Research Report Environmental Commission

Forum:	Environmental Commission
Issue:	Combating the pollution of the oceans by plastic debris
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Position:	President of the Environmental Commission

Introduction

Plastic is one of the most used materials worldwide, its waste is one of the worst problems our environment has to deal with.
Plastic is everywhere, it is used in our everyday life.
Plastic has become one of the most common materials since the beginning of the 20th century and our current and comfortable life is unthinkable without using plastic.
It has many positive and useful aspects, such as durability, light weight and low production costs. Plastic pollutes the oceans worldwide. Since 70% of the Earth is covered by water, this is a global problem.

All around the world plastic waste is thrown into the oceans. This is one of the easiest ways for companies to dispose of their rubbish, but they do not think about the consequences for the animals living in the oceans, the water, the whole environment or even themselves.
Yearly about 250,000 million tons of plastic are produced and about 7 million tons are thrown into the oceans per year. Currently there are no exact recent numbers on the amounts of marine litter.
In many countries the use of plastic increased, so the production and disposal of plastic increased as well, leading to an extreme waste stream.

Plastic Production

Plastic is produced all over the world.
It is contained nearly everywhere, so the production is necessary for modern life.
Investing in plastic production is effective, the global trade with plastic is really successful and profitable.
Plastic is needed and demanded all over the world so it has to be produced in huge masses. Depending on the country, different laws and rules of action have to be followed. In some countries the usage of special chemicals is forbidden, which increases the production costs because a different chemical mix is needed. Some chemicals are forbidden because they pose a danger to human health or the environment.
During the production many countries do not have to spend as much money as others have to, this decreases the final production costs and so there is more profit.
The production has been increasing for many years and it will increase in future as well. Every year more plastic is needed, although every year about 250,000 million tons of plastic are produced, there is an increase of about 5% per year.
China is the world leader in plastics production and conversion. Low production costs in plastics conversion have triggered investments in the plastics industry, including the plastics machinery manufacturing.

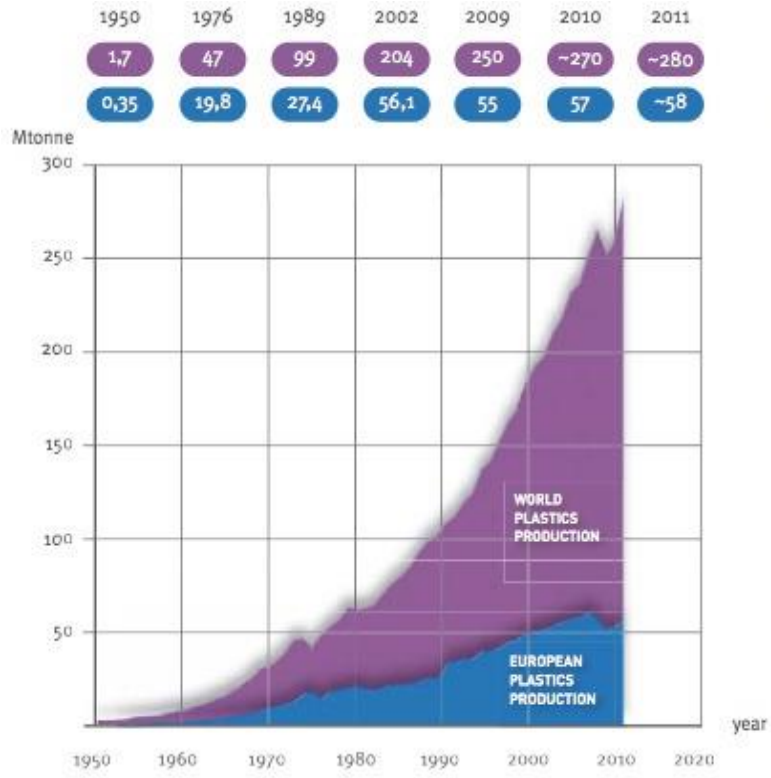


Figure 2: World Plastics Production 1950-2011
Includes Thermoplastics, Polyurethanes, Thermosets, Elastomers, Adhesives, Coatings and Sealants and PP-Fibers. Not included PET-, PA- and Polyacryl-Fibers
Source: PlasticsEurope Market Research Group (PEMRG)

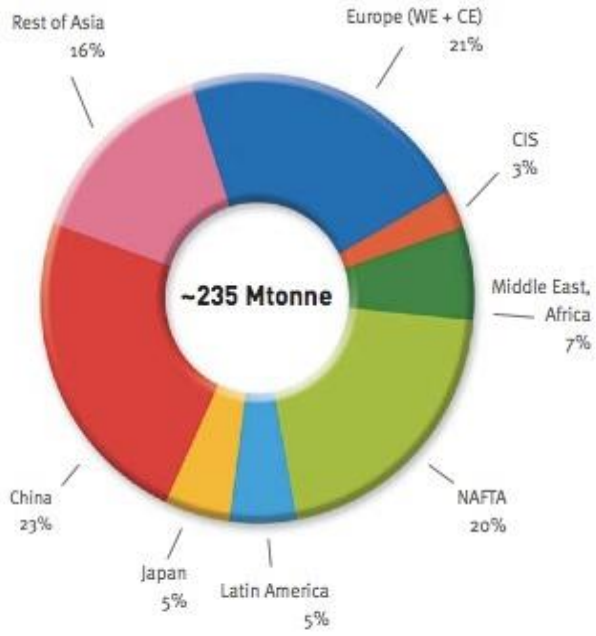


Figure 3: World Plastics Materials Production 2011
w/o Other Plastics (~45 Mtonne)
Source: PlasticsEurope Market Research Group (PEMRG)

Plastic

The first types of plastic were developed during the industrial revolution (about 1760 to 1830). Since that time many years have gone by and the industry went on developing better types of plastic. Earlier on it was a very valuable material, now plastic is not as much valued as it was. Plastic is thrown into the ocean and so now plastic waste is a global problem which poses a danger to the environment.

The very chemical bonds, that occur during mixing up different kinds of chemicals, that make them so durable tend to make them resistant to most natural processes of degradation

Plastic is mostly made of crude oil. The whole oil resources around the world are exploited and so there will not be enough oil to provide the population in future, so there will not be enough material to produce plastic.

Most plastics have a hard but still flexible consistency and it can take decades or even centuries to disintegrate in water.

Because of the currents, which cause erosion, the plastic waste breaks into smaller pieces. These small pieces contract, they have the size of a grain of sand, so about 1mm to 5 mm. If they are about this size, they are called “microplastics”.

Currently two classifications of microplastics exist, the primary microplastics and secondary microplastics.

Primary microplastics are produced and are a direct result of human material manufacturing.

Secondary microplastics are derived from the breakdown of larger plastic debris, they are microscopic plastic fragments.

These small plastic particles are washed ashore. On the coast they mix up with the sand and so are often invisible. Meanwhile the microplastics are able to be seen on many beaches. At some places of the world about ten percent of a beach consist of plastic, there every tenth grain of sand is plastic.

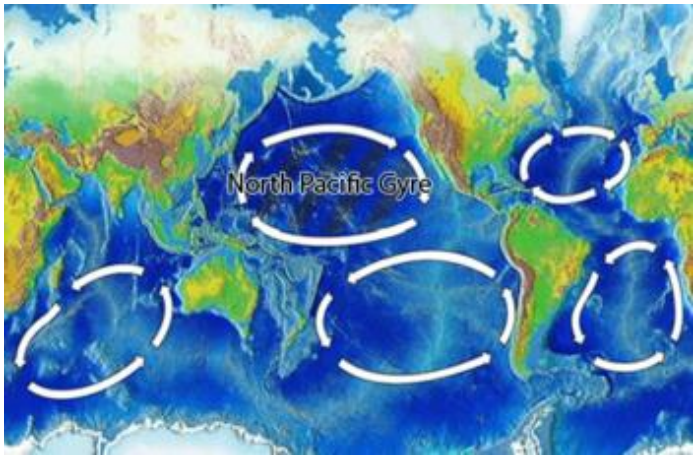
During the degradation process many chemicals end up in the ocean and are gathered by living creatures. This causes many consequences, such as but not limited to: poisoned water, dead animals and pollution of the environment.

Currents causing waste accumulations

The plastic waste is spread through all the oceans, because of the currents.
An ocean current is a continuously ongoing movement in the water in a special direction. They can flow for great distances and are really important for our climate.
Without the currents, the temperatures around the world would change.
They can bring warm water to a colder region and so care for an increasing temperature.
Currents are responsible for spreading the waste throughout the ocean.
They are mostly circular and so have no real end. The waste flows in the water to accumulate in certain big areas. Currents occur worldwide in the oceans and enable marine life.

Great Pacific Garbage Patch

The Great Pacific Garbage Patch is one of the most famous waste accumulations in the oceans worldwide. It is located in the central North Pacific Ocean.
It is a gyre with a huge amount of marine debris particles so with a high density of waste particles. The area is indefinable, it deforms so it expands or shrinks depending on the strength of the currents.
The waste was transferred to this area because of the currents.
The density of waste and especially of plastic is very high there, so there is already an extreme area with dirty polluted water, which expands every day.



Causes for plastic in the ocean

There are many ways how plastic ends up in the oceans. Mostly the waste ends up in the oceans because ships throw it away.
Just throwing it in the ocean is the cheapest way to dispose of their rubbish.
Furthermore ships can lose something of their charge, it falls into the ocean and stays there because it can not be put back on the ship.
Sometimes even accidents happen, where complete ships sink. The whole charge and everything the ship was transporting ends up in the ocean. Also the material the ship was made of and which transported the goods sinks.

Often waste dumps are located near the ocean or a river which flows into the ocean. The waste reaches the water and so it flows directly into the ecological system. Since the dumps are located next to the coast, this is a vicious cycle, there is always new waste dumped there which then flows into the ocean.
Natural disasters are another reason how litter can enter the oceans. Earthquakes can be really extreme and can so cause unbelievable damage. Everything that is destroyed during an earthquake in combination with a tsunami, so plastic, parts of houses, fragments, small ships or even cars can be transferred back to the ocean by the waves which caused the damages.
The fishing industry is another contributor.
Many fishing nets, about 25,000 every year, are thrown away and remain in the water for many years. Because of those nets many animals entangle themselves, those nets are called ghost nets.

Effects

Animals

The plastic waste is a big problem, especially for animals. It poses a danger to them because it is really toxic. Because of the erosion the plastic splits into smaller pieces which animals often confuse with their nourishment.
Turtles for example confuse plastic bags with jellyfish and die trying to digest them. If plastic erodes into smaller pieces, those are often eaten by animals and endanger the health of the animals, even if they are really small.

The animals eat plastic particles which enter the food chain. This leads to a dangerous condition, they eat the plastic because they confused it with food and so feel full, but exactly this is the problem. This feeling of being full is not real, the plastic is toxic and has no nutrients which every creature needs. This leads to a wrong feeling of being full, and so they die of starvation, without noticing it.
Often animals die because they get entangled in old fishing nets. Those old nets were thrown into the oceans by fishing companies to get rid of them. They stay there for many years and so cause many deaths, because every kind of sea animal can get stuck there.
Furthermore animals often suffer from wounds caused by sharp plastic ends. They hurt themselves while swimming through a plastic contaminated area, while searching for nourishment.

Mankind

Not only animals are affected by the negative aspects of plastic, we are as well. Even during our normal life we get in contact with plastic without noticing it.
Except for the things we can identify as plastic, we often do not know where plastic is already established.
Since the consumption of fish is really high, many people consume small plastic particles.
The fish confuse the plastic with their nourishment and so have plastic in their organism. While consuming the "plastic polluted" fish we absorb the plastic as well and so it does not only enter the food chain of the animals, it also enters ours.
The indirect consumption of plastic has a negative impact on our health. It contains toxins which end up in our body.

Water

The water in the oceans is poisoned by the huge amount of plastic. Because of the chemicals contained in the plastic, which were used to produce the plastic, the quality of the water changes.
The plastic waste stays in the oceans for many years, during this time they start to disintegrate. While disintegrating the plastic releases the chemicals into the water. This influences not only the whole area around the plastic waste, it also influences further areas through which the currents pass.
So the currents transport the polluted water through all the oceans. The polluted water has a too low oxygen percentage. Furthermore it contains chemicals like bisphenol a, phthalates and parabens. Those can cause many sicknesses, such as cancer.

Extra costs

In addition to the health threats, waste also has economic consequences.
Tourist areas are affected, beaches must constantly be cleaned, the garbage gets caught regularly in propellers and fishing nets.
Agriculture also suffers from contaminated pasture land near the coast.
In power plants, the waste causes damages in the cooling water absorption, at desalination plants it blocks the hydrologic cycle.
The pollution of our seas every year leads to enormous economic damage.
In addition there are diving accidents by scattered waste under water and injuries or illnesses by medical waste on beaches.

Recycling

Plastic recycling is a very important step towards decreasing of plastic waste. Since plastic is one of the most common materials in our modern life, its usage should be sustainable. Plastic is made of oil, a resource which is limited and will be even more expensive in future.
To prevent the need to live without plastic, it should be recycled and so used for many years. The amount of plastic which is wasted every year is immense, this material could be reused. The reuse of plastic is important to decrease the plastic production, material which is so important for our modern world should be appreciated.
Depending on the country about 10% of the used plastic is recycled, the rest is either burned to produce energy or thrown away.

Questions, which could help you to prepare for the debate:

How can the UN fix the problem?

What is your country's position on the whole issue?

What could be done to reduce the usage of plastic?

Are there more sustainable and environmentally acceptable alternatives for plastic?

How can it be ensured that the oceans will not be polluted in future?

How can the existing waste accumulations be purged?

How can plastic waste be disposed of for free?

Helpful links:

http://www.unep.org/yearbook/2014/PDF/chapt8.pdf

http://www.unep.org/newscentre/default.aspx?DocumentID=2791&ArticleID=10903

http://news.nationalgeographic.com/news/2015/02/150212-ocean-debris-plastic-garbage-patches-science/

Sources:

http://www.nowpap.org/ML-on_UN-level.php

http://www.unep.org/regionalseas/marinelitter/publications/docs/plastic_ocean_report.pdf

http://www.motherjones.com/environment/2015/02/ocean-plastic-waste-china

http://www.epa.gov/osw/conserve/materials/plastics.htm

http://www.unep.org/yearbook/microplastics.asp

http://www.unep.org/newscentre/Default.aspx?DocumentID=2791&ArticleID=10931

Useful resolutions by the United Nations Environment Programme (UNEP) and the United Nations Environment Assembly (UNEA):

http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCsQFjAB&url=http%3A%2F%2Fwww.unep.org%2Funea%2Fdownload.asp%3FID%3D5171&ei=rMGOVbSeDoOLsgHh4bYQ&usg=AFQjCNF7bdpv6Ap1LbGYapbtK8qUNmRdpQ&bvm=bv.96783405,d.bGg

Pictures in order of appearance:

http://www.abc.net.au/news/2013-01-22/an-pacific27s-plastic-peril/4477332

https://chrisbioworld.wordpress.com/category/conservation-2/

http://news.softpedia.com/news/Plastic-Waste-Soon-to-Send-Man-Flying-from-Sydney-to-London-287394.shtml

http://www.sciencebuzz.org/sites/default/files/images/micro_plastic_lots.preview.JPG

https://upload.wikimedia.org/wikipedia/commons/6/64/North_Pacific_Gyre_World_Map.png

http://ecowatch.com/2012/07/09/marine-litter-birds/