

Is Plastics Bad?

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Abstract:-- We use plastics in a number of objects and it brings up the question, how much damage or cost does it create and where? This study maps harmful effects of plastic waste on environment, animals, humans and marine environment. It also lists few countries playing a major role to combat plastic waste pollution. The paper concludes with few suggestions on the ways to decrease its waste, junk or trash.

Index Terms— Plastics, cost, waste pollution.

I. INTRODUCTION

The early use of Plastic dates back to 1600 B.C. with its exploitation that started in 1839 followed by its mass production in the year 1940s and is still continuing to expand. The plastics produced globally since the 1950s exploded from 2 million tons to 440 million tons in 2015. If production continues at a current rate, plastic trash could top 13 billion tons by 2050. Most of the things, we use today is made up of plastics. "Take out all the stuff in your house that's made of plastic and probably your space will end up with virtually nothing". The reason being, Plastics are cost efficient in terms of lightweight that matters in industries and makes it easier for issues like storing and shipping. Second, it is cheap to manufacture, inexpensive and economical (E.g. plastic spoons and forks). Third, in terms of hygiene quality, it helps prevent the spread of diseases caused due to improperly cleaned metal cutlery.

Today, we are dependent on plastic to a great extent as it makes our life so much easier. They are found in the form of different products that we use every day and are present in a range of applications close to a user like bed mattresses, fibres in most clothes, food package, PVC tubes in medical devices, children's toys and much more. Unfortunately, many materials used in making plastics include chemicals that are actually very harmful. These days, most plastics are made up of fossil oil or gas and using more of it adds to global warming.

There are two distinct groups of plastics namely Thermoplastics and Thermosets:

- Thermoplastics can be heated and reformed repeatedly (E.g. Celluloid). Its property allows easy processing and recycling.
- Thermosets cannot be remelted and once formed, reheating causes material to decompose rather than melt (E.g. Bakelite, poly phenol formaldehyde).

II. NEGATIVE IMPACTS OF PLASTIC

- Plastic causes dangerous risk on health, environment, animal and on the marine environment. Packing of hot food in plastic bags causes harmful chemicals to dissolve in the food which flows into the bloodstream on ingestion may induce several diseases including liver and lung damage. On disposing plastic with other waste, it pollutes land, air and water and takes ages to degrade naturally. The disposed plastic bags normally end up being swallowed by animals and block the wind pipe and digestive tract which in could lead to death in most cases. Plastics are also a hazard for marine life as they block the gills of fish and also are known to be causing harm to the coral reef by wrapping around them and blocking the flow of water and sunlight thus cutting out their source of nutrition.
- Disintegration of plastics leads to release of harmful chemicals that percolate into the soil and water thus making it toxic, this is consumed by humans and animals in various forms which lead to serious diseases and in many cases death. The production of plastics releases various toxins including various greenhouse gases which are effective in fast-forwarding climate change and polluting the air.
- As plastics are unable to pile in landfills they block storm drains, litter streets, stick to trees and further contaminates oceans where all marine animals eat or get tangled in them.
- The animals and sea creatures are hurt and killed every day due to the high amount of discarded plastic waste in the sea.
- A new investigation by Orb Media and researchers discovered plastic fibres are
- found in tap waters over the globe where 83% of samples were contaminated with plastic fibres. The micro

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plastic contamination in water that we consume every day is now a huge problem.

- Studies show plastics and micro plastics are ingested by fish becoming part of a fish diet and unfortunately, we are eating plastic eating fish.

A study by researchers published in Science Journal quantified the amount of plastic entering oceans from coastlines of 192 countries. The findings show China ranks first followed by countries in Southeast Asia, Srilanka, Egypt, Nigeria, Bangladesh and South Africa. India ranks 12th in the list of top 20 countries discharging maximum junk of plastic waste into high seas. In addition, the study calculated 275 million metric tons of plastic waste generated by 192 countries in 2010, an average of 8.8 million plastic waste entering oceans and globally 620% increase in production of plastics since 1975.

As per Central Pollution Control Board, India generated 15,342 tonnes of plastic waste (the year 2016), of which 9,205 tonnes reported to be recycled and 6,137 tonnes left uncollected and littered. These plastic bags have become an indispensable part of Indian shopping and the waste elements generated by it stays for a very long time in the environment which is very harmful. It can remain underground for 500 years, contaminating the soil and polluting the environment. The table shows Plastic waste consumption (Tones) in India for the years 1996, 2000, 2001 and 2007 in an increasing trend

S. No.	Year	Consumption (Tones)
1.	1996	61,000
2.	2000	3,00,000
3.	2001	4,00,000
4.	2007	8,500,000

Plastics Consumption In India

Source: Central Pollution Control Board, as cited in Plastic Consumption in India (Atulesh).

BAN ON PLASTIC BAGS

A number of countries around the world has taken move on different ways towards ban on plastic bags and few of which are listed below.

- In Kenya producing, selling or using plastic bag will cost four years jail or \$ 40,000 fine, one of the toughest plastic bag ban.
- Norway recycles 60% of plastic packaging.

- Costa Rica taking stand against plastic waste flooding and planning to ban all single use plastics.
- Seattle to ban plastic straws, utensils at restaurants from 1st July 2018.

• Today Rwanda ban on plastic bags in year 2008 is seen by most as a success.

- Initiatives taken by many states in India against the use of plastic. Few to be mentioned are Sikkim, Himachal Pradesh, Karnataka, Goa, Rajasthan and Mumbai.

AN EXAMPLE OF PLASTIC WASTE USED IN CONSTRUCTING ROADS

The benefits of using plastic waste on roads are plenty. It makes roads stronger, gives better resistance towards rain water and water stagnation, helps in reduction of pores, no effect of UV radiation, load withstanding benefits, cost in road construction reduces with nil maintenance cost. Countries like United Kingdom, Netherlands, Ghana, US, Bhutan and India are paving way forward using plastic waste to construct roads as an alternative that are greener, stronger and requires less maintenance.

In India context, cities are playing a major role by using plastic waste in construction of roads. Few examples are as follows:

- Indore is recycling half of its plastic waste daily with 30% used for roads and more than 500 km roads are constructed.
- Chennai claims to construct 1,035.23 km length of roads using 1,600 tonnes of plastic.
- Pune has given a contract to Rudra Environmental Solution (India Ltd) for building 12 trial plastic roads across the city.

Suggestions

So, is it a problem if we burn or bury plastics? And the answer is definitely YES.

Burning plastics releases harmful chemicals that pollutes the air, damages our atmosphere and as we breathe in the polluted air it causes a range of health issues including cancer. By burying it, we won't see but ends up in number of problems. Example, the rubbish dumped in environment can lead to breeding ground for disease carrying pests like mosquitoes and rats. Hence recycling, reusing as something valuable, and reducing its use is a better solution.

Simple ways one can take in decreasing large junk of plastic waste we generate in 16 ways (Moss Laura), are as follows:

- Saying no to plastic straws at restaurants and bringing reusable stainless steel or glass drinking straw.

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- Using reusable bags from plastic produce bags.
- Giving up gum made of plastic that may also be toxic plastic (polyvinyl acetate manufactured using vinyl acetate a chemical to cause tumour's in lab rats).
- Making use of boxes that is easily recycled and made into more products than plastic bottles.
- Buying food items from bulk bins that opt to fill a reusable bags or container and saves unnecessary packaging.
- Buying variety of prepared foods in glass jars and instead of throwing or recycling, better to reuse jar while buying bulk food.
- Using reusable cup to coffee shops instead of using plastic, paper or Styrofoam cups preventing lot of unnecessary waste (e.g. office).
- Making use of our own containers whether pickup or bringing home leftovers from restaurants.
- Opting for using matches over disposable plastic lighters for various purposes for starting fire.
- Skipping frozen foods, even those eco-friendly packaged items that are actually coated in thin layer of plastic. This helps in consumption of fewer processed foods and avoiding chemicals in plastic packaging.
- Saying goodbye to plastic ware (disposable chopsticks, knives, spoons, forks, sporks) and keeping a set of utensils that reduces carbon fork print.
- While buying things at farmers market, bring plastic containers, if need a refill, or ask the grocer to take back the containers and reuse.
- Use cloth diapers than disposable diapers that consume a huge amount of plastic and trees a year while manufacturing.
- Prepare own fresh squeezed juice or eat fresh fruits that is good for the body rather than plastic bottled juices.
- Replace use of multiple plastic bottles of (tile cleaner, toilet cleaner, window cleaner) with own cleaning products (baking soda and vinegar).
- Pack lunch in reusable containers or reusable snack bags instead of packing in disposable plastic containers and bags.

Urgent things we can do today calls for four R's of plastic use as follows:

- Refusing all sorts of plastic use
- Reducing the use of plastic bags each week
- Reusing the plastic bag for number of purposes at home or outside, and
- Recycling of plastics by taking our own used bags, returning unwanted plastic for recycling if shopping is

delivered, checking food scraps before recycling to avoid contamination causing problems in production preventing recycled plastics from being used, approach local council to provide plastic bag recycling.

Although plastics are seen disposed everywhere, it is simply ignored. There is an urgent need to act now and take action towards saying no to plastic bags, cleaning the trash around, using eco-friendly products, reducing plastic waste, using reusable cloth bags, following healthy environmental habits, raising awareness on impacts of plastic pollution. Additionally, we need to encourage eco-friendly industries, push government to charge fine on ones who uses plastics or manufactures it with a similar kind of law what Kenya and many others has adopted. In conclusion, plastic pollution will become a big problem for future generations and significant effort is needed to tackle the problem now, if not us then who? Therefore, big focus in the coming years is everyone should make a little effort in incorporating the above mentioned good ways that contributes in reducing plastic waste towards clean and healthy environment. Success in combating various problems of plastic pollution we face today is in our hands and the need of the hour is to make changes in our lifestyles.

REFERENCES

1. Halden R.U (2010). Plastics and health risks. *Annu. Rev. Public Health.* 31:179-94
2. Greene, Sean (July 21, 2017). Plastic trash could top 13 billion tons by 2050. And recycling doesn't help much. Retrieved September 8, 2017, from <http://www.latimes.com/science/sciencenow/la-sci-sn-plastic-trash-20170721-htmlstory.html>
3. National Molding (2017). How Plastics Changed Our Daily Lives? Retrieved September 8, 2017, from <http://nationalmolding.com/blog/how-plastics-changed-our-daily-lives/>
4. Report. Everything you (don't) want to know about plastics. (2014). Retrieved September 12, 2017, from <https://www.naturskyddsforeningen.se/sites/default/files/dokument-media/rapporter/Plastic-Report.pdf>
5. Lifecycle of a Plastic Product. Retrieved 12 September 2017, from <https://plastics.americanchemistry.com/Lifecycle-of-a-Plastic-Product/>
6. Guide for minimizing plastic bag waste. Dubai Municipality Waste Management Department 2013. Retrieved September 7, 2017,

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- from <https://www.dm.gov.ae/wps/wcm/connect/ffd19203-95c2-4e11-a60c-a6111b61979f/Leaflet+of+Minimizing+Plastic+Bags+%28Eng%29.pdf?MOD=AJPERES>
7. About Disposable Plastic. Retrieved September 8, 2017, from <https://www.earthday.org/take-action/disposable-plastic/>
 8. Banning Plastic Bags is Great for the World, Right? Not So Fast. Retrieved September 8, 2017, from <https://www.wired.com/2016/06/banning-plastic-bags-great-world-right-not-fast/>
 9. Jacobsen Sharon. Plastic Bag Pollution. Retrieved 13 September 2017, from http://dpw.lacounty.gov/epd/PlasticBags/Articles/Googobits_07-21-05.pdf
 10. Walia, Arjun. (September 6, 2017). Researchers discover plastic fibres found in tap water around the world. Retrieved September 7, 2017, from <http://www.collective-evolution.com/2017/09/06/researchers-discover-plastic-fibres-found-in-tap-water-around-the-world/>
 11. Boesak, Tilly. (July 5, 2017). Are we eating plastic eating fish? Ocean Blue Adventures. Retrieved September 7, 2017, from http://oceanadventures.co.za/are_we_eating_plastic_in_fish/
 12. India in top 20 countries that dump maximum plastic in oceans. (February 16, 2015). Retrieved September 11, 2017, from <http://www.dnaindia.com/india/report-india-in-top-20-countries-that-dump-maximum-plastic-in-oceans-2061269>
 13. PTI (August 2, 2016). 15,342 tn plastic waste generated in India everyday: Dave. Retrieved September 7, 2017, from <http://indiatoday.intoday.in/story/15342-tn-plastic-waste-generated-in-india-everyday-dave/1/730211.html>
 14. Rajkumar. P. 2015. A Study on Plastic Waste and Environmental Degradation. ABC Journal of Advanced Research, 4, 9-15.
 15. Atulesh (n.d.). Plastic Consumption in India. Retrieved September 7, 2017, from <http://www.wealthywaste.com/plastic-consumption-in-india>
 16. Kenya brings in world's toughest plastic bag ban: four years jail or \$ 40,000 fine. (August 28, 2017). Retrieved September 7, 2017, from <https://www.theguardian.com/environment/2017/aug/28/kenya-brings-in-worlds-toughest-plastic-bag-ban-four-years-jail-or-40000-fine>
 17. Linnenkoper Kirstin (February 13, 2017). Norway's top researcher's to run major plastics recycling project. Retrieved September 7, 2017, from <http://www.recyclinginternational.com/recycling-news/10335/plastic-and-rubber/scandinavia/norway-039-s-top-researchers-run-major-plastics-recycling-project>
 18. Lofgren Kristine (August 7, 2017). Costa Rica aims to become the first country to ban all single use plastics. Retrieved September 7, 2017, from <http://inhabitat.com/costa-rica-aims-to-become-the-first-country-to-ban-all-single-use-plastics/>
 19. Chow Lorraine (August 25, 2017). Seattle to Ban Plastic Straws, Utensils at Restaurants Next Year. Retrieved September 7, 2017, from <https://www.ecowatch.com/seattle-ban-plastic-straws-2476937005.html>
 20. 15.(Plastic News) Rwanda's Plastic Ban (October 7, 2016). Retrieved September 7, 2017, from <http://blog.nus.edu.sg/plasticworld/2016/10/07/plastic-news-rwandas-plastic-ban/>
 21. Plastic Ban in India – EcoRight (19 April 2017). Retrieved 13 September 2017, from <https://ecorightbags.com/2017/04/19/plastic-ban-in-india/>
 22. Amit P. Gawande. 2013. Economics and Viability of Plastic Road. A Review. J. Curr. Chem. Pharm. Sc. 3(4). 231-242.
 23. Mapacpac Donna. 7 May 2017. Countries are Starting to Pave the Way Forward with Plastic Roads. Retrieved September 13, 2017, from <http://www.theevolvingplanet.com/countries-paving-forward-plastic-roads/>
 24. Tiwari Shewali (3 July,2017). These Indian Cities Are Putting Plastic Waste To Good Use, Are Using It To Construct Roads. Retrieved September 13, 2017, from <http://www.indiatimes.com/news/india/these-indian-cities-are-putting-plastic-waste-to-good-use-are-using-it-to-construct-roads-325095.html>
 25. Plastic Pollution – Ocean Ambassadors. Retrieved September 18, 2017, from http://oceanambassadors.org/pdf/OA_ERP_WEB.pdf
 26. Moss, Laura. (July 29,2015).16 simple ways to reduce plastic waste. Retrieved September 6, 2017, from <https://www.mnn.com/lifestyle/responsible-living/stories/16-simple-ways-reduce-plastic-waste>
 27. Say No to Plastic Bags – Clean Up The World. Retrieved September 8, 2017, from http://www.cleanuptheworld.org/PDF/au/plastic-bags---revised-household-version_final.pdf