

FORUM:	Special Conference
ISSUE:	Eliminating the Plastic Wastes Disposed in the Ocean
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Introduction

Our consumption of plastics has increased exponentially ever since the invention of the plastic in 1907. By the 1960s, plastic debris had begun to find its way into the oceans. This had caused several concerns about plastic in the years to come. Yet plastic pollution became hard to control as most plastic products are disposable and produced on a large-scale as they use fossil fuels which are cheap and easy to obtain. Now more than 8 million tons of plastic debris ends up in the oceans per year. There are several issues that arise from plastic pollution. Firstly, it poses a threat to human and animal life. Plastic is made from petrochemicals, when it degrades in water, it releases toxins which are carcinogenic. Marine life are directly exposed to these toxins when plastic falls into the oceans, especially if they happen to ingest the sunken plastic item. Furthermore, the accumulation of plastic in oceans can make tourist attractions seem extremely uninviting and repulsive aesthetically, therefore the country's export revenue and national income can potentially fall. There is a lot of initiative required from us in order to sway away from our habitual consumption of plastic and use alternative, sustainable materials. We only get one planet after all.

Background

During World War II, there was tremendous growth of the plastics industry in the United States, plastic production had increased by 300% during that time. The wartime was a time where natural resources had to be preserved, therefore the production of artificial alternatives increased. In fact, the synthetic polymer nylon was invented in 1935, right before the second world war. People began to rely more on plastics and related materials during this time.



An octopus is shown to be entangled in a fisherman's net

In the 1980s, the plastic industry began an influential drive encouraging US municipalities to collect and process recyclable plastic materials as part of their waste management systems, mainly to



reduce the quantity of waste in landfills. However, plastic is not easily recyclable, due to its makeup. Not all plastics can be processed easily in the industry to make new products. 50% of all plastics are used once then thrown away, and only 6% are recycled.

Problems Raised

Health of Animals

By now we all heard of one too many cases where a marine animal has been entangled by a plastic item. Once an animal is entangled, it can drown, incur wounds and will be unable to move or obtain food for itself. Furthermore, for various species of marine animals, including sea birds, the ingestion of plastic is also a major concern. Many animals mistake plastic waste for prey and eat it. For example, a sea turtle may mistake a plastic bag in the water to be their natural prey, the jellyfish, hence, they will ingest it. Animals that are higher up in the food chain or of higher risk of ingesting plastic, because toxins ingested from marine animals can travel up the food chain. This affects the entire food chain and the ecosystem due to the loss of biodiversity. Also, when animals digest the plastic waste they have consumed, the plastic becomes smaller and turns into “micro-plastics” which is excreted from the animal back into the oceans. As the plastic debris becomes smaller and smaller, the risk of debris accumulating in animal tissue increases. Humans and our economy depend on sea animals as a source of food, this will decline rapidly if the rate of plastic waste accumulation continues to increase.



More than a quarter of all fish contain plastic in them, according to a study that analyzed the guts of fish sold at markets in Indonesia and California

Human Health

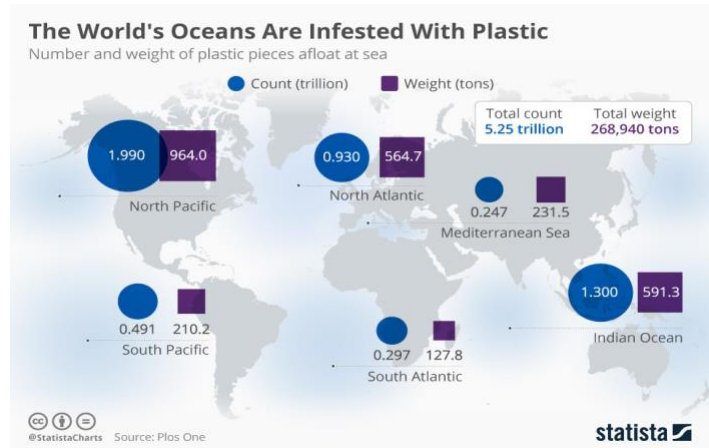
Plastic packaging is omnipresent. Not only does plastic debris affect marine life, but it affects human life as well. Water and food can be contaminated by plastic toxins which can come into contact with our bodies when we consume it, but we can also be exposed to toxins in the air. These particles in the air can cause lung or gut injury when inhaled/digested, but also cross cellular membranes, including placentas. Even a fetus protected by the walls of her mother’s uterus is prone to hazards from plastic toxins. Recent scientific studies have revealed the presence of several species of human pathogenic bacteria in marine plastic debris. Plastic debris creates accommodating circumstances for disease-transmitting invertebrates, such as mosquitos and snails. The spread of pathogens can cause disease in marine animals and humans alike. This hits the developing countries the hardest, as the medical research



facilities may not be as advanced enough to develop cures for these diseases. Plastic contains chemicals or additives to give it certain properties. These “additives” can be carcinogenic and harmful to our overall health. These additives e.g. Bisphenol A and brominated flame retardants can cause chronic illnesses such as cardiovascular diseases, type 2 diabetes and hormonal imbalance.

Economic Impact

It costs a lot of money to clear the plastic debris in the oceans. Removing the plastic beach litter each year costs the UK about 18 million euros on average, and the cost of marine litter for the Scottish fishing fleet was as high as 13 million euros per year on average. Marine litter affects fishing because nets become caught on debris and therefore become damaged. Lastly, the visual impact of plastic pollution on tourists can be devastating enough to drive them out of the country, reducing the country’s export revenue.



Location and quantity of plastic masses floating in the sea in oceans around the world

International Actions

Resolution UNEP/EA.3/L.20

The third session of the UN Environment Assembly, which consisted of governments, entrepreneurs, activists and other entities, took place at the UN office in Nairobi, Kenya during December 4-6, 2017. During this time, delegates discussed the status of decisions and resolutions, which were focused on eradicating global pollution. One of the resolutions they passed was UNEP/EA.3/L.20, a draft resolution specifically about resolving marine litter and microplastics. The resolution is found to be consistent with prior research sponsored by the Ocean Conservancy’s Trash Free Seas Alliance and plastic manufacturers worldwide. UNEP/EA.3/L.20 aims to improve waste management techniques and prevention methods against using plastic through the collaboration of governments that will promote practices that will bring long-term benefits to the global economy.

NextWave Coalition



NextWave is a coalition group founded by large companies including Dell and Hewlett-Packard. These companies employ people living in coastal regions to collect discarded plastic within 48 km of waterways to prevent it from entering the sea. The plastic collected is then sent to manufacturers who reuse it to produce new plastic. Hewlett-Packard is a computer, desktop and printer company and recently joined NextWave in 2018.



The founding member of NextWave has set the bar high by clearing the ocean of countless pieces of plastic

Since 2016, Hewlett-Packard has been working with Haitian locals to collect approximately 250, 000 kg of plastic that has been used to create ink cartridges for their inkjet printers. Hewlett-Packard has also worked with an NPO called the First Mile Coalition to create 600 jobs collecting plastic bottles, which shows that scrapping plastic can be beneficial to the economy i.e. by creating jobs. Although NextWave is only a small group of companies and a new organization, they claim that their partnership with Dell has kept about 1.36 million kilograms of plastic out of the oceans the past five years.

Key Players

India

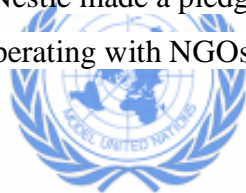
As a developing country, India has poor infrastructure and finds it difficult to control the accumulation of litter, whether it is on land or in water. However, the government has shown initiative to curb the plastic pollution in their rivers. The Indus and the Ganges rivers in India carry the 2nd and 6th highest amounts of debris to the ocean respectively. A few years ago, the government launched the Namami Ganges Project with the hope of cleaning the Ganges, but little to nothing has been done so far according to the environmental court in India. India was one of 194 countries to sign the UNEP/EA.3/L.20, which proves India's agreement towards eliminating plastic waste. Last year, India banned disposable plastics in Delhi as well as plastic straws in Mumbai and several other states.



The Indian government vows to clean their sacred river Ganges

Nestlé

A year ago, Nestlé made a pledge to make all of their packaging recyclable or reusable by 2025. Nestlé has been cooperating with NGOs, suppliers, waste managers, retailers, and other companies in



order to are to end plastic pollution. Nestlé's partnership with global recycling organization "Loop" has allowed it to start testing reusable ice-cream containers for its Haagen-Dazs brand in the U.S.

Additionally, Nestlé has begun working with Danimer Scientific to produce biodegradable water bottles using Danimer Scientific's PHA polymer Nodax, which was confirmed by the University of Georgia last year to be

a convincing alternative to petrochemical-based plastics. Next year, Nestlé is set to launch new water dispensers that allow consumers to fill their own reusable water-bottles, using state-of-the-art technology. Nestlé has changed its management's views towards plastics, its customers' views towards plastics, and its employees' views towards plastics.



Image of Haagen-Dazs's new reusable ice-cream container

Possible Solutions

Government Action

Government action is very important in order to clean up marine litter on a large scale. Large masses of plastic debris stay afloat in different oceans around the world, and what is significant about their location is that they are mostly close to highly populated countries/regions. This includes many Asian countries, such as India, China, Indonesia as well as the U.S.A. Waste management is a huge factor affecting a government's ability to control plastic pollution in their country. Governments need to find ways to deter people from plastic consumptions e.g. by punishment or promote alternative/substitute materials. Governments can impose taxes on local plastic items to deter plastic consumption or organize campaigns to promote the message that plastic pollution is harming society. Education and awareness will make it easier for personal change and action. Once people realize they are doing something wrong they will be able to change their behavior themselves.

Mainly, the use of disposable plastics must come to a close. Several countries have banned these now, and it has shown massive improvements. Plastic's durability and non-biodegradable nature is actually a blessing in disguise. We can reuse the same piece of plastic for years on end, there is no need to dispose of it so quickly.



This technology is powered by wind and wave energy which allows it to concentrate plastic debris towards the center of the system.



Research

In order to get rid of the abundant, lightweight, durable, multi-use material that we can't seem to live without, we need to find alternative ways to live, especially when we are in an era of advanced technology and scientific knowledge. Despite the harm plastics can do, they have done a lot for humankind as well. The development of computers, mobiles and modern medicine has been aided by the use of plastic. Due to its light and insulative nature, plastics help reduce fossil fuels expended for heating and transport. Additionally, plastic's cheap and abundant qualities help raise the standard of living as it is easily affordable. We may not be expected to get rid of plastics altogether, but we can develop more sustainable materials and consumption patterns. Research and development of new technology have already shown some promise, studies have found that there are certain polymers that can be composted or that biodegrade naturally such as the PHA polymer Nodax that Danimer Scientific helped develop for Nestlé.

Glossary

The Great Pacific Garbage Patch

The 'Great Pacific Garbage Patch' is the largest mass of floating trash located in the Pacific Ocean. The patch includes a combination of the Western garbage patch located near Japan and the Eastern garbage patch between Hawaii and California.



The Great Pacific Garbage Patch contains 1.8 trillion pieces of plastic and covers an area of over 865 thousand square kilometers.

Biodegradable

A substance that is capable of being decomposed by bacteria, fungi, microorganisms or other living organisms.

Microplastics

Tiny fragments of plastic created when larger plastic litter breaks down in the ocean and may also refer to the plastic microbeads added to some cosmetic products.

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