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Addressing Marine Plastic Pollution Through a SDG 6, 12, and 14 Nexus



UNIVERSITY OF BERGEN

To holistically address the issue of marine plastic pollution, it is useful to consider the linkages between SDG 6: Clean Water and Sanitation, SDG 12: Responsible Consumption and Production, and SDG 14: Life Below Water because they demonstrate relevant, but largely unexplored connections.

3 key points

- Marine plastic pollution is an increasingly urgent topic at the nexus of ensuring human well-being and a thriving biosphere.
- To combat marine pollution and littering, society including individuals, the community, and industries, should improve their waste management practices and other measures to reduce plastic pollution in the oceans through their lifestyles, consumption, and production patterns.
- Over 267 species in the marine environment are known to have been affected by plastic pollution. Therefore, resolving this issue are key to humankind as we are both creators, and victims of the plastic pollution problem.

Introduction

There is an estimated 300 million tons of marine plastic pollution annually that largely originates from land and can impact the marine environment, harm human livelihood, and economically affect businesses and governments (Fadeeva and Van Berkel, 2021). In addition, plastic is present in the marine environment due to insufficient waste management, dumping or littering by consumers and producers, unintentional leakage of plastic across its life cycle, and direct inputs from marine activities (Veiga et al., 2016). Plastic makes up the majority of all waste in the ocean (80%) and is thus important for policy action (Marine Plastics, 2018).

Most of the plastic present in the ocean is transported from land via rivers and transitional water ecosystems (TWEs) (i.e. bays, lagoons, or estuaries). TWEs are disproportionately exposed to human and natural stressors compared to other aquatic environments due to their role in connecting fresh and marine waters, and yet they are under-investigated (Renzi et al. 2020). Therefore, to holistically address the issue of marine plastic pollution, it is useful to consider the linkages between SDG 6: Clean Water and Sanitation, SDG 12: Responsible Consumption and Production, and SDG 14: Life Below Water because they demonstrate relevant, but largely unexplored connections.

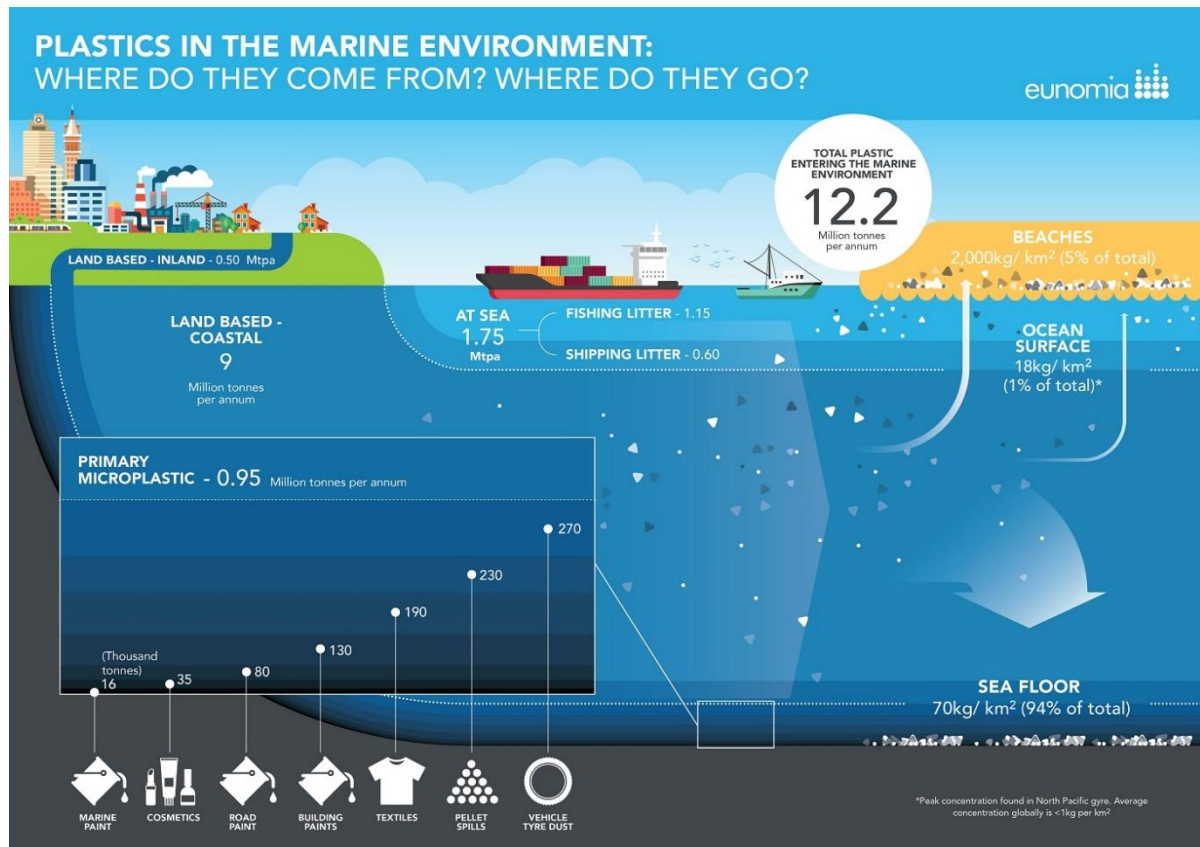
Plastic pollution is difficult to track and manage because of the many pathways it takes to travel from land to the marine environment (Duncan et al., 2020). In addition, the durability of plastic allows it to persist in the environment, meanwhile ultraviolet radiation and erosive forces cause the plastic to break apart into increasingly smaller pieces (Holmes et al., 2020). Eventually, the seas and oceans accumulate a large presence of visible plastic (macroplastics) that comes from mismanaged waste or objects that have been lost or littered as well as invisible microscopic plastic (microplastics) (Boucher et al., 2020).

Analysis

Stopping the pollution before it enters the environment is likely the most effective approach to address Target 14.1 of SDG 14, which aims to prevent and significantly reduce marine pollution by 2025. However, more data related to where plastic pollution comes from and where it ends up could help experts highlight key problem areas. Due to the complexities regarding plastic transport and its persistence in the environment, it would be helpful if industries could include information about their plastic waste into their reports (a goal of Target 12.6). Specifically, industries should disclose the types of plastics used (polymers), a mass balance of their processes, and thorough information about their value chain (who they buy from and who they sell to).

The reduction of the global material footprint (Indicator 12.2.1) is critical towards reducing plastic waste. In addition, material footprint is directly related to lifestyle – if we consume less raw material the footprint can shrink (unstats.un.org). In the first instance, plastic manufacturing must be reduced. The most effective mechanism for reducing overconsumption is through reuse and recycling which in turn reduces waste and the General Recycling Rate (Indicator 12.5.1) (unep.org). Throughout the developed and developing world there are examples of waste management systems enabling circular systems which directly impact on reducing plastic waste in waterways and the oceans (Williams, J., 2021; OECD, 2020). Communities and individuals have become engaged in a joint effort to collect, recycle, and reduce waste through innovative management systems, for example, in Mumbai 1500 volunteers collected over 3 million kilograms of waste in one year (GRID-Arendal, 2021). Since 2015 there is a marked increase in initiatives, however data on the impact of the recycling rate is not yet available as monitoring is complex (GRID-Arendal, 2021).

Education is an important approach to addressing the challenge of plastic pollution and is linked to Indicator 12.8.1 (de Sousa, 2021). There is an urge to incorporate relevant environmental knowledge into education systems (Vince & Hardesty, 2018). For such educational campaigns to be effective, they must consider drivers for behaviour change, such as underlying mental models (Mironenko & Mironenko, 2020), rather than simply providing information (Hartley et al., 2018). These educational initiatives should be directed towards key stakeholders who often live close to TWEs and, therefore, can negatively impact the core function of the ecosystem through poor sanitation (Pérez-Ruzafa et al., 2011). To this end, it would be useful to create a TWE literate society by building curricula on estuarine principles and concepts (Cava et al., 2005); this will teach society about what they can do to protect the ecosystem from plastic waste.



Sources and impacts of marine litter in brief. Source: Eunomia, *Plastics in the Marine Environment*, June 2016, <https://www.eunomia.co.uk/wp-content/uploads/2016/05/Eunomia-Marine-Litter-MED.jpg>

Conclusions

While effective policies to address marine plastic pollution must inherently be top-down to some degree, we urge that these policies ensure three central elements. First, policies should consider specific environmental and socio-economic contexts, particularly through engaging stakeholders in participatory and deliberative processes in the relevant local communities. Second, engagement should be done early in the decision-making process, and be continuous, with the aim of uncovering unintended consequences of policies and to include local traditional ecological knowledge. Finally, policies should be flexible by including regular checkpoints. The primary aim of these checkpoints is to acknowledge the dynamic nature of such situations, and to ensure that policies are reflexive, meaning that they are continuously responsive to feedback. Reflexivity is critical for when negative consequences (actual or potential) of policies are discovered or new contextual developments occur, where decision-makers can reflect on such circumstances. Decision-makers and local stakeholders can work together to bring about positive impacts and changes to ensure that such policies are effective as well as socially, economically, and environmentally sustainable.

Recommendations

Industries should disclose metadata regarding their value chain and internal processes as part of their corporate social responsibility (CSR) and sustainability reporting.

Incentivise “reduce, reuse, and recycle” with circular economy strategies geared towards shrinking the plastic footprint.

Strengthen collaboration among decision-makers, higher education, research institutes, and community members to enhance evidence-based policy.

Further relevant SDGs: SDG 2, SDG 3, SDG 11, and SDG 13

IMPRINT

SDG Bergen Science Advice in collaboration with Bergen Summer Research School's 2021 PhD course holders professor Birgit Kopainsky, Dr. Hiwa Målen and Dr. Ingunn Johanne Ness.

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Relevance to the 2030 Agenda

The nexus presented elaborates on the connections inherent within the 17 SDGs. Therefore, a nexus between SDG 6, 12, and 14 builds towards the 2030 Agenda.

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