



**Greenenergy**

a green concern

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FROM EDITOR'S DESK

PLASTIC the RED issue of the GO GREEN...!!



**This pandemic has shown human being the actual strong effect of global warming. Years together the man has started destroying the nature and the environment. Right from the civilization then industrialization and the DEVELOPMENT...!!!**

**Plastic has been innovated and then the plastic pollution has become one of the most pressing environmental issues, as rapidly increasing production of disposable plastic products overwhelms the world's ability to deal with them. Plastic pollution is most most visible in developing Asian and African nations, where garbage collection systems are often inefficient or non existent. But the developed world, especially in countries with low recycling rates, also has trouble properly collecting discarded plastics.**

**Plastic made from fossil fuels are just over a century old. Production and development of thousand of new plastic products accelerated after World War 2. So, transforming the modern age that life without plastic would be unrecognizable today. Plastic revolutionized medicine with life-saving devices, made space travel possible, lighten cars and jets-saving fuel and pollution-save lives with helmets, incubators and equipment for clean drinking water.**

**The convenience plastic offer, however, led to a throw away culture that reveals the material's dark side: today, single-use plastics account for 40% of the plastic produced every year. Many of these products, such as plastic bags and food wrappers, have a life-span of mere minutes to hours, yet they may persist in the environment for hundreds of years. We al need to now take action and aim NET ZERO EARTH till 2050. On EARTH Day 2021, this target has been declared by I.G.B.C. and ABHALMAYA has a part and parcel of the campaign. Lets GO GREEN.**

- Ar. Pramod Chaugule





## **Plastic Pollution and its effects on lives: from big chunks of plastics to micro plastics**

*By Amey Kaluskar*

You must have till now known already that plastic is the evil doer in the environment. People, teachers, celebrities, environmentalists, governments do say that plastic is bad for the environment, as it doesn't degrade naturally like other pieces do and will be there for hundreds of years piling up in the landfills, or forming an island in the ocean affecting marine life, destroying the beautiful landscapes, and directly or indirectly affecting almost every being on earth. In short we all know plastic is the villain of the society, yet we all still use it. In fact I can bet there must be at least one thing made of plastic under 1 meter of radius of where you are right now, maybe your phone, a calculator, snack wrapper, plastic bottle, a pen on your desk, refill at least if that's a metal pen, your airpods, cards in your wallet, or even the glasses you are wearing. It's nearly impossible for anyone living in this modern world to avoid plastic for even a day. Now when you know you have such a special bond with plastics would you still call it a villain?

It dates back to the time of World War 2 after which the production of thousands of new plastic products gained boost, transforming the age as we know. Plastics revolutionized medicine with life saving devices, made space travel possible, lightened cars and jets saving fuel and pollution, and saved lives with equipment for clean drinking water and so more. Conveniences that plastic offer, has however, led to a throw-away culture that reveals the material's dark side.

Plastic is a polymer, meaning a material whose molecules are very large in long chains with endless series of interconnected links, developed specifically to defeat natural polymers. Since these synthetic plastics are largely non biodegradable, they tend to persist in the natural environments even under difficult conditions. An average consumer today comes in contact with many lightweight single-use plastic products and packaging materials, which account for approximately 50 percent of all plastics produced, are not deposited in containers, and eventually do not end up in landfills, recycling centers, or incinerators. Rather they are disposed of improperly at or near the location where they end their usefulness to the consumer. Dropped on the ground, thrown out of a car window, heaped onto a trash bin which is already full, or inadvertently carried off by a gust of wind, they immediately begin to pollute the environment. Many of these have lifespan of mere minutes to hours sometimes, yet may persist in environment for centuries.

Theoretically, accumulation of plastic materials to a point where it creates problem for fauna and their habitats as well as humans, can be termed as plastic pollution. Plastic pollution is most visible in developing Asian and African countries where waste collection systems are not very efficient or in some cases non-existent. The developed countries, those with low recycling rates, too has trouble properly collecting discarded plastics. Studies haven't shown any particular demographic group most responsible, though population centers generate most litter, highlighting the point that, the causes and effects of plastic pollution are truly worldwide.

Let's hear some facts and numbers. Global plastic production grew from 1.5 million tonnes per year in 1950 to almost 360 million tonnes per year by 2018, out of which between 4.8 million and 12.7 million tones are discarded into the oceans annually. There exists an island of discarded plastics in Pacific ocean called the Great Pacific Garbage Patch which is triple the size of France. The mass of plastic found at the surface layer here is 180 times higher than the mass of marine life in the region, meaning plastic must be the primary food source for organisms feeding in the region. Scientists have found garbage at the highest peak on the planet, the Mt Everest, and deepest trough, the Mariana Trench, 36000 feet below sea level.

Since plastic is such a persistent material it has long term ecological, economic and eco toxicological effects. These include physical impacts on marine life as the fishes, from small ones to the large ones like whales, sea turtles, other beings and even birds, were found with huge quantity of chunks of plastics in their stomachs, entanglement of marine life in plastic fibres in the ocean, all these causing starvation and eventually death. Oceanic plastics contain harmful substances called Persistent Bio-accumulative Toxic chemicals or PBTs. “Bio-accumulative” means that these pollutants can amass in the body of organisms, up to a level that can become detrimental to them and to the health of entire food webs. Since plastics in ocean are in wide range of sizes, animals as small as plankton and as big as whales can ingest them. These organisms get confused with their prey and end up consuming these pieces. The problem is not limited to just marine life but on land and even in cities, as many cows in India were reported to have found tens of kilograms of plastic matter in their digestive systems. The chemical impact includes the built up of persistent organic pollutants like PCBs and DDT, which are chemicals that were banned more than 30 years ago, but our environments are so contaminated that decades of clean up efforts have yet to eliminate their threats to our health. Economic impact, on the other hand, includes damage to fisheries, shipping and tourism industry.

Out of more than 7 billion tonnes of plastic produced in 1950s, only 10 percent is recycled. Overtime, most of it has broken down to particles that make their way to lakes, rivers, reservoirs and oceans, eventually contaminating our food and water. There's so much of such micro plastic around that we even breathe these tiny particles or fibres in tens of thousands every year. Humans are known to have consumed them via food, water and air, but the potential impact on human health is not yet known.

Plastics are relatively inefficient to be reused as recycled scrap in the manufacturing process, as they have low melting point, which prevents contaminants from being driven off during heating and reprocessing. Recycling rates vary from country to country with only northern European countries obtaining rates above 50%.



Plastic is that material which has tremendous applications and plays a vital role in our day to day lives. Completely erasing plastic from the system is not the solution until there is a sustainable alternative with similar attributes. Solution lies in increasing usefulness and life of plastic to as much as possible, by putting it to use again and again. Improvements in the waste collection system and its proper reuse or disposal is necessary. Sweden sets an example in this case as the country imports waste from other countries to extract energy from it. Governments need to come together and put strict laws and order on disposal of plastics. But in the end, it's not the government, everything relies on the individuals and their habits. Since in any case, reusing or recycling does not really inscribe plastic pollution, as recycled plastic is "properly" disposed of, whereas plastic pollution comes from improper disposal.



## THE GREAT PACIFIC GARBAGE PATCH

AQUATIC LIFE GETTING  
AFFECTED DUE TO PLASTIC  
IN OCEAN







THE 5 PLASTIC GYRES AROUND THE WORLD

# Why are we not able to replace plastic?

*By Arati Patil*

Nowadays, plastic has become an inevitable part of life. Everything around constitutes at least a minute part of plastic, right from the clothes we wear to even paper cups which we use as an ecofriendly alternative for use and throw plastic cups. But from overall analysis of plastic around us and its basic purpose, we get to know that plastic is majorly used in packaging. Most of the packaging done is single use, hence generates a lot of plastic waste. Some of these kinds of packaging are difficult to recycle. Now why is it so that we are still not able to find an alternative for this single use packaging using plastic?



First of all, this kind of plastic packaging is widely used in food industry. Plastic packaging is used to preserve food for longer time, help transport and distribute food, helps keep food fresher for longer period of time and is most importantly water-proof. This need arose from the need to transport packaged food from one part of world to another. With developing trends in eating habits, people prefer exotic food over locally grown food, hence increase in packaged food. Also the paper cups which we use are lined with thin plastic to avoid leakages.

Plastics are also used in medical field. We cannot find any alternative for plastic there. Everything from a syringe to huge medical equipments are made from plastic.

Things from our day-to-day life, like laptops, mobile phones, even our notebook covers, everything is made from plastic. Heat resistant plastics and the insulation property of plastic along with its cost effectiveness has no other alternative as for now.

Bioplastics were introduced as an biodegradable and ecofriendly alternative for plastics. They are basically plant-based plastic, which can be made from corn starch or sugarcane. The greenhouse gas emission of bioplastics compared to regular plastic is much lower. But even though it is biodegradable, most of them need industrial composting facilities to break them down. This facility is not widely available and hence are not broken down properly. Instead they are dumped in landfills like usual waste and they decompose producing methane. Also they can be harmful for regular plastic recycling process if not separated from regular plastic. Also this solution is not cost effective.

So now we can say that we need a flexible, water-proof, cost effective, biodegradable, heat and electric current resistant, easy to dispose off material in order to replace plastic.



## PLASTIC PACKAGING IN FOOD INDUSTRY

## PLASTIC USES IN MEDICAL FIELD



# The 4 R's- Refuse, Reduce, Reuse, Recycle

The 4 R's of waste management that can save us –

## 1. Refuse –

The very first step is to 'Refuse' unnecessary plastic even if it is offered to us.

## 2. Reduce –

Next step is to 'Reduce' the existing plastic waste with appropriate segregation method. Waste should be classified into reusable waste and recyclable waste. Also further usage of such products should be avoided.

## 3. Reuse –

Whatever reusable plastic is available should be 'Reused' as many times as possible.

## 4. Recycle –

Recyclable plastic should be 'Recycled' accordingly. Whichever waste cannot be reused should be searched for its recyclable alternative.










# Recycling of Plastic

Recycling of plastic is a process in which the material is broken down into form closer to its original form to create new products from the same material. There are two ways to recycle plastic: Mechanical recycling & Chemical recycling. Mechanical recycling consists of washing the plastic and converting them into granules which is further melted whereas chemical recycling consists of chemically treating plastic to convert it to monomers.

There are total 7 types of plastic. Each type of plastic needs to be recycled separately. Recycling all types of plastic together results in weaker blends of plastic having only few applications. Hence different codes are assigned to different types of plastic to help differentiate it and segregate it at its source.

Each type of plastic can only be recycled 2-3 times. After that the quality of recycled material is no more suitable for use. Also, each time plastic is recycled, some amount of virgin plastic is added to this recycled material.

Virgin plastic is a plastic which is directly derived from petrochemicals. Recycled plastic can be used to make bottles, buckets, chairs etc. Lowest quality of plastic is the plastic used as wrappers, which cannot be recycled further.

Plastic Resin Identification Codes						
						
PETE	HDPE	PVC	LDPE	PP	PS	OTHER
Polyethylene Terephthalate	High-Density Polyethylene	Polyvinyl Chloride	Low-Density Polyethylene	Polypropylene	Polystyrene	Other

The last resort for such non-recyclable and non-reusable plastic is pyrolysis. Pyrolysis is extracting fuel and carbon from plastic as it is a product of petrochemicals. The oil extracted from the process of pyrolysis is called pyrolysis oil. This oil, though not as efficient as commercial oil like diesel, yet can be used as an alternative to kerosene in industrial burners.

What happens exactly in this pyrolysis process is that plastic is thermally degraded at higher temperatures. This is converted into gaseous state which when condensed gives two types of liquid. One of them is water and the other is pyrolysis oil.

This can be considered as last resort for non-recyclable, non-reusable plastics.

There is however one last category of plastic waste. This category is inert waste. Nearly 5-10% of all the collected waste is inert waste, that is, waste which cannot be recycled, nor reused, nor can be used in pyrolysis. These kinds of plastics comprise used dried paint brushes, dried paint buckets, etc. These kinds of waste don't have a particular way of disposal. Some way to manage these kinds of wastes in an ecofriendly manner need to be designed.





# What can we do?

- Implement 4 R's in our day to day life as much as we can.
- Getting closer to zero-waste lifestyle.
- Using eco-friendly alternatives for day to day applications.
- Segregate plastic wastes at source.
- Avoid single-use plastic.
- Buy more bulk products.
- Carry cloth bags while visiting stores.
- Try to replace plastic with steel or glass containers.
- Buy local foods and avoid buying packaged food

# Innovator's column

## 1. re-Charkha –

re-Charkha is a Pune based start-up founded by Amita Deshpande upcycling the waste plastics like polythene bags, gift wrappers, biscuit wrappers, detergent packages etc. into handwoven purses, pouches, electronic cases.



## 2. Rhino bricks –

Rhino bricks introduced by Rhino Machines by a Gujrat-based entrepreneur Manish Kothari are bricks made from foundry dust and waste plastic. They are 2.5 times stronger and 25% lighter and are very cost effective. They are made from 75% foundry dust and 25% plastic waste.



### 3. Eco-Bricks –

Eco-brick is a brick like structure made by filling waste plastic bottles with used plastic for density. They can be used as building blocks for furniture, garden walls and other such structures.

This concept is used for storing the plastic waste collected thus reducing its net surface area and also utilizing for constructive purpose as well as preventing its further degradation into micro plastics.







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