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## Behavioral Adaptation Project Report

One of the many negative consequences of globalization is that most of the consumer products we depend on are not products of our local economy. With the proliferation of multinational trade agreements, the streamlining of supply chains, and the availability of a seemingly endless supply of cheap energy, it has become possible to produce vast quantities of household items and to distribute them to virtually any desired locale. It is now customary in most of the industrialized world to find the identical products for sale in every store, regardless of location. One detrimental effect of the homogenization of marketplaces across vast distances is the corresponding homogenization of our consumer spending habits and values. In order to entice us to open our wallets we must first be convinced that the items themselves are a valuable addition to our daily lives, and thus a massive industry has developed to persuade us to invest in an assortment of products in order to maintain our personal hygiene and clean our homes. Many of these products contain a multitude of chemical compounds which are environmentally taxing to produce, dispose of, and are potentially hazardous to humans as well. Rampant advertising and marketing have not only successfully cast this proliferation as a sign of societal progress but have also fostered the popular assumption that communities of the past were not equipped with the knowledge to stay healthy and clean in their absence. Breaking away from the consumerism-driven paradigms of personal health and cleanliness requires a willingness to seek out and embrace lifestyle changes which do not fall within societal norms, and it is only with this mindset that we can free ourselves of our dependence on unsustainable, globalized commodities.

Attaining a level of relative freedom from the dominant consumerist lifestyle model is a goal towards which I have been working for some time now. Following my undergraduate experience, I spent nearly a decade in the landscaping industry, where I participated in and supervised a multitude of unsustainable practices. Several years ago, inspired by the low impact, rewarding lifestyles of local vegetable farmers I had become acquainted with, I decided to pursue agriculture as a career. I enrolled in a farming program through the University of Vermont, moved to northern New England, and dedicated myself to becoming a professional organic vegetable farmer. Ultimately growing vegetables was just one aspect of my reeducation, as I also actively changed many other aspects of my life to fit a less carbon intensive lifestyle. From commuting and shopping without the use of a car, discovering various composting methods, and learning how to clean my house without industrial chemicals, I feel like I have had some unequivocal successes.

While my life is not totally devoid of plastic and paper, the number of single-use items in my home has been drastically reduced in the last few years. This has provided me with confidence in my personal resiliency and an increased sense of security, as I found myself less dependent on store-bought products than in the past. Moving back to the suburbs of a major east coast city in the fall of 2019 afforded me easy access to a plethora of supermarkets and other services, and despite the COVID 19 lockdowns in the early spring I did not find it difficult to obtain any

product I desired. However, when I visited my local grocery store to “stock up” on supplies I realized that I was still entirely dependent on one specific product: toilet paper.

I was shocked to find that the area designated for disposable paper products, which normally occupies both sides of a grocery aisle, was completely empty. Panicking shoppers had purchased every roll of toilet paper in the store, followed by the paper towels, napkins, and tissue paper. It was illuminating to witness the scale of our societal addiction to single use products, exacerbated by a single existential crisis. This dependence, cultivated carefully for over the last hundred years by paper product manufacturers, is key to sustaining a lucrative industry which realizes massive profits through the exploitation of ecosystem services, while abrogating all moral and financial responsibility for the environmental degradation that results from their practices. Through subsequent searches in the following weeks at other stores I eventually succeeded in purchasing what I needed, yet it left me with an unexpected, uneasy feeling of vulnerability. That experience, of feeling helpless in a crisis, is not something I wish to repeat.

In the months that followed the first pandemic wave I began to research alternatives to conventional bleached toilet paper and was surprised to find that many other people shared my interest in alternative systems. By far the most compelling option, both in terms of affordability and feasibility, was to purchase a bidet for my home toilet. The apparatus is installed underneath the toilet seat and sprays clean water from the feed for the tank. No electricity is necessary as it draws water directly from the pressurized pipes in the bathroom and the velocity of the stream is controlled by a dial that extends from the side of the toilet. Bidets and similar systems have been popular in other cultures for many years, yet Americans have stubbornly refused to embrace them even as other improvements to personal hygiene have gained cultural acceptance. The reasons for this can be attributed to outdated, misleading claims that they harbor and spread disease as well as their gendered portrayal in popular culture. Touched by the corrosive tentacle of toxic masculinity, bidets, which provide universally recognized hygienic benefits over dry wipes, have been relegated to the fringes of bathroom culture in America. As I digested this information, I became convinced that widespread adoption of bidets could have a positive long-term effect on the environment on a macro scale. Additionally, they could improve the health of millions of people through their increased sanitary benefits. However, making changes can be difficult, and my ingrained predisposition towards the conventional system made it easy to lose interest in making the change. In the following months I packed my things and moved to Michigan to begin school and the bidet project slipped from my thoughts. I certainly was not expecting that I would be implementing that system in my Ann Arbor apartment, but when I was presented with this behavioral adaptation project I knew that it was the change I wanted to experiment with.

Firstly, I acquired a bidet for \$40 on Amazon.com and easily installed it on my toilet. To complete this experimental system, I also purchased several packages of reusable cloth wipes from Etsy.com. These were fabric squares, approximately eight inches across, that were sewn around the edges. While it would have been fantastic to save money and convert my old t-shirts and rags for this purpose, I did not have access to a sewing machine nor did I have sufficient materials in my apartment for such use. I put a cloth liner inside a wicker basket with a lid to collect the soiled wipes, so that everything could be transferred to a washing machine easily

without physical contact. My goal was to eliminate toilet paper from my life for one month, and possibly forever.

The use of paper tissue products in the bathroom originated in the United States in the late nineteenth century and evolved several times to reach our current standard. Prior to the advent of disposable rolls of toilet paper, it was common to use whatever materials were available including moss, snow, and corncobs. Some of the first common paper wiping materials included the Sears, Roebuck catalog and outdated editions of the *Old Farmer's Almanac*, which were printed with a hole so they could easily be hung in outhouses. While toilet paper was invented in 1857 it was not widely adopted for decades, primarily because of the taboo surrounding the subject. During the early twentieth century a series of clever marketing ploys, which focused on femininity and hygiene, catalyzed its widespread adoption across the country. Presently the paper tissue industry in America, which comprises only four percent of the world's population, generates \$31 billion in yearly revenue and accounts for roughly twenty percent of global consumption. Unsurprisingly, the industrialized processes that the industry giants coalesced around have exacerbated existing climate challenges and created new existential threats to our natural systems.

Toilet paper, tissue paper, and paper towels have an enormous environmental footprint. The numbers are staggering: 27,000 trees are harvested each day to satisfy world demand for toilet paper, which equals 10 percent of global tree consumption. It is possible for companies to produce pulp from recycled sources or alternative fibers, however consumer demand for soft, plush, disposable tissue products has driven the industry to rely almost exclusively on freshly extracted biomass. In fact, toilet paper made from 100 percent recycled fibers currently makes up only 2 percent of annual sales in the United States. Altering the manufacturing processes to increase sustainability-minded single use tissue production would dramatically reduce the environmental impact of the industry, as the process by which virgin timber is converted to toilet paper is complex and energy intensive. After the wood is stripped of bark and chipped into small pieces it is combined with a chemical mixture and “digested” in an apparatus similar to a pressure cooker for several hours to eliminate excess moisture and create pulp. From there it undergoes a multi-step cleaning process that removes the lignin and cellulose, which allow for a soft finished product. While colored toilet paper was common in America until the 1970's it is almost universally bleached today, which improves the shelf life of the product and helps to further soften it. The impacts of the use of bleach on such a scale are not trivial, as even more recent “eco-friendly” processes result in the release of elemental chlorine as a by-product into the air and water surrounding the manufacturing facilities.

The sources of virgin timber for toilet paper production are also disconcerting. Disposable tissue paper products are often produced by blending of softwood and hardwood pulp, but the softwood species of pine, spruce, and fir are more desirable due to their longer fibers. In North America some softwood pulp is harvested from pine forests in the southeastern United States, but the majority is sourced from boreal forests in Canada. These northern forests, which are part of the boreal forest biome that stretches across the globe, are massive carbon sinks. Accumulating more carbon per hectare than any other forest on earth, they are an integral component of our climate change mitigation strategy, and the Canadian forest alone accounts for 12 percent of the world's carbon stores. The clearcutting practices that are widely employed by the logging

industry have resulted in the loss of over 28 million acres of boreal forest since 1996, which in turn has caused the release of 26 million metric tons of carbon dioxide into the atmosphere each year during that time. Many of these forests are also irreparably harmed by logging roads and other scars on the landscape that do not heal, and are planted back as monocultures that cannot support the food web necessary to sustain the diversity of life that existed there prior to the intensive logging. Much of this land will not return to its previous state for over a hundred years, if ever, and that will inevitably have catastrophic consequences for the continuing migrations of caribou and other wildlife as well as the 600 tribes of Indigenous Peoples who rely on the ecosystem services provided by the forest for their existence. Similarly, the effects of the assault on old growth and late-successional forests for wood pulp can be seen in the Pacific Northwest, where clearcutting is commonplace, and monocultures of Douglas-fir are planted as a replacement. In the southeastern United States, a region once covered by near-continuous forests with high levels of biodiversity, logging is ongoing at four times the rate of the rainforests of South America, and over half of the remaining forests in the region are under 40 years old. An examination of European consumption of disposable tissue products reveals a similar story, as large swaths of Sweden's Great Northern Forest are now at risk because of the growing international demand for virgin wood. This worldwide problem is projected to worsen, as currently only 30 percent of the world's population uses tissue paper products, and tissue is the fastest growing sector of the paper industry globally.

Through the examination of the broad environmental consequences of single use tissue production and the benefits of using a bidet system, it has become abundantly clear to me that society is overdue for a fundamental shift in bathroom hygiene. Converting from single-use tissue to a combination of washing and reusable cloth wipes was surprisingly easy and completely eliminated a waste stream from my life. The only resource that I now use is water, and that is greatly reduced as well. Bidets typically use half a liter of water per wash, which is trivial compared to the resources consumed throughout the manufacturing process of disposable tissue paper products. For instance, it has been estimated that between 37 and 76 gallons of water and 1.5 pounds of wood pulp are necessary to produce a single roll of toilet paper. Beyond the numbers and on a personal note, the bidet system has noticeably improved my hygiene on a day-to-day basis. The water stream is surprisingly accurate and cleansing, and the cloth wipe system is simple and sanitary. The most difficult aspect of this experiment was the mental preparation, as I was nervous that it would be unsettling or unpleasant. However, within a few days I adjusted and had no issues whatsoever. My experience was overwhelmingly positive, and I plan on proselytizing to my friends and family about the benefits of converting to a bidet washing system in the future. It should also be noted that I do not plan on removing the toilet paper from the bathroom all together, as I recognize that not everyone is ready to make the switch and I do not intend to make anyone uncomfortable.

It is clear that many of our contemporary, consumerist notions regarding health and cleanliness will not be feasible in the downshift, yet while it is now socially acceptable to use reusable rags in the kitchen it is taboo to alter our toilet paper habits in the bathroom. I hope that my experience with this behavioral adaptation experiment will not only to educate my classmates of an environmentally responsible change they can make in their lives but also to show that challenging zero waste transitions can be accomplished one step at a time with patience and practice.

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