Barriers For The Implementation of Prevention Measures Concerning Food Waste

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Abstract:

Food which is suitable for human consumption is wasted at all stages of the value added chain all over the world. In some countries this problem has been recognised and several studies have been conducted to find proper prevention measures to overcome the careless handling of food. Although some promising prevention measures for different stakeholders have been identified, the implementation of those measures is often stopped by apparently insuperable barriers.

The paper analyses barriers for different prevention measures concerning food waste, which arise for different stakeholders along the value added chain. Barriers may concern marketing policies, economic development, legal restrictions, individual attitudes and others. The knowledge about specific barriers could be used for designing prevention measures or awareness campaigns in a better way. The paper shows how to overcome some of those barriers by citing examples from different case studies.

Keywords: *food waste, prevention measures, economic barriers, behaviour, incentivies, attitudes*

1 Introduction

Food which is suitable for human consumption is wasted at all stages of the value added chain all over the world. In some countries such as the UK, Japan or Austria this problem has been recognised and several studies have been conducted to find detailled information on the current state (cf. Lebersorger et al., 2005; Schneider & Obersteiner, 2007; Watanabe, 2009) as well as mechanisms behind that behaviour (cf. Wenlock et al., 1980; Wassermann & Schneider, 2005; WRAP, 2008; Glanz & Schneider, 2009; Selzer et al., 2009). The

results of those studies were used to develop proper prevention measures to overcome the careless handling of food (cf. Schneider & Wassermann, 2005; Schneider & Lebersorger, 2009a). Although some promising prevention measures for different stakeholders have been identified (cf. Falcon et al., 2008; Schneider, 2008, Salhofer et al., 2008; Parfitt et al., 2010), the implementation of those measures is often stopped by apparently insuperable barriers.

The paper analyses some barriers for different prevention measures concerning food waste, which arise for different stakeholders along the value added chain. Barriers may concern marketing policies, economic development, legal restrictions, individual attitudes and others. The knowledge about specific barriers could be used for designing prevention measures or awareness campaigns in a better way. The paper shows how to overcome some of those barriers by citing examples from different case studies.

2 Legal Barriers and Incentives

On July 1st 2009 the European Union cancelled certain marketing standards for 26 fruits and vegetables, which regulated a very detailled classification and labelling of the products. According to those specific marketing standards the products had to be classified into different marketing classes which for example regulated shape and size of the product. This was helpful for rating a product according to the price level. One well-known consequence of these marketing standards was the regulation of the curve of a cucumber. As only high class products could be marketed profitably, products which did not fit into the highest classes often were thrown away by agriculture, i.e. at the first stage of the value added chain.

Most fruits and vegetables are now subject to a general marketing standard which only regulates the sound condition for consumption of the product. According to the responsible commissioner, the EU commission recognised "…that it is not senseful to throw away acceptable products because they do not have the right shape" (BMLFUW, 2008). Thus, the measure to cancel the specific marketing standards seems to be effective to prevent edible food from discard. But there are some restrictions which retard the positive impact of the measure. As an alternative to the general marketing standard the producer may also use the international standards of the United Nations Economic Commission for Europe (UNECE) which is more or less equal to the former marketing standards. This means that there is no obligation to use the general marketing standard. Thus, as a cucumber with a slight curve fits better into a case than one with wide curve, the supermarkets have not changed their specifications. In addition, another 10 standards regarding 75 % of the inner European trade volume of fruits and vegetables (such as apples, pears, strawberries, sweet pepper, kiwi fruit, tomato, peaches and nectarines, salat, grapes as well as citrus fruits) are still in force. The partly deregulation provides new options for those producers who are ready to enter the market with innovative ideas to find those consumers who are searching for real taste and quality instead of visual standards. Future will show to which extent changes will happen.

Food products and their handling is a very important issue and therefore is regulated by several legal restrictions all over the world. To protect human health, strict legislation is in force and also rigorous penalties have been implemented in case of violations of these laws in some countries, especially in the US. The following example gives an idea about an incentive to support the donation of edible food stuff to social organisations such as food banks, food rescue programs, shelters and others. In 1996, the Bill Emerson Good Samaritan Food Donation Act was signed by former US president Clinton to encourage the donation of food and grocery products to social organisations for further distribution to people in need. Most of the products otherwise would have been thrown away due to a near use-by date, a damage of packaging, a non-profitable market price or a stock surplus. The act protects donors from liability when donating to a nonprofit organisation as well as from civil and criminal liability if a product, donated in good faith, later causes harm to one of the needy beneficiary. Liability is limited to intentional misconduct or gross negligence which is defined as "voluntary and conscious conduct (including a failure to act) by a person who, at the time of the conduct, knew that the conduct was likely to be harmful to the health or well-being of another person". Further, to disburden the involved stakeholders regarding administrative and legal research, the act standardises donor liability exposure for all US states. A similar legal act called La Legge del Buon Samaritano was passed in Italy in 2003. In other countries, specific legislation for donations has been regarded controversially. Opponents claim that the same legal requirements should be used for everyone who markets food stuff no matter who will be the beneficiary.

3 Economic Barriers and Incentives

3.1 Economic Barriers on Economy´s and Company´s Level

The agro-economic instrument of intervention support was implemented in the European Union in post-war period to secure a minimum price level for specific products. If the market price falls below a defined minimum price, the EU will buy a certain amount of those products from European producers. This measure decreases the available amount of the product on the EU market and leads to a stabilisation of the price at a level above the defined minimum price. Unfortunately, this measure was also an incentive for overproduction of some food products such as milk, butter and beef. The retained amounts were either reintroduced to the European or global market at a later date when the price level was increasing again, or had to be disposed of. This policy also led to disputes with other stakeholders on the global market such as the U.S.A. and Canada, but also developing countries. In some cases this strategy was accused to destroy local markets especially in developing and emerging countries. According to some reforms of the EU Common Agricultural Policy since the 1990ies, the system of European Union agricultural subsidies and programmes was restructured and some improvements can be observed. The direct interrelation of subsidies with the income of farmers, the aim of job preservation in agriculture and improving living conditions in rural areas as well as implementation of environmental measures in agriculture demands an alternative measure to be implemented. Thus, the system of product-based subsidies and intervention prices has been slowly changed into a system of direct subsidies to farmers.

A stiff competition between the different food retailers could also be a barrier for the implementation of food waste prevention measures. For example in Austria, three food retailing companies control a market share of 78.5 % (Lebensministerium, 2009). This leads to a lowest price policy and the implementation of several multi-pack offers (e.g. “Buy one, get one free”, so called BOGOF). According to the intention to save money, consumers buy those special offers and at the end a lot of surplus food is wasted by the households. A change of that policy is doubtful because the retailing companies claim that those measures are necessary to increase economic growth and job preservation in retail. In consideration of the fact that the consumer faces a hugh flow of advertisements aiming to accelerate the purchase of food products, an awareness campaign against food waste seems without much prospect. But an example from the UK shows that it is possible to rethink those strategies under certain conditions. According to WRAP (2010) the food retailing company The Co-operative Group changed their policy from BOGOF for perishable goods to a half-price strategy (half price for one product) within the Love Food Hate Waste campaign.

3.2 Economic Incentives for Companies

According to the results of a project which analysed data from 43 Austrian bakeries, on average 9.5 mass% of the bread offered for sale by bakeries could not be sold. Particularly, if supermarkets send the bread which could not be sold, back to the delivering bakery a loss of economic value is noticable for the bakery. Some of the bakeries realised the large potential of optimisation and implemented efficient measures to prevent the losses within the company. The most common prevention measures are to optimise ordering activities within the headquarters and the branches as well as external costumers, to sell remaining bread under bargain conditions and to cancel unprofitable business relationsships (Schneider & Scherhaufer, 2009). Thus, an Austrian bakery saved more than 400,000 Euro in 2008 (equals to 519,000 CAD or 528,000 USD) due to the implementation of several prevention measures (Bernhard, 2009).

Another example from Austria shows the potential of economic savings in health care facilities, by means of analysing and changing traditional behaviour as well as organisational structures. In 2003, seven departments of the Viennese hospital Hietzing conducted an internal project aiming to locate optimisation potentials regarding food wastage. Thus, financial resources could be rededicated to increase the share of organic food for the staff as well as for patients. After measuring the amount of wasted food and categorising the types of wasted food, specific measures were implemented in different hospital wards considering the needs of the patients and staff members. The focus of the prevention measures was laid on optimising the ordering activities as well as the portion size. Overall, about 7,500 Euro (equals to 9,700 CAD or 9,900 USD) could be saved per year in the seven participating wards. The exploration of the results from the pilot test promised a saving of approximately 32,000 Euro (equals to 41,500 CAD or 42,000 USD) for the whole hospital (KHL, s.a.).

Production, trade and need of food stuff depend on several conditions, some of which may be influenced such as logistic systems and some of which could not be controlled or predicted exactly, such as weather conditions or the shopping behaviour of

consumers. Thus, there will be always some edible food stuff which cannot be sold. An alternative to wastage of those products is to donate them to organisations which give them to the poor. This is a really win-win-win situation for the company, the environment and the people in need as it saves disposal costs for the company, saves resources and prevents the release of greenhouse gas emissions due to improper disposal otherwise, and provides nutrients for people. All over the world similar activities take place and some countries aim for introducing a tax reduction for donating companies to provide an additional incentive to donate edible products instead of wasting them.

3.3 Economic Barriers on Household Level

In 2005, the average household within the EU27 spent 12.7 % of its household consumption expenditures for the purchase of food and non-alcoholic beverages. The household budget survey shows great differences between the member states. The highest proportion of household consumption spent on food and non-alcoholic beverages was found in member states with the lowest household income, which is Romania. There food and non-alcoholic beverages accounted for 44.2 % of the mean consumption expenditures of households whereas in Luxembourg households spend 9.3 % on average (Eurostat, 2010). In 1999, the average household consumption expenditures for the purchase of food and non-alcoholic beverages within EU15 equalled to 13.8 %, with the highest proportion found in Lithuania with 45.7 % and the lowest found in Luxembourg with 10.1 %. The decreasing share of household expenditures on food and beverages during the last decades is assumed to contribute to the generation of food waste by households, besides other social conditions and trends.

A waste composition analysis which was conducted in Upper Austria calculated a yearly loss of food and leftovers equal to 300 Euro (390 CAD or 400 USD) on average per household and year which is disposed into residual waste by households (Schneider & Lebersorger, 2009b). The basis for the calculation of the price was an average price level for food categories received directly from the shelf of the four market-leading Austrian supermarket chains. The household consumption expenditures regarding food and non-alcoholic beverages account for 4,357 Euro (5,629 CAD or 5,747 USD) per household and year in that region (Statistik Austria, 2005). Thus, the food which is disposed of into residual waste accounts for only 6.4 % of the total expenditures for food (Schneider & Lebersorger, 2009b). For the UK, WRAP (2008) calculated that the average household disposes food worth approximately 430 Euro (550 CAD or 565 USD) per year into the waste collected by local authorities (this means residual waste and separate collected food waste). As in the UK the share of household consumption expenditures for the purchase of food and non-alcoholic beverages is below the EU average, the incentive to save money by avoiding food waste seems to be also very small.

Besides the fact that the cost of food waste is only a small part of the total consumption expenditures of households and therefore the incentive to save that money is weak, a lack of awareness regarding the amount of wasted food respectively money can be observed. Lebersorger & Schneider (2010) found that ¾ of interviewed people stated that they threw away less food than others.

3.4 Economic Incentives for Households

As it was mentioned in chapter 3.1, different prevention measures implemented by companies may lead to a reduction of costs for production, handling and disposal of unsold products. But sometimes it is also useful to involve the consumers in the prevention measures – both unconsciously and with awareness campaigns. Thus, the prevention measure saves not only expenditures of the company but may also have a positive impact on the wallet of the consumer. An Austrian bakery company offers a 5 % discount on pre-booked orders, in order to minimise bread waste and to ensure a maximum of freshness of the product. The ordered products are freshly crisped up in the store before the consumer picks them up. Other measures concern an additional piece of pastry for free if the bill is more than 5 Euro (equals to 6.50 CAD or 6.60 USD) within one hour before closing time or an overall discount of up to 50 % for all fresh products (Schneider & Scherhaufer, 2009). This measure decreases the amount of bread waste on the one hand and increases the satisfaction of the consumers as well as the sales volume per consumer on the other hand (Bernhard, 2009). In recent years, also supermarkets give a discount on products near the best-before date, e.g. dairy products or convenient products, to prevent the wastage of those products within the shops as well as to minimise financial losses.

4 Individual Attitudes

In former times stale bread was used for different dishes to save the resource for nutrition. It was dried and crushed or cutted and then used for dumplings, croutons in soup, as coat for other food or as essential ingredient for specific dishes (such as French Toast or bruschetta) and casseroles. On the one hand, since cooking and consumption behaviour have changed, bread has to meet high requirements regarding freshness whereas stale bread is used to be thrown away by the households. A survey among 1000 Austrians older than 15 years showed that 2/3 of the interviewees bought bread every second day and 78 % rated absolutely freshness as the most important attribute of bread (Starmayr, 2008). On the other hand croutons and bread crumbs are bought ready to eat at the supermarket or convenience food is used instead of cooking with leftovers.

According to Pudel and Westenhöfer (1998) four tendencies could be differentiated linking food supply and public awareness from a psychological point of view. The first one is the loss of the value of food, which implies that people who did not face any food shortages have less emotional behaviour regarding food than the generation born before 1950. Secondly, due to the large product range available in supermarkets where food is wrapped in colorful packaging, food lost its identity. Food seems to be just another product among other products, there is no seasonality and no connex to the producer anymore. This is also reflected by a third trend, the loss of origin. The food offered at the supermarket is mostly wrapped and preprocessed and thus only the pictures on the packaging may give an association to the origin. The fourth tendency is the loss of social and emotional linkage. This means that traditional recipes from the grandmother disappear as well as the social event of having a meal together within a family. The realisation that those developments changed our society over the last decades clarifies that long-lasting measures are necessary to overcome those behaviour.

An example from another food issue should be used to clarify the difficulties which have to be overcome. Diet is part of an individual lifestyle and affected by mostly unconscious corporative, cultural and social factors. Preferences regarding nutrition are enrooted in former centuries and have been changed and formed due to cultural developments as well as socialisation. They are an instrument for distinction between groups of individuals (e.g. classes) within a society. Due to industrialisation of agriculture, modern conservation techniques and sophisticated transport options within the last century, industrialised societies have undergone a development forward to an affluent society with an oversupply of food stuff. The evolutionary code of human beings is geared to ensure sufficient nutrition, thus humans tend to eat as much as possible. This mechanism was vital for the survival in former days but nowadays the population faces the problem of overweight (Klotter, 2007). Although there are a lot of strategies available to keep a healthy weight, and the ideal of beauty suggests a slim and sporty body, the disease pattern of obesity can be observed in almost all industrialised countries and increasingly also in emerging countries. It can be assumed that the mechanism to buy too much, symbolised in the wastage of food, is similar to the mechanism of eating too much.

5 Conclusions

Wastage of edible food is a widespread phenomenon throughout the value added chain and caused by various factors. The implementation of prevention measures should be supported by information on the barriers for changing the common behaviour, to ensure that the measures will have an effect. Particularly in the case of stakeholders who have no clear structures and unknown interactions such as households or society, the overcoming of such barriers is a challenging undertaking and no recommendation for a specific measure could be given at the moment. Literature shows that especially on the level of companies a lot of different measures have been implemented or could be developed, which decreases the amount of wasted food and also has other advantages (e.g. economic). Thus, increasing awareness regarding the wastage of food as well as information gained from case studies could support further projects on this level. Sometimes the deregulation of barriers will not have immediately a positive effect but could be the impulse for innovations.

The prevention of wasted food includes a lot of different measures which have direct or indirect positive or negative effects for different stakeholders. On the one hand, the discounted sale of products near to best-before date decreases directly the amount which has to be disposed of at the supermarket. On the other hand, it could also increase the wasted amount at household level due to a surplus of food stuff which was bought because it was that cheap. Thus, a single measure implemented on a single level of the value added chain, may not have the expected effect. The strategy should include a bundle of different prevention measures for multiple target groups at various levels of the value added chain, which is implemented long-term.

References

Bernhard K. (2009) Potentials for optimization of bread and pastry production. In: Lechner [Ed.]: *Prosperity Waste and Waste Resources.* Proceedings of the 3rd BOKU Waste Conference 2009 Prosperity Waste and Waste Resources, facultas.wuv, Vienna, pp 53 – 65.

Bill Emerson Good Samaritan Food Donation Act (1996) Conversion to permanent law of Model Good Samaritan Food Donation Act and Transfer of that Act to Child Nutrition Act of 1966, Public law 104–210/1996, 110 STAT. 3011 (www.gpo.gov/fdsys/pkg/ PLAW-104publ210/pdf/PLAW-104publ210.pdf, accessed 2011-01-11).

BMLFUW (2008) EU: 26 Vermarktungsnormen bei Obst und Gemüse gestrichen - Krumme Gurken und knollige Karotten künftig erlaubt (EU: 26 marketing standards regarding fruits and vegetables cancelled – in future buckled cucumber and bulbous carrots permitted). (presse.lebensministerium.at/article/articleview/71264/1/21503/, accessed 2011-01-11).

Eurostat (2010) Household consumption expenditure - Statistics explained. (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Household_consumption_expenditure#Further_Eurostat_information, accessed 2011-01-03).

Falcon J., Gray S., Virtue N. (2008) Love Food Champions - Final report. Banbury. (www.wrap.org.uk/downloads/LFC_draft_FINAL_report_171008-FINAL.38326c8e. 6083.pdf, accessed 2011-01-11)

Glanz R., Schneider F. (2009) Causes for food waste generation in households. In: Cossu R., Diaz L.F., Stegmann R. [Eds.] Proceedings Sardinia 2009 Twelfth International Waste Management and Landfill Symposium, S. Margherita di Pula - Cagliari, Italy, 5 - 9 October 2009, Executive Summaries (pp 31-32), CD-Rom.

KHL (s.a.): Sorgsamer und sensibler Umgang mit Lebensmitteln im Allgemeinen und von Brot und Backwaren im Speziellen (Careful and sensitive handling of food in general and in special with respect to bakery products). Project within the activities of greening healthcare campaign. Vienna.

Klotter Ch. (2007) Einführung Ernährungspsychologie (Introduction on nutrition psychology). Ernst Reinhardt Verlag München, Basel.

La Legge del Buon Samaritano: Legge 25 giugno 2003, n.155, Disciplina della distribuzione dei prodotti alimentari a fini di solidarieta' sociale. 25.07.2003, n.155 (gazzette.comune.jesi.an.it/2003/150/3.htm, accessed 2011-01-11)

Lebensministerium (2009) Daten zum österreichischen Lebensmittelhandel 2008 (Data on food trade in Austria, 2008). Information of the Federal Ministry of agriculture, forestry, environment and water management (www.lebensmittelnet.at/article/articleview/77104/1/8154#, accessed 2011-01-11).

Lebersorger S., Linzner R., Unger N. (2005) Potential reduction of residual waste by home composting – a case study. In: Cossu R., Stegmann R. [Eds] Proceedings Sardinia 2005, Tenth International Waste Management and Landfill Symposium, St. Margherita di Pula, Cagliari, Italy, 3 - 7 October 2005. (Abstract; full paper on CD), pp.61-62.

Lebersorger S., Schneider F. (2010) Wissenschaftliche Begleitung des Pilotprojektes zur Vermeidung von "Lebensmitteln im Abfall" in Niederösterreichischen Wohnhausanlagen (Pilot-project for the prevention of food waste in multi-family dwellings in Lower Austria). Project on behalf of the Waste Management Association of Lower Austria, Vienna.

Parfitt J., Barthel M., Macnaughton S. (2010) Food waste within food supply chains: quantification and potential for change to 2050. Phil. Trans. R. Soc. B. 365, 3065-3081.

Pudel V., Westenhöfer J. (1998) Ernährungspsychologie: Eine Einführung (Food psychology: An introduction). 2nd edition, Verlag für Psychologie, Göttingen.

Salhofer S., Obersteiner G., Schneider F., Lebersorger S. (2008) Potentials for the prevention of municipal solid waste. Waste Management, 28 (2), 245-259.

Schneider F. (2008) Wasting Food – An Insistent Behaviour. In: Edmonton Waste Management Centre [Ed.] Urban Issues & Solutions. Proceedings of Waste - The Social Context '08, International Conference, Edmonton, Alberta; Canada (full paper on CD).

Schneider F., Lebersorger S. (2009a) Households attitudes and behaviour towards wasting food – A Case Study. In: Cossu R., Diaz L.F., Stegmann R. [Eds.] Proceedings Sardinia 2009, Twelfth International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Italy; 5 - 9 October 2009 (Abstract; full paper on CD), pp. 831-832.

Schneider F., Lebersorger S. (2009b) Untersuchung der Lebensmittel im Restmüll in einer oberösterreichischen Region (Analysis of food waste in residual waste in an Upper Austrian region). Project on behalf of Federal State Government of Upper Austria, Vienna.

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 Sardinia 2007, Eleventh International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Italy; 1 - 5 October 2007 (Abstract; full paper on CD), pp.469-470.

Schneider F., Scherhaufer S. (2009) Aufkommen und Verwertung ehemaliger Lebensmittel – am Beispiel von Brot und Gebäck (Generation and recycling of food – with focus on bread and pastry). On behalf of Federal Ministry of Commerce, Family and Youth, Vienna.

Schneider F., Wassermann G. (2005) The loss of useable goods in production and trade – a Case Study in Austria. In: Cossu R., Stegmann R. [Eds.] Proceedings Sardinia 2005, Tenth International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Italy; 3 - 7 October 2005 (Abstract; full paper on CD), pp.815-816.

Selzer M., Glanz R., Schneider F. (2009) Causes of food waste generation in households. In: Lechner P. [Ed.] Prosperity Waste and Waste Resources. 3rd BOKU Waste Conference 2009, facultas.wuv, Vienna, pp. 91-100.

Starmayr B. (2008) 10 Antworten zum Brot- und Gebäckkonsum in Österreich – Ergebnisse der Umfrage „Brot 08“ (10 answers regarding bread and pastry consumption in Austria – Results of the survey „bread 08“). Study on behalf of Backaldrin Österreich GmbH, 2008 (www.vfg.or.at/?TabId=62, accessed 2011-01-04).

Statistik Austria (2005) Monatliche Verbrauchsausgaben - Bundesländerergebnisse. Konsumerhebung 2004/05 (Monthly consumption expenditures – results for federal states. Consumption census 2004/05), Vienna. www.statistik.at/web_de/statistiken/soziales/verbrauchsausgaben/konsumerhebung_2004_2005/index.html (accessed 2011-01-05).

Wassermann G., Schneider F. (2005) Edibles in Household Waste. In: Cossu R., Stegmann R. [Eds.] Proceedings Sardinia 2005, Tenth International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Italy; 3 - 7 October 2005 (Abstract; full paper on CD), pp.913-914.

Watanabe K. (2009) Estimation of quantities of wasted food. In: Lechner P. [Ed.] Prosperity Waste and Waste Resources. 3rd BOKU Waste Conference 2009, facultas.wuv, Vienna, pp. 77-84.

Wenlock R. W., Buss D. H., Derry B. J., Dixon E. J. (1980) Household food wastage in Britain. The British Journal of Nutrition, 43, (1), 53- 70.

WRAP (2008) The food we waste. Food waste report. Bunbury, UK.

WRAP (2010) Case Studies, Courtauld Commitment (Phase 1: 2005-2010) - Examples of household packaging optimisation and food waste. Bunbury, UK.