

Chapter 5

Plastic Waste Pollution and Its Management in India: A Review

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ABSTRACT

Plastic, one of the most preferred materials in today's industrial world, is posing a serious threat to the environment and consumer health in many direct and indirect ways. The global plastic production increased over years due to the vast applications of plastics in many sectors. More than 50% of the plastic waste generated in the country is recycled and used in the manufacture of various plastic products. The remaining half is disposed of at landfill sites or simply burned in incinerators. The burning of plastics, especially PVC, releases this dioxin and also furan into the atmosphere. In this chapter, the authors examine the environmental and health effects and harm caused by the burning of plastics in detail. It focuses on the current status of plastic waste management in India and industries working under the extended producer responsibility. Therefore, an attempt has been made to review the current practices prevalent in India to deal with this plastic waste and problems associated with it.

1. INTRODUCTION

Plastic, with its exclusive qualities is now a serious worldwide environmental and health concern, essentially due to its non-biodegradable nature. More than 50% of the plastic waste generated in the country is recycled and used in the manufacture of various plastic products. Dioxin is a highly carcinogenic and toxic by-product of the manufacturing process of plastics. Burning of plastics, especially PVC,

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releases this dioxin and also furan into the atmosphere. Plastics are so versatile in use that their impact on the environment is extremely wide ranging. Careless disposal of plastic bags chokes drains, blocks the porosity of the soil and causes problems for groundwater recharge. Dioxin is the common name for a class of 75 chemicals. It is a toxic waste product formed when waste containing chlorine is burned or when products containing chlorine are manufactured. Dioxins are among the most potent synthetic chemicals ever tested, causing cancer and harming our immune and reproductive systems even at very low concentrations (Pavani and Rajeswari, 2014). Plastic is a relatively cheap, durable, and versatile material. These properties have led to its use in the creation of thousands of products, which have brought benefits to society in terms of economic activity, jobs, and quality of life. However, plastic waste can also impose negative externalities such as greenhouse gas emissions or ecological damage. It is usually non-biodegradable and, therefore, can remain as waste in the environment for a very long time; it may pose risks to human health and the environment; in some cases, it can be difficult to reuse and/or recycle (Toxic link, 2016). Plastic disturbs the soil microbial activity. Plastic bags can also contaminate food-stuffs due to leaching of toxic dyes and transfer of pathogens. Furthermore, flame-retardant materials such as polyvinyl chloride (PVC) are known to cause corrosion in incinerators during combustion due to their constituent halogen substances; these materials also produce halogen compounds such as dioxins.

Moreover, CO₂ discharged from the combustion of polymers causes environmental problems such as global warming and acid rain. In addition, suspected endocrine disrupting chemicals, typically Bisphenol A, can dissolve out of polycarbonate (Fatima, 2014). As per the government report more than 15,000 tonnes of plastic waste are generated in India everyday, of which 6,000 tonnes remain uncollected and littered. As per a report of a Task Force constituted by erstwhile Planning Commission in 2014 indicates that 62 million tonnes of municipal solid waste is generated in India annually in urban areas. However, as per the CPCB report of 2014-15, 51.4 million tonnes of solid waste were generated in the country, of which 91 per cent was collected, and 27 per cent was treated and remaining 73 per cent disposed of at dump sites. Central Pollution Control Board has estimated that the generation of 15,342 tonnes of plastic waste in the country, out of which, 9,205 tonnes were reported to be recycled and leaving 6,137 tonnes uncollected and littered (Press Trust of India, 2016). The growth of the Indian plastic industry has been phenomenal equal to 17% is higher than for the plastic industry elsewhere in the world (Panda et al, 2010). Petrochemical products permeate the entire spectrum of daily use items and cover almost every sphere of life like clothing, housing, construction, furniture, automobiles, household items, agriculture, horticulture, irrigation, packaging, medical appliances, electronics and electrical etc. These industries hence drive the demand growth of petrochemicals. Current low per capita consumption level of plastic products as compared to developed countries per capita consumption as shown in Figure 1 suggests that India offers a huge opportunity over long term (FICCI-2014).

To manufacture finished products, polymers are processed through various types of techniques namely extrusion, injection moulding, blow moulding and roto moulding. Various products manufactured through these processes are highlighted in the Table 1. In India, extrusion-based methods account for 75% of the total amount of plastics processed; this is very similar to the situation in Western Europe.

Over 27% of all extruders in the plastics processing industry are operated for the manufacture of blown films. Injection moulding is the second largest processing technique (19%) and is mainly used for the manufacture of household products, packaging, and in the electrical sector. Blow moulding and rotational moulding constitute a small share; these processes serve to manufacture products like bottles, drums, tanks etc. (Muth et al, 2006).

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