GREENCOOK

COMMON STRATEGIES, METHODS AND TOOLS

to defeat food wastage

first best practices
and recommendations
from partners

November 2012

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GREENCOOK
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GREENCOOK, what for ?

Innovative and mobilizing dynamics to defeat food wastage

Because one third of the food produced in the world each year ends up in the dustbin, without having been consumed, GreenCook wants to defeat food wastage !

There is a pressing need, for consumers to respect food and food producers again, to enjoy the pleasure of healthy and tasty eating again, to rediscover culinary know-how, and to optimise food presentation, storage and conservation.

Food wastage is a challenging problem, directly linked with the question of waste, consumption and climate change. As a reflection of our overconsumption society, food wastage also reinforces social inequalities and is ethically unacceptable.

In view to help consumers to improve their management of food as well as to preserve their purchase power tools and methods are already under experimentation for several years. Most often those actions are unfortunately not coordinated neither long-lasting.

They aim at changing behaviour or altering the offer (at the supermarket, in the restaurant or in the canteen). It is alas hard for them to be generalised, because of the complexity of the levers that have to be activated.

Since 2010, GreenCook's ambition is to create this lever effect, by generating a dynamic that motivates all of the food players and by throwing pathbreaking bridges with the fields of health, welfare and economic development.
Its diversified partnership intends to show the added value of united, transversal action, and to influence EU policies, in order to get a new European sustainable food model to emerge.

GreenCook Mid-Term brochure wishes to compile an unexhaustive list of actions undertaken by partners as well as first results gained and outputs produced.

More information needed ? Please get in touch with GreenCook Lead Partner :

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GREENCOOK...
from projet to action !

12 partners, 1 common goal

GreenCook is an Interreg IVB transnational project (2010-2013) - Priority 4 : Strong and prosperous communities

Project's budget :
6,055 millions euros (2,999 millions euros are ERDF funding)

GreenCook gathers an exclusive and pathbreaking combination of 12 partners from 5 countries of North-West Europe (Belgium, France, the Netherlands, Germany, United Kingdom), all aware and ready to give an active contribution to food wastage reduction.

Each of these partners brings a unique, targeted expertise and legitimacy, and directly usable know-how :

- Local and regional authorities dealing with waste management and/or prevention : Bruxelles Environnement (Belgium), Artois Comm. (France), AV Ludwigsburg (Germany)
- Public authorities managing school canteens and charities : Conseil Régional Nord-Pas de Calais (France)
- A Green Dot organization dealing with food packaging : Fost Plus (Belgium)
- An environmental marketing agency in direct link with E.Leclerc supermarkets : Greentag (France)
- Research institutes : CRIOC (Belgium), University of Stuttgart (Germany), University of Wageningen (the Netherlands)
- Networks of private chefs and cooks : De Proeftuinen (the Netherlands), Sustain (United Kingdom)

Espace Environnement, an acknowledged co-operation organiser, is ready to support the emergence of shared innovative solutions, and recurrent trans-sectoral discussions.

12 partners committed for action !

4 work directions to influence in-home and out-of-home consumption

Fighting against food wastage requires to combine work on consumer behaviour and optimisation of the food offer. For this purpose, the GreenCook partnership has identified 4 work directions, corresponding to 4 emblematic places of consumption, themselves connected to 4 groups of key players :

- **At home, in the kitchen :** precarious households and audiences, waste-managing local authorities ;
- **In the restaurant, in the company canteen :** catering professionals ;
- **In the school canteen :** teachers and pupils (education); cooks (management) ;
- **At the supermarket :** producers, retailers; food banks.

Partners will develop innovative strategies to influence the consumer and cook relationship to food, both among out-of-home food professionals, and among households.

Procedures, tools and training will be designed to improve the adjustment to real food needs, the stock control, the food choice (packaging) and conservation, the meal planning, the menu composition (in terms of taste and nutrition), the final use of unconsumed food, etc.

In school canteens, a teaching approach will supplement these aspects, to induce an overall, recurrent consideration on the living environment, health, well-being, and the acquisition of new knowledge.

At the point of sale, the interaction between customers and retailers will be intensified in order to guide the consumers in their choices and to enable the retailers to optimise their ordering and replenishment processes, in direct association with the producers, and especially with the local producers.

In this context, the "product/packaging" duo and its optimisation in the light of the waste avoidance will be highlighted.

Finally, special attention will be paid to the disadvantaged public and to food banks, for which any efficiency gain is vital.

Actions and outputs to enable, exemplify, engage and encourage

The Action Plan is based on 4 communities of practice, whose operational objectives are :

- **to enable**
- **to exemplify**
- **to engage**
- **to encourage**

These should be mutually reinforcing, so that all of the conducted actions converge towards the expected result.

The co-operation catalysed by GreenCook within the communities of practice gives the partners the keys for understanding and the tools for acting.

This mutual learning is built gradually through the deliberations at the time of the transnational work groups, with the Steering Committee's support, by the means of the living laboratories (which embody the pooling of the partners' knowledge and know-how) and thanks to in situ visits of noteworthy good practices.

GreenCook gives rise to many outputs, tailored to the targeted audiences : practical handbooks and training modules, food audit tools, stock management software, smart decision-making and planning tools, cookbooks, awareness-raising video testimonials, etc.

A permanent network of GreenCook ambassadors will also emerge, which masters the results in order to better disseminate them, and which lays the basis for a strong communication strategy.

A "food wastage avoidance" criterion will be incorporated into the existing environmental certification or labelling procedures.

These results, cross-referenced with the lessons learnt from the dialogue platforms with sectoral actors external but influencing the project (e.g. food safety), will serve as a basis for the development of a truly transnational strategy. They will support a rational for political lobby to foster food wastage avoidance and the promotion of sustainable food management.

Stop wasting food !

Emulation and exemplarity are encouraged by the creation of a transnational trophy for packaging designers and chefs.

Validating and disseminating GreenCook results at the North-West Europe level thanks to a Joint Steering Committee

The work carried out by GreenCook partners is closely followed and validated by a Joint Steering Committee gathering :

- Technical experts and academics in the field of food wastage, waste prevention, protection of the environment and sustainable food ;
- Representatives from regional and/or national governments ;
- Major EU level stakeholders.

GreenCook partners may currently refer to relevant and strategic advice from the Joint Steering Committee members (the composition of the Joint Steering Committe may evolve with the project's contents and news).

Specific duties of the Joint Steering Committee members who gather at least once a year are as follows :

- giving advice to partners as regards the implementation of GreenCook action plan, by bringing know-how, knowledge and good practices from their country or abroad ;
- helping to remove barriers resulting from the conflict of interest between local and transnational objectives ;
- putting GreenCook issues and actions into perspective as regards national and/or European policies ;
- deciding on the priority issues to address within the Transnational Dialogue Platform, or on the actions and results to bring to the forefront at the transnational level ;
- supporting GreenCook's partners in their dialogue dynamics with external sectors having decisive impacts on food wastage reduction (ex. : food safety policy) ;
- helping partners to adjust GreenCook messages and to relay them through their respective networks (including political arenas) ;
- disseminating widely GreenCook's results.

Stephanie BUDEWIG	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety – Germany
Aubry COLLIGNON	Walloon Public Service – DG Agriculture, Natural Resources and Environment – Walloon Waste Agency – Belgium
Jean-Jacques DOHOGNE	Associations of Cities and Regions for recycling and sustainable resource management (ACR+)
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SUSTAINABLE restaurants and canteens

Background

Mass catering (in schools, company canteens and restaurants) feeds many people but is also a significant source of food waste.

For instance, mass catering in France serves somewhere between 4 billion (Ministry of Agriculture) and 4.99 billion (Chamber of Commerce and Industry of Caen) meals every year, generating between 300,000 and 600,000 tonnes of waste in 2009.

A study carried out by Bio Intelligence Service on behalf of the European Commission estimated waste at a million tonnes of food.

The report « Pertes et gaspillages dans les métiers de la remise directe – restauration et distribution », published by the French Ministry of Agriculture, Food, Fisheries, Rural Affairs and Spatial Planning (MAAPRAT) in 2011, found that an average of 167 g per person and meal is wasted in mass catering and 147 g per person and meal is wasted in school catering.

In view of the above, three GreenCook partners **(Artois Comm., Bruxelles Environnement and the Nord-Pas de Calais Regional Council)** suggested helping schools to implement a suitable strategy to curb food waste in their canteens.

The three of them apply a substantially identical methodology.

A steering committee is appointed to guide and contribute to the implementation of the project after selecting or recruiting pilot schools and, when necessary, signing a commitment charter. A quantitative and qualitative audit is then conducted.

The former objectivises and characterises the amount of food wasted by weighing it, while the latter asks students, parents and/or kitchen staff about their food consumption habits and their opinion and awareness of food waste

An action plan to minimise food waste is established and implemented based on the information collected.

Measures are then evaluated to find out whether the food waste reduction objectives have been attained and a series of recommendations are given based on the action plan which differ from one project and partner to the other.

First lessons drawn from the pilot projects

In canteens

Bruxelles Environnement is conducting three types of pilot studies in Belgian school communities.

1. The food waste challenge (in five pilot schools)

The objectives of this challenge are :

- **understanding food waste in schools better ;**
- **raising awareness about this issue among students and in the school community as a whole ;**
- **implementing structural and organisational changes to minimise food waste.**

Its objectives are the following :

- raising individual and collective awareness about food sustainability in canteens, including food waste prevention ;
- collecting data on the amount of food wasted ;
- developing tools and measures to prevent food waste.

3. A pilot study with a school catering company servicing seven different schools to collect precise data on food waste in school catering and reduce it with measures implemented when preparing and serving meals.

The challenge of the five pilot schools goes through eight key stages :

- signing a charter ;
- launching the challenge with a steering committee ;
- establishing a contact group to raise awareness ;
- conducting a participative, qualitative and quantitative audit ;
- checking control bins ;
- developing and implementing action plan ;
- evaluating the project ;
- capitalising on what has been learnt.

Raising the awareness of pupils is a priority !

2. The sustainable canteen project, concerning canteens in schools, companies, kindergartens, old people's homes, etc.

Over 80% of students and 100% of teachers were made aware of food waste thanks to this strategy.

Key figures on food waste were extracted from the practices. Conditions vary from one school to the other, but food waste tends to be greater when warm meals are served in schools and the catering services are external companies.
Soup represents a high proportion of the food thrown away and has a significant environmental impact.

The action plan set out spans several areas of work :

- communicating/raising awareness with posters, information booths, games, etc.;
- improving the offer with the possibility to adapt the size of sandwiches ;
- introducing sustainable snacks ;
- structural changes, etc.

In these schools, Bruxelles Environnement was able to highlight the exponential food waste reduction which occurs when awareness raising measures go hand in hand with structural changes.

The sustainable canteen project, on the other hand, was conducted in 20 canteens, with almost 7,500 meals and 78 people directly concerned by the hands-on, thematic training sessions on sustainable food.

The communities involved, formalised their commitment by signing a charter.

A diagnostic stage began following the appointment of a steering committee, including a quantitative and qualitative analysis of food waste.

An action plan tailored to each situation was developed and implemented based on the diagnostic report. Again, results varied a lot from one site to the other. But what has been learned from them?

No matter how small it is individually, a reduction in food waste can become significant considering the number of meals served. In a school serving meals for 600 people, reducing food waste by 15 g per meal represents 9 kg of food waste less every day.

Food waste can also be curbed by adapting the available equipment. For instance, one school wasted soup all the time because its cooking utensils were not suited to the amount to be served. Changing the equipment made it possible to manage production better and, therefore, to reduce food waste.

Finally, the methodology was substantially the same in a pilot study to provide advice to a school catering company in seven different schools.

The first results revealed that roughly 40% of food prepared is thrown away. Only four fast-food menus resulted in a 25% reduction in food waste.

Therefore, food waste awareness must be part of a broader context of food sustainability, at the risk of failing to achieve the sustainability objectives. 20% of food wasted is due to overproduction of meals and 20% due to leftovers. Caterers consistently prepare too much food. Measuring the amount of food wasted is an awareness raising method in and unto itself.

Corrective measures were suggested based on what had been observed and characterised: working on a light meal at 10 am to make people less hungry for lunch, adapting serving sizes, reorganising the time devoted to meals, making the setting pleasant and respecting serving data sheets

Artois Comm. carried out its project in France from September 2011 to June 2012.

Eight schools (four primary and four secondary) took part. Specific recommendations were extracted from the first pilot stage in order to reduce food waste, including :

- signing an «anti-waste charter» which the students must observe in school and at home ;
- putting bread at the end of the meal distribution chain ;
- limiting the number of slices of bread per meal ;
- letting students choose serving sizes according to their appetite ;
- organising flavour workshops so students can discover new foods.

The weighing carried out following the implementation of the measures showed a decrease in the amount of food wasted in the pilot schools.

The second stage of the project began in September 2012. Artois Comm. aims to devise a specific methodology to fight food waste, which can be applied to all the schools located in the area where it operates. The Communauté d'Agglomération also wants to introduce school meals to the school project, identify schools' strengths and weaknesses regarding food waste and getting more and more people on board the project, including kitchen staff and parents.

The Nord-Pas de Calais Regional Council, on the other hand, decided to implement «GreenCook strategic and operational guidance» in ten pilot high schools in its area.

It consists of devising a long-term strategy to fight food waste in each school. The measures implemented must be reproducible and transposable so that they can be applied to all the high schools in the Region once the project has been completed.

The ten pilot high schools were chosen according to different criteria, including a uniform geographical distribution, the number of meals served, the type of education provided, etc.

The first stage was a one-day event during which each of the ten high schools hosted a visit of the premises in the sense of the food chain. Impressions were exchanged with the agents involved in mass catering in order to obtain qualitative information on food waste. Consumers were also interviewed.

At the end of the sitting, the waste arising from preparation, serving and washing was weighed by category and a series of hypotheses were deducted from this initial analysis.

A second quantitative stage took place over four weeks in May 2012 in all the high schools at the same time. Standard menus were created to enable comparisons among schools. This stage tested a series of hypotheses postulated beforehand in order to confirm or dismiss them.

Element	Hypothesis	Expected result	Actual result
Food quality	Use of quality foods	Food waste reduction	Partially confirmed Foods which do not require much chewing are easier to eat Less food waste
Food on offer	Wide range of choices	Overproduction and food waste	Partially confirmed
Time	Queues and quick meals	More leftovers	Unconfirmed Queues and quick meals do not promote food waste

The Nord-Pas de Calais Regional Council will now consolidate all the hypotheses and choose those which will undergo further testing. Once confirmed, they will help to optimise the way food waste reduction measures are implemented.

ISWA also conducted research in Germany, in the canteen of the Stuttgart University, Mensa.

Its aim was to find out how much food was wasted in the canteen and identify the main sources of waste.

A new methodology was then devised to reduce and prevent food waste, thereby creating a role model. A debate on food waste management alternatives was also launched. Measures are being developed and implemented to prevent and reduce food.

In restaurants

The findings of the research projects in canteens are applicable to private catering to a great extent. Sources of waste in restaurants closely resemble those in canteens: overgenerous plates, purchasing and supply problems, inappropriate servings and more. The two moments when most food is wasted are the preparation of the meals and the return of plates from clients.

De Proeftuinen conducted quantitative and qualitative research in four Dutch restaurants, drawing inspiration from recent research by the British Sustainable Restaurant Association (SRA). The methodology used differed somewhat from that applied in canteens and took into account the characteristics and limitations specific to the private catering sector.

The main differences are summarised here above.

Canteens	Restaurants
Three measurement options	One measurement option
Multiple food waste hotspots studied	Two food waste hotspots studied (preparation and return from clients)
Precise characterisation of foods	Two categories (vegetables/meat and bread/leftovers)
Lots of data collected (quantity, cost, etc.)	Waste by client, no financial results
Visual estimate of leftovers	N/A
Multiple questionnaires/surveys	Client surveys

It was revealed that 80% of waste is generated during preparation and it consists mostly of vegetables (55%). Bread represents a mere 6% of total food waste. The clients surveyed did not wish to choose the size of their servings or take leftovers home.

This research enabled us to make a series of recommendations specific to the sector, mainly on purchasing local and seasonal produce but also on stocking foods according to their expiry dates. Suggestions were made regarding menu design and presentation, for example, by promoting rationally diversified menus. Finally, communication with staff and clients is crucial if behaviours are to be changed.

Reasons for wasting food are the same in the canteens and in the restaurant

A common definition of food waste and a common methodology to measure and reduce it

Food waste is a global problem, and catering and mass catering sectors share part of the responsibility.

Each project partner tested different ways of reducing food waste. They regularly share questions, hypotheses and results to find common points and refine their respective approaches.

Measuring food waste has been identified as a crucial first step to changing behaviours and reducing food waste. The «catering» and «school catering» partners are therefore working on a common methodology based on measurement and actions to curb food waste, drawing upon the experience and building upon the results obtained.

The aim is to provide :

- a clear definition of food waste ;
- rational arguments to curb food waste, including social, environmental and economic data ;
- a methodology to measure the amount of food wasted which takes available resources (staff, time, money, etc.) and the diversity of objectives into account ;
- examples of specific measures to fight food waste;
- advice tailored to the type of establishment and target audience.

Définition

A crucial first step is to agree on what we are talking about : food waste, food losses and food waste prevention. Knowing what will be measured (preventable, partially preventable and unpreventable food waste) is also important. The partners used bibliographical research and their pilot experiences to agree on a definition of « food waste » : food which is intended to be eaten by people but eventually is not.

Economic, social and environmental arguments

Why fight to reduce food waste in the world of mass catering? Knowing food waste's impact on our society is a powerful call to action to reduce it. It has an economic, social and environmental impact. The economic impact is threefold: the cost of foodstuffs, the cost of the staff needed to supply and prepare these foodstuffs, and the cost of processing food waste.

Its environmental impact arises from the resources needed to produce, consume and eliminate it, and can be expressed in terms of CO_2 equivalent, water footprint, area of land used, and so on.

Many parts of the world are gripped by famine. The best way to feed the planet is not to produce food more, but to distribute it better and minimise food waste. The social impact can be quantified in terms of the average meal lost per child and grown-up based on the amount of food wasted.

Common methodology

The methodology used at the current development stage of the project suggests three ways of measuring food waste at an increasing level of detail.

The choice depends on :

- the time and resources available in-house ;
- the institution's objectives and the data it wishes to collect.

It will be tweaked over the following months as the partners continue to debate and lessons are learnt from the tests.

The table below shows the key elements of the three options put forward.

The options chosen must still be defined and confronted with reality, while the selected hypotheses are yet to be tested in the different pilot centres. A document published at the end of the project will present specific measures and summarise lessons and recommendations.

Partners complement each other perfectly in this sense:

	Option 1 Basic	Option 2 Intermediate	Option 3 Optimised
Time	2 days	1 week	2 weeks or more
Team	1 person	2 people	2/3 people
Material	1 set of scales	1 set of scales 7 containers	1/2 sets of scales 9 containers
Documents	5 containers	1 weigh-out sheet 1 visual estimate 1 consumer survey	1 weigh-out sheet 1 visual estimate or measurement panel 1 staff survey 1 consumer survey
Results			
Amount of food wasted	+	++	+++
Food waste by post	+	++	+++
Ingredients thrown away	N/A	+	++
Environmental impact	+	++	+++
Economic impact	+	++	+++
Social impact	+	+	+

Legend :

N/A -> no results

\+ -> approximate extrapolation

++ -> more detailed and accurate extrapolation

+++ -> detailed analysis

- **Artois Comm., Bruxelles Environnement** and **the Nord-Pas de Calais Regional Council** tweak their methodologies based on their pilot studies and are able to test the tweaks in the field straight away.
- **De Proeftuinen** draws upon its experience with restaurants to put forward a series of methodological adaptations specific to this sector.
- **ISWA** (Stuttgart University) and **WUR** (Wageningen University) guarantee the methodological accuracy and scientific rigour of the reference data and the comparison of figures.

Helping the projects to get cooks, chefs and consumers on board

Each partner involved in the «Sustainable restaurants and canteens» project has developed tools which seek to promote food waste-reducing behavioural changes among canteen staff, cooks and consumers.

Bruxelles Environnement has designed, among other things, a calculator and a waste measurement methodology, which can be used by canteen staff to evaluate the sustainability of their canteens and identify the areas for action with the greatest priority. The calculator was tested in the pilot canteens to evaluate and adapt it to help canteen staff shift towards food sustainability at their sites. Both tools will be evaluated and modified based on the feedback received.

Canteen chefs received theoretical and practical training on food sustainability. They were also given a methodological guide on optimising food use, improving stock management and raising awareness about this issue in mass catering.

Training was also provided on introducing sustainability clauses in foodstuff supply specifications.

A teacher's guide on food sustainability with a detailed chapter on food waste was written for teachers who wish to discuss this issue in their classes.

Artois Comm. and **Bruxelles Environnement**, on the other hand, have created awareness-raising tools such as posters, «a little hungry» and «very hungry» signs for plates and food-themed games.

The **Nord-Pas de Calais Regional Council** closed the circle in one of its ten pilot schools by reusing unpreventable food waste on-site to «feed the ground which feeds us».

A pilot electromechanical composter was installed in Tilloy-les-Mofflaines' agricultural school in early 2012, a groundbreaking facility with a composting unit, a maturing area and a maturing sieve.
The system makes it possible to recycle organic waste, which comes mainly from the school's catering service. The electromechanical composter speeds up the decomposition of organic material, thereby producing nutrients which are used to fertilise the plots on which the school grows its own vegetables, including potatoes.

Every day, a head composter works with the catering team to collect organic waste for the composter. The first compost can be used after a three-month cycle.

The benefits of these composting unit are many :

- *Personal involvement*. Upstream from the composting process, sorting tables have been set up at the exit of the school restaurant to encourage students to sort the different types of food waste left on their trays: leftover meat, fish, starchy foods, etc.

The integrated weighing system shows them how much food is wasted at their level and how much waste is produced in general.

- *Economic windfall*. The facility allows for source separation in which students collect and process organic waste themselves. This reduces costs significantly by eliminating the need to pay third party agents to process the waste.
- *Environmental benefits*. The installation of the electromechanical composter reduced the global environmental footprint of waste processing at the Tilloy-les-Mofflaines site. Waste is processed manually on-site, preventing pollution from waste transportation and management, and the compost is then reused. Thus, the electromechanical composter meets the legal requirement set by the new French law which calls upon those who produce large amounts of waste to «implement source separation and waste reclamation [...] in order to curb greenhouse gas emissions and promote return to the soil».

- *An ecological step forward.* Because local composting is a way of raising ecological awareness, the facility represents a first step towards a greater ecological awareness among students. In the long-term, this process will help them to change their consumption habits and become ecologically responsible citizens..

For the beginning of the 2012/2013 school year, the management and educational teams prepared an information and communication scheme for the students, based mainly on lessons given by life and earth sciences teachers.

The aim is to show students the importance of waste in the cycle of life, its global environmental relevance and the potential solutions to tackle this very topical problem. Students representing the GreenCook project will also take part in food waste-reducing measures as part of the steering committee, together with the catering team and the chef.

In private catering, **Sustain** (United Kingdom) and **De Proeftuinen** (the Netherlands) have come together to create a network of professional ambassadors.

It includes restaurateurs from different backgrounds (gastronomical restaurants, caterers, mass catering companies, hotels, etc.) who were approached due to their renowned passion for sustainability and their commitment or desire to commit to these issues.

The network convenes two to four times a year in themed meetings, which discuss food-related issues such as local foods, waste management and the design of menus, as well as other topics such as food quality and security, communication and changing behaviours.

The long-term aims are to foster the exchange of knowledge and know-how, develop a common sustainable purchasing tool and hold on-site meetings.

The network is also active in raising awareness among the public and in large-scale communication on the effective role of restaurateurs in reducing food waste.

Rewarding good practices

Founding president of Euro-Toques International Baron Pierre ROMEYER joined forces with the NGO Euro-Toques Belgique (a former GreenCook partner which still supports the project) and the Walloon Brabant Province to organise a contest open to all schools which provide hospitality or food-related training.

The organisers asked students in their final grades and/or those specialising in hospitality, who are selected by each participating school, to prepare a complete menu (starter, main course and dessert).

Each team is compiled out of three students led by an active professional from the province, an alumnus of the school or a traineeship supervisor who has been chosen by the school and has been awarded no stars by gastronomical guides.

The GreenCook Trophy has been awarded to the team, which reduces food waste the most for two years now and it will be awarded again in 2013.

SUSTAINABLE retail and consumption

Context

Commercial practices & food wastage

Food wastage is a phenomenon that is probably emblematic of our (over-excessive) consumer society, and which raises a number of questions. This with regard to the environment because it provokes significant impacts in terms of waste and consumption of raw materials; with regard to household budgets due to its cost; but perhaps more due to the inequalities that it aggravates within the population.

Whilst wastage is mainly caused by households, it also occurs throughout production and retail chains. These causes are therefore social, but also commercial.

These causes have been analysed by the **CRIOC** as part of a study commissioned by the Observatoire bruxellois de la Consommation durable (Brussels observatory for sustainable consumption) in 2009, and put into perspective by the study published in the UK by WRAP in 2007 (for the Love Food Hate Waste Campaign) which already pointed out that :

- 30 to 40% of harvests are abandoned each year because they do not match with the characteristics demanded by the food industry or the retail sectors ;

- in the processing and fast food sectors, approximately a third of the food is thrown away ;
- in supermarkets, half a billion tonnes of food per year remains unsold ;
- households, the ultimatelink in the chain, throw away more than the processing firms and supermarkets together (for example, an inhabitant of London throws away an average of 140 kg of food per year, often not opened for consumption).

By way of comparison, analysis of household dustbins in Brussels in 2004 enabled to estimate the amount of food wasted per inhabitant per year to be 15,2 kg.

The observations of commercial practices conducted by the **CRIOC** are interesting for several reasons. As a result, it has proved difficult for the **CRIOC** to identify commercial practices that clearly influence food wastage in one way or another.

Indeed, whilst those commercial practices encourage purchasing, they do not directly provoke waste. However, it is obvious that a purchase that does not

correspond, in terms of quality and/or quantity, to the needs of a household is more likely to result in food wastage. Furthermore, certain practices can either positively or negatively influence wastage depending on the characteristics of the household (e.g. large package sizes may represent a significant saving for larger households, but will generate more wastage in smaller households).

In this context, the **CRIOC** has identified commercial practices that limit the duration of conservation of foodstuffs at consumers' homes and has issued a series of recommendations. the GreenCook partners have used this as a basis to deploy their pilot initiatives concerning sustainable retail and consumption.

Consequently, a fact clearly evident is that the retailer can play a much more active role with regard to provide information to the consumer in order to help them to reduce or eliminate food wastage.

For example, they can :

- build up a dialogue with consumers that is not merely focused on prices but on other characteristics concerning foodproducts: origin, production methods, nutritional properties, etc ;
- develop a system of information that enables consumers to correctly interpret the best before dates figured on labels and packaging ;
- supply information on quantities to purchase according to needs, optimal conservation conditions during transport and storage at home and recipes for using leftovers.

It is the **CRIOC's** view that a dialogue must also be set up with producers so that they can contribute to the fight against household wastage by putting products on the market :

- whose packaging design enables easy use and complete emptying ;
- whose packaging allows optimal conservation (whilst reducing the problems of over-packaging as much as possible) ;
- in quantities and formats that are in phase with consumers' needs ;
- whose labelling includes clear information on the correct conditions of conservation.

A certain number of the recommendations proposed above have been tried and tested in the field by GreenCook partners.

Classification of consumers

In 2010, the CRIOC published a study on food wastage with the aim of gauging perceptions, attitudes and behaviour of consumers in Wallonia, in terms of food wastage.

This study was added to, several months later, by highlighting of consumer profiles in relation to this specific theme, based on food purchase habits, handling and conservation of foodstuffs and socio-demographic characteristics.

This work led to the establishment of a classification summarising 683 interviews conducted by telephone with inhabitants of the Brussels-Capital region and the region of Wallonia, aged 18 years or older.

As the study shows (whose full results can be obtained from the **CRIOC**), the change in perception of food wastage seems to have improved since 2007 (the date of the previous study). The population surveyed was, in general, more attentive, even if problematic behaviour is still evident. Each segment had a different perception, but two groups (the far-sighted and the self-willed, i.e. three consumers out of four) had developed attitudes and behaviour favourable to the limitation of food wastage. The study indicated, however, that they did not always know how to act efficiently.

On the basis of this study's findings, the CRIOC has therefore recommended that a policy of awareness-raising be implemented, combining factual information, generalised advice and practical methods (how to purchase, how to conserve, how to use leftovers, etc.), suited to the different consumer profiles identified.

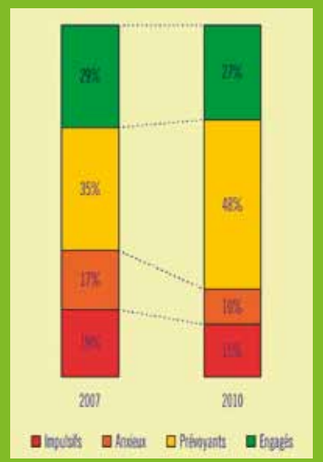
As a result, the far-sighted, for example, will be receptive to arguments confirming the necessity to manage food purchases, to explanations on conservation methods, to the advantages of cooking leftovers, etc.

The self-willed will appreciate receiving practical tools for managing purchases, conserving foodstuffs or also recipes for cooking leftovers.

For the impulsive, it will be necessary to explain the advantages of limiting food wastage by specifying the consequences (costs).

Lastly, the anxious can be reassured about the dangers related to food safety, by explaining conservation methods to them and the advantages of cooking leftovers in a healthy and safe manner.

The classification described above has also significantly contributed to thinking of GreenCook partners involved in pilot projects in different sectors, with the idea of being able to design communication tools (messages and visuals) that are adapted to their target populations and objectives.



Change in profiles from 2007 to 2010

The "far-sighted": very much aware of the issue of food wastage, they try to programme their purchases to avoid it. However, they are less attentive to conservation of the products that they buy [48%].

The "self-willed": these consumers are convinced that food wastage has a significant environmental impact and are concerned about it, even if they encounter difficulties in managing their purchases [27%].

The "impulsive": food wastage is not a priority in their eyes, all the more so given that they are hardly attentive to their purchases. They do not adopt behaviour that is likely to limit such wastage [15%].

The "anxious": the fear of food poisoning incites them to buy packaged products and to avoid consuming leftovers of food, meaning that they frequently waste food [10%].

4 types of consumers to convince

Reducing food wastage at the point of sale

Characterising supermarket waste

For a number of years, the E. Leclerc hypermarkets in Templeuve, Wattrelos and Lille-Fives have been committed to a sustainable development approach, actively supported by **Greentag**, their agency dedicated to environmental marketing and a GreenCook partner.

Various waste prevention initiatives have been set up by **Greentag**, including actions aimed at combatting food wastage.

In order to evaluate the amount of waste that can be attributed to food wastage, Greentag has undertaken, for example, a waste characterisation study at an E. Leclerc supermarket. This is an extremely innovative approach, because it enables the precise quantification and analysis of which departments generate the most waste and ultimately to identify the cost of food wastage for the firm.

Scope of the study

Only the waste produced within the store at Templeuve was taken into account in the audit. In other words, the waste produced upstream, by producers and manufacturers, or downstream, by consumers or charities, was not included in the scope of the study.

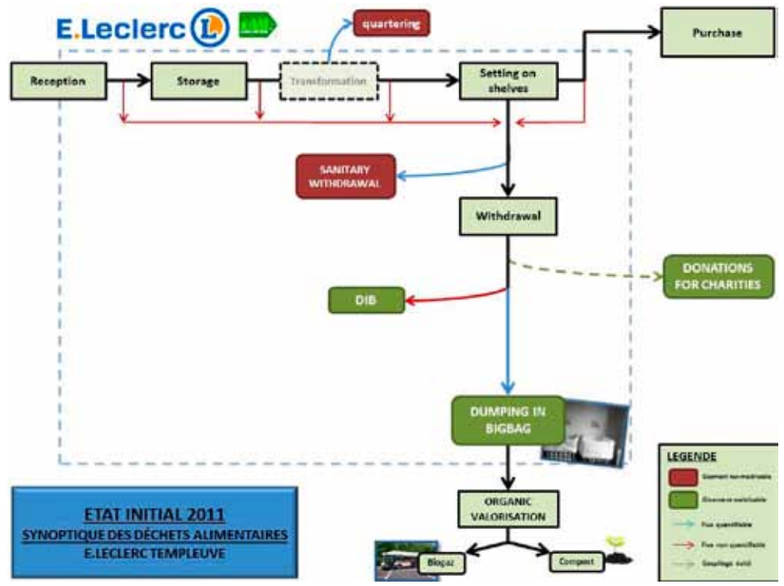
Implementation methods

Interviews with the departmental managers provided the necessary understanding of the circuits taken by the foodstuffs. They also made it possible to identify the critical moments that generated food wastage. From this diagnostic, a block diagram was developed, providing a visual grasp of all the merchandise flows and the "outlets" through which the food waste flows.

This diagram clearly revealed two types of resources: one for which no prevention actions are possible, because it concerns products removed from shelves for health reasons or waste meat; and one which can be controlled and perhaps quantified.

The foodstuffs taken from the shelves have three possible outlets:

- Common industrial waste: this type of waste is not reclaimed and does not fall within the scope of the audit.
- Waste stored in big-bags awaiting organic recycling, either via composting or through transformation into bio-gas.
- Donations to charities, which is considered as a measure of avoidance, in the strictest sense of the word, of food wastage.

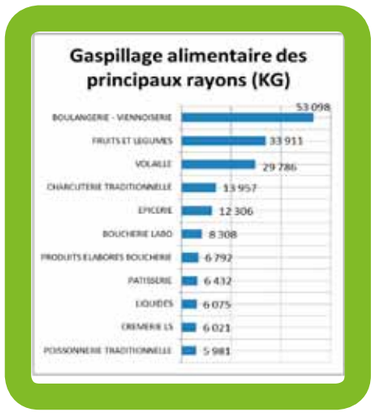


Results

The resource of waste removed in big-bags represents a gross weight of 279 tonnes per year, i.e. 192 tonnes per year in net weight.

Analysis of food wastage per department shows that the bakery and pastries department is responsible for the largest part of food wastage.

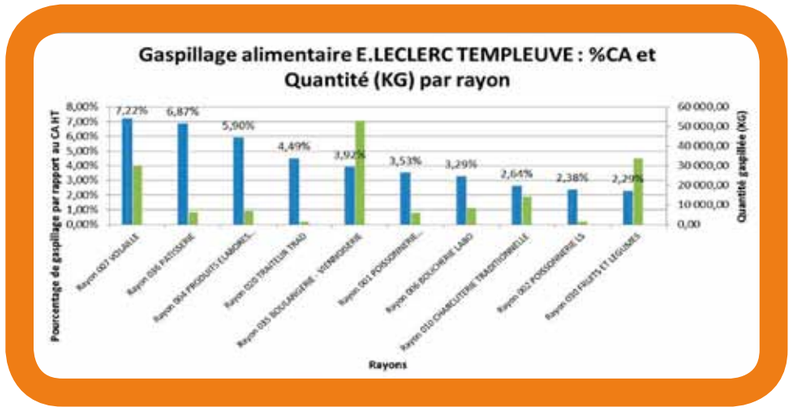
Fruit and vegetables as well as poultry are the next most significant contributors to the mass of waste which is sent for disposal.



The study conducted by **Greentag** also made it possible to determine the percentage of waste in relation to the hypermarket's turnover.

Leading the rankings, poultry has the biggest impact on the firm's turnover, followed by cakes and processed meat products.

Ultimately, the share of food given to charities represents 18% of food wastage. These 36,4 tonnes of food enable 42,720 meals to be produced, a not inconsiderable amount! (See the chapter devoted to food donations).



In the end, **Greentag** estimated that for the Templeuve store alone, food wastage cost 1,25% of its turnover (excluding tax). This data was converted into numbers of meals and into CO_2 equivalent, producing sobering figures:

Quantification of food wastage for the Templeuve store (5,250 m²):

Net amount (€)	% of turnover excl. tax (€)	Weight (t)	Meals (Equiv. 855g)	Equiv. CO2 (kg)
474 881 €	1,25 %	192	224 386	6 282

The same conversion was made for the portion of foodstuffs given to local charities:

Quantification of donations for the Templeuve store (2011):

Net amount (€)	% of turnover excl. tax (€)	Weight (t)	Meals (Equiv. 855g)	Equiv. CO2 (kg)
107 306 €	0,28 %	36,4	42 720	1 201

The main findings

- The resource of food wastage that is recycled organically has the biggest impact on the hypermarket's turnover. Different ideas have been examined by the E. Leclerc store in order to reduce this resource, in particular the transformation of fresh products nearing their best before dates (e.g., the smoothies & soups project – see below).
- In France, the state encourages donations to charities by exempting the food given from tax to a rate of 60%. This measure encourages hyper and supermarkets to cooperate with the food bank and charities. In the future, **Greentag** intends to increase its action in this area.

Optimising supply by looking into the issue of food packaging

Food packaging fulfils several purposes. Consequently, from a food wastage prevention viewpoint, packaging helps to ensure the conservation and protection of products. Indeed, damaged or faulty packaging often renders products unfit for sale, since consumers avoid products that show signs of degradation. Thanks to packaging, products are protected during handling and transport enabling them to arrive at consumers' homes in a perfect state.

Furthermore, packaging is constantly changing. Certain so-called "smart" packaging today makes it possible to provide consumers with information on the freshness of the products that they contain.

In addition, the question of packaging is closely linked to the issue of portion size. Indeed, today we are witnessing a multiplication of food products in individual packaging. The advantage of this process is probably to best respond to the needs of different types of households, based on the observation that the number of people living on their own is constantly increasing. Furthermore, individual portions could help to reduce wastage of perishable goods.

However, where is the limit? When does packaging prove to be necessary? When does packaging prove to be superfluous, depending on the type of food it contains, the profile of the consumer buying it and the use for which it is intended?

In order to identify the most advantageous solution in environmental terms between a product bought in bulk and a pre-packaged product, **Fost Plus** commissioned a study in collaboration with 3 supermarkets belonging to the Belgian chain Delhaize.

The aim of this study was to compare the environmental impact of the sale of fruit and vegetables in bulk or pre-packaged, including the impact of the packaging and the volume of unsold products. The products are removed from the shelves due to multiple handling or simply because they are nearing their best before dates. The study should be able to determine the best option for the supermarket from an environmental point of view : sale in bulk or in packaging ?

Study phases

- Choice of consultant and development of a working methodology in cooperation with the partner supermarket.
- Collection of data on unsold products in accordance with the products selected within the scope of the study and expression of hypotheses.
- Analysis of data with the store managers (in September / October 2012) in order to obtain more qualitative data (explanation of figures) and to validate the hypotheses.
- Launch of a survey of consumers.

Expected deliverable

The **Fost Plus** study is still in progress. The results are expected by the end of 2012. On the basis of this study, a decision making tool will be developed by **Fost Plus** in order to help each supermarket to make packaging choices for all the products taken into account in the study. Each store will receive an evaluation grid that it may use in order to optimise the sale of fruit and vegetables in packaged format.

Further initiatives

Fost Plus has published works on subjects combining prevention, packaging and food wastage, with the aim of attracting the attention of companies to the importance of carefully choosing their packaging depending on the products to be packaged and consumption needs.

Fost Plus gives training on packaging optimization in design schools in order to raise awareness amongst tomorrow's professionals, this to incorporate thinking about conservation of food in creative approaches.

A prize, the "Greener Packaging Award", designed to reward the most environmentally-friendly packaging, has recently been created. Will some of them help to reduce food wastage? That is the question... and the answer will arrive at the end of November, during European Waste Reduction Week! Information can be found at www.greenerpackaging.be

Transforming out of date products to give them a second life

Greentag expressed the desire to examine the best means of transforming fruit and vegetables that have become unfit for sale but which are perfectly consumable.

This desire is based on the following observations :

- The food wastage characterisation study, at the E. Leclerc store in Templeuve, demonstrated that fruit and vegetables represented a significant resource : the second most significant in tonnage after pastries.
- Though fruit and vegetables are removed from shelves for reasons of appearance (bruises, stains, impacts, etc.), they lose nothing with regard to taste and nutritional qualities.
- A survey, carried out on Leclerc store customers, showed that 62% of them would be in favour of purchasing smoothies and soups made from fruit and vegetables removed from the shelves.

These arguments incited the firm to test the production and sale of smoothies at the Leclerc store in Templeuve.

Beyond clear waste reduction objectives, Greentag also wished, via this pilot scheme, to raise awareness amongst customers but also amongst personnel with regard to the problem of food wastage.

Preliminary thinking

Implementation of this project required a series of prior steps :

- Market research focused on fresh fruit juice in order to identify the main players and competitors.
- Analysis of the marketing mix aimed at determining the product range, prices, the most suitable department as well as the promotional means to be developed.
- Determination of quantified targets (e.g., divert as much fruit and vegetables away from big-bags as possible, since each tonne of waste costs the store approximately € 100).
- Establishment of a budget incorporating costs and sales objectives.
- Study of regulatory constraints, in particular HACCP standards.

On completion of this exploratory phase, **Greentag** decided to create 5 recipes for smoothies made from a basis of 2 to 4 different fruits. The choice of recipe was determined by the amounts of which fruit was disposed most in the store.

Greentag decided on packaging enabling HACCP standards to be respected (0,5 litre bottles with a hermetically sealed cap). An information message was also included on the label in order to raise consumer awareness about the approach used.

Lastly, it was decided to place the bottles at the centre of the fruit and vegetables department, by decorating the product counter in as attractive a way as possible. The starting price was initially set at € 0,99 per bottle.

Organisation of production

Organisation of production at the supermarket was defined with the team.

In order to carry out this experiment, it was necessary to assign a member of the personnel to production of the smoothies for 3 production days per week.

Due to the very restricted size of the machines, the amount of bottles produced during the start-up phase could not exceed 150 bottles per week. In practice, 75 litres of smoothies were produced from 225 kg of fruit.

Quantification of production cost for smoothies :

	Expenses / charges	Turnover	Deficit	Amount of fruit used	Cost of processing avoided
On average per week	€ 190	€ 86	104	120 kg	€ 12
Since the start of the test	€ 2 085	€ 945	€ 1 140	1 316 kg = 2 big-bags	€ 136,11

Results

In September 2012, after 11 weeks of experimenting, the average production was amounted at 74 bottles per week, of which 54 were actually sold, i.e. 77% of the production output.

It seems obvious that, under current production conditions, the smoothies initiative results in insufficient profitability, which can be explained by the low amounts produced and by a sales price that is too low to cover the charges, in particular for personnel.

The main findings

The experiment carried out by **Greentag** highlighted the considerable difficulty of implementing this type of project and making it economically viable on a non-industrial scale. The following obstacles were identified :

- The difficulty of scheduling the production of smoothies, due to the variability of ingredients available from day to day.
- The low capacity of the equipment, with which it was not possible to produce large quantities and meet a consumer demand that fluctuated greatly itself.
- The lack of space at the store, which does not possess a room that could be dedicated to production of smoothies on a large scale.
- Paradoxically, the fact that the personnel were made aware of food wastage and instructed to reduce wastage on the shelves limited the production of smoothies, since the amount of available raw materials decreased.

The following corrective measures will therefore be taken in the future :

- The recipes will be based on 2 ingredients or a single ingredient (pure juice). The store has invested in a high capacity automatic fruit press.
- The prices will be adapted (€ 1,50 for the juice and € 1,80 for the smoothies).
- It is planned to offer "soup kits" (pre-cut, out of date vegetables) in order to put the vegetable resources to good use.

Ideally, to ensure the profitability of such a project, it would be necessary to increase the production of smoothies, which in particular implies the availability of sufficient and constant amounts of raw materials.

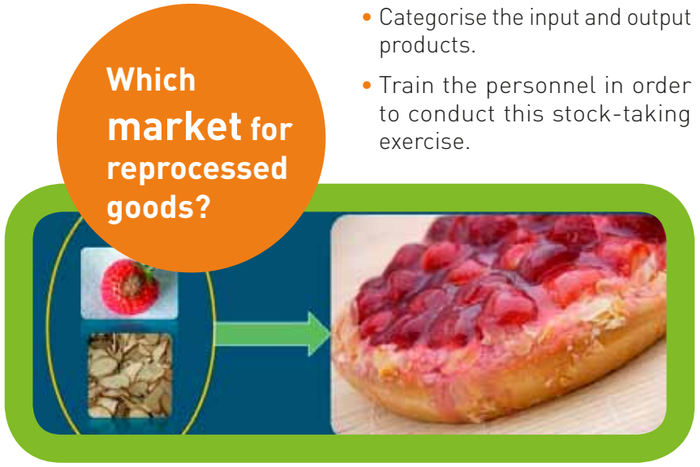
Such requirements can only be met by grouping collection of unsold products between several stores. The University of Wageningen (**WUR**) attempted to model such a scheme in a feasibility study.

In the Netherlands, indeed, it is estimated that food wastage represents a revenue shortfall of 400 million euros, i.e. 1,4% of supermarkets' total turnover.

The feasibility study, whose results concern genuine issues, focuses on 5 key questions :

1. Which markets and which target populations offer the most promising perspectives in terms of consumption of re-worked products?
2. How should collection and transport be organised?
3. What food transformation technologies are the most suitable to cope with the variability of products and quantities available?
4. Which business model is the most appropriate?
5. What is the financial outlook for such a model?

This project was conducted in collaboration with two PLUS supermarkets who saw this study as an opportunity to involve themselves, in an innovative and original way, in the fight against food wastage. Furthermore, the results of the research offer prospects of implementing the scheme country-wide in the Netherlands and transposition into good practices on an international scale.



Methodology

In order to answer the key questions, various steps were taken by the **WUR** research teams :

1. Analysis of information transmitted by the supermarkets involved in the research (purchases, sales figures, amounts of waste).
2. Analysis of possible options regarding re-packaging and transformation of food (by brainstorming with the different stakeholders in the research).
3. Analysis of food collection, transport and storage systems.
4. Market research – highlighting of consumer / prospect categories.
5. Development of a business case and reporting on results.

Main findings

Performance of the study required considerable investment of time in order to :

- Categorise the input and output products.
- Train the personnel in order to conduct this stock-taking exercise.

The first steps of research, still in progress, demonstrated the extent of how difficult it is to re-package products due to their variability in type and in quantity.

At this stage of the research, **WUR** identified certain opportunities in terms of transforming surpluses.

The study revealed a transformation potential for fruit and vegetables in the production of smoothies and the possibility of using nuts in cake making.

Organising food donations

The E. Leclerc hypermarkets in Templeuve and Wattrelos propose a guaranteed freshness charter to their customers, which is accompanied by early withdrawal standards from the self-service shelves, for various foodstuffs. These out of date products are stored before being donated to charities: Secours Populaire (the French equivalent of the Salvation Army), the Restos du Cœur and the Red Cross, outreach grocers, etc.

The characterisation study conducted by **Greentag** made it possible to quantify the share of food wastage that is avoided thanks to donations to charities and to compare three scenarios: disposal in big-bags of fruit and vegetables, donations and transformation through production of smoothies.

Logistics

Partnerships with charities required the implementation of specific logistics and management systems.

After having met with charities wishing to receive its unsold goods, the firm developed a standard procedure incorporating four different steps :

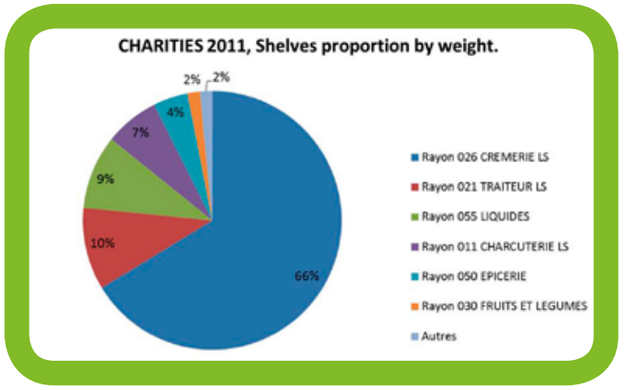
1. Drawing up of a donation contract including practical information such as the day the foodstuff is donated, the types of foodstuff, etc.
2. Scanning of products donated to charities and globalisation of amounts with a view to tax exemption (at a rate of 60% for the firm).
3. Provision of a "donation slip" on the day the foodstuff is donated; this document is printed in triplicate.
4. Monitoring of donations via a computerised management system.

Initially, the foodstuffs donated to the charities were scanned and costed without quantification of these products' weight. The characterisation study conducted within the scope of the GreenCook project made it possible to address this shortcoming.

Main findings

1. Quantification and characterisation of food wastage

- The resource of foodstuffs donated to charities represented 36,42 tonnes in 2011 (in net weight).
- The characterisation study clearly revealed the nature of donations to charities. As shown in the table below, the donations exist out of products from the dairy and cheese departments at a rate of two third.
- It is also surprising to observe that the share of fruits and vegetables is only 2%.



For 1 tonne of fruit & vegetables	Type of recycling		
	Big-bags	Donations	Smoothies
Cost of processing	€ -213,24	€ 372,12 (défiscalisation) € 65,8 = + € 306,32	€ -1 148

2. Comparison of the cost of food wastage according to recycling method

The characterisation study also made it possible to quantify the cost of a tonne of fruit and vegetables according to the recycling procedure.

In conclusion, donations are clearly the most advantageous option for the firm, especially when the tax exemption possible on the total amount of foodstuffs donated is taken into account. Without this measure, disposal via big-bags would be the most attractive, from a financial point of view. Finally, under current production conditions, the manufacturing of smoothies is the least profitable option.

requires the charities to possess refrigerated vans or trucks, logistics and personnel. In other words, they must display a certain professionalism to be able to carry out this sort of task.

- From a logistic point of view, the charities are not able to carry out collection of the foodstuffs on weekends and public holidays. Therefore, a significant volume of foodstuffs is disposed of in big-bags without being recycled via donations.
- The charities do not request fruit & vegetables because, according to them, these foodstuffs do not correspond to the demand of the people whom they assist who neglect this type of food in their intake or do not know how to cook it (related actions initiated by other GreenCook partners could improve this situation).

In light of the advantage of making donations to charities, from an ethical and financial viewpoint, Greentag wishes to increase the proportion of food wastage that is avoided by this means. In the future, its objective is to inverse the current ratio of 20/80 (20 = proportion of food waste recycled through donations) to achieve a ratio of 80/20 in 2014.

The main findings

The collaboration with the charities highlighted constraints and difficulties to differing degrees :

- The collection of foodstuffs

The stores now inform their personnel of the results obtained by the initiatives aimed at combatting food wastage. These various communication media are also motivational tools for the personnel, inciting them to continue the approach to which the firm has committed..

Another interesting approach concerning food donations and disadvantaged populations, is the one conducted by the University of Wageningen (**WUR**) for the Salvation Army.

In the Netherlands, the Salvation Army possesses 250 sites that are supplied with meals by 3 central kitchen sites. This activity represents 5.000 meals per day, which are re-heated on each of the sites. Each central kitchen site receives foodstuffs that come from the agri-food industry. In practice, this situation offers little flexibility in logistic terms and leads to a mismatch between supply and demand.

Consequently, the Salvation Army asked **WUR** to examine to what extent it was possible to optimise the supply of these sites in order to limit food wastage. Beyond the organisational and logistic aspects, the study focused on two more qualitative objectives :

1. To find the meal preparation technique that was most suitable and most flexible in order to transform the foodstuffs donated.
2. To improve the quality of meals as well as the user-friendliness of the restaurant premises.

This research project was notably financed thanks to the Ministry of Agriculture, which awarded a grant of € 25.000 to the Salvation Army.

Methodology

A study comparing 6 processes for "decoupling" the preparation of meals was conducted. Decoupling makes it possible to dissociate the moment the meals are prepared to the consumption of the meals.

From this perspective, WUR conducted interviews with key people, such as cooks and Salvation Army employees in order to highlight the advantages and disadvantages of each conservation method (sterilisation, freezing, vacuum packing, pasteurisation, etc.). Furthermore, the study focused on quality criteria (nutritional values and taste) but also on perception criteria.

The second part of the study focused on how to improve the perceptions of users with relation to the meals that they receive. The aim was to develop an ideal consumption scenario based on bibliographical research and meetings with the key people involved.

The main findings

In the end, the **University of Wageningen** developed a programme to optimise transformation of meal leftovers that took into account the products' expiry date, their transformation potential and their conservation capacity.

Vacuum packing proved to be the most promising conservation method because it allows the conservation time and quality of the ingredients to be increased. Vacuum pack cooking also offers more flexibility in terms of meal preparation, conservation and serving.

Different regeneration techniques have also been investigated in order to ensure optimal quality of meals on all the Salvation Army sites. Each site must select which of the techniques it uses according to its context and its working habits.

The study nevertheless demonstrated again the extent to which it is difficult to predict the type and amount of foodstuffs available. The vacuum pack production process and centralisation of meal preparation at a single site would provide a solution to this issue.

This new organisational method could combine with the optimal usage of the central kitchen.

Raising consumer awareness on reduction of food wastage and motivating them to act

At the point of sale

Supermarkets generate a large amount of consumer traffic.

This flow is significant and an asset in reaching a wide audience and disseminating information. However, supermarkets are also places where consumers are traditionally in a hurry and therefore loathe to receive technical information on a specific subject. This is the crux of the challenge : finding the right method to raise awareness amongst a wide audience that food wastage is a major issue and getting them to adopt anti-wastage practices at home.

Greentag therefore decided to make one of the E. Leclerc stores (Templeuve) a pilot unit for progressive testing of different approaches to communicating with consumers.

From a commercial point of view, the Salvation Army could convince new suppliers (supermarkets and producers) to donate their surpluses, making it possible to broaden the restaurant service to take in other target populations.

A specific study still needs to be undertaken on the logistic aspects inherent to planning transport of foodstuffs. It should concern both the collection of surpluses from donors and the retail of meals.

Finally, a positive meal experience is essential, because the Salvation Army restaurants are a place for socialising. They protect disadvantaged people from isolation and malnutrition. The study's most important recommendation aims to postpone the choice of menu to the latest moment possible, by preference at the time of the meal. The reason is as follows: if the users choose what they want to eat and the amount they want to eat, they will eat more, enjoy their meal more and ultimately food wastage will be limited.

Initiatives deployed

As a result, in 2010, from April to September, 11 gazettes called "Voisins naturellement (naturally neighbours)" were distributed in letter boxes. These gazettes included articles providing advice on how to waste less and how to consume more sustainably.

The following year, generic and detailed posters describing the GreenCook project and communication on 4 major themes of food wastage (conservation, cooking leftovers, planning menus and dosage of portions) were installed in the store (hanging posters and end of shelf posters).

A stand decked out in GreenCook colours was also occasionally set up in the store's entrance hall with specific events carried out by an environmental association. Food wastage awareness raising gifts (shopping lists, GreenCook colour pens, etc.) were handed out to visitors. During this period, specific messages were also printed on the back of the cash register receipts.

In tandem, approximately thirty volunteer households signed up to the ADEME's carbon coach programme by signing a charter of commitment and participating in 3 workshops organised by Greentag. These workshops, run by experts, were intended to help households control their carbon footprint.

One of the workshops, run by a nutritionist, dealt specifically with food and the fight against wastage. During the workshop, the households were able to try out learning to make smoothies.

GreenCook hints and tips were also included in the Alliances du Nord (Northern Alliances) brochure promoting partnerships between E. Leclerc and local producers, distributed in September with a circulation of 140,000 in the store's catchment area.

The www.jeconomisemaplanete.fr web site rounded off this scheme. Visitors to the site can find advice and information, but also leave testimonials. This interactivity with consumers is interesting as it allows better understanding of consumer demands, or even to anticipate trends in terms of anti-wastage products.

A recipe competition was also organised. The objective was to select the best suggestions in order to incorporate them into a transnational recipe book currently being prepared by the Dutch partner **De Proeftuinen**.

The main findings

Publication of the *Voisins naturellement* (naturally neighbours) gazette, which was intended to signal a turning point in the firm's communication, was nevertheless a failure. In fact, the breakaway from traditional methods linked to the publication of this type of brochure seemed to bother the customer base, with a negative impact on the store's turnover.

Furthermore, at the end of 2011, a survey commissioned by **Greentag** on the pilot hypermarket's customers (121 consumers surveyed) also demonstrated the very insignificant impact of this type of communication initiative on raising consumer awareness, or even changing consumers' purchasing behaviour.

Interacting with consumers at the point of sale? It works!

Indeed, the in-store posters were not particularly well-noticed. Despite their sometimes imposing size, the consumers declared that they continued to prefer traditional channels (the press and the internet) for this type of communication.

The activities proposed in-store (the stand) fared somewhat better, probably due to their greater degree of interactivity.

The results of this survey, although disappointing in relation to the efforts made by **Greentag**, nonetheless led to the adaptation, in 2012, of the content and form of consumer-focused communication.

The www.jeconomisemaplanete.fr web site was, for example, progressively enhanced.

GreenCook tips and hints have been systematically incorporated into the traditional commercial brochures. The offerings contained in the brochures are consistent with the objectives of GreenCook and the stores' environmental policies.

The households involved in the Carbon Coach operation are regularly called upon by Greentag in order to serve as a lever for broad publicising of anti-wastage messages and good practices; their presence is similar to the work of an ambassador.

In addition, Thomas Pocher, the manager of the Leclerc pilot stores, was interviewed several times for documentaries broadcast on major French TV channels (Envoyé Spécial on France 2 and, more recently, Global Gâchis, on Canal+).

Greentag has also very recently been associated with "Feeding the 5.000", organised by Canal+ and Britain's Tristam Stuart in order to raise the awareness of Parisians about the fight against food wastage. For this event, which involved making a giant free curry for 5.000 people, using out of date fruit and vegetables, Greentag displayed hands-on participation by supplying foodstuffs, but also by setting up a stand to show how to make smoothies.

In 2013, **Greentag** plans to organise a forum on food in the store's shopping mall. The idea is to bring together experts (nutritionists, cooks, researchers, GreenCook partners, etc.) on stands proposing events. This forum will enable consumers to meet professionals to gain concrete insights on how to reduce wastage.

Finally, a survey will be conducted during 2013 to gauge the comprehension and global uptake of the fight against food wastage project. The two snapshots (the studies in 2011 and 2013) will be able to be compared and will be used as benchmarks to assess the efficiency of the actions implemented.

In the Netherlands, supermarkets have also been called upon to be the theatre for consumer awareness raising initiatives. The chosen implementation techniques are different, however.

In collaboration with Berkel Milieu & Circulus, the University of Wageningen (WUR) has in fact decided to set up and evaluate a pilot project intended to commit supermarkets and customers to a joint "Food Battle".

Method

3 towns (Lochem, Apeldoorn and Brummen), 5 supermarkets (from the Co-op, Jumbo, C1000 and AH chains) as well as 60 to 75 participants have just recently signed up to this "Food Battle", in which **De Proeftuinen** and Voedingscentrum have also provided their expertise (De Proeftuinen has, in particular, conducted demonstrations of cooking leftovers on the car parks of the participating supermarkets).

The idea was to incite the potential participants to subscribe on-line via a dedicated web site, then to commit to weighing their food waste during a 3-week period. The main tool of the "Food Battle" is therefore a digital and paper diary in which the families record and compile their efforts.

Concurrently, the stores involved have contributed to the organisation of events on site and have offered the households involved a discount on their shopping, in order to motivate them to take part in the challenge.

The results of this pilot project, which has just been completed, are not yet available.

For more information on this project, which enjoyed exceptional media coverage, as well as videos presenting the "Food Battle" operation in images, visit www.foodbattle.nl

fun but educational, visual and interactive manner, involving all the 5 senses.

At the heart of this exhibition lies food wastage and its link with packaging. Visitors will also find very interesting information on smart packaging, prevention, recycling and packaging biomimetics.

This nomadic exhibition is on tour in Belgium. It can also be visited on-line at www.packstory.org.

At home

Based on the Showcase Households operation developed in France by the ADEME, **AVL Ludwigsburg** set up a Champion Households campaign in Germany in the Stuttgart region with the methodological support of the University of Stuttgart (**ISWA**).

The aim of this operation was to collect a maximum amount of data on the daily behaviour of households concerning food, by correlating the food wastage and purchasing behaviour. Indeed, knowing the reasons that push people to waste food makes it possible to develop a more suitable strategy for combatting it.

At exhibitions

Fost Plus has designed a mobile exhibition dedicated to packaging. It presents the history, development, various functions and social role of packaging in a

Methodology

45 showcase households signed up for the exercise (15 in 2010 and 30 in 2012) during a 3-month period.

Each phase itself included 3 steps:

1. **Initial taking of stock (month 1)**
2. **Raising awareness of new types of behaviour (month 2)**
3. **Crystallisation of new types of behaviour – analysis of post-operation benefits (month 3)**

During month 1, the task involved writing down the waste at each moment it was made, completed with the product name, its weight and the reason why it was wasted.

Month 2 included a series of activities intended to influence the behaviour of the households involved by informing them and mobilising them. These activities were built around the findings of a survey conducted previously by telephone, which highlighted the following causes of waste: poor understanding of best before dates, incorrect usage of in-store promotions and excessive amounts of stock at home.

Raising awareness is already reducing wastage !

At this stage, the families were asked to estimate their wastage. Then these estimates were compared with the actual figures and the families' reactions were recorded.

Findings and results

The results demonstrated that the families had thrown away a total of 123.5 kg of food during the 3-month long experiment.

Almost half of this waste was made up of fruit (19%) and vegetables (27%). An additional 16% concerned bread and pastries.

The main reasons raised for such waste were preparation of dishes in too large portions, poor conservation of certain foods and other food going off.

An interesting result was that the households wasted less and less as the operation progressed. Through changes in behaviour that were ultimately rather simple, they managed to reduce 58% of their food wastage.

This confirms a starting assumption shared by all the GreenCook partners, namely that simple awareness raising (as well as mobilisation by means of a public commitment) already helps to decrease wastage.

In addition to these quantifiable results, the operation also enables in the field testing of a series of practical tools (including cooking recipes).

All these elements (tips, hints and a daily calculator) were compiled to give rise to an on-line information portal christened Smart Food Saving Portal 2.0, intended to support the efforts of other families through generalisation and standardisation of the approach.

This portal, which was pre-tested by the families involved, is accessible to all since 1st October 2012 at the following URL: www.respect-food.eu

Today it is only available in German, but this portal can easily be adapted to the other project languages in the forthcoming months or years.

With disadvantaged populations

Leaving nobody behind in the fight against food wastage is one of the main commitments of GreenCook, which has developed a whole range of initiatives dedicated to socio-economically fragile populations.

In this context, it seems important to understand, upstream of project launches, the specific needs and expectations of these populations, in order to account for them in the project's communication strategy.

Artois Comm., therefore conducted a study in 2011 on the beneficiaries of several distribution centres (Restos du Cœur & Secours Populaire) closely linked with the GreenCook project in order to discover their eating habits.

The survey focused on questions linked to preparing meals, cooking leftovers, organising shopping and conserving food from packaging opened.

Amongst other things, it revealed that:

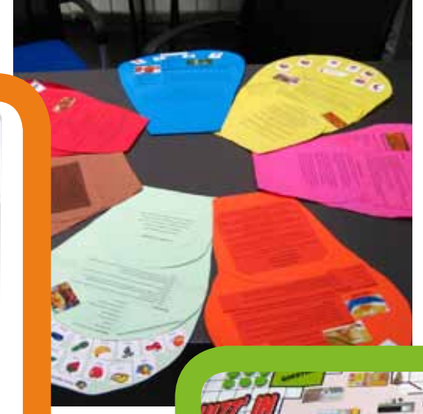
- The beneficiaries of these distributioncentres would like to learn simple recipes to use at home, as culinary know-how seems to be regressing in this category of the population.
- They would like to learn how to cook leftovers without putting their health at risk.
- They would like more information on the meaning of the labelling of food products, which is often rather obscure and is consequently a cause of wastage.

The main actions

The results of this survey, cross-referenced with the expertise of the **Nord-Pas de Calais Regional Council**, which coordinates all the region's consumer education programmes, made it possible to create a significant amount of adapted communication materials and tools.

These tools were created thanks to the pro-active involvement of several other GreenCook partners (**Bruxelles Environnement, GreenTag** and **AVL Ludwigsburg**), enabling **Artois Comm.** and **the Regional Council** to benefit from feedback from their pilot projects (presented above) and to adapt the messages and materials to the needs of disadvantaged populations.

Consequently, Artois Comm. has set up, and will further develop in the future, workshops on cooking in general and cooking leftovers. Educational exhibitions will be hosted by Restos du Cœur and Secours Populaire distribution centres. Sheets displaying simple and practical recipes will be printed and made available to the beneficiaries of these centres.



As regards the **Nord-Pas de Calais General Council**, faithful to the tradition involving joint production of its methods and materials with the groups of inhabitants directly concerned, it will progressively develop, in a participatory way that meets the expectations of their final beneficiaries, a series of 15 practical tools as follows :

1. An adjustable calendar of seasonal fruit and vegetables, including conservation advice and recipes for cooking leftovers.
2. A board game (called "Quizz'In") on energy, the environment, balanced diets and cooking leftovers.
3. An exhibition of photos on the food chain, from the field to the fork.
4. A recipe book for cooking leftovers.
5. A series of 12 table mats on fish from the North Sea, how to cook them and how to use the leftovers (heads, carcasses, etc.).
6. Harvest baskets made from old milk boxes, intended for picking local berries and nuts (hazelnuts, blackberries, raspberries, etc.).
7. Shopping bags on which a comic strip about food wastage is printed.
8. A series of 10 table mats conveying anti-wastage messages, to be used in school canteens.
9. Labels enabling identification of seasonal fruit and vegetables in outreach grocers.
10. A board game including all the places of conservation and consumption of products (supermarkets, kitchens, tables, fridges, freezers, etc.).
11. A "balanced diet flower" (with 21 petals representing the different food groups, advice for conserving them and recipes for cooking leftovers).
12. A shopping memo including the elements that make up the bottom of an ideal fridge and the back of an ideal cupboard (to be checked before going shopping!).
13. A photo story on the perception and the reality of food wastage.
14. A measuring glass made from a used plastic bottle, to be used to measure portions of pasta and cereals.
15. A souvenir film about the creation of the tools with the inhabitants.

3 of these tools are already available today: the balanced diet flowers, the measuring glass and the Quizz'in game.

Cooking workshops (some of which include an inter-generational approach) complete the scheme of the **Nord-Pas de Calais Regional Council.**

A date for the diary is June 2013: a grand citizens' forum will be organised, devoted to food wastage as part of the 25th anniversary of the consumer education initiatives, which will bring together several thousand participants in Lille.

In the media

Another derivative of the results of the experiments in German champion households (presented above) was the creation of a multi-media information campaign instigated by **AVL Ludwigsburg**, namely the "Respekt!" campaign.

Directly inspired by the famous English campaign "Love Food Hate Waste", "Respekt!" also has fruit and vegetables centre stage, in an aesthetic and informative fashion.

Several types of media were created by AVL Ludwigsburg: posters, postcards, inserts in local newspapers and magazines, etc.

A series of video clips was also produced, resembling a detective story, aiming to "unmask" the causes of food wastage and put forward solutions. These video clips are designed to be broadcast on the internet and social networks (Facebook, Dailymotion, YouTube, etc.) but also on local TV channels and in cinemas as trailers before projection of featured films. This broadcast strategy hopes to generate a genuine snowball effect, so that a maximum number of households can receive the message, in as short a time as possible and ultimately requiring a limited amount of money.

The especially new and well-styled way of approaching the issue of food wastage makes these video clips very uncommon deliverables which are therefore interesting to exploit.

In addition, AVL Ludwigsburg publishes twice yearly its free Wertstoffmagazin for all the households in its region (516,000 inhabitants). This magazine can also be downloaded from www.avl-Ludwigsburg.de.

Most of the subjects dealt with in this magazine are related to waste prevention, which makes this media especially appropriate for publication of anti-wastage messages from the GreenCook project.

Some examples of articles that have already appeared are: description of the GreenCook project, recipes for conserving and using leftover bread, information on interpreting best before dates and a summary of the "Food Night - Nacht der Lebensmittel" event in September 2011 (including a debate between experts, cooking demonstrations and projection of the film Taste the Waste).

A major awareness raising campaign on combatting food wastage was developed and launched by **Bruxelles Environnement** in April 2012.

This campaign, named "Le gaspi, salsifi!" (a vegetable and waste based play on words) made it possible, by staging "living" fruit and vegetables, to combine the fight against food wastage and promotion of local products (or even forgotten vegetables) within the same process.

The messages to the consumer have been disseminated in the form of large posters, inserts in the regional press and video briefs intended for viral broadcasting on the internet.

In addition to this campaign, a spatula type tool, presented on a linerboard printed with messages linked to the fight against food wastage and concerning recycling of glass has been developed in collaboration with Fost Plus.

The evaluation performed by an external consultant clearly demonstrated that the campaign was positively received: it was considered to be very informative and educative with a humoristic approach that was much appreciated.

It will be adapted to the Walloon context during autumn 2012, since all the public authorities responsible for prevention and management of waste in Wallonia have decided to give the fight against wastage pride of place within the scope of European Waste Reduction Week.

A calendar of seasonal fruit and vegetables including conservation advice, fridge magnets and a brochure with 65 tips for sustainable waste-free eating has also been published by **Bruxelles Environnement** and distributed at different events and exhibitions. More information is also available on the www.bruxellesenvironnement.be web site, which is regularly updated.

Notes