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Food for Thought

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**Food Waste as a Threat and a Hope for the Planet**

Around the world, nearly 800 million people suffer from hunger. These 800 million could be fed more than twice over with the amount of food we squander annually (Royte, 2017). One-third of the food globally produced goes to waste, according to the Food and Agriculture Organization (FAO) of the United States. This is enough sustenance for three billion people, worth around one trillion US dollars (“Food Waste”, 2016). One in four calories intended for consumption is never actually eaten, which wastes not only the food but the energy, water, land, and labor resources needed to produce food on an industrial level (“Food Waste”, 2016). Water scarcity, which is a problem that increasingly plagues society as the earth warms and aquifers are depleted, could even be alleviated with a reduction in food waste. The water used to irrigate all the food that is never actually eaten could meet the freshwater needs of nearly nine billion people (Daugherty, 2014). In developing countries, food loss at the production and transportation level is a pressing problem. Aid organizations are attempting to address this worryingly prevalent issue by providing farmers with materials to help them more efficiently store and preserve produce. In Afghanistan, small-scale farmers were able to shrink their tomato losses from 50% to 5% of the total grown because of the storage bins, grain sacks, and low-tech cooling and packing equipment they were provided with, all of which significantly reduced food lost due to improper storage (Royte, 2015). Developed countries are primarily to blame for food waste, which is a problem that must be addressed on a more individual level. Food waste occurs at the consumer level due to unreasonable aesthetic standards, societal influences regarding the acceptability of food waste, and food planning behaviors. The increasing quantity of food waste is having a devastating effect on the environment, but we are not out of hope; there are many individual actions that can be undertaken to combat food waste, including consuming leftovers and changing shopping and food preparation practices.

When we throw out food that we don’t want to eat, whether because we don’t like it or we simply have too much, it’s not only the food that we’re throwing away. Also being wasted is the huge quantity of water, land, fuel, and labor that are needed to provide that food. To put this wastage in perspective, “the production of uneaten food in the U.S. gobbles 70 times the amount of oil lost in the *Deepwater Horizon* disaster” (Royte, 2015). The water wasted globally is equivalent to the Volga’s annual flow, the longest river in Europe (Royte, 2015). Not all the destructive effects of food waste are quantified as easily as the oil and water lost. Besides the fact that close to a third of food intended for human consumption is wasted, more than twice what is necessary to feed the estimated 800 million people worldwide who suffer from hunger, agricultural production and the resulting food waste is one of the largest contributors to global greenhouse gas emissions (Porter et al., 2016; Royte, 2015). Food that is buried in landfills rather than composted decomposes anaerobically, which produces methane, a greenhouse gas considerably more potent than carbon dioxide. In fact, if it was a country, global food waste alone would be the third largest generator of greenhouse gases in the world, surpassed only by China and the U.S. (Royte, 2015). Over a fifty-year period from 1961 to 2011, annual global food loss and waste grew 203%, approximately 2.2% annually (Porter et al., 2016). In 2011, the global per capita average for food waste and loss related emissions was 324 kg CO2e. When this is multiplied by the median expected population in 2050 and 2100, emissions from food waste and loss show a 32% increase by 2050, and a 53% increase by 2100 (Porter et al., 2016). Since different regions of the world contribute to global food waste and loss at very different rates, this estimate contains a lot of wiggle room. However, the fact remains that as a global trend, more food is being wasted as the population increases and developing economies adopt dietary habits typical of developed economies. To remediate the effect this pattern has on global greenhouse gas emissions, strategies must be enacted to reduce food wastage wherever possible.

Food wastage can be addressed in developed nations, where the problem lies more in food waste, which occurs at the consumer level, rather than food loss. Unreasonable aesthetic standards are one of the biggest drivers of food waste. Aschemann-Witzel et al. (2015) reported that consumers use a food’s appearance as “an extrinsic cue” which they use to determine the food’s “intrinsic product quality”. But this problem does not occur only on the consumer level; producers also feel the strain from buyers’ ridiculous standards for the appearance of produce. Luis Garibaldi, who owns Fundo Maria Luisa, the largest grower of mandarin oranges in Peru, reveals that 30% of his crop is rejected by European and North American markets because it’s not “the right size, color or sweetness, or it might have blemishes, scars, scratches, sunburn, fungus, or spiders” (Royte, 2017). That’s an awful lot of minute details that could go wrong with a crop that is prone to the vagaries of nature. In Kenya, food waste advocate Tristram Stuart met a farmer who discards 40 tons of green beans, broccoli, runner beans, and sugar snap peas per week because they don’t meet European aesthetic standards. That’s enough food for 250,000 people (Royte, 2017)! The standards for produce are seemingly exacting, and yet when it comes down to it, the grades are very unclear. If a tomato is to be sold in a supermarket, it must fall under one of three possible grades. A Grade 1 tomato must be “mature; not overripe or soft; clean; well developed; fairly well formed; and, fairly smooth,” and “free from: decay; freezing injury; sunscald,” or damage of “any other cause” (“Tomato”, 2017). This seems fairly practical, but it leaves a large margin for interpretation. There are no set guidelines to determine what constitutes a “fairly smooth” tomato, nor how to tell whether or not one is “well developed” (“Tomato”, 2017). While the United States Department of Agriculture (USDA) provides visual aids, no two tomatoes look exactly the same, which leaves a lot of gray area to slog through. It seems that consumers have lost track of the connection between the land and the food it produces, which perhaps explains why people are so unwilling to accept minor blemishes that only serve to show the natural processes the food went through on its journey to our mouths (Aschemann-Witzel et al., 2015).

It is not just exacting aesthetic standards that drive food wastage; societal influences regarding the acceptability of food waste and food planning behaviors also play a major role in food wastage in developed nations. Aschemann-Witzel et al. (2015) determined through ethnographic studies in the U.K. that “socially-determined practices in food and eating” play a pivotal role in consumers’ food wastage practices. It was separately found that injunctive norms had a strong effect on food wastage (Stancu et al., 2016). Injunctive norms describe what is commonly interpreted as “approved or disapproved behavior in a culture,” which often dictate how people behave in the presence of others (Stancu et al., 2016). What this means in the context of food waste is that when consumers believe that food waste is frowned upon by their peers, and thus that they shouldn’t waste food, their resolve to not waste becomes much stronger (Stancu et al., 2016). Food planning behaviors also have a significant impact on food waste. These behaviors refer to what we buy when shopping, what ingredients we use to cook meals and how large we make them, as well as to what degree we consume leftovers. 20-25% of consumer waste results from packaging factors alone, such as too-large packaging and best-by dates having passed. Consumers are often unaware of packaging’s essential role in extending a food’s lifetime, and thus don’t pay attention to the packages they purchase. For example, a consumer would waste less if they purchased a package that offered the amount of food they really need, rather than one which may offer a better price, but would result in much uneaten food. Additionally, re-sealable packaging will significantly extend a product’s lifetime (Aschemann-Witzel et al., 2015). By looking at household diaries in the U.K., paired with compositional analysis of household food waste, Aschemann-Witzel et al. (2015) were able to determine the most frequently-mentioned reasons for throwing away food. Consumers primarily cited being unable to use the food in time, that an excessive amount had been served, and, of course, personal preferences (Aschemann-Witzel et al., 2015). A meal that one family member loves may be too spicy for another family member, or contain ingredients that they dislike. Stancu et al. (2016) reported that inadequate planning often results in consumers underestimating how much food they have, and thus buying too much. Food planning practices, including use of shopping lists, quantity of food purchased, and pre-planning of meals, are determined by social norms as much as the acceptability of food waste behavior is. The problem of food wastage is deeply entrenched in the minds and actions of society, and to address the root of the problem people must be convinced that food waste is a problem with drastic consequences.

Changes in consumer behavior regarding food waste have a large effect in reducing greenhouse gas emissions, perhaps the most pressing issue that results from food waste (Aschemann-Witzel et al., 2015). Increasing leftover consumption has the most important contribution to food waste, since leftovers that are thrown away are the largest contributor to the food waste stream in developed countries (Stancu et al., 2016). To address this problem and increase leftover consumption, discussions regarding food waste and sustainability should focus on eating the food rather than solely concentrating on its wastage Too often, we talk about the quantity of food wasted without discussing how we can go about consuming food to save it from the waste stream (Aschemann-Witzel et al., 2015). Changing shopping and food preparation practices is also essential to reducing food waste and resultant greenhouse gas emissions. The lack of planning that goes along with purchasing, preparing, storing, and reusing food has an especially large effect on the amount of food wasted by consumers (Ashemann-Witzel et al., 2015). Better planning routines, such as bringing a detailed shopping list to the store, are indicative of consumers buying fewer spontaneous purchases and too-large items that would likely result in wasted food (Stancu et al., 2016). The purchasing of too much food as well as people’s general lack of concern regarding food wastage are largely a result of America’s consumerist culture and low price of food (Aschemann-Witzel et al., 2015). People are encouraged to buy as much as they want, while simultaneously being told that they needn’t concern themselves with wasted food since buying more makes economic sense. However, in the long run, the food saved by buying only what is needed and thus wasting less will result in money saved for the individual.

Educating consumers about proper preparation routines, handling practices, and the meaning of date labelling can have a positive effect in reducing food waste (Ashemann-Witzel et al., 2015). Providing booklets that detail ways to prepare food in the most waste-effective way can target the individual consumer directly. Cooking courses that focus specifically on wasting less or education campaigns that focus on household economics can have the same effect in reducing waste. It has been shown that perceived improvement of skills that results from these education campaigns has had the effect of a reduction in food wastage (Stancu et al., 2016). Other approaches that require more personal responsibility include shopping checklists and templates that would include activities such as remembering to check current food inventories before going shopping to avoid over-purchasing. Additionally, measuring instruments could help consumers prepare proper portion sizes. Recipes that detail ways in which leftovers can be incorporated into the meal would also have a strong effect in reducing consumer food waste. Improving planning routines, such as knowing how much food one needs to purchase, can result indirectly in a reduction in food waste, while better shopping and preparation practices, including leftover reuse, have a direct effect of reducing food waste (Stancu et al., 2016). Both direct and indirect strategies to reduce food wastage through improved consumer education are essential if we aim to reduce wastage in a way that will significantly lessen greenhouse gas emissions.

Better consumer education can also reduce food waste by teaching consumers that ugly food doesn’t necessarily denote bad-tasting food, and that “use by,” “sell by,” and “best by” dates shouldn’t always be taken seriously. Food that is ‘ugly’ often holds a higher nutrient content than produce that is grown with copious pesticide use, as is the standard industrial fashion (Neimark, 2016). The pockmarks and blemishes typical of organically-grown produce are signs of stress, which results in large part from these crops’ receiving fewer pesticides (Baránski et al., 2014). Because of its own battle to survive, this misshapen produce is often unexpectedly high in nutrients, which are produced by plants as defense mechanisms when pests cause them stress (Baránski et al., 2014). Baránski et al. (2014) found that organic produce, grown with little or no pesticides, had a 20-40% higher antioxidant content than produce grown in the standard industrial fashion. While discolored or deformed food may initially result in upturned noses, with a little understanding of the food production process it becomes clear that we should in fact be seeking out ugly food, rather than avoiding it. Another opportunity for food waste reduction lies in the confusing mess that is the “sell by,” “use by,” and “best by” dates put on food. The U.S. Department of Agriculture itself states that “There are no uniform or universally accepted descriptions used on food labels for open dating in the United States” (“Food Product Dating”, 2016). The date-labeling phrases that are used have nothing to do with when a food will expire. But these labels are too often taken as expiration dates, which results in copious food wastage. A “Best If Used By/Before” label specifies how long a product will be of best quality or flavor. A “Sell-By” date communicates to the store for how long it should display the product for inventory management. A “Use-By” date suggests a date by which the product should be used for it to be of peak quality. None of these dates are safety indicators (“Food Product Dating”, 2016). The complete lack of clarity as to what each of these labels means often leads to unnecessary wastage of food that is still edible. The USDA even states that “Foods not exhibiting signs of spoilage should be wholesome and may be … consumed beyond the labeled ‘Best if Used By’ date” (“Food Product Dating”, 2016). If this knowledge of food labels is spread throughout the general public, a significant amount of food can be saved from the trash can.

Simply taking less food at mealtimes will also decrease the amount of food we put in the trash. This is especially relevant for college students, who often frequent buffet-style dining halls. In this all-you-can-eat system, students typically pile their trays high with food that they can’t possibly finish. And what they can’t eat goes straight into the trash. But simply foregoing a tray can have a major effect in food waste reduction. This is exemplified by dining halls that have instituted trayless systems. By removing trays from dining halls, many colleges in the U.S. have cut food waste by 25-30% by reducing the amount of food students take at mealtime (Royte, 2015). In a university-specific study, a reduction of 0.81 ounces per patron in solid plate waste was observed when switching from a tray system to a trayless system (Thiagarajah et al., 2013). The significance of these results is clearer to see when the data is expanded to the entire dining hall. About 25 pounds of solid waste would be saved among the 500 average diners per meal, which would result in an approximate 225-pound reduction in weekly food waste (Thiagarajah et al., 2013). While instituting trayless systems can greatly reduce food waste, individuals can have the same effect by simply choosing to go without trays at mealtime.

Food waste is a specific issue that holds the promise of many effective solutions. However, it is only a symptom of a diseased system, one that focuses less on reuse than maximum resource use, and promotes excessive consumption to the detriment of sustainability. Consumers have lost the connection between the land that gives life to the food they eat (Aschemann-Witzel et al., 2015). On a much broader scale than food waste, the causes of this loss of human-nature connection that point back to industrialization and the resulting culture of consumerism must be addressed if we mean to remedy the symptoms. Individual actions can lead us on the right path to addressing the causes of society-driven environmental degradation. Every one of us can do something, no matter how minor, to reduce food waste. At restaurants, take home leftovers, share side dishes, and if you’re trying to cut down on carbs, just ask the waiter to hold the bread and butter (Royte, 2017). The standard plate today is 36% larger than it was 50 years ago; it won’t hurt to cut portions at home. Always eat your leftovers! Leftovers have been shown to contribute the most to the consumer waste stream. Freeze or can food that you don’t plan on eating anytime soon. It’s very important to not waste meat, because it’s such an extremely water-intensive food. (Royte, 2017). Change starts with each and every individual. If enough people stress the importance of respecting and protecting the land through actions as simple as being more aware of food wastage, conservation-oriented food practices can become a new societal norm, and people worldwide will share in the values of food conservation and environmental awareness that will result from conscious individual actions to better the world we live in.

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