Committee: Environmental Comission (EC)

Topic: Measures to abolish single-use plastics from the market

Student Officer: Valentina El kadi

Position: Deputy President

Personal Introduction

Dear delegates,

My name is Valentina and I am currently a student in Year 11 at St Catherine's British School. It is my honor to serve as your Deputy President in the Environmental Commission (EC) at the 8th Campion School MUN conference this October. I will be serving as the expert chair on the topic of "Measures to abolish single-use plastics from the market".

The point of this study guide is for you to develop a thorough understanding of this topic, and hopefully provide you with enough information to come up with your own solutions. It is highly encouraged that you also carry out your own research in terms of your country's policies, and their political relations with other nations.
If at any time during your conference preparation any issues arise regarding your research, please do not hesitate to contact me in order to clarify any issues.
I wish you the best of luck with your preparation for the conference and I'm looking forward to meeting you at the conference.

Yours truly,
Valentina El kadi
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Topic Introduction

The topic of "Measures to abolish single use plastics in the environment" relates to the global community, as the majority spends their everyday life doing things not perceived as harmful to other people's lives and potential environmental hazards.

In recent years, single-use plastic has become an incredibly significant material in businesses/companies, the market, our environment, and our daily lives. Most advances of society over the past century have been facilitated by the use of plastics. The reason why large amounts of single-use plastics are used is because they are cost-effective, easy to manufacture, lightweight, and undemanding to the distributor of the product. Single-use plastics are primarily used in packaging, medical equipment, consumer products, etc. Examples include grocery bags, straws, plastic cups, disposable utensils, and different types of plastic containers.

Due to this very unfortunate turn of events with the covid-19 outburst, the consumption of single-use plastics has increased to a large extent. Nowadays, masks, gloves, and hand saniizers have become part of our daily lives and routine.

Nevertheless, they are being consumed at staggering rates, and as a result, numerous complications regarding its disposal ensue. These issues have proved to be quite harmful, first and foremost to the environment. To start with, there are many issues that arise regarding the making and the disposal/elimination of plastic, due to the materials used in its production, and its difficulty of decomposition. Generally, plastics are non-biodegradable, meaning that it is very improbable that bacteria will manage to break them down.

Plastic pollution is a global challenge that requires immediate action, and some countries and businesses have recognized it as an environmental emergency and have acted upon it. Experts have been coming up with more sustainable alternatives, which many countries and companies have started using, for example paper cups, and metal bottles and straws. Other countries have implemented

legislations focusing on the banning of single-use plastic products, while many businesses have focused on no single-use plastic policies.

Definition of key terms

Single-use plastics

"Single-use plastics are goods that are made primarily from fossil fuel–based chemicals (petrochemicals) and are meant to be disposed of right after being used once. Single-use plastics are most commonly used for packaging and serviceware, such as bottles, wrappers, straws, and bags."[1]

Biodegradable

"Capable of being broken down (decomposed) rapidly by the action of microorganisms. Biodegradable substances include food scraps, cotton, wool, wood, human and animal waste, manufactured products based on natural materials (such as paper, and vegetable-oil based soaps)."[2]

Alternatives to single-use plastics

"Alternatives to single- use plastics are products made from materials that are more eco-friendly and can fulfill the same uses plastics do. Stainless steel straws,

[1]January 09, 2. (2020, July 30). Single-Use Plastics 101. Retrieved August 08, 2020, from https://www.nrdc.org/stories/single-use-plastics-101

[2]What is biodegradable? definition and meaning. (n.d.). Retrieved August 08, 2020, from http://www.businessdictionary.com/definition/biodegradable.htm

bamboo straws, pasta straws, paper straws, reusable silicone straws, paper cups and metal bottles."[3] They are more sustainable and don't emit greenhouse gasses.

Fossil fuels

"Fossil fuels are hydrocarbons, primarily coal, fuel or natural gas, formed from the remains of dead plants and animals."[4] They are also a non-renewable source of energy.

Landfills/dumps

"A landfill site, also known as a dump, rubbish dump, garbage dump, or dumping ground, is a site for the disposal of waste materials. Landfill is the oldest and most common form of waste disposal, although the systematic burial of the waste with daily, intermediate and final covers only began in 1940."[5]

Crude oil

"Crude oil (also known as petroleum) is a naturally occurring fossil fuel and consists of a mixture of hundreds of hydrocarbons (only composed of Hydrogen and Carbon atoms), and very commonly used in the making of plastic. Crude oil is unprocessed oil that is extracted directly either from the land or under the sea. In

[3]10 worst single-use plastics and eco-friendly alternatives. (n.d.). Retrieved August 08, 2020, from https://www.wwf.org.au/news/blogs/10-worst-single-use-plastics-and-eco-friendly-alternatives

[4]Fossil fuel. (n.d.). Retrieved August 08, 2020, from https://www.sciencedaily.com/terms/fossil_fuel.htm

[5]The Editors of Encyclopaedia Britannica. (2007, December 11). Naphtha. Retrieved August 08, 2020, from https://www.britannica.com/science/naphtha

this unprocessed state, this mixture is not of any use, therefore, it needs to first be separated into fractions."

Fractional distillation

"Fractional distillation is the separation of a mixture into its component parts or fractions. Chemical compounds are separated by heating them to a temperature at which one or more fractions of the mixture will vapourize."[6]

Sulfur Dioxide

"Sulfur Dioxide is a heavy pungent toxic gas SO_2 that is easily condensed to a colorless liquid, is used especially in making sulfuric acid, in bleaching, as a preservative, and as a refrigerant, and is a major air pollutant especially in industrial areas."[7] The chemical compound formed when sulfur reacts with oxygen.

Carbon Dioxide

"Carbon dioxide is a colorless, odorless gas found in our atmosphere. Its chemical formula is CO2, which means it is one carbon atom bonded to two oxygen atoms. It is a waste product in our bodies and is also produced by burning fossil fuels."[8] The product of carbon and oxygen reacting with each other.

[6]ThoughtCo.com is the World's Largest Education Resource. (2019, May 22). Retrieved August 08, 2020, from https://www.thoughtco.com/

[7] Sulfur Dioxide. (n.d.). Retrieved August 08, 2020, from https://www.merriam-webster.com/dictionary/sulfur dioxide

[8] (n.d.). Retrieved August 08, 2020, from https://study.com/academy/lesson/what-is-carbon-dioxide-definition-lesson-quiz.html

Naphtha

"Naphtha is a flammable liquid hydrocarbon mixture. Mixtures labelled naphtha have been produced from natural gas condensates, petroleum distillates, and the distillation of coal tar and peat. In different industries and regions naphtha may also be crude oil or refined products such as kerosene."[9]

Background Information

Plastic production:

Plastic is predominantly produced from coal and oil, which are both fossil fuels. One naturally occurring fossil fuel is crude oil, and it is commonly used in the making of plastics. Once crude oil has been extracted in raw material form, as primary sector activity, from underground or under the ocean, it needs to be separated into fractions for it to be useful. This process of refining is carried out by fractional distillation. During fractional distillation, vaporized crude oil is inserted through the column. The column has a temperature gradient, being hot at the bottom and cool at the top. The fractions' boiling points differ, hence, will condense at different parts in the column. Larger hydrocarbon fractions condense near the bottom and are commonly used for bitumen (tar), and heavy fuel oil[10]. Fractions with smaller hydrocarbons condense at the top and are more commonly used as petrol

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10{{newsItems.title}}. (n.d.). Retrieved August 08, 2020, from https://qualifications.pearson.com/en/qualifications/edexcel-international-gcses-and-edexcel-certificates/international-gcse-science-double-award-2017.html

and naphtha. An extremely useful hydrocarbon to come out of crude oil, relating to the topic, is naphtha that it is used in the production of plastic.

After fractional distillation, cracking occurs. Its main task is to take less useful long-chain hydrocarbons, like naphtha for instance and break them down into more useful alkenes (e.g. petrol) and a useful alkene, which will later be used to produce plastic. Following this procedure, the alkenes that were produced during cracking are usually used in addition to polymerization reactions for making synthetic polymers (also known as plastics). The product is polyethylene and is used to make single-use plastic materials such as plastic bags and bottles[11]. Without fractional distillation, the natural resources (oil, naphtha) used in the production of plastic would not exist. Without cracking, plastic products that are commonly used to fulfill a one-time use, would not be produced in the same way.

However, the chemicals used in the manufacturing of these materials have certain effects on their own, both environmentally and economically. To elaborate, most of the chemicals used in these processes are known to destroy many parts of our ecosystem, as well as being involved at oil spill accidents. In such cases intense media attention is initiated as well as political uproar, bringing many together in a political struggle concerning government response to oil spills and the actions that need to be taken for preventing them from happening[12].

[11]{{newsItems.title}}. (n.d.). Retrieved August 08, 2020, from https://qualifications.pearson.com/en/qualifications/edexcel-international-gcses-and-edexcel-certificates/international-gcse-science-double-award-2017.html

[12](n.d.). Retrieved August 08, 2020, from https://www.usgs.gov/mission-areas/water-resources/science/large-oil-spills

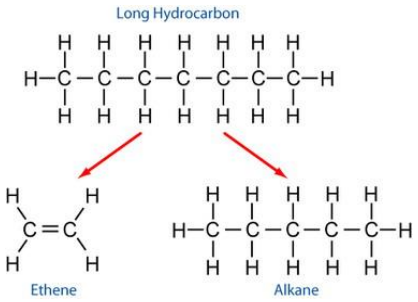

Figure 1 shows what cracking is.

Environmental/animal impact:

Subsequently, when this process is finalized and the plastic has fulfilled its purpose, it will eventually be disposed. One of the most common plastic elimination methods is through incinerators. While only 12% of plastic goes through the incineration process, it is still a very beneficial method when land is scarce. Incineration possesses a multitude of benefits, as certain harmful chemicals can be destroyed by high temperatures[13], while generating energy that is highly beneficial to several countries. Two countries that consume the most energy generated from incinerators worldwide are Sweden and Denmark.

Nevertheless, when plastic is burned in incinerators, one significant aspect of the process is that a substantial amount of Carbon Dioxide (CO_2) is released. Since carbon dioxide is a greenhouse gas, over a long period of time it creates what is commonly known as the "Greenhouse Effect", contributing to global warming. During the "Greenhouse Effect" the atmosphere traps heat radiating from Earth towards space, blocking it from exiting the Earth's atmosphere. Certain gases in the atmosphere resemble glass in a greenhouse, allowing sunlight to pass into the greenhouse, resulting in the earth's temperature increasing largely.

[13] Incineration. (n.d.). Retrieved August 08, 2020, from https://www.thefreedictionary.com/incineration

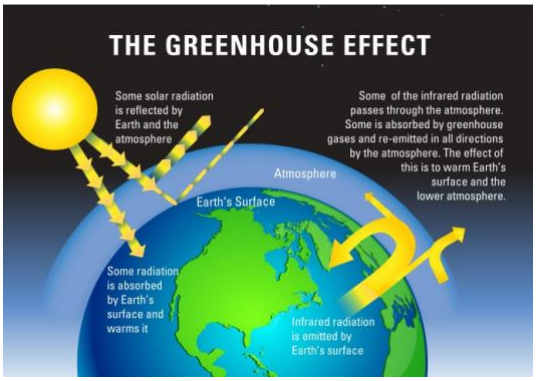

Figure 2 shows the diagram of the greenhouse effect.

Moreover, critical concerns arise during oil extraction and transfer. Those concerns specifically surround the risk of potential oil spillages. In the event of an oil spill, the land surrounding it will presumably suffer major destruction. It must be pointed out that due to the fact that refineries tend to be near the coast, so boats with crude oil can directly dock, most oil spills affect coastal areas or oceans/seas. One of the most destructive instances that might be likely to take place is if a tanker has an accident in the ocean, e.g. by crashing against rock formations, causing its oil to spill. Such an oil spill consequently causes a major destruction of aquatic life.

The term that is most commonly used for this type of incident is marine oil spills. Two major disadvantages of this type of occurrence are: Firstly, it is very difficult to clean them up, and on some occasions the process of cleaning could potentially take up to years. Secondly, due to the destruction and disruption of sea life, it is very hard for the affected the areas to fully recover in a short period of time.

Nonetheless, there are many factors that surround the time of recovery and the whole process of it, taking into account that a key factor for the recovery process are the weather conditions. Recently, Mauritius had a major oil spill from a ship, releasing approximately 4000 tons of oil in the ocean, endangering people's lives, as well as thousands of endangered species. This occurrence was officially declared as

an environmental emergency by the country. Oil spills can have disastrous consequences for the environment, as presented before, but also on a socioeconomic and political level.

In addition, single-use plastics are more biodegradable than durable plastics, but not as easily biodegraded. Instead of fully deteriorating, they break into smaller fragments of plastics (microplastics), making it easier for smaller species to ingest. Unfortunately, after plastic has fulfilled its one time purpose, most of it ends up polluting the world's oceans. An estimated 150 million tons of plastic are floating around the world's ocean, with a further 12.2 million tons entering it every year[14]. To put this into perspective, imagining tons of plastic floating around your natural habitat, obstructing one's views, limiting their movement, sometimes even worrying about the likelihood of getting trapped with no escape and immobilizing them, and even risking one of death.

An appalling phenomenon is when marine animals, such as dolphins and turtles mistake plastics (mostly plastic bags) for food, but end up either getting trapped, or ingesting it. As a result, blocked airways, stomachs, and suffocation are the fatal repercussions innocent animals have to endure, due to human carelessness and environmental neglect. About 1 million marine animals, an estimated number of 700 species, including endangered ones [15], die each year as a result of plastic suffocating them. When a large amount of plastic surrounds a sea creature, it is inevitable that something like that will happen.

[14] WHITE PAPER ReFork. (n.d.). Retrieved August 8, 2020, from https://refork.org/wp-content/uploads/2020/06/2020_06_whitepaper_refork_english.pdf

[15] Williams, J. (2018, May 16). We Depend On Plastic. Now, We're Drowning in It. Retrieved August 08, 2020, from https://www.nationalgeographic.com/magazine/2018/06/plastic-planet-waste-pollution-trash-crisis/

Human health concerns

To begin with, the important fact to realize is that the dust and chemical pollution coal extraction causes is beyond comparison to anything else. The main issue with underground mining is that the operation brings large fragments of rock and land up to the surface from under the earth. When the portions of land and rock are mixed with the water and air, the mining byproducts created are toxic.

Moreover, when mining is in effect, a considerable amount of dust is generated, causing it to travel to nearby populated regions via the wind. That's where the problem begins, as serious health concerns arise when this dust is exposed to humans. People known to live near coal mining areas, as well as the miners that work there, tend to suffer from diseases caused when the dust from coal is inhaled. The list of diseases known that affect those people in higher percentages than anyone else goes as follows: Cardiopulmonary disease, hypertension, Chronic obstructive pulmonary disease (COPD), and kidney disease.

One of the chemicals used in the making of single-use plastic containers and bottles is bisphenol A (BPA). Nonetheless, it is not the safest chemical to be used, since it leaches, causing the polymer itself to break down, especially when storing acidic items or at elevated temperatures. As a result, most single-use plastic bottles and the inner linings of food cans are known to leach BPA into food and drinks over time. The most common sources of exposure to BPA are through food and inhalation.

Unfortunately, it is safe to say that through several scientific studies, it has been discovered that BPA has been associated with various health related issues. Human exposure to BPA can cause these health issues as follows: decreased sperm production, ovarian chromosomal damage, type-2 diabetes, increased risk of breast cancer, cardiovascular disorder, obesity, metabolic disorders, prostate cancer, pains, recurrent miscarriages, sterility, etc.

When using plastic products, the likelihood of inhaling or ingesting a great deal of poisonous substances or even small fragments of plastics (microplastics) is unquestionable. However, it is not certain that they are carcinogenic or endocrine disrupting, but there is a very high chance that they are. These chemicals are found in marine animals, and later find their way into the human body, increasing the risk of cancers, congenital disabilities, immune system problems and childhood development issues.

Several health concerns surface when plastic is sent for burning in incinerators. Incineration systems pollute the atmosphere by releasing various unsafe gases, such as hydrochloric acid, sulfur dioxide, dioxins, furans and heavy metals, as well as particulates, and these chemicals are potentially carcinogenic[16]. As a result, inhaling these emissions could cause humans several respiratory problems.

Another result of the misuse of plastic is when plastic bags end up blocking sewers, instead of ending up being recycled, incinerated or sent to landfills, hence, breeding grounds for mosquitoes and pests are provided. Therefore, plastic bags can increase the transmission of vector-borne diseases, such as malaria. Additionally, the possibility of toxic substances used in plastic transferring into animal tissue is very high. Consequently, the chemicals gradually make their way into our food chain. Styrofoam products, which contain carcinogenic chemicals like styrene and benzene, are highly toxic if ingested, damaging the nervous systems, lungs and reproductive organs.

[16]Home. (n.d.). Retrieved August 08, 2020, from https://engineering.mit.edu/engage/ask-an-engineer/can-we-safely-burn-used-plastic-objects-in-a-domestic-fireplace/

Covid-19 and its impact to the single-use plastic crisis:

Due to the recent outburst of covid-19, the consumption of products like medical gloves and different plastic-based equipment designed to protect us has increased. The product used most commonly lately are medical gloves. Even though they are not always made of plastic, but rubber, that does not mean they don't negatively impact the environment. Both rubber and plastic are used for many different products we use. The only difference between them is that plastic is a synthetic polymer, whereas rubber can be produced as a synthetic polymer when it has been found as a natural polymer[17].

Types of plastics:

- Polyethylene Terephthalate (PET) used in water bottles, disposable containers etc
- High-density Polyethylene (HDPE) used in Milk jugs, grocery bags, soap bottles etc
- Polyvinyl Chloride (PVC) used in shoes, sewage pipes, window frames
- Low-density polyethylene (LDPE) used in cling wrap, frozen food bags, Squeezable condiment bottles
- Polypropylene (PP) used in plastic diapers, tupperware, kitchenware
- Polystyrene or Styrofoam (PS) used in disposable coffee cups, packing peanuts,plastic cutlery
- Other plastics, used in baby bottles, Plastic CD's, Medial storage containers

[17] Madhusha. (2017, October 25). Difference Between Plastic and Rubber: Definition, Properties, Different Products. Retrieved August 08, 2020, from https://pediaa.com/difference-between-plastic-and-rubber/

Economic/business impact:

While recognizing how much the discovery of single-use plastic has impacted the global population both positively and negatively, and how it has affected the world's ecosystem, it would only be fitting to focus on how much the worldwide economy has benefited, as well as the businesses involved in plastic production and distribution.

A vast amount of businesses have extensively profited from producing and/or exporting plastic, either to other companies, or directly to the customer. Major companies such as "Coca-Cola" and "Nestle" are some of the companies responsible for 6 million metric tons of plastic annually[18]. Undeniably, because of plastic, companies known globally are so successful as it helps with packaging, and the product itself. However, plastic bans and taxes have presented several obstacles to both consumers and companies.

Furthermore, as a part of primary sector activity, the extraction of natural resources is performed. The top 10 world leaders in the coal mining industry are as follows, in respective order: China, India, the United States (US), Australia, Indonesia, South Africa, Germany, Poland, and Kazakhstan[19]. Most countries mentioned above (e.g/ China and India) are developing countries because of their large focus on secondary sectors, this activity also classifies those countries as industrialized nations.

[18]Light, L. (2017, June 07). The Dodd-Frank battle may not help America's favorite banks. Retrieved August 08, 2020, from https://www.cbsnews.com/news/small-banks-dodd-frank-relief/

[19] Akanksha. (2020, June 08). Coal giants: The world's biggest coal producing countries. Retrieved August 08, 2020, from https://www.mining-technology.com/features/featurecoal-giants-the-worlds-biggest-coal-producing-countries-4186363/

However, in developed countries (e.g United States), they primarily focus on the tertiary sector, which classifies those countries as de-industrialized. The coal and oil mining businesses are largely involved in the whole process of single-use plastics being made as they provide the natural resources used. For numerous economies worldwide, these businesses are the ones which provide jobs and help somewhat stabilize the unemployment rate. Additionally, providing a stable income to an employee will increase the amount of tax paid to the country's government, which can later be used to fund the public sector (education, entertainment, healthcare, police, infrastructure, nationalized industries). If the whole production of single-use plastic were to diminish, the economy would face downfall. Evidently, there are many uses to oil and coal besides manufacturing of plastics, however, if those industries were to close, coal mining and oil extracting sales would largely decrease.

Mining is a significant contributor to national economic development, measured by the revised Mining contribution Index (MCI-Wr). It is inevitable that the top 10 countries with the largest coal industries in the world would have moved up a few steps in the World Bank's country classification for 20 years straight. Under no circumstances should we omit how several lower income countries (LIC's) with large coal resources have also benefited greatly financially. Data from MCI-Wr's study in 2016 has confirmed that mining has had a significant impact in the economic development of LEDCs.

Figure 4 shows a map of the countries where mining contributes more to wealth is in black and the ones where mining contributes less are shown in a lighter grey.

Areas where mining has positively impacted their economy are Central Asia, Southern, Western and Central Africa, Oceania and South America. The regions shaded in grey where mining contributes less to their economy are Western Europe, North Africa and the Middle East, Japan and some countries in South Asia.

Major countries and organizations involved

Canada

In major cities like Vancouver, they have permanently banned plastic straws, foam cups and single-use food containers, and aspire to ban all solid waste by

2040[20]. All together, they plan to completely phase out single-use plastics which are considered harmful, (such as straws, plastic bags, cutlery, plates and stir sticks) by early 2021. Furthermore, they have decided to work on limits to be introduced for companies that are involved in the manufacture of plastics or sell products with plastic packaging, to become more responsible for their plastic waste. Back in 2018, Montreal banned single-use plastics too.

United Kingdom (UK)

The government announced in 2018 that they intend to take measures moving forward to ban the distribution/sale of plastic straws, drink stirrers and plastic cotton buds in the UK in 2020[21]. In Scotland they ceased the consumption of plastic straws in large businesses(e.g/museum cafes, schools, offices, sports centers etc). Many UK-based companies, such as McDonalds UK and Costa cafe, are few of the many examples of businesses who have banned plastic straws in their shops. Furthermore, the UK government targets to eliminate avoidable plastic waste by the end of 2042.

United States of America (USA)

In several States there are numerous measures that have been implied in the battle to prohibit single-use plastic consumption. In California, New York, Hawaii

[20]Global Efforts to Curb Single-Use Plastics. (2019, December 13). Retrieved August 08, 2020, from https://www.earthday.org/global-efforts-to-curb-single-use-plastics/

[21] Shukman, D. (2019, May 22). Straws: UK government to bring in new controls on plastic. Retrieved August 08, 2020, from https://www.bbc.com/news/science-environment-48358002

and Washington there has been a ban of single-use plastic straws and any other non-biodegradable products. In New Jersey they have banned single use plastic bags and there is a fee of 5-10 cents. In addition, South Carolina also took part in the initiative by banning single-use plastic bags and Styrofoam food containers[22]. Nonetheless, the United States also has a very big issue regarding plastic overconsumption, and several US companies are responsible for the most plastic pollution caused by a company.

European Union (EU)

In 2019, the European Parliament voted in favor of abolishing all single-use plastic products in all UN member states. There was a new law endorsed that would completely ban all single-use plastic items in 2021[23]. All EU member states will have to comply with the changes taking place. By 2025, plastic bottles should be made of 25% recycled content, and by 2029, 90% of them should be recycled[24].

China

[22]Global Efforts to Curb Single-Use Plastics. (2019, December 13). Retrieved August 08, 2020, from https://www.earthday.org/global-efforts-to-curb-single-use-plastics/

[23]Russia to ban single-use plastic items. (2019, May 07). Retrieved August 08, 2020, from https://investforesight.com/russia-to-ban-single-use-plastic-items/

[24]https://www.theguardian.com/environment/2019/mar/27/the-last-straw-european-parliament-votes-to -ban-single-use-plastics

China is one of the world's largest plastic polluters. It did, however, pass a law following to ban all plastics in the past, and even though it was definitely a step in the right direction, it was not the most successful. Part of the plan was to ban non-biodegradable bags, as was announced by the major Chinese cities, and in all cities and towns by 2022[25]. There has been more than 200 million m squared of plastic waste floating off the Chinese coast in 2017, up to 27%. A large amount of plastic waste is also being dumped in significant industrialized zones in China, near the Yangtze river for instance[26].

India

New Dheli phased out all single-use plastics in 2017. In 2018, India was expected to announce they would ban 6 types of single-use plastics. However, it has since been postponed with the excuse that it would disrupt the industry. They also announced that they would ban single-use plastics in 2022[27]. Even though India is not the top plastic polluter in the world, its disposing methods are insufficient.

France

[25]Single-use plastic: China to ban bags and other items. (2020, January 20). Retrieved August 08, 2020, from https://www.bbc.com/news/world-asia-china-51171491

[26]Baynes, C. (2019, October 29). China dumps 200 million cubic metres of waste in sea after drive to stop throwing it in rivers. Retrieved August 08, 2020, from https://www.independent.co.uk/environment/plastic-pollution-china-sea-waste-rivers-yangtze-pearl-environment-a9176286.html

[27] India tables ban on single-use plastic. (2019, December 17). Retrieved August 08, 2020, from https://www.earthday.org/india-tables-ban-on-single-use-plastics/

In 2016, France banned supermarkets from distributing free single-use plastic bags. It aimed to minimize the consumption of an estimated 5 billion plastic bags from supermarkets, and around 12 billion produce bags. There was a risk that the economy would be affected negatively, however, the French Environmental Minister estimated over 3,000 jobs would result from production of an eco-friendly alternative[28]. Other initiatives that took place in 2016 was the Paris agreement. The Paris agreement was an agreement within the United Nations Framework Convention to combat the issue of climate change by dealing with greenhouse gas emissions, adaptation, mitigation, and finance[29].

Kenya

In 2017, Kenya implemented a country-wide ban of plastic bags that also falls on the distributors and producers of single-use bags. They implemented severe consequences if anyone disobeyed the new enforced law, which was either being sentenced 4 years to jail or 40,000 fine for selling plastic.

Timeline of events

1856	Parkesine, the first member of the Celluloid class of compounds and is

[28]Global Efforts to Curb Single-Use Plastics. (2019, December 13). Retrieved August 08, 2020, from https://www.earthday.org/global-efforts-to-curb-single-use-plastics/

[29] (n.d.). Retrieved August 08, 2020, from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

	considered the first ever man-made plastic patent, created by Alexander Parkes[30].
1869	The invention of celluloid was accomplished by John Wesley Hyatt.
1898	The German chemist Hand von Pechmann manufactured polyethylene for the first time.
1907	Bakelite, a material that would later be used very commonly in the production of various household products during the Roaring 20s, invented by Leo Baekeland.
1912	Jacques E. Brandenberger discovers cellophane.
1990s	Increased amount of plastic manufactured.

30"Timeline of Plastic Development." *Wikipedia*, Wikimedia Foundation, 13 July 2020, en.wikipedia.org/wiki/Timeline_of_plastic_development.

2011	Australia was the only country since then to successfully ban all single-use plastic bags.
2015	The global amount of plastic produced was 7.8 billion tonnes. More than every person alive on Earth[31].
2016	The Paris agreement was signed.
2018	Several countries and organisations/companies took measures to completely ban or reduce how much plastic they make, distribute and use. Vancouver was the first major Canadian city to ban single-use plastic straws and move on to planning on removing all single-use plastics by 2040.

[31]Parker, L. (2019, June 07). The world's plastic pollution crisis explained. Retrieved August 08, 2020, from https://www.nationalgeographic.com/environment/habitats/plastic-pollution/

2019	The EU voted against the consumption of single-use plastics in all EU member states.

Previous attempts to solve the issue

Businesses and companies:

Countless coffee shops and food chains have either switched or are in the transition stage of phasing out single-use plastics (e.g/ replaced plastic cups with biodegradable paper cups), and instead are using biodegradable paper. Despite this, there are several disadvantages to an alternative like this, one being the cost. A company may not have the budget to facilitate a product like that, hence, will continue to use plastic products because it's much cheaper.

Greengrocer businesses, commonly in Asian and Latin American countries, have come forth with a very eco-friendly solution which has seemed to be quite successful, and affordable. They have replaced plastic/Styrofoam packaging used for fruits and vegetables with plant leaves, specifically, banana leaves. Notable mentions are The Philippines, Vietnam, Indonesia, Thailand, and Bolivia, known to have a large source of banana leaves at their disposal. Reducing single-use plastic waste in packaging and replacing it with banana leaves is the ultimate solution for reducing plastic. Benefits include: it is even cheaper than plastic, it is biodegradable, commonly found in those countries, no harmful chemicals are released while it's made or being disposed of because it is natural, and finally, no health related issues are presented as it is not made from toxic substances.

Government initiatives:

In supermarkets, environmental taxes have been enforced in order to encourage people to bring their own reusable bags, whilst at the same time limit the number of plastic bags used per person. Governments have also taken legislative action by enacting fees and bans on businesses that use lots of plastic products.

Relevant UN Resolutions, Events, Treaties and Legislation

- UNEP/EA.2/Res.11 2/11. Marine plastic litter and microplastics[32].
- In 2015, 17 sustainable development goals adopted by UN member states for 2030[33]. It included increasing regulations regarding plastic consumption.
- At the Earth Summit in Rio De Janeiro, Brazil, in 1992, Agenda 21 was adopted by 178 governments[34]. It outlined the protection of the environment and human lives through global alliance.

Possible solutions

Humanitarian aspects:

Plastic pollution is an immense global challenge which humans are responsible for. However, simple changes in everyone's daily routine will definitely benefit the planet in the long-term. Firstly, swapping out single-use plastic bags for

[32]http://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/13444/UNEA%202%20Marine%20plastic%20litter%20and%20micro-plastics%20English.pdf?sequence=1&isAllowed=y

[33]The Sustainable Development Agenda – United Nations Sustainable Development. (n.d.). Retrieved August 08, 2020, from https://www.un.org/sustainabledevelopment/development-agenda/

[34]Staff, B. (2020, April 30). AGENDA 21: The socialist plan to use coronavirus pandemic for GLOBAL CONTROL. Retrieved August 08, 2020, from https://www.theblaze.com/glenn-tv/agenda-21-pandemic

reusable bags when shopping for groceries is a simple, yet effective alternative. An eco-friendlier choice are metal water bottles which are reusable.

Thirdly, instead of drinking from plastic straws, an eco-friendly replacement would be reusable straws made of either metal or glass. Furthermore, avoiding materials like polyester, nylon, acrylic and other synthetic fibers as they are all types of plastic and are present in about 60% of clothing made today. When putting such materials in the wash, tiny plastic fibers can be released into the water system which will eventually make their way into the ocean[35]. Buying secondhand clothing limits the amount of clothes made, and as a result, will limit the effect clothing has on the environment. There are plenty of additional alternatives to minimize the consumption of single-use plastic products in someone's everyday life.

Government initiatives:

Incorporate a legislation that restricts the amount of plastic produced by one major plastic manufacturing firm. If that was to happen, the next step is to increase taxes on those major plastic manufacturing firms to sustain restrictions on overproduction. If any of these companies by any chance dismiss the new profound regulations, they could be obligated to pay a fine.

Company interference:

Coffee shops could completely stop using plastic cups/straws, instead they can use ones made of paper. Another very useful solution that will not only benefit the businesses economically, but will also make them more sustainable, is to encourage people to buy a slightly more expensive reusable cup. Moreover, food chains and

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coffee shops can add a recycling bin where customers can throw away single use plastic products and enforce recycling and even composting to assure the prevention of extensive food waste.

Educational aspects:

Educating students in schools, both young and older, to discuss the advantages and disadvantages of plastics and even incorporating a lesson which illustrates the dangers of plastic pollution in the environment in the context of an environmental studies subject would increase the awareness of all citizens. Further, emphasizing on the impact both animals' and humans' lives face, but also on the financial impact. This, in turn will educate young, developing minds in being more environmentally conscious, as well as putting into perspective that ignorant actions result in the destruction of the ecosystem.

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