

THE ENVIRONMENTAL CHALLENGES OF POLYTHENE AND PRODUCTION AND PREVENTION LEGISLATION IN THE WORLD

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Abstract

Plastic pollution is one of the major environmental concerns of the twenty-first century. It has an impact on the global environment and will eventually have an impact on every walk of life. Plastic pollution is not an issue of one state or region, but it is a global issue. Human intellectuals and states all have the duty to give alternate option to stop plastic pollution locally and internationally. Aquatic pollution due to plastic waste is a worldwide challenge causing adverse impacts on aquatic ecosystems and public health. In this paper, plastic pollution, production, usage, our ocean, the producer, and the legal framework for the control of plastic use or plastic pollution globally as well regionally will be discussed. It also focuses the effects of plastic pollution on our environment, especially on marine creatures as it can be hurt either by mechanical impacts, physiological problems linked to ingesting plastic garbage, or being exposed to synthetic compounds introduced into plastics.

Keywords: Plastic pollution, Legal framework, Aquatic ecosystem, Natural habitat.

1. INTRODUCTION

Plastic was initially created in the 1860s but it was not used in industry until the 1920s. By the 1940s, its output had been skyrocketed and remained one of the fastest-growing worldwide industries [Washington, DC: 2013]. Plastic production rose from 1.7 million tons in 1950 to approximately 300 million tons in 2012, growing at an average rate of 8.7 percent annually [Brussels: 2014]. From 1970 to 2012, global output grew as plastics slowly swapped resources like glass and metal. Plastic packaging is gradually replacing metal, glass, and paper packaging, especially for food. 30 percent of package sales in 2009 were made up of plastic packaging [Naperville, IL: 2009]. The United States of America vehicle industry has been an exponent of this change as the U.S. government mileage rules have pushed for a reduction in vehicle weight. Currently, a distinctive American automobile has 336 pounds of plastic, or about 10% of the weight and 50% of the volume, of the vehicle [Washington, DC: 2014]. Less than 20 pounds of plastic were used in automobiles in 1960. Metal is now frequently replaced with plastic in engine parts, bumpers and door panels.

Plastic merchandise buildup Plastic pollutants in the environment that badly disturbs the natural world, wildlife environment, and human beings. Plastic debris that causes pollution is categorized as micro or macro debris solely based on length [Hammer, J; Kraak, MH; Parsons, JR 2012]. Plastics are less expensive and sturdy, and as a result degree of plastic manufacture, by the way, human beings are excessive [Hester, Ronald E.; Harrison, R. M. 2011]. The chemical makeup of the majority of plastics makes them resistant to many natural decaying tactics, and as a result, they deteriorate gradually. Together, these two factors have resulted in an overabundance of plastic contaminants in the environment [Lytle, Claire Le Guern, 2009]. Land, waterways, and oceans can all be affected by plastic waste. Dwelling species, particularly marine animals, may suffer harm mechanically (such as tangling in plastic objects or issues related to ingesting plastic trash) or chemically (via exposure to chemicals in plastics that interfere with physiology). Pollutants made of plastic have an impact on people too, disrupting a variety of hormonal systems. Plastic consumption and manufacture have increased globally for more than 50 years. Estimates indicate that 299

million lots of polymers were produced in 2013, a 4% rise over 2012 and confirmation of a trend toward growth [Gaelle Gourmelon 2015].

Environmentalists have long criticized plastic as a persistent contaminant that cannot completely be decomposed and nor biodegradable. According to a study done in 2004 by Dr. Richard Thompson at the College of Plymouth in the UK, there is a lot of plastic trash in the oceans and beaches of Europe, America, Australia, Africa, and Antarctica. They declared that the tiny plastic pellets known as "mermaid's tears," which are produced by residential and commercial plastic garbage, have undoubtedly spread throughout the world's oceans. Some plastic pellets had broken up into fragments with a diameter smaller than a human hair. However, even though some are hidden, the portions are still there and are still made of plastic. They simply float around inside the herbal device rather than being absorbed there, where they are eventually consumed by zooplankton and marine life [Claire Le Guern, 2009].

According to the latest study of plastic pollution to date, eight million tons of plastic entered the oceans in 2010. According to worldwide observation, 192 countries created 275 million tons of plastic garbage. With 1.32 to 3.52 million tons, China was the country that produced the most of this trash. The Philippines, Sri Lanka, Indonesia, and Vietnam came next [Anna Salleh, 2015]. Less than 0.01 million tons came from Australia, which didn't place among the top 20 pollutants. However, they continued to deliver up to 13,888 tons of trash per year, of which 25% find their way into waterways. Given the exponential rise in plastic production worldwide, the amount of plastic that eventually ends up in the ocean is certain to increase significantly [Genelle Weule, 2017].

In June 2006, UN environmental program reported that there was a normal of 46,000 bits of plastic flotsam and jetsam drifting on or close to the shallow of each square mile of sea. We live in a plastic-accommodating ethos; for all intents and purposes, each individual on this planet utilizes plastic materials straightforwardly and in a roundabout way each and every day. Every year, our children use almost 210 million pounds of plastic diaper liners to begin their lives on Earth. We also give them toys made of plastic and drain jugs, and we buy their food using plastic containers and plastic credit cards. Maintaining a strategic distance from those infants by utilizing contraceptives brings about the mass transfer of billions of latex condoms, stomachs, and hard plastic anti-conception medication pill compartments every year [Niall Ferguson, 2006].

Human beings regularly consume food and liquids from roughly 34 billion containers and bottles that were later created. They patronize fast food restaurants with drive-through windows and buy products that use an additional 14 billion pounds of plastic. Their social orders as a whole continually produce 60 billion tons of plastic material. Each one of us consumes 190 pounds of plastic annually on average; filtered water, cheap food bundling, furniture, syringes, PCs and PC diskettes, pressing materials, junk sacks thus substantially more. When it is deliberated that this plastic does not biodegrade and stays in the biological systems for all time, human beings are taking a gander at a fantastically high volume of amassed plastic junk that has been developed since the mid-twentieth century. This high-level use of plastic is a danger to planet because these plastics will go somewhere which is just three spots it can go: earth, air, and seas [Natasha Christian, 2018]. Although it is very difficult to determine the actual amount of plastic in the ocean, the most recent estimates place the amount at up to 51 trillion particles, or 236,000 tonnes. That may sound like a large amount, but it is undoubtedly far less than the estimated 8 billion tonnes that were dumped into the seas in only 2010 alone. Definitely, the end result of the "missing" plastic is a puzzle for scientists.

Plastic is far-reaching in the vast sea, yet is especially amassed in the five noteworthy sea gyres, turning streams of water, in the Pacific, Atlantic, and Indian Oceans. The Great Garbage Patch in the North Pacific, a collection of tiny fragments of plastic less than 5 millimeters in size, is the largest and best-known of them. There are two kinds of plastics that buoy; one is polyethylene, which is utilized to make drain containers and plastic sacks, and the second is polypropylene, which is utilized for things like jug tops, straws, and dairy compartments. As they fly out to the ocean plastics get ground down into little, hard 3D shapes, which can be eaten by marine creatures.

Additionally, microbes live in plastics in a phenomenon known as the "plastic circle." Although there is some evidence to suggest they could play a role in separating the plastic, these species may simply be using the plastic to skim across the sea. Although recent research discovered the centralization of the smallest particles, between a few microns and a few millimeters, was significantly lower than anticipated, plastics should theoretically become more indestructible as they separate.

2. PRODUCTION OF PLASTIC INCREASES GLOBALLY, AND RECYCLING LAGS

An estimated \$600 billion of income is produced annually by the global plastics industry [Austin, TX:2014]. Plastics are used in a wide range of fields and businesses including building, telecommunications, health care, foodstuff and transportation. Western Europe and North America had 100 kg [pounds] of plastic consumed per person [Nairobi: 2014]. Asia presently utilizes only 20 kilograms per person, but it is anticipated that this number would rise quickly [Berlin: 2014].

Asian countries are now producing more plastics. In 2013, the region generated 45.6% of the world's plastics, with China generating almost a quarter of them [Brussels: 2014]. Due to the country's expanding manufacturing industries and rising population, India has recently experienced a rapid increase in plastic production [Tavazzi, L. 2013]. Currently, the central Asian countries and Europe are producing 22.9% of the world's plastics, with Germany leading the continent in this regard. 19.4% of the world's plastic is produced in North America, with the United States playing a significant role [Washington, DC: 2014]. The Middle East and Africa (7.3%) and Central and South America (4.8%) have the lowest output proportion of the entire world [Brussels: 2014]. The majority of plastic is consumed for packaging, which accounts for 40% of demand in Europe and 42% in the US.

Around 22 to 43% of plastic garbage in the world is dumped in landfills, wasting resources, taking up valuable space and degrading communities [Nairobi: 2014]. These issues could be reduced by refining plastic from the waste stream for recycling or electricity. However, a large portion of the plastic waste that is collected for recycling is sent to nations with lesser environmental regulations, throwing off the equilibrium between resource usage, environmental protection, and clean material cycles. Additionally, energy recovery from plastics frequently produces harmful ash, necessitates air emission regulations, and is inefficiently efficient [Nairobi: 2014]. The amount of post-consumer plastic generated in Europe in 2012 was recycled at a rate of 26%, or 6.6 million tons, while 36% was burned for energy recovery. Accordingly, 38% of post-consumer plastics in Europe ended up in landfills [Brussels: 2014]. There are nine European nations that have banned the disposal of plastics in landfills.

In 2012, just 9% of the plastic produced in the US [2.8 million tons] was recycled. The remaining 32 million tons, or around 13% of the country's municipal solid waste stream, were dumped [U.S. EPAP 2014]. Although some of the plastic debris is exported to Canada and Mexico, while China and Hong Kong receive the majority of the United States' plastic waste [Costas Velis 2014]. Plastic recovery rates are indeed lower in other parts of the world. According to the United Nations Environment Programme, 32 percent of plastic waste in Latin America, 40 percent of plastic waste in Asia, and 57 percent of plastic waste in Africa is not even collected; it is instead left as trash or is fired in the open [Nairobi: 2014]. Japan, UK, Germany, and the US are the top exporters of waste plastics. Europe is the world's leading exporter of waste plastic destined for recycling and exports roughly half of the plastics it gathers for recycling [Costas Velis 2014].

China imports the majority of plastic trash from the western world with established collection systems, accounting for 56 percent [by weight] of all imported waste plastic globally. However, it's unclear what will happen to all of this imported plastic once it arrives. According to the International Solid Waste Association, there is still a significant amount of plastic that is processed by family-run, low-tech firms without any environmental protection measures [Costas Velis 2014]. The government of People's Republic of China has underway to take action to remove uncontrolled facilities through its 2010 Green Fence Operation. China is the sole source of 87 percent of Europe's

exports of recyclable plastic garbage. Recent quality control initiatives [implementing a "zero tolerance" policy for contamination levels in imports] by China's border control, which resulted in a drop in the price of secondary raw materials, showed how susceptible the international plastics recycling market is to be changed in the Chinese market [Costas Velis 2014].

Every year, 10 to 20 million tons of plastic make their way into the ocean. A total of \$13 billion is wasted annually due to the environmental harm caused by plastics to marine ecosystems, which also includes time spent cleaning beaches and financial losses to the fishing and tourism industries [Costas Velis 2014]. Plastic remains in the ocean after it has entered. Small fragments of it disintegrate and are swallowed by marine life, moving chemical contaminants from prey to predator and moving them up the food chain. According to a recent study, there are approximately 268,940 tons or 5.25 trillion plastic particles floating about in the world's oceans [Marcus Eriksen et al., 2014]. With approximately 2 trillion pieces of plastic weight over 96,000 tons, the North Pacific gyre has the most. More plastic pollution is present in the Indian Ocean in the southern hemisphere than in the South Pacific and South Atlantic combined [Marcus Eriksen et al., 2014].

3. GLOBAL REGULATIONS OF PLASTIC POLLUTION AND ITS ENFORCEMENT

This section provides a synopsis and overview of the developed nations that have made enacting legislation and guidelines that restrict the use, manufacture, sale import, and removal of microbead products, which end up as marine litter. There is also a review of voluntary measures used in countries to control the manufacture and sale of microbead products. Similarly, there are only a few countries, i.e. [8 out of 192 countries [Canada, France, Italy, New Zealand, the Republic of Korea, Sweden, UK, and the US] have banned microbeads by regulating national-level laws and regulations in use, sale, and manufacture of personal care products. It is interesting to note that Sweden is the only nation to have fully enforced the prohibition on the manufacturing and sale of rinse-off cosmetic products that include plastic particles smaller than 5 mm in any dimension [Marie Lof, 2018].

Several worldwide and local treaties, conventions, and different agreements impose binding responsibilities on the international community or state to keep the oceans, the species that live there, and the ecosystems safe from pollution, including the one which comes from the land and contains things like plastic bottles, shopping bags, crisp packets, cigarette lighters, and cellophane wrappers. International law may have one major drawback. Though, it might be difficult to keep obligations, despite the fact that they are solemn and legally enforceable.

There is no law enforcing agency or prosecuting attorney in charge of enforcing them. The most powerful country that is a party to a treaty has the authority to raise disputes with other parties, but they are frequently hesitant to do so for understandable reasons. They do not desire to disrupt pleasant political relationships with their associates or neighbor states; they will worry about the possible expenses and few governments are so ideal themselves as to have any fear of being at the receiving end of comparable remedy.

As a result, nations that ignore their legal commitments to defend the marine ecosystem against attacks from ocean plastic and other sources do not come under much pressure. Although they may theoretically be brought before the international court of the law of the ocean, which has the vitality to use huge consequences, expenses, and reparations in opposition to offending events, they see no prospect on the spot that this would possibly manifest, and they are maybe definitely right. It does not mean that there is not anything to be completed. On the other hand, public shame is a potent tool for business. No government enjoys being criticized for breaking many legal agreements and international laws. Ocean plastic activists from all around the world may utilize the moral weight of international law to put pressure on governments to uphold their environmental obligations, comply with the law, and take crucial steps to significantly reduce plastic pollution in the oceans.

States that are mostly responsible for marine plastic contamination ought to be somewhat concerned. One small state whose fisheries, seashores, or tourism are being negatively impacted by a wave of waste plastic would be sufficient to prove that international law actually has

consequences. Despite the fact that such a country may be scared of acting on its own, it is far from where it is going. If supported by a much larger coalition, such as the association of tiny island governments, and backed by a coalition of conservation NGOs and civil society, that may alter as the amount and impact of marine plastics increase. There is a need of trade on immediate basis in order to stop the drift of plastic into the waters, which is now estimated to be about 8.8 million tons per year. It would save all the unique species and priceless ecosystems that the plastic tide is driving to oblivion, and to restore the overall health of our seas and all life on earth.

According to the widespread consensus, "current international mechanisms, governmental policies, non-governmental regulations, and market standards are obviously not strong enough, nor broad sufficiently, to safeguard and preserve marine ecosystems worldwide" [Ferraro, G. and Failler, P. 2020]. Although enhanced global attention and numerous political initiatives to foster cooperative approaches [Nielsen TD, Holmberg K, Strippel J. 2019].

Although universally global agreements are "soft law," voluntary, and not required by law, they are important incentives to control behavior and could one day turn into "hard law." [Stoll, T., Stoett, P., Vince, J., & Hardesty, B. D. 2020]. These agreements reflect established and evolving conventions. There are few formal mechanisms to punish countries that violate these norms beyond shame tactics, which have different degrees of success. Recently, regulation has been developed to help manage and decrease plastic trash i.e. Sustainable Development Goals (SDGs), United Nations Environment Assembly (UNEA) resolutions, Food and Agriculture Organization (FAO) strategies on marking fishing equipment, and G7 marine litter action of the International Maritime Organization (IMO) are some international agreements for managing and preventing Microplastic (MPs) SDG aims to eliminate and considerably diminish any kind of oceanic debris up to 2025. Through the Oceans Conferences conducted by the United Nations in 2017 and 2018, substantial progress has been achieved toward fulfilling the SDGs. These devices, strive directly or indirectly to prevent marine pollution including MPs [Nielsen TD, Holmberg K, Strippel J. 2019].

Other instruments include the United Nations Convention for the Law of the Sea [UNCLOS], which concentrates on garbage and chemicals. Moreover, the global plastic waste industry was made more transparent and regulated by the new amendment to the Basel convention. The instruments stated above are connected to oceanic debris, and general pollution and target largely secondary MPs [that arise from the fragmentation of larger plastic items], leaving a gap in primary MPs that were not tackled by any of the current global instruments. The UNEA resolutions address marine plastic pollution and MPs as a bundle, but still, recognize specific issues concerning MPs. Considering the increasing development of ocean contamination by plastic litter, research is required to help restrict plastic pollution and clean water bodies globally. States should take innovative efforts to educate the public about marine debris. To manage the excessive use of plastic, there must be strict laws and policies. If not, the ecosystem will degrade in the following few decades [Shivika Sharma and Subhankar Chatterjee 2017].

More than forty nations mostly agree to both ban or partially ban plastic, and impose taxes or fines on people and corporations consuming single-use plastic luggage to higher guard and keep the surrounding atmosphere protected. Below are continent-wise regulations regarding plastic pollution;

3.1.1. Africa

More than 15 countries in Africa have either outright banned or charged for the use of plastic bags, placing the continent at the forefront of their development. The first country to call for a boycott was South Africa, which asserted that the plastic pack was becoming its "national flower." This was due to the number of packs that appeared as litter in bushes and trees. To demonstrate that they were serious about the issue, South Africa imposed in 2003 fines of AUD\$11,000 or a 10-year prison term. Back then, the administration claimed that the 55 million nation used eight billion plastic packs annually. Kenya surpasses South Africa in 2017 by making the manufacture, sale, and even use of plastic bags illegal. Kenya set a maximum fine of \$AU56, 000 to ensure that the message was clearly understood, making it the strictest rule in the world to combat plastic waste. [Oliver Tickell, 2018].

According to Greenpeace, Morocco, a nation in North Africa, used to be the world's second-largest consumer of plastic bags behind the United States. However, Morocco has prohibited producing, importing, selling, and dispersing plastic bags since 2016. In the year after the ban's implementation, according to the press agency AFP, Moroccan police have captured around 420 tons of plastic bags being used illegally [Oliver Tickell, 2018].

3.1.2. Asia

In 2002, Bangladesh became the first nation in the world to outlaw plastic bags. The decision was made to protect their drainage systems and prevent further flooding catastrophes. Similarly, usage of plastic bags has been banned completely in half of India's states and territories. But it has not been simple, all disposable plastics, including bags, cutlery, cups, plates, and other single-use products, were outlawed in 2017 in the capital city of Delhi. In Karnataka, further south, the government imposed a total ban on the entire state in 2016. There, single-use plastic items cannot be used or sold by wholesalers, retailers, or traders [Oliver Tickell, 2018].

China forbade retailers nationally from handing out free plastic bags in 2008 ahead of the Olympic Games in Beijing, requesting that customers use baskets and cloth bags in its place (referencing the color of the bags). According to China's National Development and Reform Commission, within a year of the ban's implementation, 40 billion fewer plastic bags were used in supermarkets. Though many store owners and street vendors have broken the restriction without receiving a penalty throughout the years, raising doubts about the order's effectiveness.

In the beginning of 2018, the developed countries were no longer able to export their plastic garbage to China, requiring them to reconsider their domestic recycling practices. China has also outlawed the import of plastic waste. China was regarded as the largest importer of plastic waste before the ban. Indonesia has committed up to \$1.29 billion over several years to reduce the amount of plastic debris that contaminates its seas. The nation has utilized an across-the-country battle to enable retailers to energize purchasers to AUD\$ 0.48 for plastic bags [Oliver Tickell, 2018].

High-thickness polyethylene plastic sacks were eliminated from Yangon, the capital of Myanmar, in 2011 in response to a request by the development committee of the city of Yangon. Additionally, the administration hindered legal activity and approved scratch-offs for polythene pack production units that did not shut down. The action followed Mandalay's decision to boycott plastic packaging in an effort to protect the environment. Malaysia, Cambodia, Taiwan, and the Philippines are among other Asian nations with restrictions or levies [Oliver Tickell, 2018].

3.1.3. Europe

There was a deadline set by the European Union, which ought to force many countries to adjust their plastic consumption habits by 2019 and demanded an 80% reduction in plastic packaging. Denmark was the first nation in Europe to levy a fee on plastic bags in 1993. It is said that as soon as the tax was implemented the annual usage fell from approximately 800 million to 400 million [Oliver Tickell, 2018].

The world's first country to forbid disposable plastic cups and plates was France. As a crucial element of the "Green Growth" policy to reduce carbon emissions and landfill trash, it also forced a countrywide ban on single-use plastic bags at food store checkouts in 2016.

Ireland gave the idea of imposing a "bag tax" more general thought in 2002, hoping to discourage customers from buying plastic bags. Within a few weeks, there was a 90-percent decrease in the use of plastic bags and a reduction in trash. Due to an increase in bag usage, Ireland increased the fee once more in 2007 to 0.22 euros (AUD 0.35). Moreover, England, Scotland, Wales, Belgium, Italy, and Germany are European nations with restrictions or levies in place [Oliver Tickell, 2018].

3.1.4. America

Despite the fact that some states and towns have anti-bag laws, the United States has not yet enacted a general ban on single-use plastic bags. In 2014, California was the first American state to outlaw plastic bags and introduced a fee for paper ones. San Francisco became the first US municipality to prohibit the use of shopping bags in 2007. In 2014, they also outlawed the use of plastic water bottles on public land. There is a five-cent (USD) fee for each pack used in New York

City. Additionally, the mayor of Chicago outlawed plastic bags in 2014; while the cities of Washington and Dallas compelled a company to apply fees for plastic bags as well as on paper bags. In 2015, Hawaii and Honolulu forbidden single-use packets. Nonetheless, they prohibited their practice even if it was thought to be for therapeutic purposes [Oliver Tickell, 2018].

In Canada, the provinces of Nova Scotia, Quebec, and Manitoba no longer utilize single-use plastic bags. Following the discovery that Quebecers use two billion packs of plastic bags annually. A proposal to gradually phase out plastic bags was unveiled by the city of Montreal, even biodegradable ones. In 2018. For the boycott in Montreal specifically, businesses might be fined up to \$2,000 [AU2, 030] and groups could be fined up to \$4,000 [Oliver Tickell, 2018].

Chile was the first nation in Latin America to stop using single-use plastic bags in seaside areas in 2017. Bachelet signed a bill in October 2017 that forbade the trade of single-use plastic bags in 102 coastal towns and villages. Also pledging to minimize the use of single-use plastic bags, Argentina, Brazil, and Colombia have implemented measures to use solely reusable packaging and to improve recycling opportunities [Oliver Tickell, 2018].

3.1.5. Australia

With the implementation of Coles Bay's ban on single-use plastic bags in 2003, Tasmania became the first state in Australia to prohibit plastic bags. During the first year of the boycott, 350,000 fewer plastic packets were reportedly utilized in the region. What has left of Tasmania issued a widespread boycott in 2013 after looking up 10 years in the future. In 2009, South Australia became the foremost state to enact a prohibition, fining businesses up to \$5000 and retailers up to \$20,000 for selling prohibited bags. The only Australian state that does not now forbid single-use plastic bags is New South Wales [Oliver Tickell, 2018].

4. AVAILABILITY AND ABUNDANCE OF PLASTIC IN THE OCEAN

In contrast to the amount that has been measured floating on the ocean's surface in its "garbage patches," eight million tons of plastic rubbish from coastal nations entered the ocean in 2010. Unless the world finds a way to improve how waste is collected and managed, the volume is expected to climb tenfold in the next ten years. In the majority of attempts to assess ocean debris, sample counts of plastic floating on the surface in significant gyres of trash in each of the world's seas have been used. A survey conducted in 2014 put the maximum amount of floating rubbish at 245,000 tons [Laura Parke, 2015]. Lead author and environmental engineer Jenna Jambeck from the University of Georgia, compares the eight million tons figure to five grocery bags of trash lined up on every foot of coastline worldwide in order to make it more understandable. "And by 2025, these five shopping bags of plastic are going to reach ten bags," which, if current garbage management procedures are followed, there will be 155 million tons annually [Laura Parke, 2015].

Plastics are hard material. It is challenging to separate them till their consumption. Only a small number of these squares use the more modern plant-based bio-plastics composed of polylactic acid (PLA), but there are several that you can return back. In any case, much like customary petrochemical plastics, for example, Perspex, PLA-based plastics just separate under high temperatures. In the common habitat, the fundamental things that separate plastics are daylight, oxygen, and water. The incorporates supposed degradable polymers utilized as a part of some plastic packs, which have starch added to enable them to break apart [Lina Zeldovich, 2019].

The type of plastic and the environment have an impact on how quickly plastic degrades. It degrades more quickly amid physical friction and sunshine. Therefore, it does so in surf environments more quickly than it does when buried beneath silt in an estuary. The thickness, density, and presence of UV stabilizers in the plastic also have a significant impact. When compared to a thin plastic bag being tossed around in the surf, dense monofilament fishing line has a lifespan of up to 600 years. But even if the bag degrades over the course of a year or six months, it may have already had a significant negative influence on the ecosystem. The issue is that normal degradation leaves nanoparticles and microparticles that may still be dangerous to living organisms [Swiss Federal Laboratories for Materials Science and Technology].

5. THE NOVEL CORONAVIRUS EFFECTS ON PLASTIC POLLUTION

The SARS-COVID-19 virus started to spread over the globe in December 2019, marking the first pandemic of this magnitude in millennia. What started as a health catastrophe has quickly transformed into an economic, social, political, and environmental consequence due to the severity of the novel coronavirus's respiratory ailment and its highly contagious nature [Silva *et al.*, 2020]. The term first underwent a global shutdown on both an international and domestic level. Lower carbon emissions were the result of people becoming less active, greater animal observations in metropolitan areas, and probably lower amounts of various forms of plastic debris lost to the environment. However, the significant increase in single-use plastic personal protective equipment [PPE] and other medical waste linked with the epidemic decreased these degrees [Ammendolia, *et al.*, 2021]. A growth of single-use plastic bags, cups, and takeout containers connected to the food sector was also observed [Prata, *et al.*, 2020]. Plastic demand for packaging, medicinal usage, and other uses is likely to rise [Parashar, N., and Hait, S. 2021]. It has been observed that plastic business clients use customer sanitization and hygiene anxieties to urge governments to rescind or postpone laws that would ban or decrease single-use plastic [Prata, *et al.*, 2020].

COVID-19 was declared a global health emergency by the World Health Organization in the early 2020s, causing increased disruption to supply networks throughout the world [Hedwall, M. 2020, Magableh 2021]. A variety of items, including pharmaceuticals and medical equipment, as well as PPE, power, foodstuff, petroleum, toilet paper, and other domestic commodities, have experienced supply chain interruption. Demand drops (e.g., airline trips) and demand surges are examples of supply chain disruptions (e.g., Online purchasing of toilet tissue) decrease in production (e.g., employment in shops or restaurants) Restriction on storage/access (e.g., storage facilities for producing and storing meat, etc.) limited supply of raw materials (e.g., construction materials and electrical components like memory chips) [Pujawan, I. N., and Bah, A. U. 2022]. These supply chain disruptions are widespread across nations, businesses, and communities, highlighting the global market's insecurity [Bassett, *et al.*, 2021]. Countries are attempting to lessen their reliance on the global market by developing and fortifying strong regional and domestic markets. Moving toward the recycling and reuse of plastic is one strategy that is gaining traction. The goal of safeguarding supply networks from system disruptions like the ongoing COVID-19 outbreak, political unrest, and other impending or emergent crises emphasizes this point [Vince, J., and Hardesty, B. D. in press].

6. HUMAN RIGHTS AND MICROPLASTIC POLLUTION

The individual's rights and dignity include the right to good health. The right to health is part of the World Health Organization's (WHO) constitution since 1946. There are at present several internationally and regionally binding agreements and treaties that defend the right to health, following the 1948 Universal Declaration of Human Rights. The Convention on Economic, Social, and Cultural Rights (ICESCR) has the highest level of authority. The right to health is defined in Article 12 of the ICESCR as "the right of every person at the highest level of mental and physical health."

In addition, there are at least 115 constitutions from different countries that acknowledge that each has a fundamental right to health. The human right to health was encroached upon by microplastic pollution in many ways. A healthy natural environment confirms the cleanliness of the air, water, soil, energy, and physical inputs for the industry. The negative environmental and food safety impacts of microplastics violate international human rights law. MPs constitute a severe risk to current and forthcoming generations by remaining in the oceans and terrestrial environments for hundreds of years, which leads to damaging terrestrial and marine ecosystems and diminishing the carbon sink capacity of the oceans, which is crucial for mitigating climate change. The phrase "healthy environment as a prerequisite for human rights" and "human rights as a tool for protecting the environment" are combined to form the phrase "right to a healthy environment (RTHE)" [Katarina Zimmer, 2021].

ICESCR argues that environmental protection and improvement are crucial for health. The 1972 Stockholm Declaration and the 1992 Rio Declaration on Environment and Development affirmed this symbiotic relationship between human rights and the environment. This method of defending the

environment based on human rights was reinforced by the United Nations Joint Declaration on the Right to a Clean Environment [2021]. Everyone has the right to a safe, wholesome, and sustainable environment, according to UN Human Rights Council Resolution 48/13 of October 8, 2021. The three facets of sustainable development—environmental, economic, and social—as well as the significance of ecosystem preservation are acknowledged in the resolution. It also recognizes how these three dimensions' support and advance human rights, which include the right to food and water and the best possible physical and mental health, housing, and clean water for current and future generations [Human Rights Commission].

Despite being referred to as "soft laws," these non-binding resolutions have almost unanimous support. Through their laws, the judicial application of constitutional provisions, regional treaties, and other legal procedures, more than 150 UN member nations have agreed to date that everyone deserves a healthy environment. Additionally, the preamble of the 2015 Paris Agreement calls on members to uphold human rights principles while addressing climate change [Mitchell, Ronald B. 2003].

Globally, hazardous substances such as microplastic endanger human health. In this context, the adoption of UN Human Rights Council Resolution 48/13 [2021], recognizing the right to a healthy environment, is an important step in the fight against this scourge the increasing dangers and concerns of microplastic pollution. The resolution states that other rights recognized by international law are connected to the right to a safe, healthy, and sustainable environment and that this right does not exist in a vacuum [Human Rights Council, 2021]. Thus, international acknowledgment of the link between plastic pollution and human rights can lead to better environmental results. In turn, it reduces adverse impacts on humans and environmental health at the national and global levels.

7. SUGGESTIONS AND REMEDIAL MEASURES

For public awareness, clean-up activities were proposed as major tools and mitigation strategies [Walker, T.R.; Pettipas, S.; Bernier, M.; Xanthos, D 2016]. Yet, given the enormous amount and widespread distribution of plastic litter in the environment, it is incredibly impossible to clean up the current mess [Brennholt, N.; Heß, M.; Reierscheid, G. 2018]. Nevertheless, appropriate cleanup measures could lessen the ecological load of plastic litter [J.C. Prata *et al.*, 2019]. Although there is a dearth of scientifically grounded solutions and technologies among several stockholders and sectors globally to ensure integration and implementation. Likewise, a comprehensive approach to managing the continuously increasing plastic litter in the ecosystem, including the marine environment, is still inadequate. In brief plastic pollution is affecting all countries including international waters. There is a dire need for global cooperation with long-lasting solutions, and multidisciplinary approaches to prevent the ecosystem from the further drastic increase of the current problem. Similarly, both domestic and global authorities dropping the release of plastics from wastewater treatment plants [WTPs], advancements in end-of-life management, life cycle management, and consumer education and awareness are the critical measures for the control of this global problem [(J.C. Prata *et al.*, 2019,) (Hartley, B.L.; Thompson, R.C.; Pahl, S. 2015)].

Plastic is obviously pretty harmful since it is not decomposed. It persists for a much longer period of time [up to 1,000 years longer] than other types of trash. Furthermore, around 80% of marine litter really originates on land, either being cleared in from the shoreline or being transported to waterways from the roads after heavy rains via hurricane drains and sewage floods. The best thing humans can do to protect the rivers is to make every effort to keep as much plastic out of the waste stream as possible. There are numerous little ways that might make a great difference [Sarah Engler, 2016];

7.1. Stop using single-use plastics: Approximately 90% of the plastic items in daily life, such as straws, saran wrap, disposable cutlery, and coffee mug lids, are only used once before being thrown away. Therefore, individuals should pay attention to how often they use these goods and replace them with reusable forms. Before it develops into a habit, it only takes a

few occasions of bringing your own bags to the store, flatware to the office, or travel mug to Starbucks.

- 7.1.1. **Reduce usage of plastic water bottles:** The amount of plastic containers thrown in the trash each year is close to 20 billion. Reusable bottle can save the environment from spoilage. Mineral water must be taken in reusable bottle.
- 7.1.2. **Boycott microbeads:** All those little plastic cleaners, which can be found in so many beauty products like body washes, toothpaste, and facial scrubs, may seem innocuous, but due to their small size, they can bypass water treatment facilities instead of that human beings can use renewable and reusable product. Tragically, for other marine animals, they too merely appear to be food. Choose foods with natural microbeads, such as salt or oatmeal.
- 7.1.3. **Cooking:** Making one's own food also has the added benefit of not using takeout containers or doggie bags. If someone does decide to order in or go out to dine, let the serving staff know not to use plastic utensils. For instance, up to some real extra credit, personal food might be taken in personal storage containers to restaurants for leftovers. Plastic utensils need to be discouraged wherever to dine by all the individuals.
- 7.1.4. **Buy used goods:** Especially brand-new toys and electrical appliances are wrapped in a variety of plastic materials, from torturously tough shells to twisted ties. Shop the shelves of secondhand stores, local garage sales, and online advertisements for goods that are just as nice in usage. Also, it will make a small financial savings.
- 7.1.5. **Back a bag tax or ban:** Voters support political figures that propose or back legislation that discourages the use of plastic bags.
- 7.1.6. **Buy in bulk:** Buying in bulk means choosing the larger container rather than a number of smaller ones over time. Take into account the product-to-packaging ratio of the commodities which are usually bought. Yogurts with only one serving, shampoos in travel-size containers, and little nut packages are just a few examples.
- 7.1.7. **Visit the dry cleaner with Personal clothing bag:** Cleaned items need to be returned in the zipped texture bag that has been created rather than wrapped in plastic.
- 7.1.8. **Put pressure on manufacturers:** Despite the fact that individuals can all influence others through their own tendencies, businesses undoubtedly to make a much bigger impression. Individuals can make certain opinions known if they believe a company could be wiser in how it is packing its products. It is possible through writing them a letter, tweeting, or hitting them where it really hurts. It is also possible through supporting and buying from a more respectable rival.

CONCLUSION

The inexpensive worth and durability of plastic have led to a high level of plastic products being used worldwide on a large scale. Being chemically resistant to degradation and due to its extensive usage, plastic pollution has a significant effect on the environment. Terrestrial and marine life is badly affected by plastic pollution. The high-level global production and consumption of plastics during the five decades represent a 4 percent increase in 2012. Similarly, at the end of 2015, plastic use had climbed from 260 million tons to 297.5 million tons. Plastic has been considered a serious threat to environment by environmentalists. Plastic is a persistent pollutant that does not totally break down or decompose, making it non-biodegradable.

Dr. Richard Thompson of the University of Plymouth conducted a thorough investigation in 2004 that came to the conclusion that there were numerous plastic particles on beaches and in the water in Europe, the Americas, Australia, Africa, and Antarctica. According to his assessment, tiny plastic pellets known as "mermaid's tears" are caused by home and commercial plastic garbage that has been widely dispersed throughout the oceans of the world. Minuscule nanoparticles with a diameter of less than a hair have been formed from the pre-existing plastic waste, even some of them cannot be seen. Those species still exist there in the form of plastic. These thermoplastics float around in the natural system because they are not incorporated into it. In the end, zooplankton and marine creatures swallow these pellets.

It is critical to keep in mind that because plastic pollution contamination is such a pervasive and complicated issue, a variety of approaches are required to address it at all levels of government. It is urged to take a holistic strategy to plastic pollution, which calls for coordinated activities from a wide range of players across numerous sectors and levels of administration. Even though ongoing participation and commitment from private enterprises and the public are required. Such a broad strategy brings benefits but also challenges because there is not always a clear-cut answer, which can cause ambiguity and dispute.

The current knowledge gaps on several elements of plastic pollution may make it more difficult to design effective preventive measures. The task of marine pollution avoidance is fundamentally worsened by the extensive use of plastic items, which is deeply established in modern consumer and manufacturing practices. Our waste management systems were not really intended to take into account this structural component. It cannot be stopped by one action alone; a systemic, all-encompassing strategy is required. The emphasis must remain on creating precautionary measures as part of complete plans, which scientifically reviewed findings will guide, while governance solutions to plastic pollution issues are being considered and accepted globally. At the same time, innovation and research should be promoted.


Plastics have both environmental and social advantages, but they must be weighed against the issues that arise from their great global volume and longevity as a waste stream. By extending the shelf lives of items, plastics assist to reduce food waste. They can also be used to create medical equipment, pack goods more efficiently than other materials, and increase transportation efficiency. However, the use of hazardous colorings, flame retardants, and plasticizers in plastic items as well as plastic litter and oceanic gyres of plastic are increasing consumer demand for more environmentally friendly materials.

In addition, cutting down on wasteful plastic use, discover new economically and more friendly packaging substitutes for refining manufactured goods and wrapping project to practice not as much of plastic, better management of the material throughout its lifecycle could help solve many problems related to plastics. Businesses and consumers could contribute more to the collection in order to get plastic garbage into a supply chain for recycling or recovery. Utilizing collaborative ventures to guarantee supply, businesses might transition to recovered plastics. Administrations need to control the plastic quantity and to promote reprocessing plastic for renewable use and consortia must organize, monitor, and give standards for the processing of plastic trash, particularly in poor nations. Global demand for plastic is anticipated to rise further as both the economy and population expand, particularly in China, Africa, Latin America, and the Middle East. To solve the plastic crisis of today and tomorrow, immediate action is required.

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