste generation.

An option to this traditional view is to adopt the “**meadow**” concept, where a field vegetated primarily by grass is left to growth wild. This concept could be applied to some parts of the different green areas that do not require a specific grass length.

Thus, at the level of the citizens, gardens could also have a designated meadow area. This “**differentiated management**” would not only implied less green waste generation to be collected and treated (eventually disposed) but also will favor and support a more rich biodiversity.

Secondary prevention: In the context of both food waste and green waste, the term “secondary” refers to the fact of acting “after” the generation of the food/green waste but avoiding the necessity waste selective collection and treatment costs (as mention in the section 2.1). This term also indicates the fact of using the food and the green waste as a resource in the production of compost. That is why composting at source is considered as prevention (secondary prevention) and this includes:

- Individual composting or home composting
- Community composting
- On-site composting (i.e. composting in public green spaces)

4.2 WE NEED MORE HARMONIZATION TO COMPARE

As seen in the section 3.2, the cases study summary shows that in European countries not only waste stocks but also prevention potentials are measured in different ways, using different units and thus making results of action and prevention potential of actions difficult to compare.

Moreover, in many cases the number of inhabitants is a data not easily found or even not present. It seems also that waste amounts (waste stocks) are not always considered a relevant data to publish. Less frequent but real, is the case of the period of time involved by the prevention actions implemented, which sometimes is not specified in the publication either.

These facts show that harmonization **regarding targets, indicators and calculation methodology** is needed to be able to compare the results at local, regional, national and even at international level, thus to be able to have a wider view of biowaste prevention actions and results at European level.

Therefore, the present working paper recommends the harmonization in terms of units, in principle: **kg/inhabitants/year**, eventually in percentage.

4.3 COMPOSTING AT SOURCE AND FIGHTING AGAINST FOOD WASTE ARE KEY-ACTIONS TO DEVELOP

Key actions at source should involve:

- composting of food and green waste at source, meaning with this home composting, community composting and on-site composting
- fight against food waste

Based on the results of the first researches carried out by international ACR+ working groups during 2006, some quantified reference data have already been gathered and analysed suggesting that based on:

- 180kg of municipal organic waste generated as average in Europe, there is a potential for prevention of 30kg
- 30kg of food waste generated at EU level (average), the generation of 8kg is possible to be prevented

4.4 WE NEED TO USE INDICATORS OF PARTICIPATION AND INDICATORS OF RESULTS

In order to measure the outputs and the need of possible adjustments regarding prevention actions, the setting up of **indicators** to follow-up the whole process reveals itself as a need. They should be not only quantitative but also qualitative to allow a wider view at the moment of measuring the impact of organic waste prevention actions at the most concrete level.

Two basic types of indicators should be considered:

- 1- indicators measuring the degree of participation of the public targeted regarding the prevention actions implemented, meaning in by this the number of people accomplishing the actions
- 2- indicators measuring the results of the prevention actions

An interesting report called *Indicateurs territoriaux de la prévention des déchets*⁵² (Territorial indicators of waste prevention) wrote by J-F CAGNOT- ARIACONSU, B GENTY - Consultant Environnement, E LE ROY - ADEME and D SAVETIER - APCEDÉ – ADEME and published by the French Environment and Energy Management Agency (ADEME), treats this subject.

Regarding home composting the indicators proposed are the followings:

⁵² Indicateurs territoriaux de la prévention des déchets :
<http://www2.ademe.fr/servlet/getBin?name=9A00616AD1FE9871CAC0A802505800A11191851242489.pdf>.

Home composting

Indicators – Targets (point zero and year N)	Indicators – Instruments	Indicators – Results
<ul style="list-style-type: none"> - % of exposed population - % of population doing composting, per composting type - Avoided quantities (kg/inhab/year) 	<ul style="list-style-type: none"> - Technical and awareness-raising instruments <ul style="list-style-type: none"> o Number of compost bins distributed o Number of volunteering Master Composters o Number of training sessions o Number of activities in waste collection facilities, garden centres, in stores, neighbourhoods and schools - Financial instruments <ul style="list-style-type: none"> o Subsidies granted to households o Total budget allocated to the activity o Total budget per source of funding - Human instruments <ul style="list-style-type: none"> o Number of man/hour for coordination/management aspects o Number of man/hour supplied by involved actors o Number of man/hour of volunteers 	<ul style="list-style-type: none"> - Waste quantities (point zero and year N) <ul style="list-style-type: none"> o Composted quantities (t) o Collection of residual OM (t) o Organic waste brought to waste collection facilities and other green waste collection centres (t) - Awareness-raising <ul style="list-style-type: none"> o Number of people exposed to the programme o Number of people aware of the action o Number of people who read a poster or a brochure o Number of people participating, per composting type o Number of people who took part in a training session or an activity <ul style="list-style-type: none"> ▪ Households ▪ Schools ▪ Communities o Number of people reached by relay-partners (e.g. garden centres) o Number of people participating in test-groups

There is also the report published by the city of Paris & ENGEES (Ecole nationale du genie de l'eau et de l'environnement de Strasbourg) addresses the subject "Prevention and Performance indicators" (Julien Koesten, 2007 - <http://engees-proxy.u-strasbg.fr/241/>).

The following tables summarises, for example, the indicators suggested for the action: fighting food waste. Indicators of objectives, means and results are shown.

ANNEXE 4.6 : L'ACTION « GASPILLAGE ALIMENTAIRE »

INDICATEURS D'OBJECTIFS	2010	Source
Evitement du gaspillage alimentaire	4 000t	DPE

INDICATEURS DE MOYENS de 2007 à 2010	Source	
Budgétaires - évolution annuelle		
Budget alloué à l'action	€/an	DPE
Budget par source de financement	€/an	DPE
Techniques et de sensibilisation - évolution annuelle		
Nombre d'animations organisées	(-)	DPE
Nombre de brochures distribuées (guide de consommation --> partenariat avec le monde de la santé)	(-)	DPE
Nombre de connexions à la fiche thématique	(-)	DPE
Humains - évolution annuelle		
Personnel affecté (équivalent temps plein)	(-)	DPE

INDICATEURS DE RESULTATS - évolution annuelle	Source	
Résultats quantitatifs		
Nouvelle procédure MODECOM		
Répartition "Produits alimentaires non consommés" dans le bac vert	%	DPE
Erreur totale sur la répartition de "Produits alimentaires non consommés"	%	DPE
Opérations lancées par la DPE		
Définition des gaspis évitables suite à l'opération foyer-test	kg/ménage	DPE
Evolution de la sensibilisation		
Enquêtes de terrain ou sondages		
% citoyens interrogés connaissant l'action	%	DPE
% citoyens interrogés aptes à expliquer l'action et son but	%	DPE
% citoyens interrogés ayant assisté à une animation	%	DPE
Evolution de la participation		
Analyse des données		
Evolution de la catégorie "gaspillage alimentaire" du MODECOM	indice	DPE
Enquêtes de terrain ou sondages		
% citoyens se présentant comme participant à la chasse au gaspillage	%	DPE

4.5 IT'S INTERESTING TO TRY TO WORK WITH OTHERS LRAs

At EU level, ACR+ propose partnerships as a useful way of gathering forces between local and regional authorities (LRA). These partnerships should take the form of « twinnings » between towns or regions



and international agreements should allow sharing experiences regarding prevention technology and knowledge.

Twinnings would be beneficial regarding prevention tool-sharing, both for technical studies or communication material (folders, audio or video clips, website...) or organisation of joint events.

ACR+ will start compiling a database and thus be able to put towns and regions interested in the same themes in touch with one another.

4.6 VARIOUS FORMS OF ACTION ARE NEEDED

When we try to promote for example composting at source it's important to recognize that if composting is not done in an appropriate way fermentation might occur and, in consequence, different proportions of methane can be produced by microorganisms according to the conditions to which the organic material is exposed (darkness, anoxia and temperature). Therefore, the promotion of composting at source should be supported by LRA through different actions, such as:

- demonstration-training centres
- organic waste composting programs
- compost masters
- charter/guides
- trainings for gardeners of buildings
- websites

4.7 SUPPORTIVE LEGAL AND ECONOMIC INSTRUMENTS ARE WELCOME

Pay as you through systems (PAYT) or variable charging (introducing a market-based approach under which householders pay a charge directly related to the volume or weight of residual waste they produce) are very interesting complementary instruments to voluntary preventive action concerning organic waste.

5. ANNEXES: CONTRIBUTION FROM PARTICIPANTS

List of Annexes

- Annex N°1:** “Humus - A quality criterion for composts” (PDF document), F. Schneider
- Annex N°2:** Different strategies on how to deal with organic waste, J.J. Dohogne
- Annex N°3:** “Food Waste”, B. Soenen
- Annex N°4:** Definition of Prevention, I. Cluyts
- Annex N°5:** Article: UK - weekly food waste collections can benefit the environment and save money - ACR+ newslines - (April 10, 2008)
- Annex N°6:** Comment développer en France des politiques de prévention des déchets? (Bruno Genty, 2003)
- Annex N°7:** Presentation on “Food & Food Waste”, J. Klincar
- Annex N°8:** Presentation on “Food Waste from Commerce - Potential for waste prevention. Targets and Indicators”, F. Schneider
- Annex N°9:** Presentation on “Markets and Consumers as a driving force for Organic Waste Prevention - Indicators of behavior changes”, Rob Renaerts
- Annex N°10:** Presentation on “Home Composting as instrument for Organic Waste Prevention. Indicators of household participation. Potential for waste prevention. Potential targets. The effects of Home Composting on the reduction of CO₂ Emissions”, Rui Dinis
- Annex N°11:** Presentation on “Community Composting as instrument for Organic Waste Prevention and integration mechanism for environmental policies in communities. Potential for waste prevention. Indicators of householder participation. Potential targets”, Vincent Gobbe
- Annex N°12:** Presentation on “Community Composting - Experiences and Results of the experiences in Watermael-Boitfort –Brussels”. Potential for waste prevention, Benoît Salsac
- Annex N°13:** Presentation on “Composting at source: composting in public green spaces. Potential for Green waste prevention and potential targets”, J.J. Dohogne
- Annex N°14:** Presentation on “Composting at source: composting in public green spaces. Potential for Green waste prevention and potential targets”, A. Materne
- Annex N°15:** Presentation on “Dealing Organic Waste and Managing Costs”. A. Gibbs
- Annex N°16:** List of participants of the Biowaste Cluster Meeting

Note:

All presentations are available in PDF format at ACR+ website: <http://www.acrplus.org/-kgcluster> (clicking on Organic Waste)

Annex N2: Different strategies on how to deal with organic waste, J.J. Dohogne

Visualising some findings: Flanders (Belgium) organic materials management

The biowaste potential can be collected in at least 4 different ways. If private gardening is possible the biowaste could be composted and recovered as fertilizer in the garden (1). Without separate collection, the biowaste is collected in the dustbins of the households and forms the organic portion of the residual waste (2). If a separate collection system is introduced, it could be organized by curbside collection (3) and/or as a bring system (4). Even when there is separate collection of biowaste, a minimum portion of biowaste remains as an organic portion in the residual waste. Both the potential kitchen waste and the potential garden waste are in general present in the four collection types (if offered), but their proportion vary.

The following slides show step by step the evolution of organic materials management in some regions in Europe. Gradually it improved its prevention, collection & treatment schemes. Step 5 is the final and most challenging step as it addresses primary prevention, namely how to avoid as much as possible organic waste to be generated.

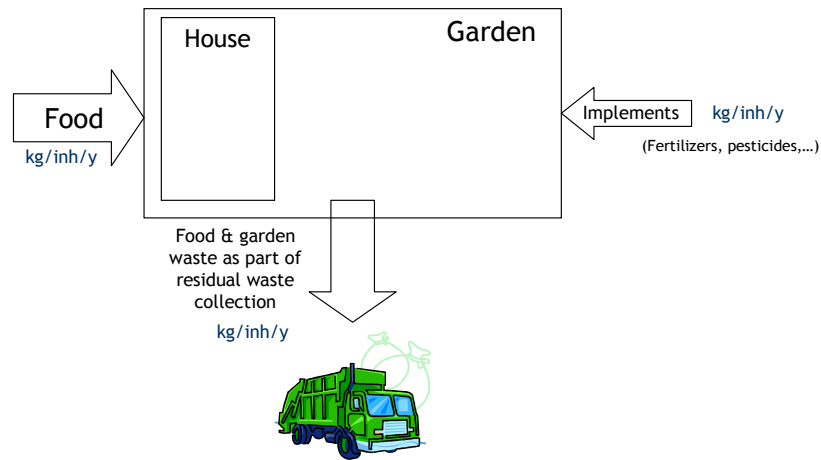
European countries, regional- en local authorities do not have to follow the same path. Possibly, some steps could be skipped in order to achieve faster better results (step 4 & 5). Whatever options are chosen, it always requires careful planning and accompanying instruments (see blue cadres)

Organic materials management

Step 1 **Organic materials management** **Single house unit**

Management scheme

- Organic % of residual waste



Step 2

Organic materials management

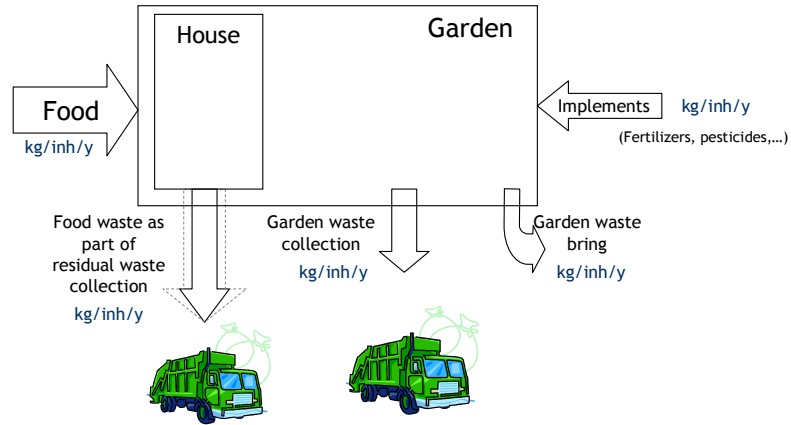
Single house unit

Management scheme

- Food waste % of residual waste +
- Garden waste collection +
- Garden waste bring

Instruments

- Information
- Sensitisation
- Tax (residual waste)



Step 3

Organic materials management

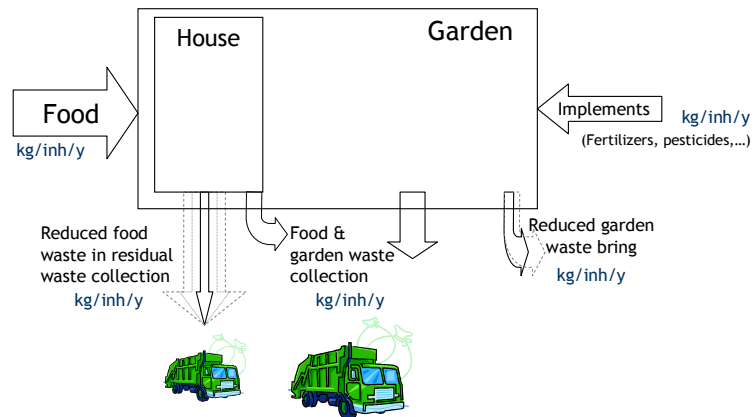
Single house unit

Management scheme

- Food waste % of residual waste +
- Food & garden waste collection +
- Garden waste bring

Instruments

- Information
- Sensitisation
- Tax (residual waste)



Step 4

Organic materials management

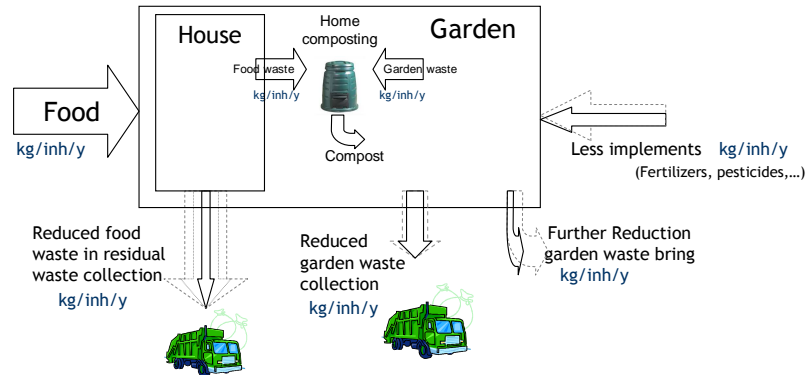
Single house unit

Management scheme

- Food waste % of residual waste +
- Garden waste collection +
- Garden waste bring +
- Home composting

Instruments

- Information
- Sensitisation
- Tax (residual waste & organic waste)
- Subsidies (bins, box)



Step 5

Organic materials management

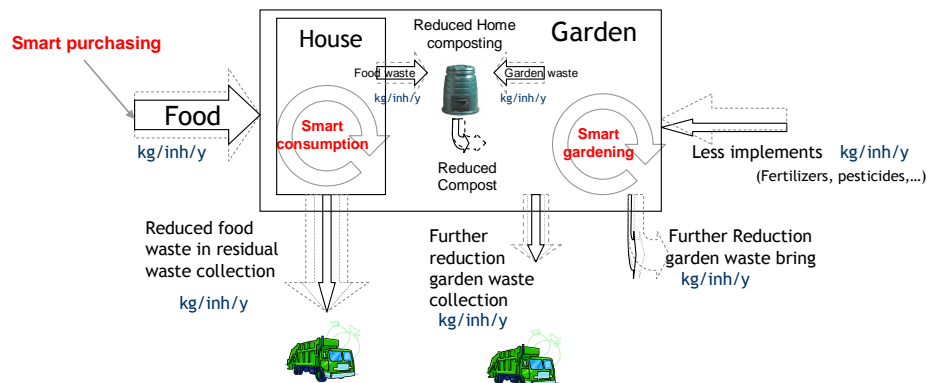
Single house unit

Management scheme

- Food waste % of residual waste +
- Garden waste collection +
- Garden waste bring +
- Home composting +
- Smart purchasing, consumption & gardening

Instruments

- Information
- Sensitisation
- Tax (residual waste & organic waste)
- Subsidies (bins, box)

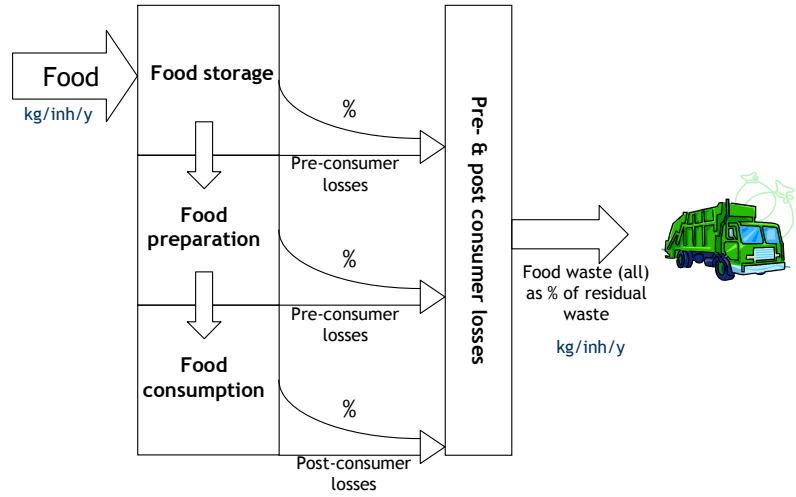


Food Waste Management

Step 1

Food waste management

Household level

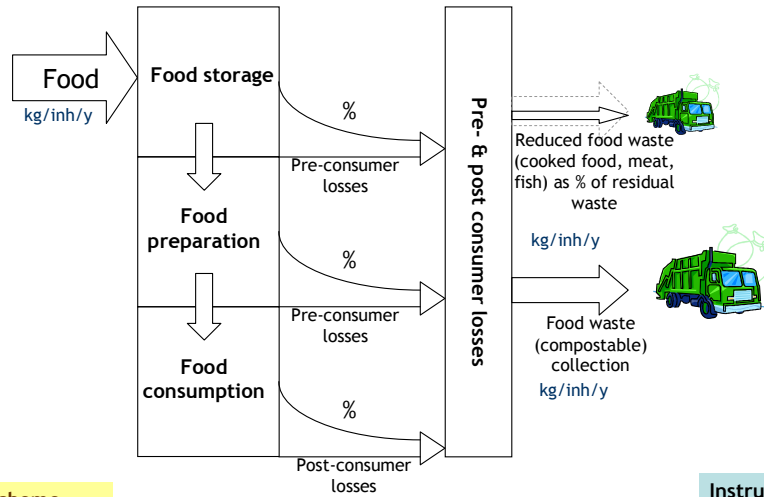


Management scheme
 • Organic % of residual waste

Step 2

Food waste management

Household level



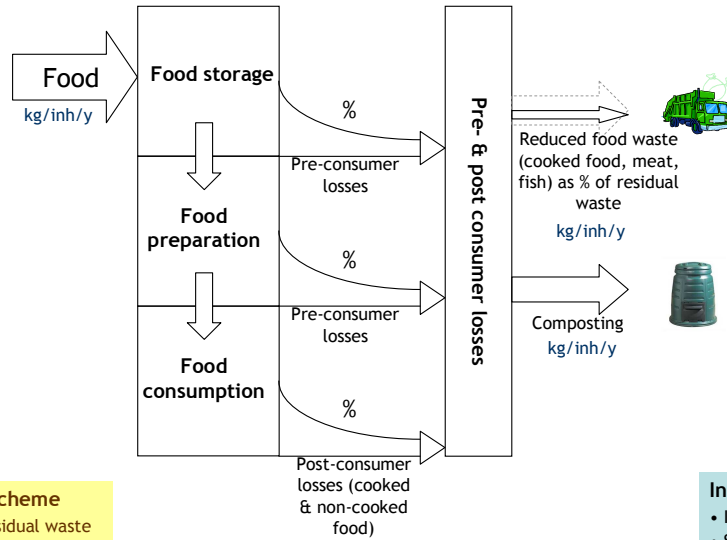
Management scheme
 • Organic % of residual waste

Instruments
 • Information
 • Sensitisation
 • Tax (residual waste)

Step 3

Food waste management

Household level



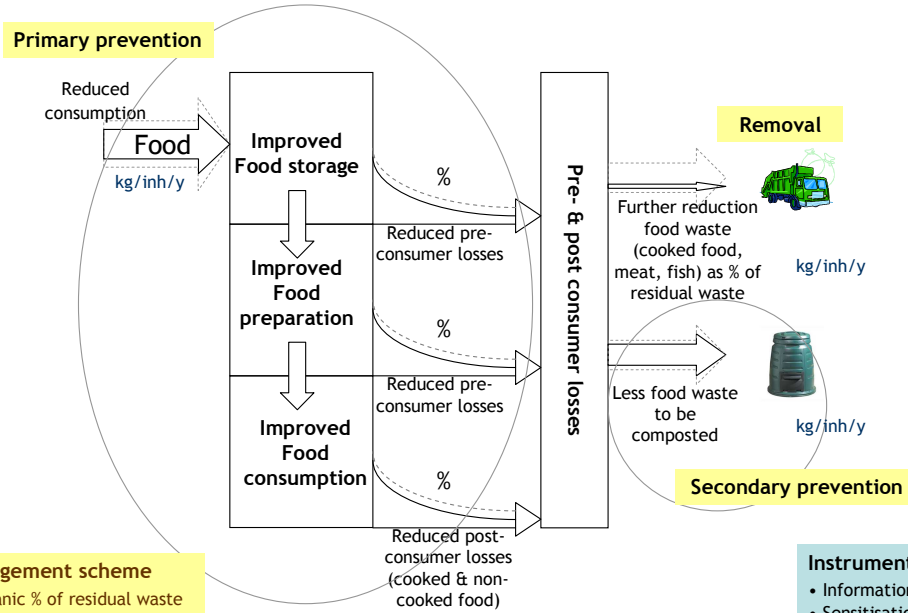
- Management scheme**
- Organic % of residual waste
 - Kitchen waste collection
 - Home composting

- Instruments**
- Information
 - Sensitisation
 - Tax (residual waste)
 - Subsidies (bin, box)

Step 4

Food waste management

Household level



- Management scheme**
- Organic % of residual waste
 - Kitchen waste collection
 - Home composting
 - Smart purchasing & consumption

- Instruments**
- Information
 - Sensitisation
 - Tax (residual waste)
 - Subsidies (bin, box)

Annex N^o3: “Voedselverspilling” & Referenties, B. S oenen

Voedselverspilling

Voedselverspilling, april 2008, Bram Soenen
 (76 paginas)

Inhoudsopgave

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Voorwoord

Wat volgt kan een aanzet zijn naar een duurzaam beleid waar speciale aandacht naar voedselverspilling deel van uitmaakt. Hierbij heb ik mij meer bepaald gericht naar het aspect van de milieu-impact. Het probleem van directe milieu-impact van de verschillende stappen en processen in de voedingsketen door emissies, hinder, landgebruik, afvalproductie, enz., is nog maar weinig bestudeerd. Over de oorzaken, de omvang en de impact op het milieu van voedselverspilling is nog veel minder gekend. Het was de bedoeling de problematiek in brede zin te beschrijven. Tot nu toe heb ik mij omwille van redenen van tijdsgebrek beperkt tot het detecteren van knelpunten en het naar voren schuiven van mogelijke oplossingen bij de consument.

Situering

Het probleem van biologisch afval is onlosmakelijk verbonden met voedselverspilling. De enige echte preventie van biologisch afval is het voorkomen van voedselverspilling. Hiervoor is het nuttig het product voeding en de levensmiddelenproductie eerst van iets verder te bekijken. Los van de fysiologische noodzaak van het eten heeft voeding ook een psychologisch-emotionele waarde. Een maaltijd kan ons identificeren met een bepaalde cultuur en het feit eten te delen is een belangrijk sociaal aspect in relaties. Daarnaast zijn er ook nog culinaire aspecten: we vinden bepaalde voeding gewoon lekker. We hebben dus als consument een sterke band met het product voeding en dit betekend dat het veranderen van ons gedrag naar verspilling toe allicht een geleidelijk proces zal zijn.

De agro-industrie voorziet ons van een rijkelijk en overvloedig aanbod aan voedingsproducten. Ze draagt ook in belangrijke mate bij aan onze welvaart door de hoge kwaliteit, veiligheid, traceerbaarheid en gemak van deze voedingswaren. Aangezien voeding een basisbehoefte is en daar de bereiding arbeidsintensief is, is de voedingssector een ook een stabiele, en zeer belangrijke industrie in Europa zowel qua omzet als qua tewerkstelling. Door de grote diversiteit in voeding en het bestaan van vele nichemarkten met kleinere spelers is het ook een typische KMO-sector. Onder andere door de verzadiging van de Europese afzetmarkt en de globalisering is deze sector sterk gericht op innovatie en import en export. Dit grote sociaal-economisch belang zal restricties opleggen aan de snelheid waarmee een transitie naar een minder spilzuchtig productieapparaat zich kan voltrekken.

Desalniettemin is uit recent onderzoek gebleken dat het product voeding en de voedingsindustrie een zeer belangrijke impact hebben op het milieu. De evolutie naar een Westerse consumptiemaatschappij met massaproductie industrie is daar niet vreemd aan. Met de voortschrijdende wereldbevolking en verwestering van de mondiale leefgewoonten en productiepatronen kan deze milieu-impact desastreuze gevolgen aannemen. Binnen dit gegeven en in de context van de globalisering heeft de Westerse wereld de verantwoordelijkheid te zorgen voor een proliferatie van een milieuvriendelijke en adequate voedselvoorziening voor allen. Bestrijding van voedselverspilling kan daar een prominente plaats in krijgen naast andere

maatregelen zoals bevorderen van biologische landbouw en reductie van de milieudruk van verpakking.

De voedingsketen

Een landbouwgrondstof doorloopt een hele voedingsketen alvorens het op ons bord eindigt om te worden opgegeten. De levenscyclus van een levensmiddelproduct, van de ontginning van de grondstoffen tot de verwijdering van de afvalproducten, ‘from farm to fork’ of ‘from plough to plate’, omvat meestal meerdere levenscyclusfasen: productie en oogst, verwerkingen, bereidingen, verpakking, distributie en verbruik.

Belangrijke veranderingen zijn opgetreden in de manier waarop voedsel wordt geproduceerd en verkocht. Tijdens de 19^e eeuw voltrok zich een landbouwrevolutie en een industriële revolutie die de opkomst van een massaproductiemaatschappij mogelijk maakte. Dit verzekerde de beschikbaarheid van afdoende hoeveelheden kwalitatief hoogwaardige levensmiddelen tegen betaalbare prijzen voor de Europese consument vanaf de 20^e eeuw.

Gesteund op wetenschappelijke ontwikkelingen ging gedurende de 20^e eeuw de verbetering van de landbouwtechnieken en industriële vooruitgang verder, samen met schaalvergroting en specialisatie. In de loop der tijd ontstond zo een complexe, innoverende levensmiddelen keten. De levensmiddelenindustrie creëert hierin voedingsproducten met een hoger toegevoegde waarde die door een uitgebreid distributienetwerk aan de consument worden verkocht.

De verlenging van de voedingsketen en de intensifiëring van landbouw en industrie hebben er tezamen met de toegenomen bevolking in Europa voor gezorgd dat het milieudraagvlak in Europa overschreden is. Vandaag gebeurt een deel van de emissies voor de voedselproductie voor de Europeaan in het buitenland. Denk maar aan de teelt van soja voor veevoeding. Bovendien kan dit ten koste gaan van het lokale voedselaanbod en gebeurt de productie soms onder, naar Europese maatstaven, onaanvaardbare sociale omstandigheden.

Voedselbederf

Voeding bestaan uit ingrediënten van biologische oorsprong, en de samenstelling van de drogestof is dan ook overwegend organisch. Door dit specifieke kenmerk is biologische, enzymatisch en chemische bederf met verlies van nutritionele waarde en geur-, smaak- en textuurkarakteristieken tot gevolg een eigenschap inherent aan voeding. Alle conserveringstechnieken en verpakking ten spijt zal deze eigenschap vroeg of laat hoe dan ook aanleiding geven tot verspilling indien het product niet tijdig verwerkt en geconsumeerd wordt.

Voedselverspilling

Voedselverspilling is voedsel weggooien dat nog geconsumeerd had kunnen worden. Onder voedsel worden ook dranken & water en dierenvoeding & voeder gerekend. Er kan onderscheid

gemaakt worden tussen primaire verspilling, dit is wat de gezinnen weggooien, morsen of niet nuttig kunnen gebruiken (bvb. omdat een verpakking niet efficiënt geledigd kan worden), en secundaire verspilling, dit is wat er door de hele productie- en distributieketen niet nuttig wordt gebruikt. Dit kan o.a. het gevolg zijn van morsen, het feit niet tijdig (voor vervaldatum) verkocht te raken, vroegtijdig bederf, niet voldoen aan kwantitatieve eisen, kwaliteits- en veiligheidsstandaarden, resten in procesinstallaties die als vuil worden weggewassen, overproductie en daarmee gepaard gaande niet-exploitatie omwille van negatieve rendabiliteit, Voor diervoeder kunnen gelijkaardige problemen opduiken.

Voedselverspilling kan ook gedefinieerd worden als alle biologisch afval behalve tuinafval (takken, bladeren, onkruid, snijbloemen, ...), niet-eetbaar keukenafval (theebuiltjes, pellen, pitten, botten, graten, ...) en niet-eetbare snijverliezen uit de agro-industrie (bladeren, kolven, “spent hops”, stelen, botten, organen, wei, ...). Het spreekt voor zich dat biologisch afval afkomstig van onderzoek (bvb. gebruikte kweekmedia, proefdieren, ...), de niet-voedingsindustrie (bvb. oude bacterieculturen voor de kweek van enzymen voor waspoeders) en de medische sector (bvb. oude bloedstalen) niet in deze groep zitten.

De term “organisch afval” is te mijden omdat hier verwarring zou kunnen zijn met chemisch organisch afval van bvb. de farmaceutische industrie. Dit verwijst naar synthetische chemische stoffen die dikwijls zeer hydrofoob (lipofiel of vetminnend) zijn, in tegenstelling tot “biologisch afval” dat omwille van zijn hoge watergehalte zeer hydrofiel of vetafstotend is.

Oorzaken van voedselverspilling

Er is sprake van een toenemende voedselverspilling die een gevolg is van sociaal-demografische veranderingen in onze samenleving (verandering van gezinsstructuur en van leef- en werkpatronen). Kleinere gezinnen, minder tijd om te koken en verhoogde aankoop van bereide schotels, het verdwijnen van de lessen huishoudkunde en kookervaring, de verlaagde ‘winkelfrequentie’ met aankoop van grote hoeveelheden, tendensen om ieder een eigen menu samen te stellen en op te eten op een zelf gekozen tijdstip, intensifiëren van de consumptiemaatschappij, ruimer productaanbod, verhoogde welvaart, daling van de voedselprijzen,

Gevolgen van voedselverspilling

Er wordt geschat dat op wereldniveau er kwart van de voedselproductie wordt weggegooid, dat is een sociaal onaanvaardbare situatie als men weet dat 13 % van de wereldbevolking aan ondervoeding lijdt. Dit voedsel vormt dan bovendien een niet te onderschatten berg afval. Verder is het verspillen van voeding een verspilling van financiële middelen met negatieve effecten op de economie. Deze negatieve effecten komen vooral op de nek van de consument terecht en meer bepaald de maatschappelijk zwakkeren, die meer moeite schijnen te hebben om zich tegen verspilling te wapenen. Naast de afvalproductie is er een nog veel grotere indirecte negatieve invloed op het milieu.

De sociale aspecten van voedselverspilling.

De maaltijd vervult een sociale functie als communicatie medium in allerhande relaties, zowel familiaal als professioneel. Een gerecht kan ook emoties en herinneringen oproepen en toont tot welke cultuur men behoort of welke levenswijze men aanhangt.

Verspillen van voedsel terwijl andere mensen aan honger of ondervoeding leiden is een belangrijk ethisch-sociaal probleem. Terwijl de wereldwijde voedselproductie een overschot toont is er een deel van de bevolking dat een gezonde en gevarieerde voeding moet ontberen. Door armoede, een gebrek aan middelen en “know-how”, mislukte oogsten en slechte distributie, kan de bevolking in ontwikkelingslanden zich soms geen basisvoedingsmiddelen veroorloven of raakt er niet voldoende voeding tot bij hen.

Ook in de Westerse wereld zijn nog steeds vele mensen afhankelijk van voedselpakketen uit liefdadigheid, en vormt eenzijdige voeding een probleem voor de volksgezondheid. Uit het beperkte onderzoek dat voorhanden is komt ook telkens naar voren dat zij die het zich het minst kunnen veroorloven, het meest verspillen.

Door te vermijden dat voedsel verspild wordt en er in plaats voor te zorgen dat het tot de hulpbehoevenden raakt kunnen dus belangrijke maatschappelijke problemen opgelost worden. De sensibilisatie rond voedselverspilling kan gezien worden als een sociaal correcte maatregel daar het de meest achtergestelden helpt.

De economische gevolgen van voedselverspilling.

De voedingssector is de belangrijkste economische sector in Europa zowel qua omzet als qua tewerkstelling. Ze levert een niet te onderschatten bijdrage aan onze welvaart.

Voor de levensmiddelenproducenten en distributeurs als verkopers van grondstoffen, intermediaire producten en eindproducten is er een positief effect zijn voor hun omzet door verspilling van hun afnemers en consumenten. Door problemen met afzet kan hun winst echter aangetast worden omdat voorraden afnemen in kwaliteit en waarde of zelfs bederven waardoor ze een kost inhouden.

Voor alle partijen tussenkomen als aankopers in de voedingsketen houdt verspilling stroomopwaarts in de keten extra uitgaven in daar bedrijven in de voedselketen de kosten voor hun verspilling geheel of gedeeltelijk door zullen rekenen. Ook kwaliteitsverlies en bederf van aangekochte grondstoffen of intermediaire producten kunnen aanleiding geven tot een verlaging van de winstgevendheid. De kosten voor verspilling komen uiteindelijk grotendeels op de schouders van de eindconsument terecht.

Voedselverspilling heeft dus een beperkt positief effect voor een belangrijke economische sector, maar de consument in het algemeen is wel de dupe van verspilling. Door minder te verspillen kan de consument niet alleen overbodige uitgaven vermijden maar zich ook een geld en moeite uitsparen voor het verwijderen van voedsel- en verpakkingsafval. De strijd tegen voedselverspilling is een maatregel die de koopkrachtdaling van de gezin t.g.v. de stijgende voedselprijzen kan milderen.

Ook voor de agro-voedingsindustrie biedt preventie van verspilling kansen. Zij kan het thema verspilling uitspelen als concurrentiemiddel. Hogere grondstoffenefficiëntie betekent daarenboven een besparing en houdt ook minder kosten in voor afvalverwijdering. Finaal resultaat zou zijn dat er in de toekomst meer landbouwareaal vrij zou komen voor de productie van bvb. bio-brandstoffen.

De directe milieu-impact van verspilling

De voedingsketen is een aaneenschakeling van stappen en processen die allen een directe milieu-impact hebben door emissies, hinder, landgebruik, afvalproductie, Daarenboven heeft verspilling bij elk van deze fasen eveneens een directe milieu-impact door de productie van organisch afval of lozingen naar de oppervlaktewateren. Verspild voedsel kan bij het ongescheiden afval terechtkomen en heeft dan een aantal specifieke negatieve gevolgen voor het milieu. Als het gestort wordt kan er door anaërobe rotting methaan (CH_4), een krachtig broeikasgas, vrijkomen. Naar de bodem en het grondwater toe kan er nitraat (NO_3^{2-}) “leachen”. Stikstof kan ook aan de atmosfeer worden afgegeven onder de vorm van verzurende ammoniak (NH_3). Rottend biologisch afval kan ook grote geurhinder veroorzaken (sulfiden en ammoniak) en zelfs ziekterisico's inhouden (ongedierte). Bij verbranding kan het de warmterecuperatie bemoeilijken: door zijn hoog gehalte aan water kan het meer energie vergen om te verbranden dan dat het er kan leveren. Talrijke combinaties van gescheiden ophaling gekoppeld aan technieken zoals compostering, vergisting en gebruik als bodemverbeteraar of verbranding kunnen deze impact reduceren, maar ze moeten emissiereductie genoemd worden en niet preventie.

De indirecte milieu-impact van verspilling

Naast de directe impact is er een indirecte impact door het feit dat alle stappen -en de daarmee gepaard gaande cumulatieve vervuiling en verspilling- die voorafgingen, nodeloos en voor niets zijn geweest. Men kan vermoeden dat deze “gratis” indirecte impact soms veel belangrijker kan zijn dan de directe impact van het afval dat deze verspilling vertegenwoordigt.

Ter illustratie een voorbeeld. De benodigde hoeveelheid voedsel nemen we 100 eenheden en we delen de voedingsketen op in 3 stappen: oogsten, verwerken en consumeren. Er wordt verondersteld dat elke speler in de keten werkt met een efficiëntie waarbij 1 op de 10 eenheden wordt verspild (90 % efficiëntie). De landbouw moet 137 eenheden produceren, waarvan de voedingsnijverheid 123 eenheden ontvangt voor verwerking (verliezen door bvb. voorraadaantasting en het afkeuren wegens inferieure kwaliteit). Van deze 123 eenheden kunnen er maar 111 verkocht worden aan de consumenten. Bijvoorbeeld omdat er verpakkingen niet verkocht worden omdat ze scheurden, of omdat ze over hun vervaldatum gaan. De consument zal van deze 111 eenheden dan weer 100 eenheden opeten en 11 eenheden in de vuilnisbak gooien. Dit gebeurt om reden van bederf maar ook omdat er teveel gekookt wordt en de overschot weggegooid wordt. Uiteindelijk wordt zo bijna 40 % van de oogst weggesmeten.

Als de consument maar 1 op de 20 eenheden verspilt in plaats van 1 op de 10, of 50 % minder, daalt de verspilling in elke stap van de gehele keten met 5 %. Er is dus een rechtstreeks effect van verspilling op alle fasen stroomopwaarts in de voedingsketen. De totale verspilling in de keten daalt uiteindelijk met 22 %.

Als de boeren maar 1 op de 20 eenheden (95 % efficiëntie) zouden verspillen in plaats van 1 op de 10, blijft de verspilling in de rest van de keten ongewijzigd. Er is dus een rechtstreeks effect van verspilling op alle fasen stroomopwaarts in de voedingsketen. De totale verspilling in de keten daalt uiteindelijk met nog geen 2 %.

De twee voorgaande voorbeelden illustreren dat hoe meer stroomafwaarts in de keten men maatregelen neemt, hoe groter het totale effect is. Dit omdat het effect zich stroomopwaarts propageert door verminderde vraag naar producten bij leveranciers dicht bij de bron. Best is dat alle spelers in de keten maar 1 op de 20 eenheden zouden verspillen in plaats van 1 op de 10. Dit geeft met het sneeuwbaaleffect doorheen de voedingsketen een vermindering van 55 % aan verspild.

Resultaat is dan een ongewijzigd welvaartsniveau met kosten en lastenbesparingen voor elke ketenpartner. De landbouw kan 15 % minder produceren om aan eenzelfde vraag te voldoen. Hierdoor komt landbouwareaal vrij voor extensievere biologische teeltmethoden of energiegewassen. De consument wint 5 % aan koopkracht en de industriële productiviteit stijgt 13 % waardoor de bedrijfswinsten toenemen. Door de geminderde vraag zal de export bij een constante bevolking wel moeten toenemen om de omzet op pijl te houden. Door het verminderde verbruik dalen, emissies, lozings en andere milieudrukken navenant.

De duurzame productie en consumptie

In het kort toont het voorgaande aan dat in het kader van duurzame consumptie en productie verspilling een thema is waar winst in elke peiler van de duurzame samenleving (zijnde economische, ecologische en sociale) kan geboekt worden zonder dat dit ten koste moet gaan van één van de andere peilers. Er is een enorm potentieel waarbij economische en sociale zorgen hand in hand gaan met zorgen voor het leefmilieu. De welvaart kan stijgen, en wel voor iedereen, terwijl het milieu er beter van wordt! Onafhankelijk daarvan zijn er nog eens positieve effecten mogelijk naar volksgezondheid door de hoge aandacht voor voedselhygiëne en bederf, die ook voedselvergiftiging voorkomen. Verschillende doelstellingen kunnen worden verwezenlijkt vanuit eenzelfde gedachte: verspilling tegen gaan.

Omwille van praktische redenen kunnen de economische kosten en de milieu-impact van verspillingspreventie op een bepaald punt zwaarder beginnen wegen dan de kost van de verspilling zelf, zodat het nodig kan zijn dat een bepaalde frictieverspilling moet getolereerd worden. De maatregelen mogen geen zwaardere impact hebben dan het kwaad dat ze bestrijden!

De integrale aanpak

Bij de bestijding van verspilling is een geïntegreerde aanpak met een analyse van de volledige levenscyclus van het product noodzakelijk. Bij acties moet steeds deze oefening gedaan worden om te verhinderen dan men problemen niet louter verschuift of verergerd stroomop- of stroomafwaarts in de voedingsketen. De consumenten en distributie zouden hogere kwaliteit kunnen eisen wat minder aanzet geeft tot retour of verspilling, maar dit kan aanleiding geven tot verhoogde kosten bij de industrie en meer verspilling door strengere triage bij de producent. Er is dus een samenwerking en inspanning nodig van alle actoren in de levensmiddelenketen, met name de landbouw de industrie, de distributie, de consument en de overheid.

Bepaalde andere industrieën, bvb. de verpakkings- en biobrandstoffenindustrie, hebben raakvlakken met de voedingsnijverheid en moeten in bepaalde gevallen misschien ook betrokken worden. Daarenboven spelen er ook andere maatschappelijke zorgen rond het thema voeding, zoals voedselveiligheid en armoedebestrijding. Deze aspecten kunnen beperkingen inhouden, maar bieden mogelijkheden tot het creëren van samenwerkingen en synergieën. Voedselhygiëne gaat bederf en voedselvergiftiging tegen met soms drastische en verspillende technieken (bvb. ontsmetten met chloor en verbod om producten te verkopen). Anderzijds is het tegengaan van bederf een hoofdbekommernis bij het tegengaan van verspilling. Vanuit het standpunt van volksgezondheid wordt minder vlees en meer groenten en fruit eten gepromoot. De verspilling van groenten en fruit is vanuit milieuoogpunt dan weer zeer belangrijk.

Verspilling bij de gezinnen

We kunnen beginnen met te stellen dat door de intensifiëring van de consumptiemaatschappij met een hoge welvaart, een overvloedig internationaal productaanbod en lage voedselprijzen, de problemen van voedselverspilling voor de gemiddelde consument verdoezeld worden.

Een combinatie van sociaal-demografische veranderingen in onze samenleving, met name verandering van gezinsstructuur en van leef- en werkpatronen (stijgende bevolkingsdichtheid, opkomst tweeverdieners & verdwijnen vrouw aan de haard, flexibele werkuren, rurale exodus & verstedelijking, stijgend inkomen, vergrijzing, toename eenoudergezinnen, ...), spelen verspilling ook in de hand.

Door de verhoogde tijdsdruk is het moeilijker de activiteiten en de maaltijden van het gezin te programmeren. Steeds meer stellen gezinsleden ieder hun een eigen menu samen en eten op zelf gekozen tijdstip. Naast hogere tijdsdruk en individualisering, zorgt ook de “verdunning” van de gezinnen ervoor dat er steeds kleinere maaltijden nodig zijn. Dit is een extra eis die meerverspilling kan in de hand werken (bvb. teveel klaar maken).

Ten gevolge van de verminderde tijd om te koken en het verdwijnen van de lessen huishoudkunde is er steeds minder kookervaring, waardoor inefficiënt omgesprongen wordt met etenswaren en etensresten. Er worden hierdoor meer kant-en-klare producten gekocht en er wordt ook vaker buiten huis gegeten. Hier zijn misschien kansen om verspilling te milderen.

Door slechte planning van de menu's, maaltijden en aankopen in combinatie met inadequaat beheer van de huishoudvoorraad en slechte opslag, moeten vervallen producten worden

weggeworpen en wordt er te veel eten klaar gemaakt. Kinderen die bepaalde voedingsproducten weigeren te eten, wiens interesses veranderen, en smaken verschillen, zouden eveneens bijdragen tot de moeilijkheden.

Veel eindgebruikers zijn ook niet in staat de houdbaarheidsdata correct te interpreteren. Aangezien deze een waarschuwing inhouden naar de volksgezondheid toe leidt dit soms uit terechte voorzorg of hygiëne tot het ónterecht wegwerpen van etenswaren.

Distributie: aanbod, grootte verpakkingseenheden en promoties

In onze verstedelijkte dienstenmaatschappij staan we niet meer zelf in voor onze voedselvoorziening. Minder en minder mensen houden er een moestuin op na, of kweken hun eigen dieren. Een maatschappij waar we zelf in ons voedselbehoefte voorzien, eventueel door ruilhandel ligt inderdaad zeer ver achter ons. De modale Westerling is voor zijn voedselvoorziening compleet afhankelijk van een modern distributienetwerk. De voedselproducten die daar in de schappen staan zijn sterk geconditioneerd om ze houdbaar, transporteerbaar, hanteerbaar en presentabel te maken.

De door tijdsdruk verlaagde winkelfrequentie zet aan tot aankoop van grotere hoeveelheden voedsel die langer goed moeten blijven. Daarnaast neemt de behoefte aan kant-en-klare éénpersoonsschotels en kleinere verbruikshoeveelheden toe in de Westerse consumptiemaatschappij. Dit t.g.v. “verduunning” van de gezinnen, individualisering en problemen met de planning van professionele bezigheden en gezinsactiviteiten. Er is ook een trend naar zachtere conserveringstechnieken zoals bvb. pasteuriseren en verpakking onder beschermde atmosfeer. Marketing is een belangrijk onderdeel geworden van de bedrijfspolitiek. Ze is erop gericht marktaandeel van een bedrijf, en dus verkoop van haar producten, te verhogen.

De distributiekkanalen

In het kader van voedselverspilling is een fijnmazig netwerk van voedingswinkels te prefereren, in zoverre dat consumenten er gebruik van maken om frequenter boodschappen te doen. De noodzaak om een eigen stock aan te leggen of grote verpakkingen in te slaan mindert, evenals de kans dat zaken bederven. Want, de aankopen kunnen beter afgestemd worden op het huishoudelijke verbruik door korter op de bal te spelen. Dit biedt mogelijkheden om verspilling tegen te gaan. De huishoudelijke taak wordt vereenvoudigd en de koopdruk wordt verlaagd doordat minder ver vooruit moet worden gepland.

Een dergelijk distributienet kan op andere vlakken zorgen voor een verschuiving van de milieu-impact of kan zelfs positieve gevolgen hebben. De verlenging van de distributieketen en de daarmee gepaard gaande verhoogde CO₂-uitstoot valt misschien in het niet tegen het feit dat mensen minder ver moeten gaan winkelen. Fietsen en wandelen i.p.v. rijden wordt misschien aangemoedigd. Ook brengt een dergelijk netwerk een verschuiving van kosten met zich mee i.v.m. een groothandelsnetwerk met een beperkt aantal distributiepunten. De uitbating zal duurder uitvallen voor de beheerders, doch deze kunnen de kost doorrekenen aan de consument.

Voor deze moet de besparing van vermeden verspilling, kleinere ijskast, minder autogebruik, ... opwegen tegen de hogere prijs van de aankopen.

Complementair hiermee kan directe verkoop of een korte keten verkoop kunnen verspilling verminderen doordat de houdbaarheid niet verloren gaat tijdens transport en er in een kortere keten ook minder gelegenheden tot verspilling zijn.

Houdbaarheidsverlenging

Producten die zonder problemen voor langere tijd opgeslagen kunnen worden, geven minder aanleiding tot verspilling daar ze meer kans hebben opgegeten te worden voor ze bederven. Een verlenging van de houdbaarheid van een product kan door het strikt respecteren van de koele keten, ook door de consument. Niet alleen door ongeopende, maar ook geopende producten thuis correct te stockeren en zich er bewust van te zijn dat hygiëne belangrijk is bij het manipuleren van levensmiddelen kan bederf voorkomen worden. Al deze maatregelen verminderen zowel de risico's voor de volksgezondheid als de milieubelasting door verspilling.

Slimme en hersluitbare verpakkingen (bvb. het bag-in-box systeem) of individuele onderverpakkingen kunnen helpen producten hygiënisch te manipuleren en goed te stockeren. Stevigere (om)verpakkingen (bvb. retourkragen voor verse groenten) kunnen ook tegengaan dat levensmiddelen verloren gaan door ongelukjes zoals vallen, waarbij producten kunnen openbreken of –scheuren. Omverpakkingen kunnen ook verhinderen dat producten vervuilen zodat ze niet meer presenteerbaar zijn voor verkoop. Goede verpakkingen moeten zo ontworpen zijn dat ze morsen bij het openen, verdelen en schenken tegen gaan, en dat ze volledig geledigd kunnen worden.

De ontwikkeling van nieuwe conserverings- en verpakkingstechnieken moet aangemoedigd worden met het doel verspilling tegen te gaan. Gekende hardere conserveringstechnieken moeten waar mogelijk voorrang krijgen op zachtere technieken om de houdbaarheid te maximaliseren. Voor conservering en verpakking moet eerst goed nagegaan worden of het gebruikte ervan niet leidt tot meer negatieve gevolgen voor milieu, bvb. door het creëren van verpakkingsafval, dan dat er positieve gevolgen zijn door vermijden van verspilling. Is een doordacht gebruik van kant-en-klare maaltijden kan positief voor het milieu?

Het aanbod

Een ruim aanbod aan “productmaten” zorgt ervoor dat iedereen voor zich een aangepast menu kan samenstellen. Bij kleine (onder)verpakkingen ontstaat er wel een “trade-off” tussen vermindering van de verspilling door het beter inspelen op de verdunning van de gezinnen en een toename van verpakkingsmateriaal. Bij grote verpakkingen bestaat het risico dat een gedeelte als etensresten in de vuilbak belandt of dat een gedeelte niet opraakt voor bederf optreedt.

De verkoop in vrac of per kilo laat toe dat men koopt in functie van zijn behoefte. Merk op dat hier bvb. ook verkoopsacties mogelijk zijn. In de veronderstelling dat de consument ook effectief maar koopt wat hij nodig heeft, helpt dit verspilling tegen te gaan. Ook kan verpakkingsafval

vermeden worden. Het is nog de vraag of er geen verhoging van afval en verspilling is in de winkel ten gevolge van niet te verkopen overschot. Er moet steeds gecontroleerd worden of maatregelen bijdragen tot een reductie over de gehele voedingsketen.

Door een algemene verminderde voeling met de landbouw, weten veel consumenten niet welke groenten en fruit in seizoen zijn en welke niet. Dit kan ertoe leiden dat dure kasteelten of import van groenten en fruit buiten seizoen worden gekocht terwijl een overvloed aan eigen seizoenskwaken blijft liggen en moet uit de rekken genomen worden.

Het ter beschikking stellen van groenten, het hele jaar door, heeft nog andere negatieve gevolgen voor het milieu. Buiten seizoen gaat het immers om intensieve, “geforceerde” oogsten of import die nadeliger kunnen zijn voor het milieu dan het seizoensalternatief. Deze milieuvriendelijke producten kunnen seizoensalternatieven in het slechtste geval zelfs uit de markt concurreren. Wie weet bijvoorbeeld nog hoe je warmoes of pastinaak moet klaarmaken?

Het hebben van een moestuin en fruitbomen zou een positief effect moeten hebben op de kennis van regio- en seizoensproducten. Werken in de tuin leert de natuur appreciëren en de kwaliteiten van voeding, die anders als een goedkoop gegeven wordt gezien, waarderen. Het tegengaan van verspilling hangt uiteraard ook af van de mate waarin de eigen groenten en fruit ook effectief gegeten worden en dan aankopen vervangen. Een tuin is hoe dan ook efficiënte stock, waaruit naar eigen wens kan geplukt worden. Groeten en fruit kunnen ook zelf geconserveerd worden (confituur, blancheren/invriezen, drogen, ...).

Promotieacties

Promotieacties zijn instrument in de marketingstrategie van een bedrijf. Door grotere verpakkingen aan te bieden, wordt het aankoopinterval verlengd en wordt klantenbinding bewerkstelligd. De omzet kan ook opgekrikt worden door reducties van het type 3 halen 2 betalen of ‘kwantum kortingen’. Bij deze technieken is er het probleem dat ze aan kunnen zetten tot het kopen van grotere hoeveelheden dan werkelijk noodzakelijk. Promotieacties kunnen een nuttig instrument zijn voor de marketing van een product. Of ze ook voordelig zijn voor de consument hangt sterk af van hoe die zijn huishouden beheert. Promotieacties zijn dus niet altijd goed voor de portefeuille van de consument

Zoals gezegd moet hier een onderscheid gemaakt worden tussen een gediversifieerd aanbod dat juist beter moet inspelen op de verschillende noden in de samenleving (HORECA, eenpersoons- en grote gezinnen). Het is ook logisch en onvermijdelijk dat grotere verkoopseenheden goedkoper zijn omdat ze lagere vaste en variabele kosten hebben (bvb. administratie en verpakking resp.).

Verbruik thuis: planning en bederf

Door de verhoogde tijdsdruk is het moeilijker de activiteiten en de maaltijden van het gezin te programmeren. Ook is er minder tijd om te koken. Door het verdwijnen van de lessen huishoudkunde is er steeds minder kookervaring, waardoor inefficiënt omgesprongen wordt met

etenswaren en etensresten. Overdreven ‘hygiënische voorzorg’ en onwetendheid bij interpretatie van houdbaarheidsdata geven eveneens aanleiding tot het te snel wegwerpen van levensmiddelen.

Door slechte planning van de menu’s, maaltijden en aankopen in combinatie met inadequaat beheer van de huishoudvoorraad en slechte opslag, moeten vervallen producten worden weggeworpen en wordt er te veel eten klaar gemaakt.

Te vrije of een verwaarloosde opvoeding van kinderen zorgt ervoor dat zij niet alle smaken en producten leren waarderen en leidt ertoe dat zij bepaalde voedingsproducten weigeren te eten. Hun veranderende interesses en verschillende smaken dragen bij tot de moeilijkheden.

Weggoien van bedorven producten

Consumenten stippen voedselveiligheid aan als reden om iets weg te gooien. Daarvoor zijn er redenen aan zoals er rot uitzien, slechte geur, slechte smaak, maar ook voorzorg en hygiënische aspecten spelen een belangrijke rol. Mensen vinden het bijvoorbeeld ook zekerder om etensresten weg te gooien omwille van voedselveiligheid. Ook het overschrijden van de houdbaarheidsdatum is een belangrijke reden.

In tegenstelling tot de levensmiddelenproducenten ontberen consumenten echter vaak de kennis en technieken om bederf en risico correct te beoordelen, bvb. a.h.v. houdbaarheidsdata. Veel mensen denken bijvoorbeeld verkeerdelijk dat een open verpakking goed blijft tot de vervaldatum, of stellen eveneens foutief dat een product na de vervaldatum niet meer genuttigd kan worden. Deze overdreven hygiënische voorzorg en onwetendheid bij interpretatie van houdbaarheidsdata geven dus aanleiding tot risico’s voor de gezondheid en onnodige verspilling en milieuvervuiling.

Daarnaast beperkt de houdbaarheid van een product ook door het niet strikt respecteren van de koele keten, ook door de consument. Ook moeten eindgebruikers er zich terdege bewust van zijn dat hygiëne bij het manipuleren van levensmiddelen en het correct stockeren van producten bederf kunnen vertragen. Extra zorg voor kwetsbare groenten en fruit bvb. door het verwijderen van gekneusde vruchten kan eveneens helpen verder bederf tegen te gaan. Het “First In First Out” -principe moet goed gerespecteerd worden en geopende verpakkingen moeten altijd eerst leeg gemaakt worden. Men moet de moeite nemen om geopende verpakking goed sluiten of in bewaarrecipiënten zetten als men ze wegbergt.

Al deze maatregelen verminderen zowel de risico’s voor de volksgezondheid als de milieubelasting door verspilling. De consument moet hierover goed geïnformeerd worden door sensibilisatiecampagnes van de overheid in samenwerking met de distributie, de industrie en consumentenorganisaties. Er kan ook al vroeg begonnen worden met het bijbrengen van meer kennis in het onderwijs.

Slechte planning, geen vaste afspraken in het gezin en gebrekkig beheer van de voorraadkast

Hoewel we toch een aantal keer per week uit winkelen gaan, houden we voor het geval dat toch thuis een behoorlijke huisvoorraad aan. Dit houdt een zeker risico in daar deze zou kunnen bederven, wat strek afhangt van het beheer door de aankoopverantwoordelijke.

Er zijn een aantal huishoudregels die kunnen vermijden dat voedsel vanuit de voorraad rechtstreeks in de vuilnisbak terecht komt. Ten eerst kan men er op letten de producten die het eerst zullen vervallen eerst op te eten (“First In First Out” of FIFO principe). De mogelijkheid om voeding die men niet op tijd gaat opkrijgen aan kennissen, familie of liefdadigheid te geven verlaagt de verspilling. Een betere planning van de voedingsaankopen komt naar voren als één van de oplossingen. Het feit van een menu op te stellen, een boodschappenlijstje op te maken, het etiket met de vervaldatum en bewaarvoorschriften in de winkel te lezen, kan verspilling tegengaan. Uiteraard moet men voor men naar de winkel vertrekt eerst de huisvoorraad controleren. Een voorraadlijst of logboek kan hier nuttig zijn voor de planning.

Dikwijls weten we ook niet op voorhand wie er bij de maaltijd aanwezig zal zijn, en dus maken we meer klaar dan nodig. Gezien veel mensen restjes niet recupereren komt zo een deel van de bereide maaltijden in de vuilnisbak terecht, zelfs nog voor het geserveerd is. Ook hier kan een goede planning met een goed bijgehouden gezinsagenda soelaas bieden.

Om de gedragingen te wijzigen zou het nuttig zijn sensibiliserings- en informatieacties te voeren bij de gezinnen over gedragingen die verspilling voorkomen en bezuinigingen mogelijk maken, zoals bijvoorbeeld een beter beheer van de voedingsaankopen en de bewaring van voedingswaren in de koelkast. Dit in samenwerking met de distributiesector voor bvb. de verspreiding van informatiemateriaal over de verkooppunten.

Een betere planning van de gezinsactiviteiten en de maaltijden en meer kookervaring, moeten verhinderen dat te veel gemaakt en weggegooid wordt. Organisatie van kookcursussen en cursussen “home economics” voor kinderen en volwassenen kunnen hiervoor worden overwogen.

Hoewel de praktijk reeds bestaat, moet het schenken van voedsel aan voedselhulporganisaties nog meer worden aangemoedigd, met name door de gegevens van deze organisaties te verspreiden met informatie over de manieren waarop schenkingen kunnen worden gedaan.

Referenties

Algemene bronnen

Why do people waste food? - An insight into WRAP's current work on Public Attitudes to Food Waste; Mark Barthel voor WRAP; 2007 (document in het Engels, beschikbaar op http://www.edenproject.com/Mark_Barthel_WRAP.pdf)

“Introduction: Importance du gaspillage alimentaire en Région Wallone?”; Martine Gillet, Directrice de la Direction de la Prévention et de la Gestion des Déchets ménagers à l'OWD november 2007 voorgesteld op *“Gaspillage alimentaire: quelles mesures de prévention?”* op 30 november 2007 in Namen; georganiseerd door *Le Minister de l'Agriculture, de la Ruralité, de l'environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

“Politique de prévention du gaspillage menée en RBC”; Joelle Van Bambeke, Bruxelles Environnement; november 2007 voorgesteld op *“Gaspillage alimentaire: quelles mesures de prévention?”* op 30 november 2007 in Namen; georganiseerd door *Le Minister de l'Agriculture, de la Ruralité, de l'environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

“Gaspillage Alimentaire – Delphi”; Enquête CRIOC/OIVO Catherine Rousseau, Directrice de la Recherche au CRIOC, november 2007 voorgesteld op *“Gaspillage alimentaire: quelles mesures de prévention?”* op 30 november 2007 in Namen; georganiseerd door *Le Minister de l'Agriculture, de la Ruralité, de l'environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

Food Industry Sustainability Strategy; DEFRA; april 2006 (document in het Engels, beschikbaar op <http://www.defra.gov.uk/farm/policy/sustain/fiss/index.htm>)

Understanding Food Waste, Key Findings of our Recent Research on the Nature, Scale and Causes of Household Food Waste; WRAP; maart 2007 (document in het Engels, beschikbaar op www.wrap.org.uk/retail/food_waste/research.html; ISBN 1-84405-310-5)

“Verspilling en Indirecte Energie van Voeding”; Milieu Centraal; augustus 2007 (document in het Nederlands, link beschikbaar op http://www.senternovem.nl/uitvoeringafvalbeheer/ketenaanpak/het_project/pilot_voedselresten/index.asp)

“LNV Consumentenplatform – Voedselverliezen, verspilde moeite? achtergrondinformatie”; Ministerie van Landbouw, Natuur en Voedselkwaliteit; juni 2006 (document in het Nederlands link beschikbaar op <http://www.agripress.be/start/artikel/180510/nl>)

“LNV Consumentenplatform – Voedselverliezen, verspilde moeite? consumentenpanels”; Ministerie van Landbouw, Natuur en Voedselkwaliteit; juni 2006 (document in het Nederlands link beschikbaar op <http://www.agripress.be/start/artikel/180510/nl>)

“LNV Consumentenplatform – Voedselverliezen, verspilde moeite? beleidsdossier”; Ministerie van Landbouw, Natuur en Voedselkwaliteit; juni 2006 (document in het Nederlands link beschikbaar op <http://www.agripress.be/start/artikel/180510/nl>)

“Proceedings: Refereed Sessions III; Sustainable Consumption and Production: Opportunities and Challenges – Food Matters – Preventing Food Losses in the Kitchen”; Conny Bakker (info-eco) voor Sustainable Consumption Research Exchange (SCORE!) Network; november 2006 (document in het Engels, beschikbaar op http://www.score-network.org/score/score_module/index.php?doc_id=1224)

The Soggy Lettuce Report – Are We a Nation of Wasters?; Prudential UK; 2004 (document in het Engels, beschikbaar op http://www.assurre.eu/uploads/documents/13-1-soggy_lettuce_report_2004.pdf)

Beyond Packaging: Food Waste in the Home; IGD; maart 2007 (betalend document in het Engels, beschikbaar op <http://www.igd.com/cir.asp?menuid=20&cirid=2113>)

Websites

“Love Food, Hate Waste”; campagne opgezet door WRAP in november 2007 (website in het Engels:

<http://www.lovefoodhatewaste.com/>

Het Brussels Observatorium voor Duurzame Consumptie is een partnerschap tussen het OIVO en Brussel Leefmilieu. Het wordt gesteund door de minister van Leefmilieu, Energie en Waterbeleid. De website geeft een reeks van studies en achtergrondinformatie over diverse thema's die aanleunen bij duurzame consumptie.

<http://www.observ.be>

Documenten over landbouw en industrie

Food Industry Sustainability Strategy; DEFRA; april 2006 (document in het Engels, beschikbaar op <http://www.defra.gov.uk/farm/policy/sustain/fiss/index.htm>)

Report on the Food Industry Sustainability Strategy Champions' Group on Waste; DEFRA; mei 2007 (document in het Engels, beschikbaar op <http://www.defra.gov.uk/farm/policy/sustain/fiss/pdf/report-waste-may2007.pdf>)

"Scoping studies to identify opportunities for improving resource use efficiency and for reducing waste through the food production chain" AEA Eney & Environment voor DEFRA ; februari 2007 (document in het Engels, beschikbaar op http://www.defra.gov.uk/science/project_data/DocumentLibrary/WU0103/WU0103_4999_FRP.pdf)

"Saving Money by Reducing Waste, Waste Minimisation manual: a Practical Guide for Farmers and Growers"; DEFRA; april 2006 (document in het Engels, beschikbaar op <http://www.defra.gov.uk/ENVIRONMENT/WASTE/topics/agwaste/waste-minimisation.pdf>; product code PB 11674)

"Comment l'industrie agro-alimentaire peut contribuer à réduire le gaspillage alimentaire du fait des ménages?"; Ann Nachtergaeel, FEVIA; november 2007 voorgesteld op *"Gaspillage alimentaire: quelles mesures de prévention?"* op 30 november 2007 in Namen; georganiseerd door *Le Minister de l'Agriculture, de la Ruralité, de l'environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

"Managing Environmental Sustainability in the European Food and Drink Industries"; Confédération des Industries Agro-Alimentaires (CIAA); 2007 (document in het Engels, beschikbaar op http://www.ciaa.eu/documents/brochures/brochure_CIAA_envi.pdf)

Study on the Economic Benefits of Waste Minimisation in the Food Sector; Integrated Skills Limited & FaireShare; januari 2007 (document in het Engels, beschikbaar op <http://www.integrated-skills.com/ISL/Files/Evolve%20Food%20Waste%20Minimisation%20Final%20Report%208-1-07.pdf>)

Plantaardige reststromen – biologisch onderzoeksbericht 14; Wageningen Universiteit & Researchcentrum (WUR); juni 2004 (document in het Nederlands, beschikbaar op <http://library.wur.nl/biola/bestanden/1722344.pdf>)

Energietransitie Ketenefficiëntie – Beperkern Derving in de Versketen; Stichting Agro Keten Kennis (AKK); januari 2005 (document in het Nederlands, beschikbaar op <http://www.stichtingakk.nl/docs/Duurzaam/AKK2734.doc>; ref. AKK2734/SB/mk)

Business Food Waste Briefing Paper – Options for Grocers, Restaurants and Food Processors; WasteCap Wisconsin; juli 2004 (document in het Engels beschikbaar op <http://www.wastecapwi.org/documents/foodwaste.pdf>)



Websites

Waste Watchers bij Alken-Maes: Het personeel van Alken-Maes gaat de verspilling te lijf om zo milieuvriendelijker te werken! Verschillende ploegjes van werknemers -- EcoTeams -- wedijveren in een ideeëncompetitie met elkaar om manieren te vinden om de freinte bij Alken-Maes te verminderen. Freinte staat voor het bierverlies dat zich voordoet tijdens het hele brouwproces.

http://www.beerhunters.be/waste_watchers_bij_alkenmaes.htm

The Food Industry Sustainability Strategy (FISS) will help the Food Industry contribute to the UK's sustainability goal. Farming: Food Industry Sustainability Strategy (FISS)

The Food Industry Sustainability Strategy (FISS) will help the Food Industry contribute to the UK's sustainability goal.

The strategy is aimed principally at the Food Industry, but may be of interest to anyone wishing to find out more about sustainability, reduction in energy consumption, food transport, the use of water, the management of waste, corporate social responsibility, ethical trading or better regulation.

<http://www.defra.gov.uk/farm/policy/sustain/fiss/index.htm>

Confédération des Industries Agro-Alimentaires (CIAA): de levenscyclus van de levensmiddelensector

http://envi.ciaa.eu/asp/life_cycle.asp

Confédération des Industries Agro-Alimentaires (CIAA): Efficiënt grondstoffen gebruik en afvalbeheer.

http://envi.ciaa.eu/asp/key_themes_1.asp?doc_cat_2=Resources%20and%20Waste

IGD Food & Grocery information Insight & Best Practices works with consumers, companies and individuals throughout the food and grocery chain to ensure we are providing information, research and leading edge best practice to help companies grow their business and develop their people.

<http://www.igd.com/secondlevel.asp?menuID=149>

Documenten over/naar consument

“Analyses transversales”; Enquête CRIOC/OIVO, Muriel Piazza, chercheuse au CRIOC november 2007 voorgesteld op “*Gaspillage alimentaire: quelles mesures de prévention?*” op 30 november 2007 in Namen; georganiseerd door *Le Minister de l’Agriculture, de la Ruralité, de l’environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

“*Déchets Alimentaire et Gaspillage*”; Enquête CRIOC/OIVO, Catherine Rousseau, Directrice de la Recherche au CRIOC et Muriel Piazza, chercheuse au CRIOC ; november 2007 voorgesteld op “*Gaspillage alimentaire: quelles mesures de prévention?*” op 30 november 2007 in Namen; georganiseerd door *Le Minister de l’Agriculture, de la Ruralité, de l’environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

“*Typologie Gaspillage Alimentaire*”; Enquête CRIOC/OIVO, Muriel Piazza, chercheuse au CRIOC november 2007 voorgesteld op “*Gaspillage alimentaire: quelles mesures de prévention?*” op 30 november 2007 in Namen; georganiseerd door *Le Minister de l’Agriculture, de la Ruralité, de l’environnement et du Tourisme de la Région wallone*; (document in het Frans, link beschikbaar op <http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

Afvalstudies uitgevoerd in het Brusselse door het studiebureau RDC-Environnement en Sita Recycling Services NV voor het Brussels Instituut voor Milieubeheer (BIM); 2001 en 2004 (samenvatting van de informatie onder de rubriek “Verspilling” op www.observ.be⁵³ of http://evelyne.huytbroeck.be/IMG/doc/20060315_NL_dossier_presse_gaspi_alimentaire.doc)

Enquête voor de kwalitatieve evaluatie van de perceptie en het gedrag van de bevolking van Brussel ten overstaan van voedselverspilling door het Centre de PsychoSociologie de l’Opinion (CPSO) van de Université Libre de Bruxelles (ULB) voor het (BIM); februari 2005 (samenvatting van de informatie onder de rubriek “Verspilling” op www.observ.be)

Le Gaspillage à la Poubelle!; Hélène Lamy in Bruxelles en Mouvement nr 147 ; juni 2005 (document in het Frans, beschikbaar op http://www.ieb.be/wp-content/uploads/2007/12/bem147_23062005.pdf)

Verspild voedsel; Intermediair 24 ; augustus 2006 (artikel in het Nederlands, beschikbaar op http://www.intermediair.nl/artikel_print.jsp?id=398182)

Websites

De website van Leefmilieu Brussel – BIM, de overheidsdienst voor milieu en energie van het Brussels Hoofdstedelijk Gewest bevat een rubriek “mijn voeding” waar praktische fiches staan over o.a. een duidelijke planning van aankopen, goede bewaarstechnieken, het verwerken of correct invriezen van restjes.

<http://www.ibgebim.be/Templates/Particuliers/Informer.aspx?id=1818> (Frans)

<http://www.ibgebim.be/Templates/Particuliers/Informer.aspx?id=1818&langtype=2067>

(Nederlands)

⁵³ www.observ.be is de site van het **Brussels Observatorium voor Duurzame Consumptie (BODC)** is een partnerschap tussen het **Onderzoeks- en Informatiecentrum van de VerbruikersOrganisaties (OIVO/CRIOC)** en **Leefmilieu Brussel** en wordt gesteund door de **Minister van Leefmilieu, Energie en Waterbeleid**.



“Brussels Parlement over Duurzame Consumptie”; Brussels Observatorium voor Duurzame Consumptie; maart 2003 (samenvatting op de website <http://www.observ.be/FR/Parlement2003/proposition/maison2.shtml>)

Halte au Gaspillage Alimentaire; Réseau Éco-consomateur; januari 2005 (Document in het Frans, beschikbaar op http://www.ecoconso.be/IMG/pdf/fc125_gaspillage_alimentaire.pdf)

Mensen kunnen op deze site opschrijven wat ze gedurende veertien dagen weggooiden, om meer inzicht in hun eigen gedrag te krijgen. Om een helpende hand te bieden, werd een handig invulschema gemaakt. Met behulp van het omrekenmodel kan getoond worden wat dat op jaarbasis zou betekenen.

<http://www.imog.be/weggooitest.html>

Documenten over verspilling in de HORECA en grootkeukens

Drie Sterren voor Afvalbeheer, in 8 Stappen naar een Milieuvriendelijke Keuken, Gids voor de Leerlingen; OVAM; 01 maart 2006 (document in het Nederlands, link beschikbaar op <http://www.ovam.be/jahia/Jahia/cache/offonce/pid/176?actionReq=actionPubDetail&fileItem=1052>)

Drie Sterren voor Afvalbeheer, in 8 Stappen naar een Milieuvriendelijke Keuken, Handleiding voor de Leerkrachten; OVAM; 01 maart 2006 (document in het Nederlands, link beschikbaar op <http://www.ovam.be/jahia/Jahia/cache/offonce/pid/176?actionReq=actionPubDetail&fileItem=1053>)

Miljoenenverspilling in restaurants door klant en keuken; Henri Luitjes Agrotechnology and Food Science Group Wageningen Universiteit & Researchcentrum (WUR); maart 2007 (document in het Nederlands, beschikbaar op <http://www.wageningenuniversiteit.nl/wever.internet/Print/Nieuwsbericht.aspx?FRAMELESS=true&NRNODEGUID=%7b98AD212A-CCD0-4FD3-980D-A216DED92987%7d>)

“*Voedselverspilling in de Horeca*”, Enquête met afvalonderzoek; Henri Luitjes Agrotechnology and Food Science Group Wageningen Universiteit & Researchcentrum (WUR); november 2007 (document in het Nederlands, beschikbaar op http://www.senternovem.nl/mmfiles/voedselverspilling%20horeca%20cijfers%20Luitjes_tcm24-250971.pdf)

“*Mise en lumière du travail des banques alimentaires et relations avec les autres secteurs?*”; Yves Hardy, banque alimentaire; november 2007 voorgesteld op “*Gaspillage alimentaire: quelles mesures de prévention?*” op 30 november 2007 in Namen; georganiseerd door *Le Minister*



de l'Agriculture, de la Ruralité, de l'environnement et du Tourisme de la Région wallone;
(document in het Frans, link beschikbaar op
<http://www.oivo-crioc.org/FR/doc/initiatives/all/document-3099.html>)

Websites

Project Ketenaapak afvalbeleid: Pilot Voedsel – Vlees & Horeca door SenterNovem voor VROM en LNE

http://www.senternovem.nl/uitvoeringafvalbeheer/ketenaapak/het_project/pilot_voedselresten/index.asp)

Miljoenen mensen lunchen dagelijks op hun werk. Over bijvoorbeeld motieven bij de keuze van maaltijdcomponenten, de invloed van de inrichting van het restaurant of variaties in het assortiment op dit keuzegedrag is weinig tot niets bekend. Het Restaurant van de Toekomst is een praktijklaboratorium dat wél voor deze gegevens gaat zorgen. Ontdek op deze site de mogelijkheden voor uw bedrijf en vindt de data om uw beslissingen te rechtvaardigen.

<http://www.restaurantvandetoeekomst.wur.nl/NL/>

“*Fresh on demand*”-project door het Wageningen Universiteit & Researchcentrum (WUR) voor de Nederlandse ondernemers (2006). Voor het onderwerp is een verkenning uitgevoerd bij het bedrijfsleven, kennisinfrastructuur, de overheid en overige stakeholders. Dit rondje is bijzonder succesvol geweest, waarbij er draagvlak is om tot een grootschalig initiatief te komen. Het gaat om het verder invulling geven via concrete instrumenten en implementatietrajecten aan de transitie rond “consumentgestuurde ketens van versproducten”. Doordat de huidige keten minder efficiënt en transparant is georganiseerd levert dat gigantische afstemmingsverliezen op. Een significante bijdrage kan geleverd worden door o.a. de enabling technologie wereld (ICT, embedded systems) en ketenpartijen te verbinden. Het open innovatie programma richt zich op de regiepunten in de keten (retail/food-service) en de wijze om samen met de overige ketenactoren de inefficiënties uit de keten te halen (dus zowel de consument, als de toeleverende ketenpartijen). (projectbeschrijving op de website <http://www.kennisonline.wur.nl/BO/BO-03/001/6/beschrijving.htm>)

FareShare is the national organisation that works with over 100 food businesses to minimise food waste by providing practical solutions to help ensure that the maximum amount of 'fit for purpose' food is consumed wherever possible.

<http://www.fareshare.org.uk/about/index.html>



Documenten over logistieke en verpakkingsoplossingen

Packaging Technologies with Potential to Reduce the Amount of Food Thrown Away; Bob Scott & Paul Butler voor Retail innovation programme WRAP; april 2006 (document in het Engels, beschikbaar op http://www.wrap.org.uk/downloads/Pckg_formats_food_waste_tech_18_Dec_MCB1.8ec4b9d5.pdf; ref.nr. INN0014-009)

Self-Dispensing Systems – Commercial Feasibility Study; WRAP; maart 2007 (document in het Engels, beschikbaar op http://www.wrap.org.uk/downloads/self_dispensing_FINAL_20_Mar_07.b4db3666.pdf; project code RWM001011)

Survey of Packaging with Potential to Reduce Food Thrown Away at Home; DEFRA; juli 2007; (document in het Engels, link beschikbaar op http://www.wrap.org.uk/retail/case_studies_research/index.html; project code RWM005002)

Informatie Vermindert Verspilling- Composteerbare en intelligente verpakking; interview Uphard Thoden van Velzen door C. Gregori in Pack News nr 168; september 2005

Websites

WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.
<http://www.wrap.org.uk/>

“*Fresh on demand*”-project door het Wageningen Universiteit & Researchcentrum (WUR) voor de Nederlandse ondernemers (2006). Voor het onderwerp is een verkenning uitgevoerd bij het bedrijfsleven, kennisinfrastructuur, de overheid en overige stakeholders. Dit rondje is bijzonder succesvol geweest, waarbij er draagvlak is om tot een grootschalig initiatief te komen. Het gaat om het verder invulling geven via concrete instrumenten en implementatietrajecten aan de transitie rond “consumentgestuurde ketens van versproducten”. Doordat de huidige keten minder efficiënt en transparant is georganiseerd levert dat gigantische afstemmingsverliezen op. Een significante bijdrage kan geleverd worden door o.a. de enabling technologie wereld (ICT, embedded systems) en ketenpartijen te verbinden. Het open innovatie programma richt zich op de regiepunten in de keten (retail/food-service) en de wijze om samen met de overige ketenactoren de inefficiënties uit de keten te halen (dus zowel de consument, als de toeleverende ketenpartijen). (projectbeschrijving op de website <http://www.kennisonline.wur.nl/BO/BO-03/001/6/beschrijving.htm>)

Annex N^o4: Definition of Prevention, I. Cluyts

- This remark refers to page 8 of this document. The paragraph quoted is copied here below in italic

The working document mention above also defines different sub-categories of composting as follows:

- **'windrow composting'** as the composting of biowaste placed in elongated heaps which are periodically turned by mechanical means in order to increase the porosity of the heap and increase the homogeneity of the waste;
- **'in-vessel composting'** is the composting of biowaste in a closed reactor where the composting process is accelerated by an optimised air exchange, water content and temperature control;
- **'home composting'** means the composting of the biowaste as well as the use of the compost in a garden belonging to a private household;
- **'on-site composting'** is the composting of the biowaste where it is generated;
- **'community composting'** means the composting of biowaste by a group of people in a locality with the aim at composting their own and other people's biowaste in order to manage the supplied biowaste as close as possible to the point at which it was produced.

In the present report, only the last 3 categories representing decentralized composting at source (home composting, on-site composting and community composting) will be considered as waste prevention actions due to the fact they allow less biodegradable waste to be collected by local authorities, reducing then the general collection and treatment costs. In the other two cases, composting is considered just as an organic waste treatment method.

"We do not agree on the statement that the last 3 categories mentioned above are considered as waste prevention actions. In our opinion these 3 categories are no prevention actions but treatment methods. The question if waste has to be collected or not is no proper basis for the distinction between 'prevention actions' and 'organic waste treatment methods'. The argument that e.g. home composting reduces the collection and treatment costs, is not a valid argument as:

- these costs are only a (small?) part of the total costs (production costs of food for instance are considerable)
- The impact on the environment of e.g. home composting may be higher than e.g. industrial composting:
 - energy recovery by incineration or industrial composting may be higher than the energy costs of collection and treatment.
 - Emissions to the air, soil or water may be higher when e.g. home composting compared to industrial composting

We think waste prevention actions can only be defined based on the definition of waste in the Waste Framework Directive, being "any substance or object which the holder discards or intends or is required to discard".

The actions as e.g. prevention actions, recovery actions or disposal actions should be categorised in a correct way. This is important as in the Waste Framework Directive it will probably be stated that the waste hierarchy will apply as a general rule".



Annex N5: Article UK - weekly food waste collections can benefit the environment and save money - ACR+ newslines - (April 10, 2008)

RRF conference focuses on two Defra-funded food waste studies - papers available.

Two thirds of households recycle their food waste when councils provide a weekly collection, along with fortnightly residual waste collection, research has found.

The reasons householders do or don't take part in food waste recycling are outlined in a Defra-funded study led by consultants Brook Lyndhurst. The full report, discussed at a conference for local authorities today, will be published later this spring.

Working with the Resource Recovery Forum and Waste Watch, Brook Lyndhurst's project Enhancing participation in kitchen waste collection schemes - household behaviour and motivations, highlights the real scope for environmental and economic benefits of separate weekly food waste collection services for householders.

It shows that there are complex factors shaping the enthusiasm and effectiveness of householders when it comes to food recycling. These factors include the type of collection scheme in operation, householder age and socio-demographic profile and local authority communications strategy.

This research, funded by Defra's Waste & Resources Evidence Programme (WREP) highlights a number of key findings:

- widespread support for separate food waste collection - 78% agree the environmental benefits are important to them; only 1 in 10 households don't see the point
- two in three households (65%) use their food collection regularly, but 23% have never tried it
- dedicated food-only systems capture more food waste than food waste mixed with garden waste. Overall, weekly food combined with fortnightly residual waste collection generates the highest kilogramme amount of food recovery per household
- people take part because they think waste is bad and like to do their bit for the environment
- people who don't do it tend to be the 'bad' recyclers and can be seen by others as letting everyone else down.

Environment Minister, Joan Ruddock, said:

"Food wastage is an increasingly important issue, on environmental, sustainability, climate change and equity grounds. There is also the real loss to the economy of so much potential value.

"This research shows that much more can be done cost effectively to prevent food wastage and to recover value from what is thrown away. Food waste recycling was targeted by our Waste Strategy, and current studies show how local authorities can make real advances.

"European and UK legislation to divert municipal biodegradable waste from landfill rightly imposes tough targets. Food waste recycling has an important role to play in helping Britain meet its international obligations.

"The most important lesson to learn is that householders do want to play their part. Government needs to



provide support and guidance, and current research is helping to inform the debate."

Defra is also funding work by the Waste & Resources Action Programme (WRAP) to trial household food waste collection systems. WRAP is supporting 19 councils to conduct weekly food waste collection trials, to develop good practice guidance in the design and operation of food waste collection schemes.

These trials are testing last year's research which indicated that councils should consider collecting food waste separately as:

- this achieves the highest capture rates if collected weekly
- benefits are pronounced when the refuse is collected less frequently
- this minimises the processing costs, as the results show that cost burdens on local authorities can be higher when food waste is simply bulked in with existing garden waste schemes.

Building on the findings of this research the trials have been designed to assess the costs and performance of food only collections in a UK context. This has involved the provision of containers and liners, design and issue of communication materials to householders, and trying out different collection vehicles and crewing levels. Extensive monitoring of the trials include participation monitoring, capture rate analysis and customer feedback.

Early results are encouraging and suggest that the schemes have been well received and are acceptable to householders. Initial diversion estimates indicate that around 3kg of food waste per week is being collected from households taking part. Participation rates so far are in the range 50 per cent to 80 per cent. The final report on the trials is expected in early June.

Note

Brook Lyndhurst's study included a 4,431 household survey in six authority areas offering different food waste collections as well as extensive discussion groups with users and non-users of the food waste collections. The research investigated the behavioural determinants of participation and non-participation, whether and how these factors differ between socio-demographic groups and in different housing situations, and the effects of scheme design (eg weekly versus alternate weekly collections and communications).

The project addressed several important questions:

- how much, and why do/don't, households participate?
- what are the main variations across socio-demographic groups and housing types?
- how does service design impact on behaviour?
- what is the role of communications?
- in what ways can local authorities develop their services and communications on food waste to meet what the public wants?

The six local authorities were: Bexley, Cambridge, Fenland, Hackney, Taunton and Weymouth. WRAP (Waste & Resources Action Programme) reported on their research into trial food waste collections systems in 19 local authority areas: Newcastle, Calderdale, Preston, South Shropshire, Luton, Mid Bedfordshire, West Devon, Waveney, Broadland, Oldham, Hackney (flats), Newtonabbey, South London Waste Partnership(4), Surrey Waste Partnership(3).

WRAP studies issued in 2007 found that UK households create 6.7 million tonnes of food waste each year, some 19 per cent of municipal waste. This figure means that we are throwing away one third of the



food we buy (16.5 kg\hh\wk bought - 5.2 kg\hh\wk thrown away. Research indicates that most could have been eaten, if it had been managed better (stored correctly, used in time and cooked in the correct quantities). WRAP's current Love Food Hate Waste campaign is designed to reduce this waste being created.

The presentations given at the RRF food waste conference are available from the Forum's website at: <http://www.resourcesnotwaste.org/>



Annex N°6: « Comment développer en France des politiques de prévention des déchets? » (Bruno Genty, D.E.S.S Espace et Milieux, Septembre 2003)

http://www.fne.asso.fr/preventiondechets/docs/etudes_Bgenty.pdf

Annex N°16: List of Participants: Custer Biowaste Meeting - 12th March 2008

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6. BIBLIOGRAPHY

A. Parry - WRAP, 2007: WRAP Conference on Food, Consumers and Resource Efficiency. November 6-7, 2007. London. Slide n°13

ACR+ study, 2006: Analysis of municipal waste management practices in Europe, an image of some of the best performing cities and regions

ASCOMADE, 2006 : Programme régional sur la prévention déchets – Proposition de fiches actions aux collectivités, p. 41

BAWP, 2006: Bundesabfallwirtschaftsplan 2006 (Federal Waste Management Plan 2006). Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna.

C. Saintmard, ACR+ 2005: Managing Biodegradable Household Waste: What prospects for European Local Authorities?

Compost, Consulting & Development - WG, 2004: Heavy Metals and Organic Compounds from Wastes Used as Organic Fertilisers

EC DG JRC, 2007: End of Waste – Compost Case Study, Working document. March 2007

EEA, 2007: The road from landfilling to recycling: common destination, different routes (<http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=2872>)

Engström, R. 2004. Environmental Impacts from Swedish Food Production and Consumption. Licentiate PhD-thesis, Royal Institute of Technology, Center of Environmental Strategies Research - fms, Stockholm, Sweden.

Engström, R. and Carlsson-Kanyama, A. 2004. Food losses in food service institutions – Examples from Sweden. Food Policy 29 (2004): 203-213.

Eunomia, 2007: Household Waste Prevention Policy, Side Research Programme

G. Matera, ADEME 2007: Prévention & Gestion des déchets dans les territoires. Compostage à domicile: un nouvel élan. Recueil des interventions.

Homburg, A., Matthies, E. 1998: Umweltpsychologie: Umweltkrise, Gesellschaft und Individuum. Juventa Verlag Weinheim und München.

J. Barth, Biological waste treatment in Europe – technical and market developments <http://www.compostnetwork.info/index.php?id=10>, accessed 23/11/2007

J. Van Bambeke- IBGE, 2006: 100kg less waste: organic waste – preventing food wastage (Powerpoint Presentation Slide #3)

Klammer, S., 2002: Gibt es eine Gewichtsreduktion und Hygienevorteile durch das belüftete bioMat®-Combi-System und Mater-Bi™ BioBags? (Are there a reduction in mass and hygienic advantages due to the vented bioMat®-Combi-System and Mater-Bi™ BioBags?) Summary of a study on behalf of Pro-Tech Handels Ges.m.b.H., Institute of Microbiology University Innsbruck, (www.biomat.info)

Kosten, J. 2007 - "Prevention and Performance indicators" : <http://engees-proxy.u-strasbg.fr/241/>

Meissl, K., Smidt, E., Schwanninger, M., 2007a: Prediction of humic acid content and respiration activity of biogenic waste by means of Fourier Transform Infrared (FTIR) spectra and partial least squares regression (PLS-R) models, Talanta 72, pp 791-799.

Meissl, K., Smidt, E., Tintner, J. und Binner E., 2007b: Humus – A quality criterion for composts, Infrared Spectroscopy (FTIR) – A new evaluation tool and its application in practice. Institute of Waste Management, University of Natural Resources and Applied Life Sciences, Vienna (available from www.wau.boku.ac.at/fileadmin/_/H81/H813/IKS_Files/AktuelleForschungsthemen/Kompostqualitaet/Humus - A quality criterion for composts.pdf).

OECD, 2002: Municipal solid waste composition: for 7 OECD countries and 7 Asian cities. (2004). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:03, November 23, 2007 from http://maps.grida.no/go/graphic/municipal_solid_waste_composition

RDC Environnement, 2004: Evaluation des politiques de prévention en matière de déchets ménagers et assimilés.

RDC Environnement, 2006: Evaluation des quantités de déchets alimentaires en Région de Bruxelles Capitale. Etude réalisée pour l'IBGE.

RDC Environnement, 2007: Techniques de Biométhanisation

Salhofer, S., Obersteiner, G., Schneider, F., Lebersorger, S. 2007: Potentials for the prevention of municipal solid waste. Waste Management 28 (2008) 245–259

Salhofer, S., Wassermann, G., Schneider, F., Lebersorger, S. 2005: Prevention of municipal Solid Waste. In: Lechner, P. [Ed.] 2005: Waste Management in the Focus of Controversial Interests. 1st BOKU Waste Conference 2005, facultas, Vienna, Austria.

Schneider, F. (2008): Wasting Food – an insistent behaviour. Proceedings Waste – The Social Context '08, Edmonton, Canada, to be published.

Schneider, F., Obersteiner, G. 2007. Food waste in residual waste of households - Regional and socio-economic differences. In: Cossu, R., Diaz, L.F., Stegmann, R. (eds) Proceedings of Sardinia 2007. Eleventh International Waste Management and Landfill Symposium, Cagliari, Italy; Padova: CISA Environmental Sanitary Engineering Centre

Schneider, F., Wassermann, G. 2005: The second life of food losses. Proceedings Waste – The Social Context '05, Edmonton, Canada.

Schneider, F., Wassermann, G., 2004: Sozialer Wertstofftransfer im Einzelhandel (Social transfer of products in retail). Report on behalf of the Initiative "Abfallvermeidung in Wien", Vienna, Austria.

Wassermann, G., Schneider, F. 2005: Edibles in Household Waste. In: Cossu, R., Diaz, L.F., Stegmann, R. (eds) Proceedings of Sardinia 2005. Tenth International Waste Management and Landfill Symposium, Cagliari, Italy; Padova: CISA Environmental Sanitary Engineering Centre.

WRAP, 2007: Understanding Food Waste, Key findings of our recent research on the nature, scale and causes of household food waste