

# REPORT ON COASTAL POLLUTION IN PAKISTAN

Submitted to  
**Supreme Court of Pakistan**

*in the case of coastal pollution in Pakistan*  
*(C.M.A. no 7971 of 2019 in HRC No. 6257-P of 2018)*



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**Pakistan Environmental Protection Agency (Pak-EPA),  
Islamabad**

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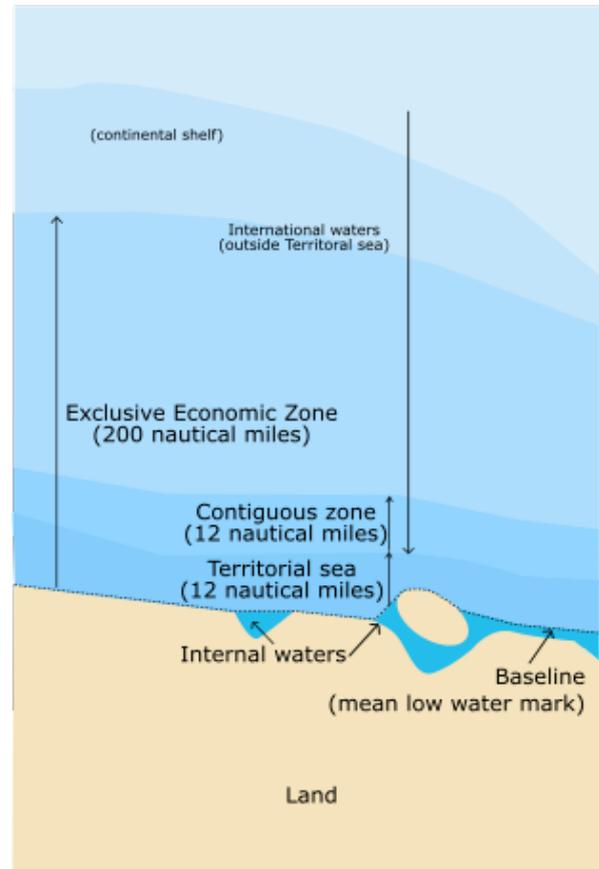
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## I. INTRODUCTION

Pakistan has a coastline of about 1050 km which touches Iran in the west and India in the east. The Coast is provincially bifurcated into Sindh Coast and Makran Coast. The coastal zone up to 12 nautical miles (NM) falls under the jurisdiction of Governments of Sindh and Balochistan, while from 12 NM up to 200 NM falls within the federal government jurisdiction.

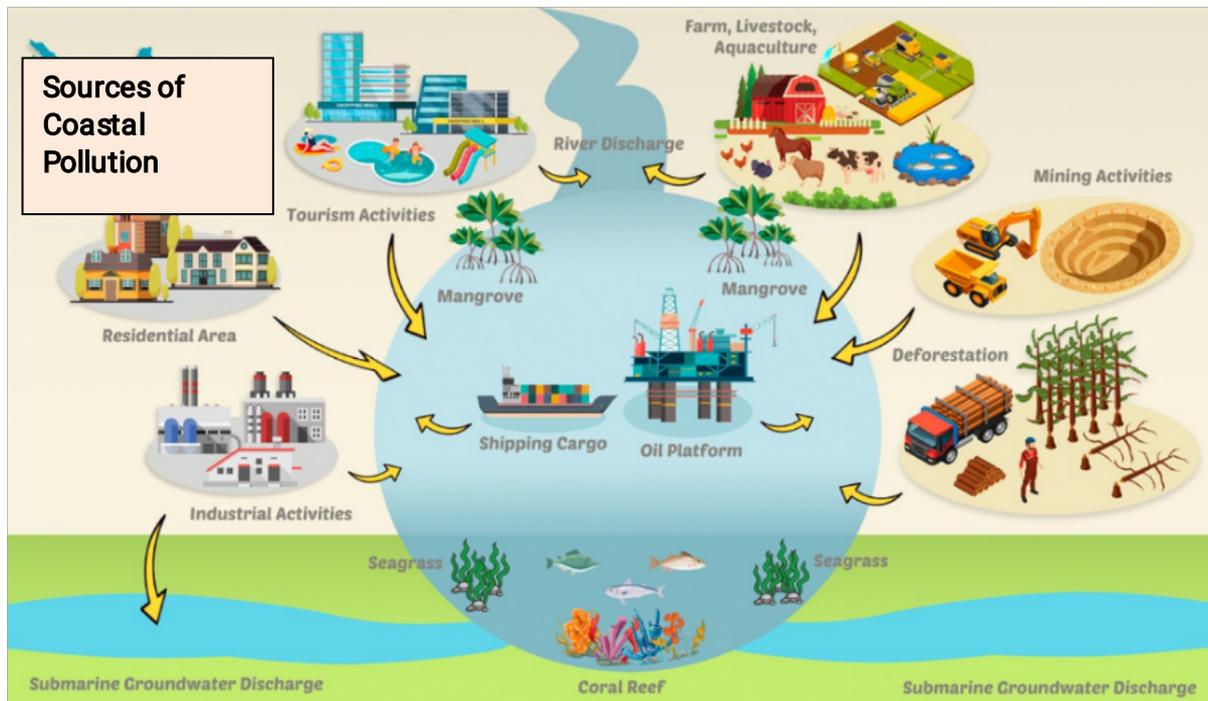
The coastal areas of Pakistan are historically important for archeologically-important sites such as Bhunbore, Ratookot, Juna Bunder Fort, and Chander Gupt Volcano. It is also of ecological significance for being home to protected Ramsar wetlands, mangrove forests, and the country's largest national park.

Although Pakistan's coast is relatively undeveloped, with the exception of Karachi-side, there has been a gradual rise in coastal pollution, due to rapid population growth, industrialisation, poor sewage treatment, weak solid waste management, and patchy environmental oversight. This has raised environmental concerns for the need for implementing effective and integrated coastal management centered on ecosystem-based approach, as the coastal ecosystems are also a source of natural capital for the local communities.



### I. Sources of Coastal Pollution in Pakistan

Coastal pollution is the introduction of substances in the coastal environment which can have a negative impact on coastal environment and human health. Contaminants or pollutants that enter the coastal soil and sea water may be physical (e.g. garbage, heat), chemical (e.g. pesticides, oil), or biological (e.g. contaminated wastewater, hospital waste).



Eighty percent of coastal pollution comes from land, from sources such as factories, farms, septic tanks, and even cars, trucks and boats. However, the major sources of coastal pollution can be attributed to:

### **A. Industrial Effluents**

Industrial waste is generated during manufacturing processes in factories, industries, mills, and mines, among others. Examples of industrial waste are chemical solvents, paints, sandpaper, paper products, industrial by-products, metals, and radioactive waste. Unlike domestic waste, industrial waste can also include hazardous substances, such as toxic heavy metals, pesticides, industrial chemicals, and radioactive substances that can enter the marine environment through rivers and *nullahs*.

Every year, thousands of tons of untreated industrial waste is dumped into the ocean, especially along the largest industrial hub of the country – Karachi. According to official figures, 90 per cent of industrial effluent and sewage produced Karachi is poured into the sea either directly or via Lyari and Malir rivers.

### **B. Domestic Sewage**

One of the greatest contributor to marine pollution along Pakistan’s coast is municipal sewage. About 550 million gallons per day (MGD) of mostly untreated wastewater is entering the coastal waters affecting the coastal areas; the problem can worsen if no remedial measures are undertaken.

### **C. Solid Waste**

A cross-country research carried out by Germany’s Helmholtz Centre for Environmental Research found that Pakistan’s Indus River is the 2<sup>nd</sup> largest contributor to marine plastic pollution. Local estimates suggest that an average of 164,332 tonnes of plastic waste enters the Arabian Sea each year. Along the Karachi coast alone, approximately 12,000 tons of solid waste is generated daily, which excludes industrial and hospital waste.

A considerable amount of money goes into managing huge volumes of solid waste. Rapid establishment of new housing sectors, industrial estates and construction activities contribute to waste generation. The amount of solid wastes is expected to substantially increase with the rapid growth of population and economic activity. The current poor solid waste management practices need to be made more efficient and modernised. Lack of planning, inappropriate technology and poor management are obviously the main areas of concern. This requires serious efforts from government authorities and other agencies for effective solid waste management.

#### ***D. Ship-breaking***

Ship-breaking is the dismantling and recycling of discarded ships. Gadani in Balochistan is the world's third largest ship-breaking hub. Shipbreaking activities contaminate coastal soil and coastal waters, through the discharge of harmful chemicals, such as ammonia, metal rust, oil, etc. According to a report by NGO Shipbreaking Platform, approximately 25% of world's shipbreaking activity was carried out in Pakistan in 2018, producing 4.2 million gross tonnage (GT) of ship scrap.

#### ***E. Oil Spills***

Oil spillage and emissions from ships is another source of industrial coastal pollution. About 2,500 ships and 200 oil tankers visit Karachi harbour every year through the Manora Channel. The sources of oil pollution in Manora channel are bilges, washings from engine rooms of vessels, discharges and leaks from bunkering point, and leaks and small spills occurring during loading and unloading at oil piers. Oily waste from city based sources including service stations also ends up in the harbour area.

### **III. IMPACTS OF COASTAL POLLUTION**

Coastal pollution incurs great costs on the economy, human health and the marine/coastal biodiversity.

For example, an oil spill can hamper marine birds' ability to fly if it gets on their fur during food-hunting. As a result, sea birds may die out when they are not able to fly, maintain body temperature, or feed properly. Additionally, oil from spills can also wash up on beaches and contaminate nesting areas and feeding grounds of birds and sea turtles.

Similarly, because of untreated sewage disposal, pathogens can enter our food chain, and transmit back to us through seafood. Over the recent years, potentially fatal diseases such as typhoid and cholera have risen drastically near coastal areas in Pakistan, as a result of poor sanitation and disposal of untreated sewage into rivers and sea.

Another effect of marine pollution is that a lot of the waste and litter dumped in the ocean eventually washes up on beaches, and hence ruins beach aesthetic and tourism. More importantly, marine litter affects marine life, because it disrupts marine habitats and marine animals often consume it human trash, mistaking it

for food. In fact, marine litter has given rise to the global problem of microplastic pollution, which is eventually consumed by fish, crustaceans and zooplankton. Humans are also affected as plastic enters human food chain from direct consumption of seafood. Coastal contamination and pollution can lead to several health related problems, such as gastric and skin related problems including skin irritation and rashes.

#### **IV. COASTAL POLLUTION MANAGEMENT**

Presently, there is a lack of proper regulation of coastal areas, which is paralleled by poor coordination among the government departments. This results in duplications of interventions, and a weakly-enforced mitigation measures for pollution control in coastal areas.

While provincial governments of Sindh and Balochistan have their independent Coastal Development Authorities, federal government in 2020 announced the establishment of a National Coastal Development Authority (NCDA). Additionally, provincial Environmental Protection Agencies (EPAs) have their own mandate to control pollution and protect air and water quality of their respective territories. However, in the case of coastal pollution, because the source of land-based pollution is difficult to find and identify, it is all the more difficult to correct and control. Correcting the harmful effects coastal pollution can be costly, as it requires heavy investments to restore and protect areas damaged by pollutants. Research organisations, such as the National Institute of Oceanography of Pakistan, can help generate data and surveys to study and monitor coastal pollution and its environmental impacts on marine environment.

In general, the problem of coastal pollution can be broadly explained as below:

##### ***A. Sewage Treatment***

Due to inadequate arrangements for treatment of the industrial, domestic and municipal effluents, they are discharged into the coastal waters, where coastal pollution can become an ultimate threat to the biodiversity of coastal ecosystems.

One way to combat coastal pollution is to treat sewage before discharging it into the sea. Sewage treatment is the process of removal of contaminants from wastewater. It includes physical, chemical, and biological processes to remove these contaminants and produce environmentally safe treated wastewater. A by-product of sewage treatment is usually a semi-solid waste, called sewage sludge that has to undergo further treatment before being suitable for disposal or land application. Karachi Water & Sewerage Board has established three sewage treatment plants. Of the total 472 MGD, these plants treat only 55 MGD of sewage and the rest finds its way to the sea untreated. For the industrial waste of 78 MGD, there is only one treatment plant with a designed capacity of treating 10 MGD. The city district government of Karachi has planned to set up six treatment plants at several sites for sewage water treatment.

##### ***B. Solid Waste Management***

Solid waste collection by government owned and operated services in Pakistan's cities currently averages only 50 percent of waste quantities generated.

Unfortunately, none of the cities in Pakistan has a proper solid waste management system right from collection of solid waste up to its proper disposal. Much of the uncollected waste poses serious risk to public health through clogging of drains and formation of stagnant ponds, providing breeding grounds for mosquitoes and flies with consequent risks of malaria and cholera. In addition, because of the lack of adequate disposal sites, much of the collected waste finds its way to dumping grounds, open pits, ponds, rivers and agricultural land. The Government of Pakistan enacted the Pakistan Environmental Protection Act (PEPA) in 1997 which provides a framework for establishing federal and provincial Environmental Protection Agencies (EPAs). One of the functions of EPA is to assist the local councils, local authorities, government agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the National Environmental Quality Standards (NEQS). However, due to weak institutional structures and limited capacities, solid waste and liquid management is not adequately addressed in Pakistan.

### ***C. Harbour Pollution Management***

At Karachi Port environmental management system has been put in place which spells that Overboard Valves (OBV) may be locked, chained and sealed during stay of vessels at the port. No ship is allowed to pass its bilges through OBV in the harbour area. Moreover, shore reception facility according to MARPOL-73/78 Annex I has been made available through private contractors. Oil spills which are a common phenomenon of commercial fishing and have detrimental effects on coastal environment, which need to be controlled through strict regulation by the Pakistan Maritime Security Agency (PMSA).

### ***D. Public Awareness Raising***

Creating public awareness on pollution and its threats is one of the important components of pollution management strategies. Awareness programmes run by the government and civil society organizations are necessary to promote proper waste disposal, and recycling and sensitise the public towards pollution threats, changing their attitude towards environmentally responsible citizenship.

## **V. CONCLUSIONS**

One of the main reasons behind marine pollution is poor sanitation and solid waste management due to limited financial investments and weak sanitation infrastructures. In a developing country like Pakistan, the prime problem has been the lack of investment in developing efficient and resilient waste management systems.

In a bid to minimise plastic pollution from entering oceans, many Asian countries, like China, have banned imports of plastic waste in recent years. Pakistan has followed a slightly different suit to curb plastic pollution from entering into rivers. Ministry of Climate Change and Pakistan Environmental Protection Agency have recently imposed a ban on polythene plastic bags in Islamabad in an effort to reduce, reuse and recycle plastic waste produced in the capital city. Similarly, Government of Sindh has issued a recent notification to discourage single-use plastic bags in the province.

Additionally, weak environmental regulation in coastal areas has led to oversight of environmental issues arising from industrial effluents discharge, oil-spillage, ship-breaking, overfishing, and the like. It is thus need of the hour to protect, preserve and responsibly and sustainably develop Pakistan's coastal areas in a way that promotes sustainable livelihoods, and nurtures unique ecosystems of the region.

## **VI. RECOMMENDATIONS**

In order to tackle the problem of coastal pollution, the following policy options are proposed:

### **Immediate:**

- i. Commissioning of an independent survey on the environmental damages to coastal areas caused by pollution, with particular focus on losses and costs incurred on the economy, human health, and coastal/marine/deltaic ecology.
- ii. Immediate ban on garbage-dumping along coastal areas of Pakistan
- iii. Improved ship vessel-traffic management and regulation by Ministry of Maritime Affairs to mitigate avoidable gaseous emission and effluents.
- iv. Strict regulation for safe transportation of ships, oil tankers, boats, naval fleet, etc. to control and mitigate oil spills, through the development of a contingency plan by the Pakistan Maritime Security Agency (PMSA).
- v. Mass awareness raising to sensitise the public about negative consequences on marine life of plastic pollution and improper garbage disposal.

### **Medium-term:**

- vi. Effective sewerage treatment plants to treat industrial and municipal wastewaters, paralleled by strict compliance of NEQS for industrial and municipal waste effluents
- vii. Proper regulation of ship-breaking sector in Gadani, Balochistan, to ensure toxic chemicals, heavy metals, oil, etc. are controlled and not disposed in coastal zone.
- viii. Reduction, Re-use and Recycling (3Rs) is one of the best ways to decrease solid-waste pollution. Domestic trash, such as cans, bottles, paper, and cardboard can be reused or recycled, which should be promoted through at-source solid waste segregation by relevant municipal authorities.

### **Long-term:**

- ix. Capacity enhancement of regulatory bodies, such as Sindh Coastal Development Authority, Balochistan Coastal Development Authority, and National Coastal Development Authority, EPAs, PMSA, NIO, to fulfil their mandates with reference to coastal surveillance and coastal environmental protection and preservation.



- x. Implementation of *Integrated Coastal Zone Management Plan for Pakistan* that was prepared by Sindh forest department and International Union for Conservation of Nature (IUCN) in 2011, but could not be implemented. It includes concrete recommendations regarding the development of an Integrated Coastal Zone Management Strategy, complemented by Five-Year Plans.
- xi. Regular research studies and data collection by National Institute of Oceanography Pakistan (NIO) regarding coastal pollutants, and their environmental impacts.
- xii. Strengthen municipal solid and liquid waste management systems in Pakistan through financial investments in municipal sanitation infrastructure. This should ideally involve investments in developing and/or renovating sewerage and sanitation infrastructure particularly in urban centres lying along river belts and coastal areas.
- xiii. Effective coastal regulation and environmental pollution control through strengthened coordination between relevant provincial authorities and departments. For example, the Sindh and Balochistan Coastal Development Authorities can jointly lead under ambit of National Coastal Development Authority to comprehensively address the country's coastal issues through a voluntary partnership between the federal government and provincial coastal protection departments. The program can provide the basis for protecting, restoring, and responsibly developing Pakistan's diverse coastal communities and resources.