

# Marine Pollution Scenario in Bangladesh: An Obstacle to the Blue Economic Growth

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The existence of oceans is crucial for the survival of life on Earth. The marine environment is the richest ecosystem on Earth, making up about two-thirds of the globe. The Bay of Bengal (BoB) is one of the world's 64 bays between South and Southeast Asia. Bangladesh's coast may be roughly split in half, with the exposed coast taking up 23,935 square kilometers and the inner beach taking up 23,266 square kilometers (Biswas et al., 2021). Bangladesh's blue economy is based mainly on the country's coastlines and the Bay of Bengal. They hold a wealth of resources. It was during the 2012 (Rio+20) Rio Summit that the term "blue economy" was first used. The term refers to an economic model predicated on the seas, intending to foster economic expansion via the methodical exploration of marine resources without jeopardizing the health of the oceans. The blue economy bolsters the social, environmental, and economic development processes. "Blue economy" describes various marine economic activities, including 26 distinct sectors. These sectors include fishery, food production, mineral extraction, biotechnology, maritime trade, shipping, tourism, coastal protection, monitoring and surveillance, scientific research, etc. Bangladesh's government has recently announced Delta Plan 2100, which incorporates five initiatives to use the blue economy to achieve Sustainable Development Goals (SDGs).

If Bangladesh makes good use of its oil, gas, fisheries production, port development, and tourist industries, it may generate annual revenues in the billions (Alam & Xiangmin, 2019; Sarker et al., 2018). However, marine pollution is one of several threats to the potential benefits of researching and using marine resources.

Human health and biodiversity are both threatened by pollution in the ocean and along the coast. When it comes to human health and well-being, food insecurity, and livelihoods, marine pollution's negative ecological repercussions are just as devastating as widespread (Kudrat-e-Khuda and Barsha, 2021). Article 1(4) of UNCLOS defines marine pollution as the release of energy or substances into the ocean that can harm the marine environment. This harm includes damage to marine resources, marine life, human health, water quality, and the use and enjoyment of coastal areas. Several reasons cause the contamination of Bangladesh's maritime environment. The two most significant contributors to global pollution are land and water, respectively, with 80% of marine pollution coming from land-based activities. As a bonus, marine pollution hastens the demise of cherished ecosystems like coral reefs and seagrass meadows (Alam et al., 2018). Pressure on marine and coastal ecosystems is rising due to changes in biochemical processes and physical factors brought on by climate change and ocean

acidification (Hossain et al., 2015). Humanity continues on a primarily unsustainable path despite growing awareness of the dangers of marine contamination.

Point Sources	Non-point Sources	Sea-based Sources of Marine Pollution
<ul style="list-style-type: none"> <li>&gt; Wastewater Treatment Plants</li> <li>&gt; Untreated sewage- Outfalls</li> <li>&gt; Partially treated/ Untreated Industrial Effluents Outfalls</li> <li>&gt; Aquaculture Effluents</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Agricultural Runoff (pesticides, fertilizers, and animal wastes)</li> <li>&gt; Oil, grease, and toxic chemicals from urban runoff and energy production</li> <li>Coliform Bacteria and pathogens</li> <li>&gt; Sediments (from Construction), Hill cutting &amp; deforestation,</li> <li>&gt; River runoff</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Crude Petroleum- (PAHs)</li> <li>&gt; Antifouling Agents- (TBT)</li> <li>&gt; Volatile Organic Compound (VOC)- PCBs, DDTs, Dioxins, Furans</li> <li>&gt; Oil Spill, Bilge from Ship, Boats</li> <li>&gt; Dumping of Wastes</li> <li>&gt; Introduction of Alien species through ballast water etc.</li> </ul>

Table: Different Point, Non-Point, and Sea-Based Marine Pollution Sources

Approximately 230 rivers in Bangladesh deposit billions of tons of sediments in the Bay of Bengal. These sediments include unidentified plant nutrients and enormous quantities of toxic residues from agricultural pesticides, industrial residues, farm effluents, solid waste, sewage discharge, etc. Other pollution causes include rapid urbanization, deforestation, and uncontrolled coastal resource exploitation. Annually, 10 billion gallons of sewage, 3.25 million metric tons of crude oil, 10 billion tons of ballast water, and millions of tons of solid waste are dumped into the marine environment on a global scale (Kudrat-e-Khuda & Barsha, 2021; Biswas et al., 2021). Almost all trash ends up in the ocean or water near the shore. Even for a developing nation like Bangladesh, the situation is quite similar. The riverine and coastal areas are home to many industrial facilities, shipbreaking yards, sewage, tourism, and transboundary depositions, all of which contribute to the release of vast quantities of harmful solid and liquid waste.

Moreover, major industrial centers of Bangladesh, including Dhaka, Gazipur, Narsingdi, Narayanganj, Chittagong, Khulna, Mongla Port, and Sylhet City, are pollution hotspots. Interestingly, these industrial hubs are connected with the major rivers, including the Ganges, Padma, Jamuna, Brahmaputra, and Meghna, which carry wastes to the Bay of Bengal and ultimately deteriorate the marine environment. In addition, the Padma, Jamuna, and Brahmaputra rivers carry transboundary pollution from India, Nepal, and China to the Bay of Bengal, where they are eventually deposited in the coastal soils of Bangladesh (Chowdhury et al., 2017; Haque et al., 2017).

The coastal regions of Bangladesh are linked to more than 8,542 manufacturing facilities. The textile industry, in particular, is very harmful to marine life since it discharges about 40,000 m<sup>3</sup> of effluent daily. Twenty percent of the world's pure water is tainted by the 12.7-13.5 million m<sup>3</sup> of sewage that the textile and dyeing industries emit yearly. Ocean and the marine ecosystem are also harmed when ships discard trash and waste into the water. Every year, about 4,000 to 6,000 tons of crude and refined oil are spilled into the Bay of Bengal from Bangladesh's imports. About 22.5 tons of polychlorinated biphenyls are dumped annually at shipbreaking yards—more

than half of the oil in the ocean results from human activity. Coastal contamination is caused partly by the 3000 trillion pieces of plastic garbage produced daily and by tourists. Heavy metals, micro and macroplastics, chemicals, POPs, and radioactive substances are among the most dangerous pollutants due to their genotoxic and carcinogenic effects (Biswas et al., 2021; UNEP, 2018). Higher quantities of toxic heavy metals (Pb, Hg, Cd, As), microplastics, POPs, and polycyclic aromatic hydrocarbons (PAHs) are observed in the water due to the lack of maintenance of effluent releasing criteria (Islam et al., 2016).

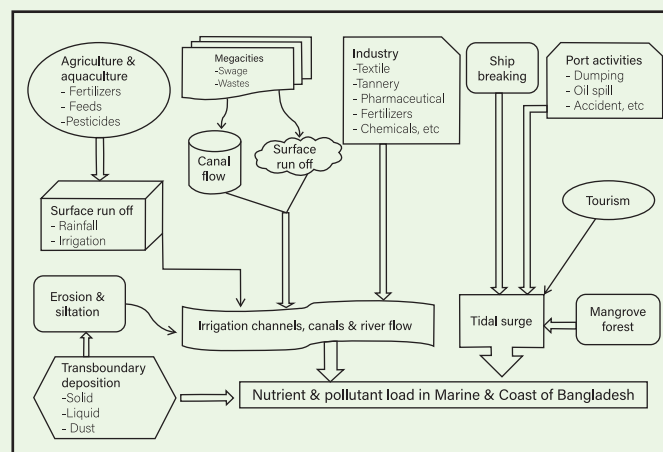


Figure: Pollution Sources and Mechanisms in the Coastal and Marine Ecosystem

If we can keep pollution out of our water and air, we will have clear blue skies and oceans. There has to be a shift toward more sustainable practices in managing our current marine resources and an increase in funding for initiatives to restore marine ecosystems and biodiversity. Since shipping is the principal means of delivering products, it must be subject to a worldwide regulatory framework. Introducing waste treatment facilities and enforcing stringent restrictions are viable options for decreasing land-based pollution. The government may start regulating land and water use by enterprises, keep an eye on pollution levels, and strictly enforce current laws. The only way to solve environmental problems on a global scale is via a coordinated legislative effort at the national and regional levels. The Bay of Bengal resources may aid Bangladesh's economic development. However, stopping marine pollution is necessary for this to occur. While laws are in place to address environmental concerns, their enforceability needs to be improved by a lack of institutionalized coordination and enough funding. The infrastructure must be upgraded to provide proper sanitation and the harmless discharge of industrial effluents. For the sake of aquatic life and human health, it is necessary to conduct a comprehensive assessment of the origins, destinations, and levels of present effluent dumping in rivers.

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