

A Scenario of Plastic Waste Management in India: A Review

AS Yadav

How to cite this article:

AS Yadav. A Scenario of Plastic Waste Management in India: A Review. Indian Journal of Waste Management. 2019;3(2):73-76.

Abstract

Now-a-day's plastic has entered every household in different forms and become an integral part of our life. Around 25,950 tonnes of plastic waste India produces every day, out of which 40% has thrown unattended causing the choking of drainage and river systems, littering of the marine ecosystem, soil and water pollution, ingestion by stray animals. Burning in the open atmosphere makes things, even more, worse as it releases toxic gases to the environment. Plastic has been declared as a national menace and our honorable prime minister has taken an initiative to make country plastic free, but it solely depends on the individual effort and contribution.

Keywords: Plastic; Bio-plastic; Management; Waste.

Introduction

Plastic and its products play an important role in our daily life and continue to assert its presence even today. A so-called wonder product of the 20th century, as a result of which produced at an enormous level globally. As per the United Nations Environment Programme report, 400 million tonnes of single-use plastic (SUP) waste produced globally every year. (47 percent of the total plastic waste).¹ There is an

estimate that only 9% of the total plastic produced gets recycled worldwide. USA is the leading country on consumption of plastic per capita basis and global average was 28 kg during 2014-15 (Table 1). According to the Federation of Indian Chambers of Commerce and Industry data India per capita consumption of plastic has increased from 11 kg in 2014-15 to 20 kg by 2022).² After the one time it is used useless and known as plastic waste which has very least degradability in the soil and after the years it remains same in ungradable form.

Table 1: Per capita plastic consumption in 2014-15

Continent/country	Consumption (in Kg)
USA	109
Europe	65
China	38
Brazil	32
India	11
Global Average	28

Source: Plastic waste management: issues, solutions & case studies. Ministry of housing & urban affairs, Govt. of India. March 2019.

Author's Affiliation: Scientific Officer, Department of Agronomy, U.P. Council of Agricultural Research, 8th Floor, Kisan Mandi Bhawan, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh 226010, India.

Correspondence and Reprint Requests: AS Yadav, Scientific Officer, Department of Agronomy, U.P. Council of Agricultural Research, 8th Floor, Kisan Mandi Bhawan, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh 226010, India.

E-mail: ambreeshy7@gmail.com

Received on 21.10.2019, **Accepted on** 28.11.2019

Its wide range of the appliance is in household and industrial products, packaging films, fluid, shopping and garbage bags, containers, clothing, toys, wrapping and building materials. It is estimated that approximately 70 percent of plastic packaging products are converted into plastic waste in a short period. Approximately 9.4 million tonnes per annum plastic wastes are generated in the country, (which amounts to 26,000 tonnes per day) and out of this approximately 5.6 million tonnes per annum plastic waste is recycled and 3.8 million tonnes per annum plastic waste is left uncollected or littered.³ Out of this, about 60 percent is recycled, most of it by the informal sector. India has a better recycle rate considerably higher than the global average of 20 percent,⁴ around unused and unrecycled 9,400 tonnes of plastic waste used in the land filling or ends up polluting streams or ground water resources.

In general, plastic takes a 450 years' time frame for complete decomposition. In spite of all the degradable issues it has several benefits also, and they have many redeeming ecological features. Many of the techniques we utilize in our designs involve targeted use of plastic products.

Their durability and low maintenance reduce material replacement, their light weight reduces shipping energy, their formulation into glue product allow's for the creation of engineered lumber and sheet products from recycled wood and their formulation into superior insulation and sealant products improves the energy performance of our structures. Due to the higher colors and additives content in recycled plastic, it became more toxic after recycling. It is advisable that only 2-3 times plastic should be recycled because recycling requires extreme thermal pressure to break it which deteriorates its quality beyond that its thermal stability is very poor. Hence, recycling is not a secure and enduring solution for plastic waste disposal. Due to improper collection and segregation systems of plastic waster, it is a more serious concern than expected.

According to the annual report (2017-18) on implementation of plastic waste management rules Gujarat state generates maximum plastic waste 2,69,808.00 million tonnes followed by Uttar Pradesh 2,06,733.4 million tonnes, while Arunachal Pradesh reported lowest plastic waste generation (Table 2).

Table 2: Statewise estimated plastic waste generation during 2017-18

S. N.	State	Plastic waste generation (MT/annum)
1.	Arunachal Pradesh	6.0
2.	Bihar	2,280.0
3.	Gujarat	2,69,808.0
4.	Jammu & Kashmir	27,870.0
5.	Manipur	24.0
6.	Meghalaya	15.1
7.	Madhya Pradesh	50,457.01
8.	Odisha	12,092.2
9.	Punjab	54,066.1
10.	Tripura	28.5
11.	Uttar Pradesh	2,06,733.4

Source: Annual report⁶

Harmful Effects of Plastics

Plastic is multipurpose, flexible, light weight, moisture resistant, sturdy and comparatively inexpensive. Those are the striking qualities that lead us just about the world, to such an insatiable appetite and over consumption of plastic goods. Our marvelous attraction to plastic, coupled with an undeniable behavioral proclivity of increasingly over-consuming, removal, littering and thus polluting, has become an amalgamation of lethal nature. The disposal of plastics is one of the least

recognized and most highly problematic areas.

Ironically, one of plastics most desirable traits: its durability and resistance to decomposition, is also the source of one of its greatest liabilities when it comes to the disposal of plastics. Natural organisms have a very difficult time breaking down the synthetic chemical bonds in plastic, creating a tremendous problem of the materials persistence.

Around a 10 percent of the produced plastic get recycled; the rest of plastic is sent to landfills, where it is destined to remain entombed in

limbo for hundreds of thousands of years, or to incinerators, where microbial and environmental thermal activity produced toxic compounds which are spewed throughout the atmosphere to be accumulated in biotic forms throughout the surrounding ecosystems.

Pollution in soil and groundwater

Plastic breaks down into smaller and small earpieces but its complete degradation is a bit complex and time taking process. When buried in a landfill, plastic lies untreated for years. In the process, toxic chemicals from plastics drain out and seep into ground water, flowing down stream into lakes and rivers. The seeping of plastic is main reason for the availability of micro-plastic which are quite often common in soil now a days.

China has admitted that 19 percent of its agricultural land is polluted from plastic. Moving to the Australian continent, they have already admitted that around 80,000 sites are classified as contaminated. The detrimental effects of plastic on soil are not that well explored compared to marine and water contamination, mostly because it is through land that plastic and its particles end up in water, or the plastic objects are blown away by the wind into seas, oceans and rivers, which may be the case if it is dumped near the water body.

Plastic interacts with water and creates Styrene Trimer, Bisphenol A, and a by-product of Polystyrene, both chemicals are extremely harmful to our health. Bisphenol A is known to affect the animals' reproductive systems, and it makes one wonder whether humans are susceptible to it, too.

Pollution in Oceans

The augmented presence of plastic on the ocean surface has resulted in more serious problems. Since most of the plastic debris that reaches the ocean remains floating for years as it does not decompose quickly, it leads to the plummeting of oxygen level in the water, harshly affecting the survival of marine species. Due to wide occurrence on the surface, it may be engulfed with the food of the ocean vulture. That's why a sharp decline in the number in the contaminated area has been reported by several environmentalists. The harmful effects of plastic on aquatic life are overwhelming and accelerating. In addition to suffocation, ingestion and other macro-particulate causes of death in larger fish, birds and mammals, the plastic is

ingested by smaller and smaller creatures and bio-accumulates in greater and greater concentrations up the food chain with humans at the top. Even plankton, the tiniest creatures in our oceans are taking the micro-plastics with their feed and absorbing their hazardous chemicals. The tiny, broken down pieces of plastic are displacing the algae needed to sustain larger sea life who feed on them.

Some important facts about plastic

1. Asia is the world leader in plastic production and pollution. The Philippines alone dumped over 1 billion pounds of plastics into our oceans. That is over 1,18,000 trucks worth. If it would be the case our oceans will be filled with the plastics than fishes in 30 years.
2. A single water bottle can take up to 1000 years to break down. Plastics are made up of oil with a highly polluting production process. Plastic breaks down into micro-particles that circulate in the environment.
3. Studies show that consuming plastic could lead to cancer, effects on hormone levels and heart damage. Our drinking water contains 83 percent plastic. Even now a day's micro-plastics have been found in the blood of even newborn babies.
4. Over 600 marine species are affected by plastics. Nearly 45,000 marine animals have ingested plastics and 80 percent were injured or killed. Plastics can pierce animals from inside or cause starvation, entanglement, loss of body parts and suffocation.
5. "Great pacific Garbage Patch" has been created in the ocean due to the collection of plastic from the water current. There are now many islands of trash in our seas.

Dangerous for human and animal life

Halogens, a class of flame retardants produced from the burning of the plastics. Cancer, endometriosis, neurological damage, endocrine disruption, birth defects, and child developmental disorders, reproductive damage, immune damage, asthma, and multiple organ damage are major health disease which would possibly happen to the human being if this plastic menace is not controlled.

Millions of marine animals died every year due to plastic debris. As we have already mentioned,

most of it comes from land. Unfortunately, there are many ways sea creatures die owing to plastic. The pollutant gets stuck in their stomach, preventing them from eating food. The same happens on land, too, since animals mistake the material for something edible, especially when eating from rubbish bins. Also, a lot of species get tangled into plastic waste and die soon enough.

Packaging industry

There is a steep growth in the packaging industry due to plastic application, in India by 2020 packaging is projected to grow \$72.6 billion industry from \$31 billion in 2015, with a proportionate rise in waste volumes [2]. The pressure on producers to streamline the collection, recycling and processing of all forms of plastic is bound to grow.

Alternative of plastics

Bagasse made from biodegradable plastics from corn starch and grain, flour is promoted as alternatives of plastics; these currently have restrictions of scale and cost. Few biodegradable packaging materials require specific micro-organisms to be broken down, while compostable plates and cups made of polylactic acid, a popular resource derived from biomass such as corn starch, require industrial composters. Seaweed is also emerging as a choice to make edible containers. On the other hand, articles made through a different process involving corn and potato starch have done better in normal conditions, going by the experience in Britain.

In India, though, in the absence of robust testing and certification to verify claims made by producers, spurious biodegradable and compostable plastics are entering the market place. Ban on single-use plastic items would have to, therefore, lay down a wide-ranging mechanism to certify the materials marketed as alternatives and the specific process required to biodegrade or compost them. A movement against plastic waste would have to prioritize the decrease of single-use plastic such as bread bags, food wrap, multi-layer packaging, and protective packaging. Consumers often have no choice in the matter.

Conclusion

Nature has already started to take care of itself. Amazingly, such excess of plastic waste seems to have triggered a new enzyme in bacteria a plastic-dissolving one. Scientists have discovered the so-called plastic-eating bacteria which could do wonders for the oceans. Such types of bacteria could solve the problem of water pollution for good. Now days there are materials that can be recycled easily, or they disintegrate more quickly than plastic.

In addition, the government should certainly do their share in encouraging green practices by supporting environmentally friendly behavior and introducing stricter penalties for offences against nature.

The scuffle against plastic waste is a never-ending one since we are constantly producing injurious material. There are plenty of ways to diminish the waste, and if every person does their part, the world can be changed for the better. Otherwise, it would not be only water, land and animals that are poisoned with plastic, but us, too.

References

1. https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf?isAllowed=y&sequence=1.
2. <https://www.thehindu.com/sci-tech/energy-and-environment/where-does-india-stand-on-plastic-waste/article29310525.ece>.
3. UNIDO Report- Recycling of Plastics in Indian perspective by Dr. Smita Mohanty.
4. <https://ourworldindata.org/faq-on-plastics>.
5. Plastic waste management: issues, solutions & case studies. Ministry of housing & urban affairs, Govt. of India. March, 2019.
6. Annual report 2017-18. on implementation of plastic waste management rules (As per Rule '17(4)' of PWM Rules, 2016, as amended 2018). Central Pollution Control Board, Ministry of Environment, Forest and Climate Change, Govt. of India, Delhi.