

COASTAL AND MARINE POLLUTION

*National Institute of Oceanography
Dona Paula, Goa –403 004,India
March,2008*

India's Coastline

- India has a coastline of 7500 km and 2000 km wide Exclusive Economic Zone.
- The Indian coastline supports almost 30% of its human population.
- The Bay of Bengal and the Arabian Sea are rich fishing grounds.
- India continues to be the 7th largest marine fishing nation in the world.

What is Coastal Pollution...

- It is a change in the physical, chemical and biological characteristics of water & sediments.
- It causes degradation of the natural quality of the coastal environments.
- It affects the health and survival of all forms of life.
- **It is a major problem in developing countries---and the trends are expected to increase.**

Causes of Coastal Pollution

- **Population growth**
- **Urbanization**
- **Industrialization**

Coastal pollution in India arises mainly from land-based sources..

- **Domestic waste**
- **Industrial effluents**
- **Agricultural runoff**

Other sources---

- **Shipping activity**
- **Offshore exploration & exploitation**
- **Infrastructural development**

Inputs of pollutants in the coastal environment of India

Sr. No.	Input / pollutant	Quantum - Annual
1.	Sediments	1600 million tonnes
2.	Industrial effluents	50 x 10⁶ m³
3.	Sewage - largely untreated	1.41 x 10⁹ m³
4.	Garbage and other solids	34 x 10⁶ tonnes
5.	Fertilizer - residue	5 x 10⁶
6.	Synthetic detergents - residue	1,30,000 tonnes
7.	Pesticides - residue	65, 000 tonnes
8.	Petroleum hydrocarbons (Tar balls residue)	3,500 tonnes
9.	Mining rejects, dredged spoils & sand extractions	0.2 x 10⁶ tonnes

major pollutants in coastal and marine environment

- **Oil**
- **Sewage**
- **Garbage**
- **Pesticides**
- **Toxic chemicals**
- **Heavy metal**
- **Radioactive waste**
- **Thermal pollution**
- **Nutrients**

Major industries in India responsible for coastal pollution

- **Fertilizers**
- **Sugar**
- **Textiles**
- **Chemicals**
- **Mines and minerals**
- **Pulp and paper**
- **Leather tanneries**

Waste Management in Indian Industries

Industries are encouraged to---

- Set up waste treatment plants
- Adopt measures to minimize waste
- Recycle waste
- Recovery and reuse of waste water

Impact of pollution on coastal ecology

- ***Corals Reefs** – loss due to anthropogenic stress, collection and recreational activities.*
- ***Mangroves** – degradation due to over exploitation*
- ***Fisheries** – decline in catch rate due to overfishing and overdependence on trawlers.*
- ***Beaches** – reduction in benthic organisms due to oil pollution.*

Coastal Ocean Monitoring and Prediction System [Funded by MoES, Govt. of India.]

- In order to keep a check on the health of our coastal waters the **COMAPS** – Programme was initiated in 1991 for the systematic monitoring of the seas around India ---
- **It is an ongoing national programme- involving 10 institutions for carrying out the various tasks.**

COASTAL RESEARCH VESSEL
MINISTRY OF EARTH SCIENCES
GOVT OF INDIA



1-3-08

Coastal Ocean Monitoring and Prediction Systems (Objectives)

- **To determine the status & trends of pollution.**
- **To establish a GIS data base.**
- **To Identify the sources of pollutants and suggest steps for control/abatement of pollution**
- **To identified areas of clean sea, low levels of pollution and areas of concern.**
- **To provide advisory to government, industry and public.**

Coastal Sampling



Hot Spots Monitoring (22 locations)

- **Veraval**
- **Tapi**
- **Gangavaram**
- **Thane creek**
- **Mandovi**
- **Mangalore**
- **Kochi**
- **Veli**
- **Tuticorin**
- **Cuddalore**
- **PortBlair**
- **Kakinada Bay**
- **Visakhapatnam**
- **Byde Bhimavaram**
- **Puri**
- **Paradip**
- **Mahanad**
- **Haldia Port**
- **Hooghly estuary**
- **Sandheads**
- **Ennore**
- **Pondicherry**

Activities under COMAPS

- **Monitoring of 26 parameters at 70 locations along Indian coast.**
- **Monitoring of Pesticide residues in fishes and green mussels from selected locations**
- **Monitoring of Specific bacteria at all locations**
- **Determination of waste Assimilative Capacity for selected locations**
- **Movement of Oil Spills for the open coast for 19 specific sites will be developed**
- **Inter-calibration exercises are conducted to assess the data quality**
- **Dissemination of data to public through ICMAM website.**
- **Using COMAPS data and other secondary information, GIS database has been completed for 15 sites .**
- **Project Monitoring and Evaluation annually by the Steering Committee.**

Status of coastal marine pollution in India

- Water & sediment quality:
- Open shore waters -- (2km away) are clean except near coastal cities.
- Inshore regions --estuaries, creeks and bays have been degraded to a varying degree depending on the fluxes of pollutants they receive and their flushing characteristics.
- Increase in levels of PHC in water & sediments especially in port areas.
- Increase in Bacterial count at several locations.
- Marine sediments are free from gross contamination by heavy metals such as Co, Ni, Cu, Zn, Pb, Cd & Hg. except at few localized areas.
- Contaminants in organisms:
- Except in a few cases commercial fish and shellfish is free from heavy metal contamination. Uptake of DDT & Aldrin by marine organisms to levels to cause concern is also not indicated. PHC accumulation in fish was not observed

Status of Goa coastal marine environment

GOA is one of the least polluted state so far----due to-

- Extensive forest cover
- Moderate population
- Less industrial activity

- Mining activity
- Beach Tourism
- Garbage ----- pose a threat to the coastal environment

Except for a few stray elevated values of certain parameters at some locations --Water quality along GOA coast is fairly good.

Beach monitoring

[Tar- ball pollution on a Goan beach]



July, 05

TPH(water)-9.50 μ g/L

TPH(sed)-23.12 μ g/g



Nov, 05

TPH(water)-4.84 μ g/L

TPH(sed)-0.609 μ g/g

Suggestions to protect marine environment

- Public awareness
- Cleaning programme
- Set standards for effluent discharge
- Minimal use of pesticides
- Strict implementation of polluter pays principal
- Strict implementation of laws pertaining to prevention & coastal zone management before establishing new industrial units on the coast.

Conclusions

**In order to preserve & protect the coastal environment
Judicious and responsible application of scientific
knowledge on all aspects of pollution is essential.**

A speedboat is moving across a large body of dark blue water, leaving a white wake. In the background, a forested shoreline is visible under a clear sky. The text "THANK YOU" is overlaid in the center of the image.

THANK YOU