

Plastic Pollution: It's Personal

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Plastic is ubiquitous in modern life. Its low cost, high strength, and broad convenience have allowed it to develop as an unrivaled product in nearly all spheres of human life. Over the past 60 years, America's use of plastic has soared simultaneously with the rapid growth of consumerism, the fast food industry, and technological advancement. Despite its advantages, plastic has ravaging effects on the environment, leading ecosystems and their inhabitants towards devastation. The US is not alone in this turmoil, however, as the United Nations identified the use of plastic as one of the world's most urgent problems - a problem that calls for an immediate solution. The detrimental effects of plastic cannot be mitigated with a single solution, though. To successfully curb these effects, the production, disposal, and use of plastic must be addressed from all angles. This effort not only requires action on an administrative level, but also on an individual level, as everyone has the potential to make an impact when it comes to plastic.

Plastic Production

Plastic production in the US is a clear indicator that American culture and everyday life have been dominated by plastic. The prominence of plastic is mainly a result of its convenience - a characteristic that drives production in America. Over time, plastic has been developed to be extremely cheap, lightweight, and durable, allowing it to be useful in almost any situation and more attractive than other materials, such as metals (Rhodes).

Plastic hasn't always been prevalent, however. In 1960, the world produced 8 million tons of plastic. Today, global plastic production exceeds 350 million tons per year (Ritchie, Rosie). This production poses major challenges to the environment, as the needs of consumerism do not parallel the needs of Earth's ecosystems. Due to the immensity of production, more than 8 million tons of plastic enter the ocean each year, some of which travel

through rivers and streams even before reaching the ocean (Rhodes). Despite offering functional benefits and versatility, plastic takes hundreds of years to break down naturally due to its durability. Rather than fully decomposing, it splits into small pieces known as microplastics, which measure fewer than 5 millimeters in diameter (Rhodes). This fragmentary decomposition is problematic because organisms, especially in aquatic ecosystems, can consume microplastics, which climb up the food chain through bioaccumulation. Because plastic is produced with toxic additives, microplastics can also disrupt organisms' reproductive abilities and immune systems (Rhodes).

It is clear that plastic production must be reformed in order to minimize these environmental disruptions. The major types of plastic include polyethylene, used for packaging materials and water bottles, polypropylene, used for food containers and straws, and polycarbonate, used for car parts and cell phones. These plastics are produced for vastly different purposes, but have something in common: they are made from petroleum and contain chemical additives, which are toxic to the environment (Rhodes). As the US is in dire need of alternatives to traditional plastic, a potential solution is switching to biodegradable plastic, composed entirely of organic material, such as sugarcane or corn. While biodegradable plastic requires composting to be fully decomposed, it doesn't leave a toxic residue upon entering the environment, making it much safer than other plastics (Moss, Scheer). As many environmental issues are interconnected, biodegradable plastic can also minimize climate change and eutrophication through the use of carbon dioxide and algae in its production (Moss, Scheer).

Companies that produce massive amounts of plastic, like Coca Cola, which produces 3 million tons of plastic per year, could be incentivized to shift to biodegradable plastic through consumer initiative (Ivanova). Many consumers have already switched to purchasing more sustainable products, such as compostable coffee cups or metal straws, but increased

awareness among the public would further these efforts. If consumers were to demonstrate a widespread interest in sustainable products, companies would be forced to consider alternatives. This effect can be exemplified through the popular anti-plastic straw movement which urged large companies, like Starbucks, Disney, and American Airlines, to eliminate single-use plastic straws (Langone).

Plastic Disposal

In addition to its production, plastic waste disposal is a leading reason for which plastic has become an unsustainable product. Plastic can be disposed of in various ways, the most common of which include recycling, incinerating, and storing in landfills. While many people believe that all of their plastic waste is recycled, they are far from correct, as less than 10% of plastic waste in America is actually recycled. According to the EPA, only 8% of plastic waste is recycled, while the remaining 92% is incinerated, stored in a landfill, or lost in the environment (EPA). This distribution makes clear that putting plastic waste into a recycling bin is not synonymous with true recycling.

To understand the magnitude of plastic waste in the US, it is critical to note that 26.8 million tons of plastic ended up in landfills in 2017 (EPA). Disposing of plastic in landfills is extremely harmful because rainwater leaches through waste piles, obtaining chemicals from plastic and carrying toxic runoff water into surrounding land and bodies of water. This disposal method can also be viewed as a social issue, as landfills are commonly located near low-income housing, exposing these communities to high-risk conditions.

Moreover, the EPA reported that 5.6 million tons of plastic were incinerated in 2017 (EPA). Burning plastic can be just as consequential as storing it in landfills, as incineration plants use a great deal of energy and emit more than 6 million tons of carbon dioxide per year

(Royte). In addition to emitting carbon dioxide, incineration plants release toxic pollutants, such as heavy metals, which increase particulate matter in the atmosphere. Incineration presents some benefits, though, as the heat from burning plastic can be harnessed to generate electricity - a process similar to cogeneration from fossil fuel combustion. While incineration plants pose more benefits than landfills, they are unrealistic to implement on a large scale because they are expensive to operate and have damaging effects on the environment.

The low rate of plastic recycling is largely a result of widespread apathy, lack of public knowledge, poor recycling services, and flaws in plastic waste management. Mixed recycling from homes and businesses is repeatedly sent to landfills or incinerators because valuable plastic is concealed by trash and low-value plastics, such as fast food cups, clamshell packaging, and food containers, which are unwanted in the recycling market. Typically, only items like water bottles, milk jugs, and laundry detergent containers are salvaged to be recycled, but even these items can be misplaced within heterogeneous mixtures of waste and end up in landfills (Gammon, Glenza, McCormick, Simmonds).

In order to combat the lack of recycling in America, the recycling system must undergo reform. The low rate of recycling is, in part, a result of poor waste separation at recycling plants. Without advanced technology to separate mixed recyclables, recycling plants handle most of their plastic in the easiest and cheapest way possible: sending it to landfills. Investing in more advanced infrastructure would allow recycling plants to operate with efficient systems for separating and processing plastic waste, enabling more plastic to be recycled.

Plastic Use

Even more consequential than the production and disposal of plastic, the use of plastic is the primary reason for which plastic has become exceedingly problematic. Americans use

plastic on such a vast scale that it has dominated daily life. From to-go containers, to retail packages, to Ziploc bags, to food packaging, plastic is used in nearly every way possible. Because most of the plastic that consumers use is single-use, it goes to waste rapidly, contributing to the 35.4 million tons of plastic waste that is created annually (EPA). To put the magnitude of single-use plastic into perspective, 40 percent of all plastic is produced for packaging, which is used once, then discarded (Parker).

While many people justify their use of plastics with recycling, it is important that consumers consider reusing their plastic products before disposing of them. For instance, plastic utensils from restaurants can be reused for work lunches, and yogurt containers can be reused to store food. Although reusing plastic is more beneficial than disposing of it, the most significant way consumers can reduce their plastic footprint is by reducing their use of plastic altogether. In reference to the phrase, “reduce, reuse, recycle,” consumers should direct their actions towards the “reduce” component.

Minor lifestyle changes, such as shopping with reusable bags, drinking water with a reusable bottle, or packaging food with reusable containers, can transform one’s plastic footprint. According to the Center for Biological Diversity, the average American family brings home 1,500 plastic shopping bags each year, totalling 100 billion plastic bags used by Americans annually (CBD). Numerous grocery stores around the country have responded to this issue by applying a fee for plastic shopping bags. For example, various grocery stores in California have implemented a 10-cent charge for plastic bags, encouraging shoppers to bring their own bags. In the same sentiment, many coffee shops have incentivized the use of reusable coffee cups by offering a discount to customers who bring their own cups. This effort can be exemplified on a local level, as Joe Van Gogh Coffee in Durham, NC applies a 25-cent discount when customers bring reusable cups.

Local Action

In North Carolina, numerous counties have taken action to reduce the impact of plastic pollution. In my discussion with Tobin Freid, the Sustainability Manager of Durham County, she outlined the efforts that Durham County has employed to limit local plastic waste. In January 2020, a policy was adopted to ban the use of county funds for single-use bottled water, which has encouraged the use of reusable cups and water fountains (Freid). Further, she detailed that Durham County is in discussion of a fee for plastic bags at grocery stores, which is a campaign led by Don't Waste Durham, a prominent organization working to limit waste in the community (Freid). In addition to advocating for a plastic bag fee, Don't Waste Durham has established a zero-waste to-go food program in which community members can order from restaurants without creating any plastic waste. It is critical that individuals in communities all over the US seek out opportunities like these in order for the country to move towards sustainability.

Despite the efforts that NC has made, the most important step towards sustainability is community members changing their lifestyles. By simply paying attention to “when, where, and how you use plastics in your everyday life,” a major difference can be made, Freid argues. She illustrates that, with regard to reducing plastic, “People need to understand that refusing is the first step” (Freid). By refusing to use single-use plastics or asking local restaurants to switch to biodegradable products, members of any community can help limit their area's plastic footprint.

My distinct passion for limiting plastic waste can be traced back to 2009 when I visited the Durham County recycling plant. This experience has had a monumental impact on my perspective and has informed the way I use plastic for more than a decade. The massive piles of waste were appalling to observe which leads me to believe that an effective way to limit the

use of plastic is to show people the physical enormity of the waste they create. If Americans saw through the media what their 35.4 million tons of plastic waste, 100 billion plastic bags, and 8 million tons of plastic in the ocean really looked like, they would be compelled to rethink their actions with consideration of the natural world. A common misconception is that one person can't make a difference, but when it comes to plastic, one person truly can.



2009 Visit to Durham County Recycling Center - Sarah Williams

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