

The Devastating Effect of Plastic Pollution on Oceans: A Risk Assessment for SDG 14 (Life Below Water)

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Abstract

Plastic pollution is perhaps one of the most disturbing anthropogenic associated issues of the 21st century and its impact can be felt predominantly on the planet's oceans. Because of its light weight, rough nature and affordability, during the last hundred years, plastic have been utilized in countless products and in our day-to-day existence. However, the very characteristics that have made plastic so helpful for human necessities have likewise made it a question of worry for the climate. Without a doubt, plastic has arrived at disastrous levels in our seas and oceans. Presently it influences marine life and their biological systems, then the health of individuals and presently even the world's economy. Large number of seabirds and ocean turtles, seal and other amphibian vertebrates are killed consistently in the wake of ingesting plastic or getting tangled in it. As plastic pollution is a transboundary issue, a worldwide plastics settlement is expected to aggressively decrease plastic production, deliberately get rid of destructive endowments, take out items and synthetic substances of concern and embrace solid public plans and thorough detailing and consistence components. Thus, purpose of this review is to address and assess the impact of Plastic pollution on marine ecosystem in order to conserve and sustain marine life below water thus fulfilling Sustainable Development Goal 14 (Life below water).

Keywords: Microplastics; SDG 14; Entanglement; Food chain; Human health

Introduction



Figure 1: Plastic pollution in ocean: A risk assessment for SDG 14 (life below water).

Plastic pollution is a global issue and its effect on seas and oceans is one of the most unsettling parts of the environmental crisis. Approximately 8 million tons of plastic enters the ocean consistently adding to the assessed 150 million tons previously coursing in marine conditions including microplastics to macro debris plastic waste [1]. Waterways, streams and winds convey disposed of plastics from landfills and urban communities to the oceans, where they collect in immense drifting "garbage patches" [2]. The Great Pacific Garbage Patch located between Hawaii and California is the most famous, with an expected surface area of 1.6 million square kilo meters [3]. Oceans, which cover more than 70% of the World's surface,

have turned into an unloading ground for human-produced waste [4]. When plastic enters the sea, it doesn't deteriorate; it rather separates into more modest particles named microplastics that are more modest in size than 5 milli meters. These little particles are even more hazardous and can be ingested by marine life forms, enter food chains and ultimately reach humans [5] (Figure 1).

Approximately 460 million metric lots of plastic are produced every year for use in an open scope of utilizations [6]. An expected 20 million metric lots of plastic litter end up in the climate consistently. That sum is supposed to increment altogether by 2040 [7]. Plastic contamination influences all land, freshwater and marine environments. It is a significant driver of biodiversity misfortune and environment corruption and adds to environmental change. One of the most visible and immediate effects of plastic pollution in the oceans is its impact on marine life. Plastics pose several threats to marine organisms from ingestion and entanglement to habitat destruction [8].

Impacts of Plastic Pollution

Ingestion

A great deal of ocean animals or at least, fishes, seabirds, turtles and ocean vertebrates are confounded by plastic trash that they expect as their food [9]. The ocean turtles are among the species that are in many cases deluded by plastic sacks, to be exact erroneously imagining that the packs are jellyfish, which are their significant food [10]. Admission of plastic that can be a possible reason for their gastrointestinal systems impeding making them to die from starvation or different reasons. Investigations have discovered that over 90% of seabirds have eaten plastic at least once and plastic utilization isn't simply restricted to birds, yet has been tormented in excess of 700 marine species [11].

Entanglement

Marine animals like dolphins, seals and ocean turtles etc. being easily caught by disposed of fishing nets, plastic sacks and six-pack rings which hinders their mobility, hunting or breathing ultimately resulting in suffocation, drowning, lacerations and infections [12].

Microplastics in the food chain

The bits of microplastics are significantly riskier as they can undoubtedly be ingested by little marine creatures like tiny fishes [13]. As a base in most marine food webs, it is quite simple for microplastics to migrate up the food chain [14]. There is consistently an opportunity that when these microplastics are ingested, the people who devour the fish likewise will ingest them, conveying harmful substances like pesticides and heavy metals into the human body [15].

Destruction of marine ecosystems

Plastic pollution has expansive consequences for whole environments, including coral reefs, mangroves and estuaries, which are basic living habitats for marine biodiversity [16]. Coral reefs are otherwise called the "rainforests of the ocean," which makes them entirely helpless against plastic contamination. It

deprives coral reefs of daylight and oxygen needed to survive and flourish [17]. Research studies have depicted that corals that have been caught by plastics are multiple times more inclined to get effected by infections. Additionally, plastics might crack the structure of corals remotely, which likewise further weakens the strength of the corals [18].

Destruction of beaches and shorelines

Global accumulation of plastics on beaches and shorelines not only effects the wildlife biodiversity but also effects the tourism industry [19]. Birds, crabs and other shore animals are likely to swallow or get entangled in plastics [20]. Additionally, due to factors like exposure to sunlight, wind, water currents etc. plastic breaks down into microplastics (smaller than 5mm) and nano plastic (smaller than 100n) which are able to traverse cell membrane walls and pierce living organisms [21]. Furthermore, degradations of plastics result in dispersion of toxic chemicals in the environment producing localized effect on wildlife and human communities whose need for clean beaches as tourist attractions and recreative venues are threatened [22].

Elevated pollution

Incineration of plastic waste release greenhouse gases and other pollutants into the atmosphere, including carbon dioxide, dioxins and methane [23]. In addition, Plastic pollution can also soak carcinogenic chemicals (such as those contained in certain plastic products or fireproofing coatings) into the soil. These can run into groundwater or rivers, affecting exposed people and ecosystems [24].

Human health risks

Plastic pollution in ocean poses threat to marine life but also to humans as well. Humans become liable to ingest the contaminants through seafood in which they are deposited with microplastics and toxic chemicals [25]. The chemicals from plastic production, including Bisphenol A (BPA), phthalates are endocrine disruptors that may cause numerous health problems-from reproductive disorders to hormonal imbalances and even cancer [26]. In fact, some microplastics have been found in drinking water, salt and even the air we breathe. Much is still being researched regarding the effects of microplastics on human health, but from the risks that have so far been identified, they are intimidating [27]. In addition, the effects of xenobiotics from plastic as xenobiotics may lead to diseased marine life and the transfer of xenobiotics to man [28]. The xenobiotics may inactivate critical genes for survival of marine species and man [29].

Economic impact

Plastic pollutants in the ocean impact ecosystems in several economic ways. These impact tourist reliance and fishing activities along the beaches [30]. The existence of pollution is destined to make tourists avoid visiting beaches and the decline in fish populations because of consuming the plastics and destroying their habitats impacts fishermen's livelihoods [31]. Ocean plastic pollution-imposed costs on the world in tens of billions of dollars

every year from cleaning beaches, lost tourism dollars and dwindling fish populations [32]. The build-up of plastic waste preserve has an unconstructive impact on aspect of a country's economy plus trade systems, among earnings decline in sectors such as small-and medium-enterprises, the familiar sector, tourism, fisheries, agriculture and water safety [33].

Sustainable Global Solutions and Future Outlook

Reduction in plastic production and use

There are several effective ways to reduce plastic pollution, but the most efficient approach is through the reduction of plastic use and production. Reducing plastic use and production involves the responsibility of all governments, corporations and individuals. Ban the single-use plastic bags, straws and utensils; such efforts are being realized by countries and cities to control plastic waste [34].

Improved waste management

Prevention of plastic entering the oceans would require improvement in global waste management systems, among other things. Examples include proper investment in recycling infrastructure and encouragement of biodegradable material use and proper handling and treatment of plastic waste [35].

Innovation and clean-up efforts

Innovation through technology is helping to fight plastic pollution. Companies such as The Ocean Clean-up are developing technology to take plastic out of the oceans. There are also biodegradable plastics manufactured from natural resources, such as corn starch, which are now taking a commanding position over the conventional plastics [36].

Conclusion

Oceans are suffering from plastic pollution at an alarming rate. Plastic waste has severe impacts on marine lives and the concerned ecosystems in addition to serious health issues for humans and economic damages. Though problems look overwhelming to the human mind, there is world effort toward reducing plastic waste and saving our oceans. The world can mitigate plastic pollution by reducing pollution through minimizing plastic production and improving waste management with clean-up initiatives eventually safeguarding the diverse marine life forms i.e. SDG goal 14 (Life below Water).

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