

Challenges and Sustainable Solutions to Plastics Pollution in the Ecosystem

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Abstract

Bakelite's development in 1907 ushered in a material revolution by introducing polymers into global markets. The usage of plastic in numerous applications such as packaging, household, electrical, construction, and many others has led to the manufacture of approximately 400 million tonnes of plastic every year, half of which is single-use plastic. The big players are China, Asia and USA. Covid-19 has aggravated the generation of plastic since 129 billion masks and gloves are discarded monthly. It is estimated that 60 percent of all produced plastic had already become waste, with a significant portion ending up in the ocean. Only 9% of all plastics produced is recycled. China's ban on plastic waste import somewhat has increased the illegal disposal of plastic in Developing nations.

The challenges are numerous. Mismanagement of plastic waste, inadequate recycling, littering, urban and stormwater runoff, sewer overflows, industrial activities, construction, and illegal dumping coming from land-based activities. Quality loss due to recycling, heterogenous composition of plastic products are other issues. About 1.8 billion tonnes of CO₂ are emitted by plastic production every year. An estimated 5-13 million tonnes of plastic enter the ocean yearly and as a consequence 51 trillion particles are floating in the ocean. This has caused serious environmental pollution and economic loss.



Sustainable solutions include the use of Circular Economy (CE) and Extended Producer Responsibility (EPR) towards zero waste. Although several countries throughout the world have policies in place to deal with plastic waste, they have yet to be properly enforced or implemented. CE and EPR are envisaged as possible solutions. There is an urgent need to ban single use plastics globally. Therefore, a summary of various policy options, the usage of modern recycling technology and other sustainability methods will be discussed. To find practical solutions to plastic challenges, it is critical for collaboration among global, regional, and national levels, research institutes, and industries. It is also equally important for organizations and society to collaborate in order to teach communities and individuals how to reduce plastic pollution as part of a larger effort to combat plastic pollution.

Biography

Dr. Agamuthu FASc., is a Senior Professor in the Jeffrey Sachs Center on Sustainable Development at Sunway University (SU). He is also the Associate Dean (Research and Postgraduate Studies) at the School of Interdisciplinary Sciences, SU. Prior to this he was attached to University of Malaya for 44 years. He is a Fellow of the Academy of Sciences, Malaysia. He is appointed as the High-Level End Foreign Expert for the Ministry of Science and Technology, China and is also a Visiting Professor for Zhejiang University of Technology in Hangzhou, China. He was an Associate Editor/ Senior Editor in Chief of Waste Management and Research (WM&R) for 20 years, and is currently an International Advisory Board member for WM&R. He is on the editorial boards of several journals such as Journal of Material Cycles and Waste Management and Journal of Safety and Environment. He is the Vice-President of the Society of Solid Waste Management Experts in Asia and Pacific Islands (SWAPI). He is the Founder Head of the

Center for Research in Waste Management and the Founder President of the Malaysian Society of Waste Management and Environment. Currently he is the Chairman for the Organization for Climate Change (OFCC), Malaysia. He is an Honorary life member of International Solid Waste Association (ISWA). He has published 22 books, 34 chapters in books and authored over 480 peer-reviewed articles, proceedings and invited papers. He has done over 75 consultancy projects and supervised over 200 Master's Degree students and 38 doctoral students. His research interest includes Solid Waste Management, Plastic and Microplastics, Marine Debris, Landfills and Biomass/Waste to Energy, to name a few. He has international cooperation and collaboration in several countries such as the UK, China, Austria, Japan, Korea, India, Norway, Finland, Cambodia, Thailand, Myanmar, Sri Lanka, to name a few.