

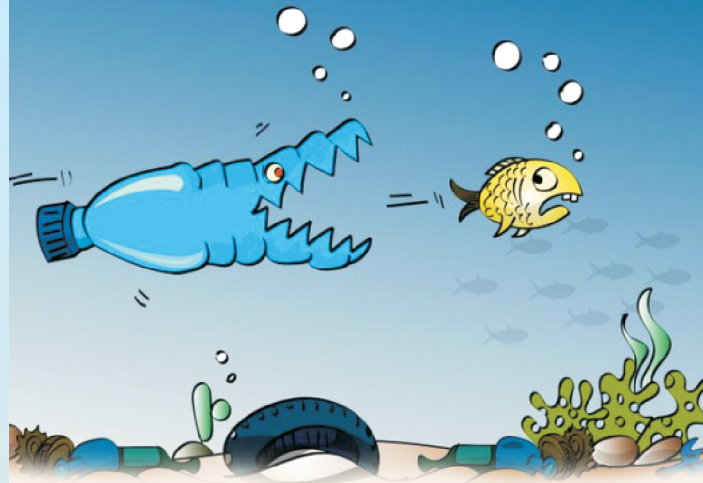
2. Secondary microplastics

These are the macroplastics which get fragmented to microplastic upon continuous exposure to sunlight and wave-tidal action. About 69 to 81% of microplastics in the ocean are considered secondary microplastics (www.eufic.org).

The so transported microplastics are accidentally taken up by marine living organisms including fishes and other biotas such as birds which may be leading to the bioaccumulation of plastic additives (Bisphenol A diethyl hexyl phthalate) or contaminants (PCBs and PAHs). Ingestion of microplastics is a matter of concern in the case of benthic sessile organisms such as filter feeders, as these may reach the food chain (Collard, *et al.*, 2017). The plastic garbages also lead to the gradual destruction of eco-sensitive habitats like seagrass meadows, coral reef ecosystems and associated biota. The discarded fishing nets in the sea consequently lead to ghost net fishing which threatens the life of marine organisms as they get entangled in it.

The main reason for plastic pollution is human lifestyle and behaviour. The discarded single-use plastic items accumulate over time and ultimately

finds there way to ocean. Therefore, minimizing the usage of plastics and recycling the used plastics is the way forward to create a plastic-free future in the years to come. The Recent research suggests that within the next 30 years, ocean will be having more plastics than the land (Ellen Mac Arthur, World Economic Forum, 2016) and report says that if the plastic production goes on in accordance to



current trends, the total plastic production is estimated to rise by 33 billion tonnes by 2050 (Watson, *et al.*, 2015).

Strict implementation of rules by the concerned agencies to do away with single-use plastics and creating awareness among the people on the deleterious effects of plastic contaminants is an urgent need. It is the right time to decide the future fate of plastics and if we fail to do so, the situation in sea would be grim and the damages would be irreversible.

**It is not awareness
but a warning**

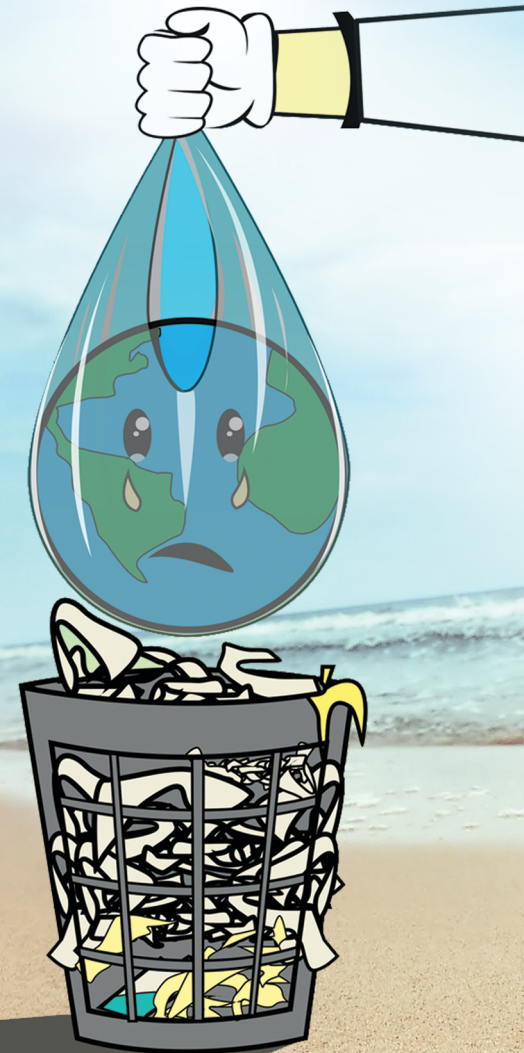
"By 2050 there will be more plastic
than fish in the world's oceans"

- Sarah Kaplan

**Ramya Abhijith, Reeta Jayasankar,
M.T. Shilta, P.K. Asokan, K. Vinod**

Published by: The Director, ICAR-CMFRI
CMFRI/FEM-CMP-28/CRS-01

Save the Sea Say "No" To plastics





What are Plastics?

Plastics are one of the wonder inventions by human beings and are categorized as man-made organic polymers.

Plastic: Human Friend or Foe ?

Plastics are considered as a major invention of the eighteenth century, though the plastic industrialization began in 1900s. The use of plastics increased during the last 40-50 years in all sectors and has become inseparable from our daily life. The reasons for this increased usage are:

1. Low manufacturing cost.
2. Easy to use
3. Long-lasting
4. Light weight
5. Extreme degrees of strength
6. Moulded any shape and size

Though advantageous, plastics have become equally dreadful to the environment, including the marine ecosystem.

Plastics: The dreaded polymers

During 1940s, the production of plastics was only one million tonnes (World Economic Forum, 2016). The Global plastic production increased substantially to 311 million tonnes in 2014 and further rose to 368 million tonnes in 2019. China is the main producer of plastics and constitutes 31%

of the total global production. The 2020 COVID pandemic had a great global economic loss, but plastic production in China increased as there existed huge global demand (www.statista.com). It is nightmarish to learn that of the total production, about 10% of plastics drift into the ocean. It is estimated that 14 million tonnes of plastic end up in the ocean every year and 80% of marine debris are plastics (www.iucn.org). The main components include the discarded single-use plastic items which are land-based and ultimately reach the ocean through the rivers and streams. In this way, tonnes of plastics are directly or indirectly thrown into the sea which makes the ocean a dumping yard of plastics.

Types of plastics

Based on the size, the plastics are categorized as Macroplastics, Mesoplastics, Microplastics, Mini-microplastics and Nano plastics.

- | | |
|----------------------|-------------------|
| 1. Macroplastic | Greater than 25mm |
| 2. Mesoplastic | 5 mm to 25mm |
| 3. Microplastic | 1mm to 5mm |
| 4. Mini-microplastic | 1 μ m to 1mm |
| 5. Nano plastic | 1 nm to 1 μ m |



The macro plastics which gain entry into the sea are subjected to continuous wave action and exposure to sunlight which consequently leads to the fragmentation of these to smaller mesoplastics and microplastics. Of these, the microplastics and plastics of still smaller size are of much concern as they are invisible to naked eye and maybe ingested accidentally by living organisms. The Microplastics have greater environmental hazards to marine life. Of the plastics in the sea, about 92% are microplastics in nature which remains for hundreds of years. The sources of plastics are mostly land-based, unregulated coastal tourism and to some extent through fishing activities.

Types of microplastics

1. Primary microplastics

Generally, these are manufactured as microplastics for commercial purposes. These kinds of microplastics are mainly used in cosmetic and other industrial applications. The plastic scrubbers and beads that are mainly used in facewash, sunscreen and handwash are called primary microplastics. About 19 to 31% of microplastics in the ocean are considered primary microplastics (www.eufic.org).

