Chapter 3
Environmental and Health Implications of Plastic Pollution:
A Pakistan Perspective

Toqeer Ahmed
COMSATS University Islamabad, Pakistan

Hassaan Fayyaz Khan Sipra
COMSATS University Islamabad, Pakistan

ABSTRACT

Plastic pollution is one of the prime and alarming issues in developing countries that has vast environmental and human health impacts which need to be addressed as a priority. Unfortunately, limited work has been done on the topic, especially on air and water pollution due to plastics in Pakistan. Informal solid waste management is being done by municipalities, which is not adequate, and the problem will increase with the upsurge in population and industrialization. There is a need to address the knowledge gap and improvements in the existing conditions to manage the issue of plastic pollution separately. In this chapter, causes; impacts of plastic pollution both on human and environmental health, plastic industries, and legislative context; and best practices to manage plastic pollution along with some important recommendations are discussed. It is expected the data presented may help the managers, environmental scientists, and policymakers to manage the problem of plastic pollution.

INTRODUCTION

Plastics reached large-scale production and consumption beginning in 1950 (Geyer, Jambeck, & Law, 2017), and the global lack of coordination on waste management and recycling has led to plastic waste accumulation, with effects on health and environment (Raynaud, 2014). Given that plastic is made to not degrade (Hopewell, Dvorak, & Kosior, 2009), plastic can be considered a sign of the Age of the Anthropocene (Zalasiewicz, et al., 2016). In order to better manage plastic waste, the principles of sustainable development and circular economy must be applied on production and consumption resource loops (Stahel, 2016).
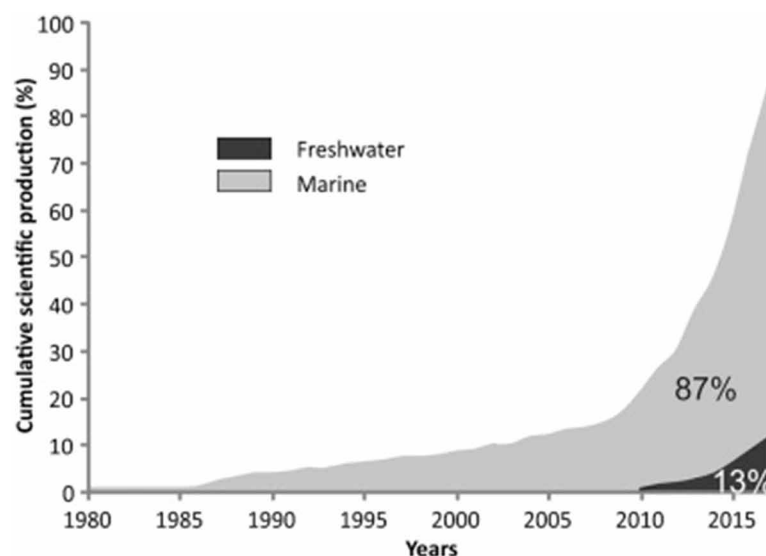
Such a transformation of production and consumption systems is considerably challenging because of a lack of data on plastic waste. However, estimates point towards mismanagement at the production and consumption levels in terms of the state of plastic waste today. In terms of production, 8.3 billion metric tons of virgin plastic were produced between 1950 and 2015, of which 6.3billion metric tons was converted into plastic waste – with 79% reaching end of life in a landfill or the environment (Geyer, Jambeck, & Law, 2017).

It is unsurprising that the demand for plastic and its subsequent conversion to plastic waste is rising rapidly, since it is linked to rising living standards. As countries urbanize and economic growth occurs, production and consumption patterns change; waste generation and waste composition change as well. Higher living standards means more plastics enter the waste stream (Hoornweg & Bhada-Tata, 2012), and where mismanaged, they accumulate as plastic pollution. Better plastic waste management strategies (namely recovery and recycling) need to be instituted as urbanization continues. Its impacts on human health and our surrounding environment need to be studied closely to ensure that sound policies can be made to address plastic pollution.

Data on plastic pollution is limited, making its study difficult. There are also inherent biases and knowledge gaps within the global assessment of plastic pollution, with the focus being on ocean and freshwater plastic pollution. The most recent review effort of scientific literature on the global scale finds 87% of studies focus on marine plastic pollution, while 13% of studies focus on freshwater plastic pollution (Figure 1); marine based papers have a growth rate five times higher than that of freshwater based pollution papers (Blettler, Abrial, Khan, Sivri, & Espinola, 2018).Water based studies on plastic pollution are given extreme importance when trying to understand the local, regional and global plastic flows, since the majority of mismanaged plastic waste ends up in river systems and eventually flushes out to the oceans (Tibbetts, 2015). The United Nations Environment Programme estimates the costs of plastic pollution to be at $13 billion in terms of environmental damage to marine ecosystems (Raynaud, 2014).

Figure 1. Freshwater and marine plastic pollution studies globally (Blettler, Abrial, Khan, Sivri, & Espinola, 2018)

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