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**Household food wastage in UK**

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# Introduction

The wastage of food is an economic, social and environmental concern. Food waste any edible or inedible part of the food that is disposed off. The issue of increasing food wastage has received a lot of coverage from all forms of media and has been discussed by the government for a very long time now. A government funded program called ‘Waste and Resource Action Programme’ (WRAP) was created in the UK in the year 2000 to address the issue of food wastage. The wholesale and retail sector contributes to only about 5% of the total food wasted in the UK and the household food wastage accounts for the maximum amount of food wastage not just in the UK but all over the world (Quested & Johnson, 2009). A study done by the Institution of Mechanical Engineers in the year 2013 declared that near about 2 billion tonnes of the food produced all over the world in a year goes to the waste. In the UK alone, about 7 million tonnes of food waste was produced by the domestic household and bread, potatoes and apples are the most wasted foods in terms of quantity. Proportionally, salad is the most wasted food. The commercial and industrial businesses waste about 3 billion tonnes of food every year. A majority of this food that is thrown away is avoidable and could have been saved. Therefore the total annual food wastage in UK adds up to 10 billion tonnes with a value of over 17 billion pounds (Ventour, 2007).

The purpose of this research is to study the food wastage in an average UK household. In order to reduce the wastage of both avoidable and unavoidable food waste that is generated from domestic household, it is necessary for every individual in the society to get an in-depth understanding of all the contributing factors for food wastage and the behavior that shapes the food purchasing, preparation and wastage habits of the people. The contribution of this research article is to provide a holistic picture of the factors that cause food wastage in a domestic household in the United Kingdom and the environmental footprint of food waste. The endeavor is to make the study of food waste and its impact on the economy, society and environment even more precise and to make the debate over the food wastage more specific and defined (Meacham, et al., 2013). This report will help us to identify the potential action plan and also give us a direction for conducting future researches in the topics related to food wastage. The aim of this research is to also find out the biggest contributors of food wastage in a household and take measures to minimize the excessive wastage of food that is going on currently.

# Literature review

In reviewing the literature for carrying out this research, we searched the database of WRAP that is the directory of entire food wastage statistics for the United Kingdom. Furthermore, we have consulted the relevant research studies and articles related to food wastage in recent times. According to the WRAP report, we waste a third of the total food that we buy. This amounts to about 10 million tonnes of food per year. Of all the food that we throw away, about 60% food is avoidable. Avoidable food waste is the food that is thrown away that could have been avoided if it was managed in a better way, it is the food gone bad that was edible earlier. Unavoidable food waste is the inedible food waste like pips and peels, tea bags, meat carcasses etc. Unavoidable food waste contributes to only 19% of the total food waste and the rest is the possibly avoidable food like potato skins, bread crusts etc. Close to 4 thousand tonnes of potatoes are thrown away in a year and out of this, about 49% of potatoes are thrown away unused, untouched and whole. Bread is the second most wasted food that amounts to about 328,000 tonnes being thrown away every year (Gustavsson & Otterdijk, 2011). This is closely followed by apples and meat products. The study further discovered that about 46% of the food waste that was avoidable was dumped in unprocessed and raw state. Food waste costs the country a lot. In their study, WRAP found out that the total food waste costs the UK about 10.2 Pounds. That comes to about 420 pounds worth of avoidable food being wasted by every household. The food waste that costs us the most is meat and fish. An average UK household wastes 602 Pounds worth of meat and fish per year. Coming down to the food wasted per person, an average UK citizen produces 70kg of avoidable food waste in a year. The most common reasons for food being wasted were the leftovers in plate, expired food products, food that looked or smelled bad, was developing mold or was left over from cooking (Limited, 2007).

The reports suggest that over a third of the food that we produce is not getting eaten. Yet the food production and demand will increase by 70 percent of the current produce. We have social, economic and environmental price to pay for the food that is wasted as the food that is thrown away can be used to feed the ever increasing population of the world. The alarming figures of food being wasted have caught attention of the people all over the world and this has become a reason of concern for all. A huge amount of food that is produced is wasted by the consumers and along the distribution chain of food materials (FAO, 2012). There are a large number of resources and a huge amount of energy that goes into production of food. The world today has limited resources for the enormous population that it houses and the wastage or throwing away of this food is wastage of these resources. It leads to environmental imbalance and impacts the economy of the nation as well. The food wasted by end users and institutions is even larger in quantity when compared to the food wasted in the supply chain. Therefore that is an even bigger concern to be addressed (Fear, et al., 2009).

In the United Kingdom, the food and beverage industry is a booming sector. It is the largest manufacturing sector in the country and the 4th largest sector in the world. It is contributing about 90 Billion Pounds to the national economy on a yearly basis, which is 7% of the total national economy. This sector is also employing 14% of the total workforce of the United Kingdom. The high quality food standards of supermarkets and export markets in the UK leads to a huge percentage of locally produced food not entering the supply chain. This is another major cause of food waste. The other causes for escalated quantities of food waste are the weather related causes, pests and diseases, and the demands of consumers for only high quality products. Once the food has entered the food supply chain, there are further reasons for food wastage. There is significant food loss during processing and manufacturing of food materials, transportation of food from the farms to processing houses, manufacturing plants or other distribution channels also damages some of the produce that is rendered waste (Gunders, 2012). Once the food reaches the consumers, there is significant wastage of food within households and the hospitality sector. UK households alone are responsible for the creation of over 7 Million tonnes of food waste annually and if we add the food waste produced by the hospitality sector, the actual food consumed remains only a third of what was intended and purchased. All these studies suggest that although the food industry in the UK is highly profitable and competitive, it is necessary to implement sustainability into the system in order to minimize the wastage of food and to consequently lower our carbon footprint (European Commission, 2014).

# Methodology

A total of 58 households from all over the world participated in this study. The data collection process lasted for about three months’ time during which the households were asked to choose 4 weeks of normal routine (without any special occasion) for measuring the food waste produced by them. A total of 65 household were initially chosen, but 7 of them could not complete the study and therefore we could collect the data for only 58 families. For the research to be methodologically correct and meaningful, only the responses of the families that have submitted the completed questionnaire were included and the incomplete ones were left out. The total participating households were the families having members ranging from age group 12 – 64 years. 45% of these households had children below 18 years and only 2 participating households were single residents. The average of the number of family members in the 58 households who participated in the study comes out to be 2.8. We conducted this study via by guiding and instructing the families online and getting the information from them via email (Morgan & Robertson, 2011). We had given every household, a journal to be maintained for the weeks in which they were taking note of the food waste. This journal was divided into the following parts – instructions for the study, a questionnaire about the family and their food habits and the quantity of food waste monitoring. The amount of food wasted was categorized and summarized. The reasons for food wastage were also deduced and noted down. We also analyzed the unavoidable, unavoidable and possibly avoidable food waste produced from each household. This research focused on the household behavior that comprises of shopping tendencies, eating practices and food preparation habits of the respondents. We also studied the impact of these behaviors on the generation of food waste from the households (Tielens & Candel, 2014). We also discussed with the families, the reasons for waste production, and motivation for food wastage. We discussed with them and educated them about the techniques and practices for prevention of food wastage. It is necessary to state at this point that the reduction of food waste produced, can only be done for the avoidable and possibly avoidable food waste. The amount of unavoidable food waste like vegetable peels, egg shells, meat carcasses etc will continue to remain the same. This survey conducted in no way represents the entire world population. It was a random and convenient sample selected to get an insight on the household food waste produced. The research has its limitation of the academic environment, and the results obtained from this shall not be used to generalize the household behavior. Due to limited time for the research, we were working on constrained resources of both time and reach. Another reason for this is that the survey was sent over the internet and the results were also collected via the same medium (Baxter, 2016).

# Data illustration

The data collected for the research was analyzed with regard to the study of household waste produced from food. The major deductions of the study carried out are represented below in the form of bar charts. The first chart shows the average number of family members in the households for which the study was done. The responding households were mostly having 2 or 3 members. We studied only 2 single households and one household having four members.

 The next figure shows the total food waste produces by the families in a week. According to the analysis, the average food waste generated by the participating households is 2.4 kg.

With respect to the products that are wasted the most, vegetables, bread and fruits were the most wasted foods followed by the dairy products like milk, yogurt, cheese etc. The table below represents the percentage of the food products found in household food waste.

The most common reason for wasting an avoidable food product was found to be food going bad. The other common reasons were children leaving food unfinished, food going out of date, getting mold, smelling or tasting bad and cooking more than required. The table below summarizes the most common reasons for wastage of avoidable foods.

Some other references drawn from this study are that people tend to waste food purchased from the supermarkets more than that bought from the local markets and this wastage goes down even further if they are growing their own produce. This can also be linked to the income group that they belong to as higher income groups and those residing in cities tend to buy ore from the supermarkets and also have a tendency of wasting food more than those belonging to lower income groups. Another interesting analysis is that the maximum leftover food is from the plates of children not willing to finish the food and the people belonging to the age group of 65+ years tend to waste food less as compared to those below 65 years. The report also suggests that the people who go shopping following a shopping list tend to waste less food than those not making a list while going out grocery shopping. The most widespread belief that was found common to all the households was that people have a tendency of underestimating their food waste produced. All the participating households were alarmed at the amount of food they waste when they started tracking it for the study.

# Discussion

The domestic households waste food while preparing, serving and eating. The food products are also discarded straight from the storage. The total food wasted by an average household participating in the study was about 2.4kg in a week. Of the total food wasted, one-third came from the meals and their preparation and two-thirds were from the stored goods. About half kilogram of fruits and vegetables were wasted by each household in a week. The average amount of prepared food that was thrown away by a household was about 700 grams. All the households stated that the biggest reason for throwing away prepared food was that the food was gone bad. About 19% of the food was wasted because the food prepared was greater in quantity as compared to the requirement of the household. The reasons that followed these were children not finishing the food and the food had gone beyond the date suitable for consumption. The largest drivers for food waste were large packaging or poor quality of food products bought and wrongly or badly cooked food (Otterdijk & Bucatariu, 2014).

The environmental commitment and awareness makes a difference and the households that are more aware about their food habits and waste generation behavior tend to waste less food as opposed to those who are less aware. This study was performed for educational purpose only and thus the results may vary from the actual figures. The people generally feel bad about wasting food. Therefore, when the food wastage is being monitored, they might have behaved differently than how they generally do. Some of the participating households confessed to cleaning their refrigerator prior to the research. Some of the households that were requested to participate, refused to do so as they were wasting too much food (Eckstrom, 2012). Some amount of human error might have also crept in the entire research process that is unavoidable. The households must concentrate on reducing the amount of household food that is wasted. Most of the wasted and thrown away food ends up in landfills wherein it is broken down by natural elements to produce methane that leads to global warming. The climate change and melting of snow caps is the result of the global warming phenomenon. So the households that contribute to about 70% of the food waste in the United Kingdom must be made aware of the impact that their actions are having on not just the society and the economy, but also the environment. The benefits of reduction in food waste are immense. Less food wasted means savings in terms of money, energy and natural resources. It reduces methane emissions and we also allow the wasted food to be available for the rest of the world population (Larsson, 2014). We can easily prevent a lot of domestic food waste from getting produced. Some of the ways to reduce household food waste are – Shop by the list, do not buy more than what you need, plan the meals in advance and buy only the things needed for those meals, cook the meals in required quantities only as excess food is mostly not consumed and goes waste, find out how to properly store fruits and vegetables so that they retain their freshness for a longer time, freeze surplus fruits or vegetables for future use, store cooked food properly in the refrigerator to avoid wastage, some food items like breads can be used a few days beyond their best before date, buy fresh food items so that they last long, make an maintain a kitchen garden to save money and wastage, find out recipes to use leftovers, when eating out order in small portions and only what you can finish, take home the leftovers, compost the food waste rather than throwing it in the bin. Untouched food can also be donated in the food banks.

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