Plastic Pollution: Global Policies and Analysis

Plastic has a durable functionality which is seen in many products that we use in our daily lives. However just like it takes many years to disintegrate, the harmful effects have endearing effects to come. It is estimated that plastic pollution production will triple in 2060 (Plastic Pollution Coalition,2023). Some laws address plastic, such as the first plastic ban from Bangladesh in 2002. 20 years since then, the production of polyethylene (what's used to create bags) has tripled from 3 kg to 9kg. How can this be? What factors contribute to its lack of efficacy? As a result, this section is dedicated to analyzing the relationship between policies/legislations/initiatives and plastic waste production. The first part is looking at a 'Case Example' which is looking at a dataset on plastic bags and examining the following concepts: mismanagement rate, legislation type, economic type, and legislation frequency. The next section compares these numbers with the Global Laws Database. Finally, addressing current solutions and a conclusion.

Case Example: Analyzing the Relationship between Plastic Bag Legislation and Plastic Waste Generation

The bulk of the section is to compare the datasets with the laws that are found in Global Plastic Laws to see if there is a relationship between the type and amount of regulations with plastic pollution. Based on the Global Plastic Law Base, the majority of laws adopted are plastic bags.

In Figure 1, contrary to the belief, the charts indicate higher mismanagement rates lead to lower plastic waste generated. However, these countries are smaller and tend to receive plastic from external sources. For example, Maldives, Guyana, Vanuatu, and Sri Lanka have higher mismanagement rates of 20 but produce less waste. Compared to countries that produce more waste but have lower rates (list examples). The following Figure 2 titled, "Plastic Waste Generated by Legislation Type", shows that legislation types such as having restrictions and regulations do produce less plastic waste while those with no national law produced the most. Figure 3, "Plastic Waste Generated by Economic Type" examines the same variables of plastic waste generated and country but examines if there is a trend between the type of economy of each country. Interestingly, these are higher-income (HI) and upper-middle-income (UMI) countries. The results of legislation and economic type vary. The US, Japan, and Spain are HI but the latter have lower waste than the US. Finally Figure 4: "Frequency of legislation and restriction" shows that restriction is the most popular restriction type followed by disposal regulation.

Global Law Database Comparison:
Method:

Laws were found on the database using the filters provided, usually clicking on "explore laws search", region, and/ or by-product or law type.

Based on the Global Law Database, there are 1246 total laws on plastic. By topic, Waste Management has 77 laws, Plastic Bags has 632 laws, Cigarette and e-cigs have 18 laws,

Food/drink packaging has 92 laws, other packaging has 14 laws, Hygiene products has 19 laws, straws have 114 laws, tableware has 110 laws, multiple have 280 laws and finally other with 105 laws(Global Plastic Laws,2023). According to the previous figure, Sri Lanka has a higher mismanagement rate yet less waste. Researching the database, Sri Lanka has 1 national law focused on reduction called Order No. 2034/33 (2017) that addresses, "The order prohibits the sale, distributing for free, display, or manufacture for in-country use of polythene products 20 microns or less. The order includes exemptions and exceptions may be granted (Global Plastic Laws,2023)." The United States has the lowest mismanagement but produces the most plastic waste. According to the database they have a total of 975 plastic laws and of those 492 are on plastic bags. However, these laws are mostly city-based rather than national(Global Plastic Laws,2023). Coinciding with the previous dataset, the United States has yet to implement a national law on plastic bag use(Global Plastic Laws,2023 & Gibson,2020). California in 2014 implemented the first statewide prohibition of plastic bags with Senate Bill No 270 that prohibits, "stores from distributing reusable bags unless they fit certain requirements(Global Plastic Laws,2023)."

The next figures, examined plastic generated by legislation type and economic type. No national law produces most waste and those with restrictions produce less. The first country is the US, which was previously mentioned has no national law. China, Japan, Turkey, and Spain have restrictions but the amount of plastic waste varies. China has 1 national law adopted in 2020 that covers all 8 topics of Plastic laws. The order called, "National Development and Reform Commission Ministry of Ecology and Environment About Opinions on further strengthening plastic pollution control" hopes to, "establish and improve the management system for the production, circulation, use, recycling, and disposal of plastic products, effectively control plastic pollution in an orderly and effective manner (Global Plastic Laws)". Spain is the country with the least waste with a restriction and of the 14 laws listed three are national and six are focused on plastic bags from 2018 to 2022. To conclude, the previous dataset showed that restrictions and disposal regulations are the most popular type of legislation. In the database, there are 'reduction' and 'waste management' options. The reduction has the most with 1156 laws, with 133 only national. Waste management has 77, and 65 are national. This coincides with the database since restriction had the most, disposal regulation is another form of waste management.

Global Action

As a result of sustainability, a global treaty has been proposed. The key issue at hand is whether the Global Plastics Treaty (GPT) should reduce or restrict the production of primary plastic polymers. Some member states argue that capping plastic polymer production is essential to stop plastic pollution at its source, while others emphasize the economic significance of plastics and suggest focusing on pollution control. The Zero Draft highlights the need for a fair transition for affected populations, including vulnerable groups, as some developing countries express concerns about the impact of the treaty on their economies and employment in the plastics industry. The goal is to reach an agreement by the end of 2024 through negotiations and intersessional work, following UNEA Resolution 5/14's call for

sustainable plastic production and circular economy principles. Key considerations include controlling virgin plastic polymer production, implementing a global monitoring and reporting framework, securing adequate and stable funding, ensuring transparency and chemical restrictions, and adopting a truly circular approach to plastics. Lessons from the Paris Agreement's NDC approach should inform the GPT's national action plan framework to strike a balance between national and international obligations.

Therefore, there is inconsistency in the efficacy of Plastic laws and global response. Limitations to this analysis can be related to how the data was collected and manipulated, and the need for another dataset for comparison. Some countries are bigger so the rates may reflect this. Further research can compare with more countries instead of the top 10 most or least. Also, most of these laws listed in the database were adopted later than the date of the plastic bag dataset. Therefore, another follow-up on specific laws of each country and analyzing which ones are more effective is recommended. Another recommendation is to analyze the treaty's efficacy in the future since it was been adopted just a few months ago. Analyzing how does export/import of plastic waste is by country and seeing if there's a relationship with laws implemented is another idea too.

Biography: Gibson, Lydia (2020), "Country-level plastic bag legislation against plastic waste and select Human Development Indices", Mendeley Data, V1, doi: 10.17632/wtvnv9fv44.1

"From Birth to Ban: A History of the Plastic Shopping Bag." UNEP, UN Environment Programme, 20Dec.2021,www.unep.org/news-and-stories/story/birth-ban-history-plastic-shopping-bag#:~:text=2002%20%E2%80%93%20Bangladesh%20is%20the%20first,countries%20begin%20to%20follow%20suit.

"Global Plastic Laws." Global Plastic Laws, 14 Oct. 2023, www.globalplasticlaws.org/. Hannah Ritchie, Veronika Samborska and Max Roser (2023) - "Plastic Pollution" Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/plastic-pollution' [Online Resource]

Gregli-Msft. "Color Enumeration and Colorfade, ColorValue, and RGBA Functions - Power Platform." Power Platform | Microsoft Learn, learn.microsoft.com/en-us/power-platform/power-fx/reference/function-colors. Accessed Dec. 2023.

Initial Considerations Inc-1 - United Nations Environment Programme, 2023, apps1.unep.org/resolutions/uploads/briefing_-_initial_considerations_for_inc-1_2022.pdf.

Jahan, A R Tahseen. "What Happened to Bangladesh's Polythene Ban?" The Confluence, 8 Oct. 2023, theConfluence.blog/what-happened-to-bangladeshs-polythene-ban/#:~:text=However%2C%20legal%20ban%20on%20polythene,According%20to%20the%20World%20Bank.

"Plastic Pollution Facts." Plastic Pollution Coalition, 31 Aug. 2023, www.plasticpollutioncoalition.org/learn/plastic-pollution-facts.

Principal Technical Advisor and Global Lead on Plastics Offer. "A Global Treaty to End Plastic Pollution Is in Sight." UNDP, 22 Nov. 2023, www.undp.org/blog/global-treaty-end-plastic-pollution-sight.

Sahoo, Soumendra Kumar. "Usage of Forward Slash (/) in Python." DEV Community, DEV Community, 6 Dec. 2022, dev.to/soumendrak/usage-of-forward-slash-in-python-41no.

Stoel, Geoffrey. "Why Can't Pandas Handle Decimals for Plotting?" *Stack Overflow*, 1 Nov.1961,stackoverflow.com/questions/33488542/why-cant-pandas-handle-decimals-for-plotting.