

A System Dynamics Approach to Model and Manage Plastic Waste Pollution

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Abstract

Plastic wastes accumulate over time due to increased usage and improper disposal in the environment. In addition, plastics decompose at a slow rate, causing landfills and oceans be filled with plastic wastes, reducing the space for more wastes. This poses as a threat to the marine environment as oceans become polluted with plastics and harm the organisms residing in the ocean. With the existing plastic waste management and policies, there is a question to whether they are sufficient in managing wastes by reducing their presence in the environment and limiting plastic consumption. The study aims to develop a system dynamics model that will replicate the plastic wastes present in the marine environment and propose solutions on the existing plastic waste management that would limit plastic usage and increase the efficiency of waste management. It will cover the supply chain of plastic wastes until the disposal process to replicate the system successfully. Parameters and scenarios are tested in the model to gather insights on the system behavior. Policies or solutions are proposed appropriate to the system that would successfully reduce plastic waste in the oceans. Further studies include developing policies that would reduce plastic production, as this is not focused on in this study.

Keywords

Manage, plastic waste, management ,ocean, pollution, harmful microbes, modeling, system behavior