The Problem with Plastic: Working Toward a Solution in Bermuda

"Plastic—a material invented to last forever—can no longer be used to make products intended to be thrown away. ***There is no away****."*[1]

Executive Summary

The excessive production and consumption of plastic has serious consequences on the environment and human health. Since plastic isn't biodegradable, it ends up either in landfills or as litter on the landscape, in waterways and in the ocean. Plastic can take hundreds of years to decompose and releases toxins into the soil and water in the process. Yet, its versatility, durability, strength and low cost have made it an indispensable companion for consumers. Every year, about 8 million metric tons of it ends up in the ocean, where it can harm fish and wildlife, and, once it enters the food chain, threaten human health. The plastic ban movement around the world comes in the wake of new findings regarding the extent and harm of plastic in our environment. The reduction of plastic has therefore become a major global challenge. The number of public policies on single-use plastics has more than tripled since 2010, with many more expanding to include other disposable plastic products. Policies on single-use plastics are now found on all continents, ranging from the municipal to the intergovernmental levels and mainly come in the form of either bans or levies, with the former being predominant.[2] This proposal briefly outlines the negative social, economic and environmental impacts of plastic pollution and delves into the ways in which the Government of Bermuda can approach this pressing issue. All Bermudian stakeholders (citizens, government, industry and NGOs) must come together to create innovative plastic management practices. Through in-depth analysis of the academic research available, this report concludes that pairing a ban with the lowering of import duties on alternative products will be the most effective method of plastic reduction.

Accessing the Problem

[1] Ellsmoor, "Banning Plastic," Forbes.
[2] Tobias Dan Nielsen, Karl Holmberg, and Johannes Stripple, "Need a bag? A review of public policies on plastic carrier bags – Where, how and to what effect?," *Waste Management* 87 (March 15, 2019): 428.

The 'holistic' impact of plastic pollution not only includes the devastating effect plastics have on our ecological and marine systems but generates direct and indirect impacts on society. Bermuda's economy, culture, beauty and lifestyle depend on our surrounding seas. Marine plastic waste results in clear costs to the economy and human health, particularly relating to the provision of sustainable and safe fisheries, aquaculture, recreation, and heritage values. Marine ecosystems around the world provide a wealth of ecosystem services (the benefits people obtain from nature), including food provision for billions of people, waste detoxification, carbon storage and cultural benefits including recreational opportunities and spiritual enhancement. Any threat to the continued supply of these ecosystem services has the potential to significantly impact the wellbeing of humans across the globe, owing to the loss of food security, livelihoods, income and good health.[3] On a global scale, it has been estimated that for 2011 marine ecosystem services provided benefits to society approximating $49.7 trillion per year. Yet, this value is declining due to the presence of marine plastic. A 1–5% decline in marine ecosystem service delivery equates to an annual loss of $500–$2,500 billion in the value of benefits derived from marine ecosystem services.[4] If this number seems inconceivable, quantifying the cumulative amount al all the plastic ever made produces another number quite difficult to fathom. More than 8.3 billion metric tons of plastic has been created since the start of mass production, which began just six decades ago, and 6.3 billion metric tons has become plastic waste.[5] This means global waste has almost doubled since the year 2000.[6] This waste exists somewhere on the planet today, and most of it is from disposable products.[7] Companies produce an estimated 5 trillion plastic bags a year, yet this is one of many kinds of single-use plastic products. Each one can take more than 1,000 years to decompose, and few are recycled.[8] Furthermore, an estimated 4.8–12.7 million metric tons of plastic entered the world's oceans from land-based sources in 2010 alone,

[3] Nicola J. Beaumont et al., "Global ecological, social and economic impacts of marine plastic," *Marine Pollution Bulletin* 142 (May 2019): 189.
[4] Ibid, 194.
[5] Laura Parker, "A Whopping 91% of Plastic Isn't Recycled," National Geographic, last modified December 20, 2018, accessed July 2019, https://news.nationalgeographic.com/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/.
[6] Hannah Ritchie and Max Roser, "Plastic Pollution," Our World in Data, last modified September 2018, accessed July 2019, https://ourworldindata.org/plastic-pollution.
[7] Parker, "A Whopping," National Geographic.
[8] Carole Excell, "127 Countries Now Regulate Plastic Bags. Why Aren't We Seeing Less Pollution?," World Resources Institute, last modified March 11, 2019, accessed July 2019, https://www.wri.org/blog/2019/03/127-countries-now-regulate-plastic-bags-why-arent-we-seeing-less-pollution.

and the flux of plastics to the oceans is predicted to increase by an order of magnitude by 2025.[9] In quantifying the enormous tangible and intangible costs associated with marine plastic waste, we hope to help make the case for devoting our attention and resources now to protecting the seas and environment for future generations to enjoy, and to promote better human health.

Bermuda's pristine beaches, marine ecosystems and overall way of life are under attack from a floating mass of plastic trash that accumulates in the Sargasso Sea.[10] In a 2013 study, the 70 Degrees West project looked at the adverse effects of plastic existing in the North Atlantic Gyre, within which Bermuda is centrally located. This gyre continually collects trash during its rotation, therefore increasing concentrations of trash within its movements. The researchers found "tremendous" amounts of marine debris washed up along Bermuda's shoreline, as well as a worrying level of micro-plastics. A more comprehensive study completed in 2010 presented an analysis of ship-survey data collected over twenty-two years in the western North Atlantic Ocean and Caribbean Sea. The study's conclusions define the Northern Atlantic's "high plastic region" as, "near Bermuda."[11] "This 'garbage patch' is not a dense collection of trash like you might find in garbage cans, in landfills, or as litter on beaches. Rather, most of what floats in the open ocean consists of irregular bits of plastic smaller than a fingernail, and whose origin is largely unknowable.[12] They can remain buoyant for decades or longer and travel distances of more than 3,000 km from origin, while creating "colonies" that increase the biogeographical range of bacteria and algae, thereby risking the spread of invasive species and disease.[13]

Ocean plastics are not only a hazard to the health of marine life but also to the health of humans, as they permeate the food chain and the water we drink. Plastic can enter the food chain in many ways; for example, plastic is broken down to microscopic levels in the ocean and ingested by the marine animals we eat. Microscopic pieces of broken-down plastic, which are

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[9] Jenna R. Jambeck et al., "Plastic waste inputs from land into the ocean," *Science* 347, no. 6223 (February 13, 2015): 768.
[10] Simon Jones, "Beware the Plastic Invasion," Bermuda Sun, last modified May 10, 2013, accessed July 2019, http://www.bermudasun.bm/Content/NEWS/News/Article/Beware-the-plastic-invasion/24/270/66320.
[11] Kara Lavender Law et al., "Plastic Accumulation in the North Atlantic Subtropical Gyre," *Science* 239 (September 3, 2010): 1187.
[12] Kara Lavender Law, "What Does the Garbage Patch Really Look Like?," Ocean Health Index, last modified April 15, 2013, accessed July 2019, http://www.oceanhealthindex.org/news/StoriesWhat_Does_the_Garbage_Patch.
[13] Kate Hodal, "Marine plastic pollution costs the world up to $2.5tn a year, researchers find," The Guardian, last modified April 4, 2019, accessed July 2019, https://www.theguardian.com/global-development/2019/apr/04/marine-plastic-pollution-costs-the-world-up-to-25bn-a-year-researchers-find.

less than 5 millimeters in length, are known as micro-plastics.[14] Research on microplastics and human health is an emerging field. The evidence that humans are increasingly exposed to microplastics is mounting. Recent reports suggest that microplastics are entering the human body through the water we drink, food we eat, and air we breathe.[15] Evidence of toxicity has raised concern about the chemistry of plastic polymers and common additives in plastic products. In the marine environment, plastic pollution increases its toxicity over time through the absorption of persistent organic pollutants (POPs), an extremely toxic group of industrial chemicals, pesticides and wastes.[16] This class of highly hazardous chemical pollutants are recognized as a serious, global threat to human health and ecosystems.[17] These pollutants are resilient and able to travel through air and water and are difficult to break down, though they are soluble in fats and oils such as the tissue in living organisms. Therefore, they are able to enter the marine food supply and become more and more concentrated as they move up the food chain.[18] There is robust medical evidence linking human illnesses and disabilities such as cancers, tumors and disorders to one or more POP. Moreover, evidence of chemical migration from packaging into food and beverages confirms that plastic and food packaging are sources of human exposure to numerous toxic chemicals.[19]

The most comprehensive study on microplastics and humans was just released this year by the American Chemical Society, finding that people ingest about 70,000 plastic particles a year.[20] Additionally, individuals who meet their recommended water intake through only bottled sources may be ingesting an additional 90000 microplastics annually, compared to 4000 microplastics for those who consume only tap water. These estimates are subject to large amounts of variation; however, given methodological and data limitations, these values are "likely underestimates."[21] The human effects of that consumption are still unclear, though the evidence is sufficient to cause alarm. It must be understood that although environmentalism has existed for years, the urgency for action and the consequences of inaction are simultaneously

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[14] David Azoulay et al., *Plastic and Health: The Hidden Costs of a Plastic Planet*, ed. Amanda Kistler (Washington, DC: CIEL, 2019), 34.
[15] Ibid, 37.
[16] 5 Gyres et al., *Better Alternatives Now: B.A.N. Report 2.0* (Los Angeles, CA: 5 Gyres, 2017), 4.
[17] Azoulay et al., *Plastic and Health*, 31.
[18] Ibid, 31.
[19] Ibid, 35.
[20] Kieran D. Cox et al., "Human Consumption of Microplastics," *Environmental Science and Technology* 53, no. 12 (June 5, 2019): 7068.
[21] Cox et al., "Human Consumption," 7068.

building at exponential rates. Plastic waste leaks into the oceans at an average rate of 8 million tons a year, and if not halted, plastic production is forecast to double by 2040, and may account for 20 percent of the world's oil production by 2050.[22]

Taking up Action

Though removing some marine plastic is possible, it is time intensive, expensive, and inefficient.[23] Thus, the better course of action is to limit consumption immediately. Single-use plastics are of particular concern, given their propensity to enter the environment. Instituting measures to phase out single-use plastic usage is a first step to addressing the 'throwaway culture' of the current unsustainable linear economy. The value of plastic bags and other products resides almost entirely in convenience to consumers and as a very low-cost means for manufacturers and distributers to increase consumer purchases. Apart from convenience, no segment of the business community, or general public has a considerable investment in heavy use of these single use items. The choice of these products as a starting point for engaging the community is appropriate because they touch every consumer, and many practical and affordable alternatives exist. The fight against single-use plastics and Styrofoam has been gathering steam over the past years, and the Caribbean has been one of the regions taking the lead in this area. Island nations throughout the Caribbean and beyond have implemented successful bans on single-use plastics, with many more progressing toward this goal. Nations that have enacted a ban targeting various forms of single-use plastics include Jamaica, Turks and Caicos, Dominica, Antigua and Barbuda, Grenada, Barbados, Saint Lucia, Guadeloupe, St. Vincent and the Grenadines, Aruba, Haiti and Puerto Rico. Moreover, all remaining islands in the Caribbean, excluding Cuba, are currently working on a ban.[24] With the first bans implemented at the beginning of the decade, the burgeoning movement resulted in multiple bans being made earlier this year. On a more global scale, the islands of Jersey have also been successful in pursuing the reduction of plastic as well as the Marshall Islands, Palau and Vanuatu. By early 2018, regulations on plastic and Styrofoam

[22] Laura Parker, "Plastic bag bans are spreading. But are they truly effective?," National Geographic, last modified April 17, 2019, accessed July 2019, https://www.nationalgeographic.com/environment/2019/04/plastic-bag-bans-kenya-to-us-reduce-pollution/.
[23] Beaumont et al., "Global ecological," 189.
[24] United Nations Environment Programme, "Styrofoam and Plastic bag bans in the Caribbean," map, accessed July 2019, https://www.google.com/maps/d/u/0/viewer?mid=1AjpZsUQgmFbYcDNpXl0GMfL6vie-h_Ni&ll=17.71102878401197%2C-49.4291659139044&z=3.

products have been introduced at the national level in more than 60 countries, and more will follow.[25]

There are two main types of policy instruments utilized to reduce plastic use. While some countries have imposed full or partial bans on plastic bags or other plastic items, other countries prefer economic policy instruments such as fees, levies, or taxes that are paid either by the retail industry, or by consumers. An analysis of the policy structures utilized by various Caribbean nations will help conceptualize the feasibility of implementation of such a ban in Bermuda. This will help formulate a unique framework that fits to the specificities of the needs and abilities of Bermuda's consumers, businesses, and government.[26] Theoretical outlines of both policy instruments will be examined, and recommendations will be given based on the current findings.

OPTION 1: BAN

Target: BAN plastic bags, take-out containers (including Styrofoam), cups, plates, bowls, lids, cutlery and drinking straws.

The first recommendation is to institute a ban on the importation and distribution of plastic bags and plastic take-out products including containers, cups, lids, cutlery and drinking straws. Not surprisingly, many of these items are some of the most-widely found items in local litter surveys.[27] We believe that targeting these products are both *realistic* and *effective* in the fight against non-degradable disposable products. Dominica's successful single-use plastics ban encompassed all of these products.[28] In Grenada, the Minister for Climate Resilience and the Environment, Senator Simon Stiell described their Non-Biodegradable Waste Control Act as "progressive legislation" which seeks to regulate the use of non-biodegradable products, with a view to reducing the negative environmental impacts and improving the health of Grenadians.[29]

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[25] United Nations Environment Programme, *Single-Use Plastics: A Roadmap for Sustainability* (New York: UNEP, 2018), 65.
[26] Lea Marie Heidbreder et al., "Tackling the plastic problem: A review on perceptions, behaviors, and interventions," *Science of the Total Environment* 668 (June 10, 2019): 1083.
[27] Keep Bermuda Beautiful, *Bermuda Roadside Litter Survey*, chart (Bermuda, 2009).
[28] Dominica Vibes, "Plastic ban to take effect on 1st January, 2019," DaVibes, last modified December 5, 2018, accessed July 2019, https://www.dominicavibes.dm/news-254475/.
[29] Now Grenada, "Styrofoam Ban to Come into Effect on 1 September," Now Grenada, last modified August 29, 2018, accessed July 2019, https://www.nowgrenada.com/2018/08/styrofoam-importation-ban-to-come-into-effect-on-1-september/.

Such a ban would represent a commitment to the health of all Bermudians and their surrounding environment. A ban, if promoted correctly, could be seen as beneficial in the eyes of the members of the public.[30] Therefore, the act of lowering duties will also be discussed.

Further, a quick overview of Dominica's plastic ban will help conceptualize the feasibility of such a law. In an effort to implement a ban of this nature, the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal and Cabinet have taken decisions to effect the ban on the importation of the following non-biodegradable single use plastics: Lids, Cups, Single Use Styrofoam/Plastic Containers, Disposable Plastic Cutlery, and Drinking Straws with effect from January 1, 2019. Dominica's Cabinet also approved the application of 0% duty on the importation of alternative authenticated biodegradable products (Lids, Cups, Single Use Containers, Cutlery, and Drinking Straws) and 0% duty on the importation of reusable shopping bags with immediate effect. Additionally, a six month phase out period, for the distribution and use of non-biodegradable products imported prior to the ban taking effect, will be in place from January 1 to June 31, 2019. The Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal along with other partners initiated a public awareness campaign which includes public consultations with the private sector and general public, media campaigns, educational sessions, and joint promotions with NGOs and Private Sector organization.[31]

Bermuda should emulate this framework when considering a plastic ban. For instance, if an announcement was made in September 2019, that announcement should be followed by consultations with external and internal stakeholders, paired with heightened public awareness campaigns. Following, a phased ban on the importation and distribution of single-use plastics could come into effect on February 1, 2020. Store owners could be given four months to get rid of plastic bags they possess because after June 1, there would be a ban on the distribution of plastic bags. By October 1, 2020, a distribution ban would come into effect, and no more of these products should be available in Bermuda. Depending on stock amounts, select businesses will have a grace period until their stocks are depleted. These tentative dates are to give an idea of what the time frame of a smooth and effective ban could look like. The Turks and Caicos, Antigua and Barbuda and the British Virgin Islands and various other islands followed this strict

[30] Heidbreder et al., "Tackling the plastic," 1086.
[31] Dominica Vibes, "Plastic ban to take," DaVibes.

but effective timeline.[32] A more detailed look of the timeline and process of implementation will follow.

STEP 1: Announce a ban on specified single-use plastics

The first action that would be taken is to announce that the government is moving toward initiating a ban. The announcement would specify a ban on the sale, importation and use of plastic carrier bags and take-out products including plastic containers (and Styrofoam), lids, cups, plates, bowls and straws. The Bermuda Throne Speech delivered by His Excellency the Governor on Friday, 9 November 2018 declared that "single-use plastics will be eliminated by 2022 and the intervening years will be spent educating the community about recycling and re-usable items and encouraging greater sensitivity to the ocean and its importance to our lives."[33] However, action on this sentiment has yet to be made by the government. Therefore, we recommend that the Bermuda Government hold a press conference to make an independent announcement to reaffirm their commitment to the eradication of single-use plastics. Within this announcement, the government should present an ambitious timeline that seeks to complete the ban *before* 2022. Thus, a date for the ban must be set and become effective on the given date. Fixed dates are preferable since they are unambiguous and predictable. Evidence shows that countries throughout the Caribbean successfully completed their respective bans within a one to two-year timeline, internal delays included.[34]

STEP 2: External and Internal Stakeholder Consultations

An integral step within the process of implementation is to meet with external and internal stakeholders to ensure engagement and acceptance of the policy so that the transition and economic impact of the ban is as seamless as possible. Therefore, extensive consultations between the government and key stakeholders should immediately follow the announcement of the ban. National officials should facilitate a stakeholder dialogue and engage with private sector

[32] Caribbean Environment Porgramme, *The Status of Styrofoam and Plastic Bag Bans in the Wider Caribbean Region* (Kingston, Jamaica: CEP, 2018), 9-21.
[33] His Excellency the Governor, "Throne Speech" (speech, November 9, 2018), 14.
[34] Caribbean Environment Porgramme, *The Status*, 9-23.

representatives to exchange views on how best to implement the regulation. These interactions should be open, transparent, and seek to solidify commitments from all participating sides in order to pursue the successful implementation of this beneficial act. Stakeholders engaged should include retailers, The Environmental Coalition (ECO) Organizations, Customs, the Department of Education and Health, and the Ministry and Home Affairs, more specifically the Department of the Environment and Consumer Affairs. The identification of remaining stakeholders should also be completed.

Consultations allow the voices of all stakeholders to be heard, to ensure understanding and cooperation. In terms of pushback, Bermuda does not have a manufacturing sector for plastic products; therefore, the production economy would not be affected in any way. Therefore, only importers and retailers will be affected, as well as the apparent "convenience" that plastic bags provide for customers. Barbados, for example, experienced resistance from its manufacturing sector with its small number of plastic bag factories. However, the government was steadfast on the ban and allowed for a longer grace period in order for manufacturers to modify operations, like switching production to plant-based alternatives.[35] On June 28, 2016 the law to ban single-use plastic bags was unanimously passed in the Parliament of Aruba. The law came into effect on January 1, 2017. Retailers were initially reluctant as switching to alternatives meant higher costs for their businesses, especially for clothing stores and take-out restaurants. However, thanks to the stakeholder consultations and education program, the new ban gained wide acceptance and endorsement from the community.[36] For instance, workshops were organized at local schools on the importance of protecting Aruba's environment, as the island economy depends primarily on tourism. The islands of Antigua and Barbuda recognized that small businesses have smaller margins to work with, therefore they were given longer grace periods to eliminate their stocks. According to Hon. Molwyn Joseph, Antigua and Barbuda's Minister of Health and Environment, no business was negatively affected by their 2016 ban, while some actually improved their bottom line as they no longer had to purchase plastic bags.[37] As the

[35] George Alleyne, "Barbados bans plastic imports," Caribbean Life, last modified January 24, 2019, accessed July 2019, https://www.caribbeanlifenews.com/stories/2019/1/2019-01-25-ga-barbados-bans-plastic-imports-cl.html.
[36] United Nations Environment Programme, *Single-Use Plastics*, 60.
[37] "Plastic Bag Ban Lessons Learned Video," video file, posted by Antigua Barbuda Department of Environment, December 2, 2016, accessed July 2019, https://www.youtube.com/watch?v=_vgMIAldZtQ&fbclid=IwAR03vM1m0FCUn3REDqqY9vX7t83mVOD4NE4Y0Wdsxh7Mnr2Yy6WXDgxr2PA.

majority of Bermuda's businesses are small-scale, similar attention must be given to awareness and ensuring that alternative products and methods are available to them at low cost.

In addition to discussing the timeline and process of the ban, these consultations should include a discussion on the availability of alternative products in Bermuda. This can be met by lowering duties on alternative "eco-friendly" products that are home compostable or meet degradability standards such as ASTM D6691, which tests the biodegradability of bioplastics in marine sediment at temperatures as high as 28C.[38] Unfortunately, though likely done with good intentions, many "green" products currently sold by Bermuda's wholesalers are misleading and counterproductive to the environmental benefits purported to be made, as these products are only certified to degrade in industrial composts, rather than in home composts or the natural environment. Such "bioplastics" consist of a category of materials that are particularly problematic and confusing. They blend plant-based materials, such as starch, with fossil fuel-based plastic, such as polypropylene. This makes biopolymers like PHA and PLA, which are biodegradable but have very specific conditions where degradation happens. These conditions are not found in soil, home compost bins or the marine environment. According to most of the companies that use PHA, PLA or PSM (plant starch material), the ocean or a backyard compost bin is not considered an acceptable disposal environment for their product, although terms like "compostable" and "biodegradable" are used on packaging.[39] This issue demonstrates the need for education when tackling this issue. Given the lack of ideal bioplastic material for all environments, following the waste hierarchy continues to make sense: Refuse, Reduce, Reuse, Recycle and compost.[40] Therefore, stakeholders much be educated on purchasing alternatives that degrade solely in the natural environment.

STEP 4: Public Awareness Campaign

Any policy change of this nature requires the support of citizens. To reduce public resistance, a strong awareness campaign on the reasons for the introduction of the ban should be launched. This campaign should permeate both the public space and media and emphasize the positive environmental and health benefits. An awareness-raising campaign in Antigua and

[38] 5 Gyres et al., *Better Alternatives Now: B.A.N. Report 2.0* (Los Angeles, CA: 5 Gyres, 2017), 12.
[39] Ibid, 11.
[40] Ibid, 16.

Barbuda titled "I'm making a difference one bag at a time" included frequent television short clips by the Minister of Health and the Environment, who provided information on the progress of the ban and feedback from stakeholders. A jingle was produced to promote the use of durable bags for a cleaner and healthier environment. Shoppers were provided reusable bags outside supermarkets, which were also required to offer paper bags from recycled material, in addition to reusable ones.[41] In Ireland the smooth enforcement of the plastic bag levy was due to an increased awareness from diligent campaigning that resulted in wider public recognition, which persuaded consumers to favour increased environmental protection.[42] Therefore, the more the public knows about the reasons behind the ban, the more supportive and willing they will be to accept this change.

Generally, persons globally are developing a greater understanding of the impact humans have on our environment and specifically the impact of plastic consumption. Various studies have identified the large amounts of awareness surrounding the issue of plastic pollution.[43] This, however, doesn't reduce the need for any government to consult its citizens and to engage them in the policy process. In discussing Jamaica's successful reduction in plastic waste, Jamaican Senator Matthew Samuda stressed the need to "consult, engage and act!" He states that "the major lesson would be the need for a robust public education campaign once the policy has been determined. "I would encourage any Government, to ensure this aspect is paid the attention it requires. This is an important component of the engagement process."[44]

STEP 3: Second Round of Consultations

Once a plan that is best suited for Bermuda is solidified in place, these consultations should be followed by a second round of consultations with the external stakeholders, namely retailers, where the process of implementation will be explained. These further consultations will help resolve challenges identified previously. Collective action is paramount to this transition, as this must be seen as a benevolent undertaking that seeks to support and work with those affected in the commercial sector.

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[41] United Nations Environment Programme, *Single-Use Plastics*, 60.
[42] Ibid, 47.
[43] Heidbreder et al., "Tackling the plastic," 1086.
[44] James Ellsmoor, "Banning Plastic: How Jamaica Moved to Save Its Environment," Forbes, last modified February 15, 2019, accessed July 2019, https://www.forbes.com/sites/jamesellsmoor/2019/02/15/banning-plastic-how-jamaica-moved-to-save-its-environment/#46f0c330163d.

STEP 4: Seek Cabinet Approval and Enact Legislation

Once stakeholders agree, a motion should be brought to Cabinet for approval. Governmental processes for the implementation of legislation should then proceed, followed by a final round of consultations during the time between the import ban and the distribution ban.

Costs and Retailer Cooperation

The ban affects grocery and convenience stores, retailers, pharmacies, restaurants, liquor stores, seasonal and temporary businesses, jewelry and household goods stores. All businesses that provide a checkout bag to customers at the point of sale, must be compliant with this policy. Throughout the phase-out process, stakeholder engagement has proven to be essential to the successful implementation of the ban. Conversations with various business owners throughout Hamilton revealed that many retailers would welcome such an environmentally conscious policy, so long as they are informed and included in the process. Cost is clearly their main concern, though many retailers have already made the switch to reusable and degradable products like recycled paper bags. In terms of cost, the Government will incur costs in legislating and enforcing the ban, and in conducting an education campaign for retailers and consumers. The retail industry will incur set up costs. Consumers may face additional costs from purchasing alternative bags (re-useable bags) if they do not own one already.[45] Alternative compostable bags or recycled paper bags will take over the plastic market. If available, checkout bags allowed should be Recyclable Paper Bags which are one hundred percent recyclable and contain a minimum of 40% recycled content in order to support the global recycling industry, or Reusable Bags, specifically designed and manufactured for multiple reuse and made of cloth or other washable fabric or durable recycled materials.

It should be noted that in some cases a perceived increased cost to consumers may be unavoidable. This is due to the short-term economic models employed by manufacturers and producers in the creation and distributing their products. This would be termed an externality by

[45] Marsden Jacob Associates, *Plastic Bags Ban Options- Cost Benefit Analysis* (Melbourne, Australia: Victorian Department of Environment, Land, Water and Planning, 2016), 6.

economists. Under the present system, manufacturers are permitted to manufacture a product which in the process may release harmful chemicals or products into the environment and or into the food chain. These producers can escape costs, or any requirement to remediate their damage, so those costs are not passed down to the consumers. This is a market failure. Whatever those costs are, they are then borne by the public directly or indirectly, for example either in increased health costs, as a result of a loss in natural capital and any other resulting economic losses, whether paid for by this generation or subsequent generations. In order to attempt to have prices reflect the true cost to society at the time of purchase, those true costs must past down from the time of product creation until that product is removed from the environment.

During the phase out period, businesses should focus on making the switch to reusable items and alternatives such as compostable take-out containers made without toxic petroleum-based chemicals like styrene, a suspected human carcinogen.[46] Restaurants and food service establishments can encourage customers to bring their own containers, while replacing disposable plastic cutlery with reusables or degradable utensils made from bamboo or cornstarch. Research shows that going reusable saves money over disposables even when figuring in the increase of capital investment and some increased labor costs.[47] However, an issue associated with a ban is that it may evoke some consumer resistance. This, in turn, may reduce the political acceptability of this policy instrument. However, research from Australia indicates that those consumers who strongly relied on plastic bags before a ban became supportive of the policy after its introduction, due to positive government messaging and the visibility of their positive environmental effects. A study from Brazil also showed high approval ratings after the ban was introduced, with over 86% of the participants considering the new law important or very important.[48] Africa Hill, Antigua and Barbuda's Environmental Officer stressed the need for clear public messaging during the ban process, stating, "I think that if any other island wanted to implement a plastic ban, there are several things they need to consider— one of them is having clear messaging. Messaging that is simple to uptake and its relevant to a wide number of stakeholders. It's important to ensure that the discussions you have throughout the media do not only cover the persons who are policymakers, but that they also cover the responses of each

[46] 5 Gyres et al., *Better Alternatives*, 30.
[47] Ibid, 29.
[48] Heidbreder et al., "Tackling the plastic," 1084.

person in society that is affected."[49] Thus, to reiterate, public awareness campaigns are essential in providing information and support from the public during this transition. The success of bans across the Caribbean have come from the governments' strong opposition to the myriad of environmental and public health issues they acknowledge as associated with plastic.

OPTION 2: Tax plastics at import, lower duties on alternatives

Target: BAN plastic bags, take-out containers (including Styrofoam), cups, plates, bowls, lids, cutlery and drinking straws.

We are aware that the government is considering pursuing a policy based on raising duties on selected single-use plastics, paired with lowering duties on alternatives. Similar to the timeline of the ban outlined above, this approach must target the same items (plastic bags, take-out containers, cups, lids, plates, bowls, cutlery, straws, Styrofoam) and be completed effectively within a given limited period of time. It should be noted that few Caribbean countries have policies relying on increased duties, though some have considered lowering duties for alternatives. However, many European countries and American states have instituted an import or manufacture tax.[50] Such tariffs are levied as an incentive to cooperate on global environmental issues and to complement domestic efforts to reduce emissions and pollution pertaining to plastic production and waste.[51]

Raising a tax on plastic imports is a feasible option for the government to undertake as there are existing avenues available to facilitate action. This economic-based rationality relies on the market and price-setting to alter behaviour. The underlying assumption is that actors respond to costs and benefits by maximising their self-interests, as changing the cost will change behavior.[52] For critics, the inherent problem of the economic rationality is that it reduces the subject of regulation to an economic value.[53] This policy instrument to curb plastic consumption will set a 'price' on single-use disposable plastic products which were previously handed out to

[49] "Plastic Bag Ban Lessons," video file.
[50] Caribbean Environment Porgramme, *The Status*, 8-24.
[51] Chrstiane Kraus, "The Role of Tariffs in Protecting Global Environmental Commons The," in *Import Tariffs as Environmental Policy Instruments* (Washington, DC: Springer Science+Business Media, 2000), 137.
[52] Nielsen, Holmberg, and Stripple, "Need a bag?," 431.
[53] Nielsen, Holmberg, and Stripple, "Need a bag?," 431.

customers for free. However, revenues generated from plastic tax have contributed to environmental funds in various countries, and could be used for beneficial purposes in Bermuda.[54] Furthermore, setting the 'right' price on plastic imports can be difficult as individuals are disproportionately affected by price changes.[55] Implementing a tariff on these certain plastic products would consequently put strains on importers, who will either have to comply and pay the tariff in order to keep utilizing the products, or be forced to switch to using alternative products. Retail stores would be able to pass the cost of the tax to the consumer. Issues will arise if the public is not engaged in the reasons behind this tax, therefore messaging and transparency is key. The inequalities that could be exacerbated by a tax should be of great concern, as retailers and consumers able to afford the added duty will continue to pollute, and those affected by the change in costs will feel stifled. In this case, the government must consider providing subsidies for reusable bags and alternative products.[56] Any policy that is designed in isolation, say to restrict use of plastic without promoting alternatives, is likely to fail.[57] Thus, for this transition to come at a low cost for businesses and with little resistance from consumers, it is essential to simultaneously lower the import duties on alternative products.

Promote the Use of Alternatives

Before banning the stated single-use plastics, the government should assess and verify the presence of valid alternatives, while ensuring that the pre-conditions for their acceptance into the market are in place.[58] Economic incentives must be provided to encourage the uptake of affordable, eco-friendly and fit-for-purpose alternatives that do not cause more harm. This can be done through tax rebates, which can facilitate the replacement of plastics with alternative bio-based products. For example, on June 2017, World Environment Day, the government of Costa Rica announced a National Strategy to phase out all forms of single-use plastics by 2021 and replace them with alternatives that biodegrade within six months.[59] The product's level of

[54] Dirk Xanthos and Tony R. Walker, "International policies to reduce plastic marine pollution from single-use plastics (plastic bags and microbeads): A review," *Marine Pollution Bulletin* 118 (May 15, 2017): 22.
[55] Nielsen, Holmberg, and Stripple, "Need a bag?," 431.
[56] Excell, "127 Countries," World Resources Institute.
[57] John Williams et al., *Public Policy Approaches for the Reduction of Plastic Bag Marine Debris* (New York, NY: Columbia University, 2012), 47.
[58] United Nations Environment Programme, *Single-Use Plastics*, ix.
[59] Ibid, 58.

biodegradability is essential, as stated in the earlier discussion on bio-plastics. Further, Antigua and Barbuda have legislated, as part of the plastic ban, that certain materials used to manufacture alternatives are to be kept tax-free, including sugar cane, bamboo, paper, and potato starch (though Bermuda does not have a manufacturing sector for alternative products, this tax reduction is nevertheless relevant). In addition to this, reusable bags were distributed for free at the entrance of major supermarkets.[60] Communication materials can be distributed to inform citizens about available alternatives. On the island of Guanaja (Honduras), each household was provided with information through a door-to-door campaign and in addition, each household was given two canvas reusable bags.[61] The public promotion of reusable alternatives to single-use plastics allows time for the population to change consumption patterns, and for affordable and eco- friendly alternatives to enter the market.

International Action

The number of national policies regulating single-use plastics is likely to continue increasing in the future.[62] Large steps have been taken in developed countries and recently governments from around the world joined hands at the third meeting of the United Nations Environment Assembly, committing to the vision of a "Pollution Free Planet". Resolution UNEP/EA.3/L.20 specifically addresses marine litter and microplastics and encourages member states to "reduce unnecessary plastic use and promote the use of environmentally sound alternatives while prioritizing policies to reduce the amount of plastics entering the marine environment."[63]The global commitments against single-use plastics underline a general sentiment to act against plastic pollution. Kirk Humphrey, the Barbados Minister of Maritime Affairs and the Blue Economy, declared that, "Barbados has to be a value driven country. We have large expectations for ourselves. We have said that we want to be fossil fuel free by 2030. We want to have a renewable platform. We want to be a country that when we speak to the world we speak as an environmentally friendly country and destination. [Therefore] these are the things that we must do if our words and our actions are to be aligned and so, we have made ourselves

[60] United Nations Environment Programme, *Single-Use Plastics*, 58.
[61] Ibid, 71.
[62] Ibid, 24.
[63] Ibid.

clear as to where we stand on single use plastic."[64] He also spoke of the opportunities for local sustainable business that the ban has for the island, saying, "this process is going to take transformation because we're not in the habit now of producing the things that we use to serve food in and to eat food out of. However, I believe that by the end of this process, we will all be better off. I also believe that we will foster more local entrepreneurs and get more young people involved."[65] This dedication has been repeated by governments throughout the Caribbean, Africa, Asia, Europe and various states throughout the USA.

Public Concern Over Plastic in 2019

A World Bank report on waste management has found that Bermuda is the highest waste generator per capita in North America and thus produces more waste per head than any other country.[66] While 2.24 kg of waste is generated per capita per day in the USA, and 1.94 in Canada, Bermuda leads with a whopping 4.54 kg.[67] Though there are various factors affecting this number, such as high tourism rates and unique land constraints, the amount should nonetheless be shocking and concerning.[68] As Bermudians, we must establish ourselves on the side of those committing to a better future for generations to come, and this starts with tackling the waste crisis that permeates local lives as well as global ecosystems. This issue is therefore an unforgettable crisis of utmost importance. Nearly 8,000 citizens have signed a Change.org online petition calling for a ban on single-use plastic in Bermuda.[69] Positively, numerous supermarkets and businesses on the island have already switched to alternative products such as paper straws, recycled paper bags and home-compostable produce bags. However, out of 55 businesses surveyed by BEST, 43 used single-use plastic carry-away products, while only 8% of restaurants offering take-out food offered biodegradable take-out alternatives.[70] The youth of Bermuda have also been garnering public attention with the Fridays for Future climate march, bringing the

[64] Nation News Barbados, "Government Bans Plastic," Nation News, last modified January 3, 2019, accessed July 2019, https://www.nationnews.com/nationnews/news/235075/petro-plastic-banned-april.
[65] Katrina Francis-Worrell, "A Plastic-Free Barbados," Nation News, last modified May 24, 2019, accessed July 2019, https://www.nationnews.com/nationnews/news/239943/plastic-free-barbados
[66] Silpa Kaza et al., *What a Waste 2.0* (Washington, DC: World Bank Group, 2018), 66.
[67] Ibid, 67.
[68] Ibid, 68.
[69]Lucie Jichova, "Ban Single-Use Plastic in Bermuda," Change.org, last modified April 2019, accessed July 2019, https://www.change.org/p/government-of-bermuda-ban-single-use-plastic-in-bermuda.
[70] Bermuda Environmental Sustainability Taskforce, *Single-Use Plastics Survey* (Hamilton, Bermuda, 2019).

environmental movement to the forefront and inspiring a new generation who faces even more dire consequences. The first rally came on July 15, 2019, and more have been planned for the coming weeks. The generation that will be inheriting Bermuda's legacy have been vocally stating their concerns for the health of the environment in which they live and the impact on their families and friends. When a thirteen-year old states, "I don't see a future. At this rate, Bermuda will be destroyed," and a twelve-year old declares that "our lifestyle has to change," we must stop in our tracks and wonder what we have done to cause these feelings, and what we can do to change. These worries did not exist for older generations who have been engrained with the hollow optimism of consumer capitalism and the ideas of success that came with the continuation of endless economic growth.

Bermuda should no longer support the dated, short-term thinking associated with disposable consumer culture. Bermuda's connection to the ocean environment is too important—the sea surrounds our home and is always just a short trip away. It is not only a pledge to the creatures that accompany us on this earth, but to our children, who will not only be affected by the eyesores of pollution but also by the health risks that come with our ever-increasing plastic consumption through our food and water. Thus, Government intervention on the consumption of single use plastic is justified because the plastic waste harms social amenity and negatively affects the environment. The costs of cleaning up litter and minimising its resultant environmental harm are also mostly borne by governments. These costs are not borne by the importers or consumers of the bags so they do not have a financial incentive to minimise the littering.[71] Intervention can introduce its own distortions and can be costly, especially if the intervention is poorly targeted. It is therefore important to establish that any proposed interventions by government are likely to produce net benefits to society.[72]

Conclusion

We believe that the Government of Bermuda has the institutional capacity and political mandate to succeed in banning or limiting the import of plastics on the island. Taking a strong, concerned stance in championing the policy is essential to ensure broad support and enforcement.

[71] Marsden Jacob Associates, *Plastic Bags*, 2.
[72] Ibid.

The advice presented in this report is largely preliminary, however it explores the high feasibility of such a policy and concludes that the long-term positive results far outweigh the negative. The policy instruments presented in this report are both regulatory and economic in nature and have been proven effective in reducing plastic use.[73]A ban on the sale of certain single-use plastic items is "relatively simple to introduce, can reduce the amount of single-use plastic consumed and can be a step towards more comprehensive policies," the UN reports.[74] Compliance with a ban may also be relatively cheaper to monitor than other forms of regulation.[75]

Bans on single-use plastics can be a step towards more comprehensive policies aiming at reducing the generation of plastic waste and at replacing single-use plastics with more sustainable, environmentally-friendly alternatives. For instance, the plastic bag ban in Antigua and Barbuda has led to the introduction of further measures to forbid the import of food plastic and Styrofoam containers and the use of plastic utensils. Further, bans on single-use plastics are considered by small and medium 'green' businesses as opportunities to prosper by marketing innovative, environmentally sound alternatives that exist on the market.[76] This policy could pave the way toward fighting even more detrimental plastics like plastic water bottles. New developments such as the new airport already have plans in place to provide ample water refill stations, with the reduction of plastic consumption in mind.

However, it is too early to draw robust conclusions on the environmental impact that bans and levies have had. In 50 per cent of cases around the world, information about their impact is lacking, partly because some countries have adopted them only recently and partly because monitoring is inadequate. In countries that do have data, about 30 per cent have registered drastic drops in the consumption of plastic bags within the first year. The remaining 20 per cent of countries have reported little to no change.[77] Of the countries that have reported little to no impact, the main problems appear to be a lack of enforcement and/or a lack of affordable alternatives.[78] Thus, lowering duties on alternatives is essential to a successful policy implementation. Overall, awareness raising is a common denominator for the success of the

[73] Heidbreder et al., "Tackling the plastic," 1084.
[74] United Nations Environment Programme, *Single-Use Plastics*, 68.
[75] Rebecca Taylor and Sofia B. Villas-Boas, "Bans versus Fees: Disposable Carryout Bag Policies and Bag Usage," *Agricultural & Applied Economics Association and Western Agricultural Economics Association*, July 2015, 2.
[76] United Nations Environment Programme, *Single-Use Plastics*, 65.
[77] Ibid, viii.
[78] Ibid.

above-mentioned initiatives aimed at having a broader social impact. Similarly, monitoring and continued communication of progress to the public will help to build confidence and strengthen commitment to the cause. “Generally, persons globally are developing a greater understanding of the impact humans have on our environment and specifically the impact of plastic consumption,” declared Jamaican senator Matthew Samuda, who helped with the successful implementation of a ban in Jamaica. “This, however, doesn’t reduce the need for any government to consult its citizens and to engage them in the policy process.”[79]

This report is based off of academic research as well as local surveying and data collection. The Bermuda Environmental Sustainability Taskforce offers this paper as a part of our public position on single-use plastics. We commend the government’s acknowledgement of plastic as an environmental and public health issue. We believe the discussion of a plastic tax is a step in the right direction but, as noted above, a ban on single-use plastics is more favourable due to its comprehensibility and feasibility. A ban would represent a public condemnation of plastic pollution and the greater climate crisis that threatens the planet on which we all live. Initiating environmental policy would galvanize admiration for a government that genuinely cares for the future generations of Bermudians, as well as generate hope for a more progressive future together. A ban, if implemented swiftly and conscientiously, would prove to be acceptable with the Bermudian population, due to its socially and environmentally beneficial nature. This policy should be paired with the lowering of duties on alternative products, in order to create accessible avenues for transition and lessen the costs for businesses and consumers alike. Bermuda can join the leaders of the world in denouncing the existing global waste crisis and strive to become part of the solution.

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[79] James Ellsmoor, "Banning Plastic: How Jamaica Moved to Save Its Environment," Forbes, last modified February 15, 2019, accessed July 2019, https://www.forbes.com/sites/jamesellsmoor/2019/02/15/banning-plastic-how-jamaica-moved-to-save-its-environment/#46f0c330163d.

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