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Reinventing Plastics

Value and limitations of plastics

Introduction

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2. VALUE AND LIMITATIONS OF PLASTICS

Plastic has become indispensable to our modern lifestyles. It helps to save energy, reduce CO_2 emissions and conserve resources. It has become vital to the food industry as it helps to cut food waste by increasing product shelf-lives. In the automotive sector, where plastics account for some 20% of materials in a car, plastics are used to cut vehicle weights and thereby improve fuel consumption. Similarly, plastics account for 60% of materials used in textile manufacture, a total of over 70 million metric tons of plastic annually. This reduces the need for natural fibers, such as cotton or wool, which require large areas of productive land that could be used to grow crops.

According to Trucost, the environmental cost of plastic in consumer goods is 3.8 times lower than that of alternative materials that would be needed if plastic was replaced. For example, it estimates that replacing plastics with alternative materials in passengers vehicles sold in North America in 2015 would lead to an increase in lifetime fuel demand for these vehicles of an additional 336 million liters, resulting in an environmental cost of $2.3 billion.

Once seen as a providential material, plastic is today more commonly seen as a time-bomb. The irony of this situation is that its initial advantages have morphed into the primary drawbacks: over 100 billion plastic bags are used every year in Europe while their lifetimes generally do not exceed 15 minutes – and it then takes 450 years for them to decompose in nature. Plastic pollution is now so prevalent in the ground and geological sediments that it has become a stratigraphic marker of passage to the Anthropocene, the post-18th century geological period characterized by the impact of human activity on the earth's ecosystems.

Plastic packaging generates significant negative externalities, estimated by the United Nations Environment Program at $40 billion annually, a greater amount than the profits made by the plastic packaging industry. Irrespective of the economic losses, the question of plastic's impact on the environment and human health is a major aspect of the controversies surrounding plastic today. Scientists have shown that the toxicity of plastic pollution, including nanoplastics, has a negative impact on marine animals. Take coral as an example. The risk of catching a disease rises from 4% to 80% for corals that have come into contact with plastic. Plastic debris is a vector for microbes and microorganisms, participating in the propagation of illnesses spread by invasive species and leading to functional problems in ecosystems.

The implications for human health of the presence of plastic fragments at all stages of the food chain are something that have not been sufficiently studied. Micro and nanoparticles of plastic have already been identified in drinking water supplies, honey, salt, seafood, the air and human digestive tracts, but we lack the ability to accurately gauge the negative impacts this contamination may engender.

Further scientific research, with a better worldwide coordination, is needed to increase our understanding of the spread of our plastic pollution and the impact this has on marine ecosystems and human health.

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