

# The History Of Food Wastage

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## **Abstract:**

The wastage of edible food due to a blemished size or colour, the current market situation, a general overproduction, an error in packaging weight or a poor management of food in households has been recognised as an important topic in numerous countries. During the recent years some projects have been carried out to receive figures to estimate the amount of wasted food for specific levels of the value added chain (such as households or retailers) or whole economies. It is often stated that the wastage of food is a result of our contemporary affluent societies and the loss of respect concerning food.

The paper reviews the development of human attitudes concerning food over the different ages and shows that also in former times not all food suitable for human consumption was used for that purpose. Main reasons for the wastage of food were related to religion and social affiliation as well as inappropriate packaging material and conservation methods. The paper summarises findings which describe the history of wasting food and early prevention measures during times of crises.

**Keywords:** *historic review, food waste, prevention measures, attitudes*

## **1 Introduction**

The wastage of edible food due to a blemished size or colour, the current market situation, a general overproduction, an error in packaging weight or a poor management of food in households has been recognised as an important topic in numerous countries. During recent years some projects have been carried out to receive figures to estimate the amount of wasted food for specific levels of the value added chain such as households or retailers or even whole economies as well as reasons for that behaviour (cf. Wenlock et al., 1980; Lebersorger, 2004; Wassermann & Schneider, 2005; Schneider & Obersteiner, 2007; WRAP, 2008; Watanabe, 2009). Most of these studies consider food waste from an ecological point of view as food production is resource demanding and wasted food is converted into methane when landfilled without pre-treatment. It is often stated that the

wastage of food is a result of our contemporary affluent societies which are not only characterized by an excessive consumption level but also by lavishly handling of goods. Reasons for the careless handling of food may be summarised in the loss of food value, loss of food identity, loss of food origin and the loss of social and emotional linkage concerning food (cf. Pudiel and Westenhöfer, 1998). Assuming that a long time ago no food was wasted, the question arises since when those factors started to change the human behaviour towards food wastage – 10 years ago, 50 years ago or earlier? In general, few data are available about food wastage in former times, especially regarding its generation. However, information about the general handling of food or measures which were implemented to overcome the wastage of food can be found in the literature.

The paper reviews the development of human attitudes concerning food in the course of time and shows that also in former times not all food suitable for human consumption was used for nutrition purpose. Reasons for the wastage of food were related to religion and social affiliation as well as inappropriate packaging material and conservation methods. The paper summarises some findings which describe the history of wasting food and early prevention measures during times of crises.

## **2 Antiquity**

In the Greek and Roman civilisation there was a strict distinction between cultivated and non-cultivated land. Food was primarily received from cultivated land, thus wide areas were not used for food production or gathering e.g. wild fruits. Hunting was seen more as collection of trophies than as food supply method. The diet was mostly vegetarian and a moderate consumption level of food was the social ideal (Montanari, 1999). From the 5<sup>th</sup> century BC, the Greek upper class used water and bread as well as perfumed clay for hand washing after dinner (Döbler, 2000). There are no records what happened to the bread afterwards.

In contrast, the Celtic and Germanic cultures - named barbarians by the Greeks and Romans - received most of their food stuff from forests and other non-cultivated land. Even animals were raised by letting them grazing unattended in the forests. The most important food source was meat which was complemented with wild fruit. The social status of a warrior depended on the amount of food which he could eat at once (Montanari, 1999). But looking at the living conditions of those people this was a necessary attitude due to the fact that the people were often faced with scarcity of food. Thus, they had to be able to eat as much as possible when food was available, to survive and/or they shared the food with the other members of their clan. Both strategies prevented the spoilage of valuable food (Döbler, 2000).

Nevertheless, some preservation techniques had already been developed. It is recorded that the Roman emperor Gallienus (218-268) could preserve grapes for three years and that he ate melons during winter time (Montanari, 1999). Salt was a valuable good due to its important character to preserve food stuff and to overcome decomposition (Döbler, 2000). Some cultures such as the Phoenicians transported food stuff over long distances and developed a trading network (Nast, 1997). Salt and other food stuff such as olive oil was

transported over long distances but there is no information how much had to be discarded along the way or after arrival due to bad condition.

### **3 Middle Ages**

From the 2<sup>nd</sup> century there is information from China about a preservation method of fish which was laid into salted rice and loaded with a heavy stone. Due to the anaerobic condition and following fermentation process the fish was preserved for a duration of two months up to 3 years, depending on the duration of the procedure. The used rice was thrown away afterwards (Nagata, s.a.). Since the dissemination of Christianity from the 4<sup>th</sup> century in Europe, specific food stuff such as bread and wine also gained religious importance besides the physiological value (Montanari, 1999). In Asia rice was as important as bread in Europe (Döbler, 2000).

The Middle Ages were characterised by large differences between the social classes. Although some preservation methods were available, most of the people living in the Middle Ages in Europe lived from hand to mouth (Schubert, 2006). The reason for the time period characterised by breakdown of food production and rural exodus, was the collapse of the Roman Empire, migration and new political developments. From the 3<sup>rd</sup> to the 6<sup>th</sup> century dramatic famine periods accompanied by epidemics happened in Europe. Besides violent conflicts which destroyed food products on the fields, human manpower was missing to harvest and distribute the food. In Europe, bread was the most important food and witnesses of time reported a famine already in case of a lack in bread supply. Farmers were forced to produce more wheat for the supply of the urban population with white bread while the rural population could not afford to eat white bread. For example in the 13<sup>th</sup> century foreign and poor people from Genoa where wheat was expensive were transported to Sardinia where a surplus of wheat could be produced (Montanari, 1999). Thus, the problem was solved by increasing the local demand in Sardinia and decreasing the population in Genoa.

Urban population was used to eat fresh meat three times a week. Leftovers from lunch were eaten for dinner but this meal was experienced as “poor” dinner (Montanari, 1999). In contrast to the common people the aristocrats used to celebrate sumptuous feasts. As a symbol for power, food was not only used for serving the guests but also for representation purposes (Andressen, 2001). It was not planned to eat all the different dishes as every guest should choose only some of them (Montanari, 1999). In 1356, the city fathers of Florence decreed an edict which regulated the number of courses, the number of dishes per course as well as the dimension of meat per dish to decrease the vast lavishness (Döbler, 2000). It is passed down that in the 14<sup>th</sup> century one cook had to work for four weeks on the 20 courses of a gala dinner due to the extravagant decorations (Schubert, 2006). In the same period, Peter IV of Aragon ordered to separate acetified wine, stale and moldy bread, spoiled fruit and cheese and similar food for donations to the poor. Even medical doctors believed that rough people could eat such food stuff without any harm (Montanari, 1999). In this age, common parlance created the ideal of the land of milk and

honey where it was peaceful and plenty of food available for everyone (Montanari, 1999; Döbler, 2000).

There was also wastage of food due to poor packaging material, transportation infrastructure or a surplus of specific food products on the market. It is reported that in 1413 several disputes occurred in Regensburg, Germany, due to spoiled herring which had been sold on the daily market. In such cases the food stock was confiscated by the market authority and the herring was burnt by the executioner. Sometimes this measure was even realised if there was only a doubt about the edibility of the herring (Schubert, 2006).

Bread was baked thoroughly to prevent the occurrence of mould. Thus, the bread was hard to bite and very stiff. In upper class households in the Dutch area this bread was used as a kind of plate in the 15<sup>th</sup> century. Every guest had a pile of bread available which was either thrown away or given to the poor after softening (Tölle, 1991). As bread was an important food product, some regulations were in force to ensure quality as well as mass of certain bread loaves. Underweighted loaves were confiscated by the authority and for example given to the city hospital. On average 80 % of the household income was used for the purchase of food and drinks in the late Middle Ages. Thus, leftovers were used as much as possible and mixed with vinegar to receive a dish named *Sammelsur* which means sour dish from leftovers (Schubert, 2006).

#### **4 Modern Ages**

In the 17<sup>th</sup> century, upper class used to have so called “Schauessen” which means dishes made from food, but not intended for consumption or no longer edible, e.g. because of the used colours or hardeners. Sugar, butter, marzipan as well as some birds such as swan or stork were used to produce buildings, landscapes, gardens, sculptures, animals and other decorations to be placed on the table (Schwendter, 1995; Döbler, 2000). Food for decoration was partly replaced by ceramic products during the 18<sup>th</sup> century but still in use until the 19<sup>th</sup> century (Andressen, 2001). Even if the decorative dishes could have been eaten, some of them were removed from the tables without being tasted. Reasons were the long distances in some castles between the kitchen and the dining hall and therefore cooled down dishes as well as unsightly looking of those dishes after portioning of the artwork. Nevertheless it is reported that the staff stole a lot of these dishes on the way back to the kitchen (Schwendter, 1995).

A specific term was created in the Viennese dialect for those women who had the permit to buy leftovers from the upper class to reuse the food in their own restaurants. They were called “Schmauswaberl” and the term is recorded since the late 18<sup>th</sup> century. Those restaurants were well-known and popular because thus it was affordable even for the lower class to eat something which had been served at the high society’s banquets. The revenue from the sale of the leftovers from the Viennese Imperial Court was used for donations to the widows and orphans fund of court servants (Haslinger, 1999; Porter and Prince, 2005). It is reported that leftovers were also taken home by court servants who could subsist on those leftovers for several days with their families, and there was still something left for the supply of beggars and hospitals (Bauer, 2009). Similar behaviour is recorded from Paris

where the Maitre d'Hotel made a pre-selection of the leftovers from the Court based on the suitability for further use at the Court. Only few products were chosen, the remaining food was given to the servants (Andressen, 2001). Another food waste "prevention measure" was implemented at the Court in Saxony. In the year 1750 it is recorded that the remaining dishes were left on the tables after the glamorous dinner. Some 100 soldiers were placed in front of the tables and on signal they ran to the tables and started eating. Thus, the leftovers provided a questionable amusement for the high society due to the final scuffle among the hungry soldiers (Andressen, 2001).

According to the strict distinction between food which is dedicated for lower class and food which is good enough for upper class, it took some years for new food products to find acceptance. One example is the potato which was used only for feeding the animals for some time in Europe (Schubert, 2006). During the 19<sup>th</sup> century the self-sufficiency was a necessity even for urban population who cultivated fruit and vegetables, wine and preserved the products for later use (Nast, 1997). 90 % of the expenditures for food were used for the purchase of grain (Montanari, 1999). Thus, the recycling of leftovers was important for middle and lower classes. Cookbooks and especially the Bohemian cuisine developed a lot of creative ideas to do so (Schwendter, 1995).

At the end of the 19<sup>th</sup> century experts pointed out that the increasing import of food products had the disadvantage that a lot of food was spoiled when purchased, but the advantage of those imports was the sufficient nutrition supply of the population (Haupt, 2003). In the fast growing cities, it was not possible to supply oneself with food anymore, thus the people depended on the groceries which had been established. The food stuff was offered without packaging and every customer had to bring his own bag, bottle or box. It is recorded that fresh bought products such as oil became inedible within short time period due to unhygienic conditions at the households and the groceries. Within the shop there was a poor presentation of the products due to a lack of space, and the shopping act was very time-consuming (Nast, 1997).

A study on the diets of hand weavers in Zwittau, Saxony, from 1885 reports that the average expenditure on food accounted for two-third of the total income of the household. One of the results was that practically no food was wasted and that the people stated that they were too poor to throw away anything (Atwater, 1895).

In the late 19<sup>th</sup> century several food diet studies in the USA were conducted, mostly by Professor Atwater. His crew defined "food waste" as "*the so called edible portion of food which may for any reason be rejected*". All uneaten residues of cooked food such as meat, vegetables, bread, cake and pastry as well as every edible part which is rejected before cooking were included. Bones and other parts of meat and fish which were inedible as well as parings were excluded from this definition. In the chapter about "waste of food in the American households" Atwater states that food waste in US households is a serious problem and that there is a demand for detailed data. It was found that actual nutrients in the waste were on average worth one tenth (up to one sixth in one case) of the whole food which was purchased by the household. The wasted food originated mostly from animal products which were much more costly, as Atwater notes in his publication. Atwater also records that a visual inspection of waste bins in a New Yorker well-to-do-class-street

showed that a “*considerable proportion of the food purchased was literally thrown away by careless servants*” and that in moderate neighbourhood “*this waste was less*”. The publication ends with the notice “*the common saying that ‘the average American family wastes as much food as a French family would live upon’ is a great exaggeration, but the statistics cited show that there is a great deal of truth in it. Even in some of the most economical families the amount of food wasted, if it could be collected for a month or a year, would prove to be very large, and in many cases the amounts would be little less than enormous*” (Atwater, 1895). But there were also American households which used leftovers carefully, others purchased stale bread which was sold at half price of fresh bread to save money or bought food in small quantities (due to financial restrictions) (Atwater and Bryant, 1902).

With the development of self-service shops, starting in 1912 in the USA, a broad range of products could be offered to the consumers and as people could have a closer and longer look to the products as well as the arising colourful packaging, besides the satisfaction of actual food needs there was also the beginning of impulse buying (Nast, 1997).

## **5 The time period from World War I to II**

During both World Wars the population was asked to use resources economically which could be achieved by abstinence, by efficient use of materials as well as by separate collection of waste fractions and recycling. Food was an important resource because sufficient nutrition was a necessity for fighting power of the troops and the morale of both troops and population. In addition, a lack of human manpower occurred in agriculture while scarcity of food could be expected due to combat operations and trade restrictions.

The Clean Plate Club was introduced in 1917 by the US Food Administration. Aim of the campaign was to use food stuff as efficiently as possible and to restrict the necessity of food imports to a minimum. The measure included a broad awareness campaign for the population. Especially children were told to eat all the food on their plate and thus to leave a clean plate (Wikipedia, s.a.). The responsibility of the US population in face of thousands of starving people in Europe as well as towards a better nutrition of the troops was communicated (figure 1, left; figure 2, left). Target groups were not only housewives as responsible person for nutrition but also the husbands at home (figure 1, right). Also the European emigrants in the USA were informed about the necessity to prevent food waste by using multilingual (e.g. English, Italian, Jewish) posters with the title “food will win the war” (Borkan, 2002).

The Clean Plate Club was reintroduced during the world economic crisis in the 1930ies and the Second World War (figure 2, right) (Wikipedia, s.a.). Today, there is the assumption that the Clean Plate Campaign laid the basis for a fatal misunderstanding. Children who grew up with the Clean Plate Campaign during war time internalised the message to eat up their plate. Thus, they told their children and grand children to do so as well but in those times the portion size of served meals had already increased. That behaviour could lead to an excessive intake of children and contribute to obesity.

Cathcart and Murray (1939) refer to the definition of Atwater regarding food waste. Thus, only edible food wasted by the 263 families from different parts in the UK has been considered in their dietary studies. The results showed that it was not really possible to get exact data about food waste in rural households as food waste was partly fed to animals before being measured. Differences in the amount of food waste were found depending on the investigated area, with the lowest value (1.06 % of lost calories in relation to purchase) in Cardiff and the highest value (2.48 %) in Scotland (St. Andrews). Main part of the food waste consisted of vegetables, bread and meat (Cathcart and Murray, 1939).

From 1941, the State Nutrition Committee was responsible for the food campaigns of Oregon State. The reduction of food waste had highest priority and should be achieved by appropriate preservation of food as well as careful handling of food. Several brochures, radio shows, training courses and poster campaigns gave information how to produce, store, prepare and preserve food. Once again it was communicated that the benefit of these efforts was a better nutrition of the own and the allied troops as well as the starving European population e.g. in France and Belgium (Borkan, 2002).

Other target groups were the soldiers as well as the cooking staff of the troops who were also asked to use their food wisely. It was a challenge to supply all the soldiers scattered all over the world. American reports note that up to 75 % of the supplies could not be used at the front line due to insufficient packaging. This was not only true for food products but also for other stuff. Therefore new packaging materials as well as technologies were developed to provide a sufficient supply of the troops (Nast, 1997).

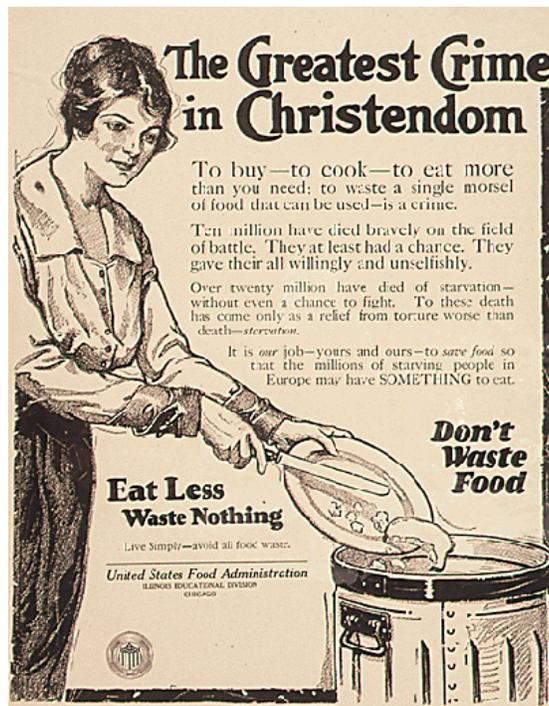


Figure 1: Poster of U.S. Food Administration used 1917 to 1919 (University of St. Andrews, s.a.)



Figure 2: U.S. Food Administration resp 1917/18 (Borkan, 2002)

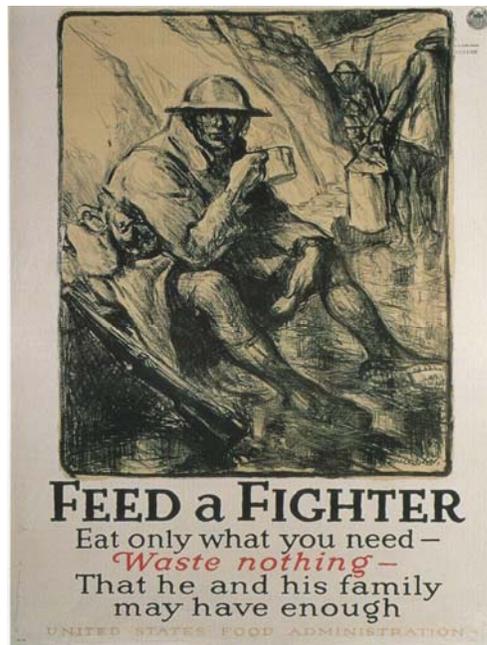


Figure 3: Poster of U.S. Food Administration during WWI



Figure 4: U.S. Food Administration resp. Clean Plate Campaign 1941-1945 (right)  
(Oregon State Archives, s.a.)

## **6 The time period after 1945**

Until mid of 20<sup>th</sup> century people often had own experiences with home growing of food products (Schwendter, 1995). In European countries with direct involvement in military conflicts during second World War, the lower classes used 50 % of the income to buy food. In contrast, in neutral Switzerland household expenditures on food accounted for only 29.7 %. Due to the conversion of groceries to self-service shops consumers had to take the offered packaging sizes instead of individual demanded quantity. According to the aimed economic boom the people were told to consume products to keep the economy growing. Thus, other values such as thriftiness lost their relevance (Nast, 1997). US studies conducted in the 1960ies showed that between 7 and 10 % of the purchased calories were wasted in households respectively given to pets or washed down the sink (Wenlock, 1980).

## **7 Summary and Conclusions**

The paper shows that due to e.g. poor transportation systems, packaging, hygienic standards and social attitudes food had to be wasted or was not used for human nutrition already in former times. Food has been used for demonstration of power and prosperity at all times. Different prevention measures were developed and implemented to reduce the wastage of food, e.g. by donating leftovers to the poor. Looking at those measures more in detail, most of them can be seen critical from an ethical point of view. Neither ethical nor hygienic aspects were considered by giving mouldy food stuff to the people and there was no choice for the people who were transferred to other regions with temporary overproduction. Since the 15<sup>th</sup> century, products which did not meet the market regulations have been confiscated - similar to present times - but were often given to the poor such as underweighted bread. Meanwhile, the donation of nonmarketable or unsold edible food stuff to people in need is a well established prevention measure worldwide, although there is still potential for optimisation with regard to infrastructure. Historic reports give hints that since the beginning of the 20<sup>th</sup> century not all of the produced bread could be sold freshly but was sold “stale” at half price. Thus, our consumption attitudes (“fresh is beautiful”) appeared early during the industrial revolution. The example of the Clean Plate Club shows that a measure was able to change people’s attitudes, but who knows how much food was saved through that measure? Since 1950 the fear and danger of hunger has converted into fear and danger of obesity and anorexia in western countries which characterise another kind of bothered relation to food. Future will show how mankind will solve the discrepancy of overproduction and overpopulation with respect to humans and resources.

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