

# 17 Bay of Bengal

## Overview

The Bay of Bengal is located on the northeastern part of the Indian Ocean. It comprises the marine waters surrounded by Sri Lanka, the east coast of India, Bangladesh, the west coast of Peninsular Malaysia, the Andaman and Nicobar Islands, and the northern end of the Island of Sumatra in Indonesia.<sup>1</sup>

The Bay receives inflows from many large rivers, often passing through large cities before discharging into the Bay. Also, these large rivers contain huge amounts of sediment, creating large fertile deltas, most notably along the Indian and Bangladesh coastlines.<sup>2</sup>

## Location

### Basic information<sup>9</sup>

Surface area : 2, 173, 000 km<sup>2</sup>

Volume : 5, 649, 800 km<sup>3</sup>

Average depth : 2, 600 m

Maximum depth : 4, 694 m

## Nature

### < Background >

The Bay of Bengal is located in the tropical monsoon belt. Its environment is strongly affected by monsoons, along with storm surges and cyclones. Major rivers (the Ganges, Brahmaputra, Meghna, Mahanadi, Godavari, Krishna and Salween) introduce large quantities of freshwater and silt into the Bay, especially during the monsoon season, from July to September. This large volume of inflowing water strongly influences the Bay's hydrological characteristics by producing a warm, low-salinity, nutrient and oxygen-rich layer to a depth of 100 m that stretches over a distance of 1,500 km from the northern shore.<sup>3</sup> Silt from these rivers has created large sandbars near the river mouths, which has turned the Bay into a shallow sea, especially off the coast of Bangladesh. Approximately 2.5 billion tons of sediment are discharged from the Ganges River annually.<sup>4</sup> In deeper waters, high-salinity, low-temperature and low-oxygen waters persist through the year.

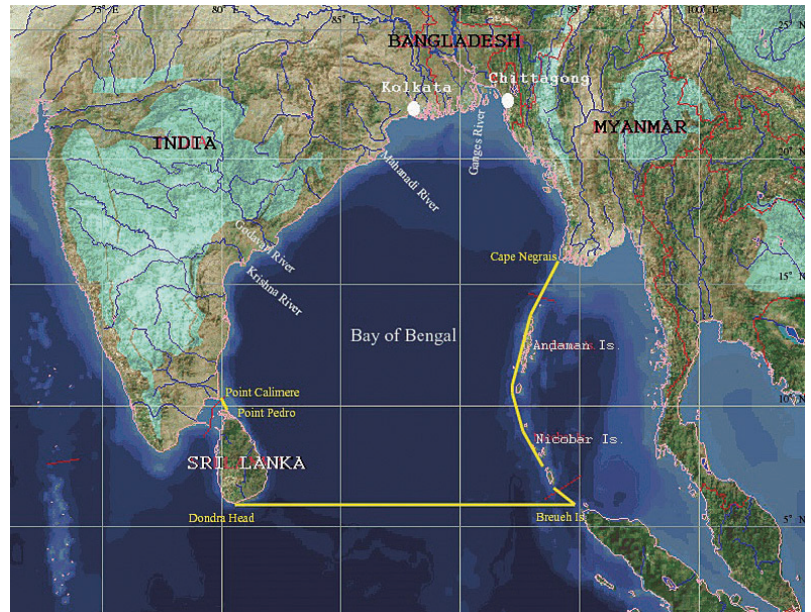
### < Surrounding environment >

#### Habitat

The Bay of Bengal is surrounded by several important biological habitats. One of these is the Sundarbans, an extremely large estuarine delta of the Ganges River that contains one of the largest continuous mangrove stretches in the world.

#### Biota

The area supports a wide diversity of wildlife, including the endangered Royal Bengal Tiger. An area of 1,330 km<sup>2</sup> in the Sundarbans has been declared as a national park and world heritage site, and supports a tiger population of 106 (2015



Satellite photo of Bangladesh, showing the convergence of the Ganges (left) and Meghna (right) rivers before emptying into the Bay of Bengal<sup>2</sup>

census). The population has decreased from the 440 tigers confirmed 10 years ago.<sup>6</sup>

### History and Culture

#### < Ganges River >

The Ganges River is most famous as a religious and spiritual center for the people of India. It is used as baptizing and memorial sanctuaries. Babies are baptized in the river because people believe it cleanses the soul of the child. For the same reason, the remaining ashes of a person following cremation are released into the river.

The Ganges River also plays an important role in the daily lives of many Indian people. The River is one of the only sources of water for people who do not have access to running clean water, and it is commonly used for washing clothes. It is also used as a mass-bathing hole, with over 10 million daily bathers. However, since the River has poor hygienic conditions, partly due to the above activities, many people have been affected by water-borne diseases.<sup>7</sup>



Royal Bengal Tiger<sup>5</sup>

### Social Environment

#### < Population >

A quarter of the world's population (approx. 1.8 billion people) resides in the countries bordering the Bay of Bengal. Approximately 450 million people live in the coastal zone, with a large proportion living in the large coastal cities.<sup>1</sup>

#### < Industry >

The major industries that are directly dependent on the Bay of Bengal are tourism, coastal fisheries and coral and sand mining for use as construction material.

#### Fisheries

Fisheries are of major socioeconomic importance to all countries bordering the Bay, as the industry provides direct employment to 2.2 million fishermen and 2.3 million people are employed in associated activities.<sup>1</sup> The main commercial fish species are shrimp, tuna, yellowfin, big eye and skipjack, with shrimp being the major export earner. Total fisheries production was estimated at 6 million tons in 2009.<sup>1</sup> However, there are signs that harvest levels may not be sustainable, especially with regard to tuna fishing. Aquaculture operates intensively along the coast, with over 200,000 fish farmers currently involved, and the industry is expected to expand. In 2009, the estimated total marine and brackish water aquaculture production was 1.46 million tons valued at USD4.8 million.<sup>1</sup>

Most of the countries surrounding the Bay are weak in developing clear policies, appropriate strategies and the sustainable management of fishery resources. The following are some of the problems facing the fishing industry in the Bay of Bengal:

- Increased competition and conflicts between artisanal and large-scale fisherman
- An alarming increase in cyanide fishing in the coral reefs, caught for the lucrative live-food fish markets in Hong Kong and Singapore
- Mangroves and estuaries, which are important fish spawning and nursery grounds, are threatened by pollution, sedimentation, dam construction (in Bangladesh) and intensive coastal aquaculture

### Environmental Problems

#### < Current status >

Compared to the other enclosed seas, pollution in the Bay of Bengal tends to be localized. This is due to circulation patterns that link the Bay to the Indian Ocean. Even so, the large rivers discharge vast amounts of pollutants into the Bay, including pesticides and industrial waste. Approximately 1,800 tons of pesticides enter the Bay of Bengal annually, with high concentrations recorded along the coast, particularly near cities and ports.<sup>4</sup>

Sewage including nutrients, POPs, household chemicals, medical wastes, excreted pharmaceuticals and sediments was identified as a major priority issue. Although the ecological effect of nutrient enrichment of the coastal environment of the Bay of Bengal is poorly documented and understood, reported localized problems of eutrophication, hypoxia and algal blooms are likely to be related.<sup>3</sup>

Oil pollution, offshore oil and gas exploration, and seabed mining are among the sea-based sources of pollution. There is heavy oil-tanker traffic between Japan and the Middle East, with the main shipping route passing through the lower part of Bengal Bay. For this reason, tanker accidents that could result in major oil spills are a constant concern.<sup>3</sup>

As a consequence of natural disasters such as tsunami and the destructive activities noted above, critical habitats including mangrove forests, coral reefs, and seagrasses are classified as degraded.<sup>1</sup>



### < Environmental Protection Measures >

The countries of the Bay of Bengal need to address a range of trans-boundary problems in the areas of fisheries, oil-spill planning, legal and institutional reviews and pollution-control measures. They need to implement regional agreements and harmonize their legislation. However, the sheer number of government departments that would need to be consulted and involved makes this a complex endeavor. On the whole, the region lacks enforcement capabilities and sound resource management practices, but areas of cooperation already exist that could be expanded to cover the whole Bay region. A multitude of international, regional and sub-regional institutions operate in the Bay of Bengal, many of which have similar mandates that currently result in overlap and duplication.

An important proponent for change is the Bay of Bengal Program (BOBP), a regional fisheries project executed by FAO (Food and Agriculture Organization of the UN), which became operational in 1979. It promotes sound and systematic fisheries management practices to all the fishermen (including artisanal fisherman) of all Bay of Bengal countries except Myanmar.<sup>8</sup>

### Related organizations and NGOs

Major international organizations of the area are listed below.

- Bangladesh, India, Myanmar, Sri Lanka, Thailand Economic Cooperation (BIMST-EC) <<http://www.bimstec.org/>>
- South Asian Association for Regional Co-operation (SAARC) <<http://www.saarc-sec.org/>>
- United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) <<http://www.unescap.org/>>
- South Asian Co-operative Environment Programme (SACEP) <<http://www.sacep.org/>>
- UNEP Regional Coordinating Unit for East Asian Seas  
<<http://www.unep.ch/regionalseas/regions/eas/eashome.htm>>
- Indian Ocean Marine Affairs Co-operation (IOMAC) <<http://www.mea.gov.lk/index.php/en/home/iomac>>

Fisheries organizations include the following.

- Indian Ocean Tuna Commission (IOTC) <<http://www.iotc.org/>>
- Indian Ocean Rim Association (IORA) <<http://dfat.gov.au/international-relations/regional-architecture/indian-ocean/iora/Pages/indian-ocean-rim-association-iora.aspx>>
- Asia-Pacific Fishery Commission (APFIC) <<http://www.apfic.org>>
- Network of Aquaculture Centres in Asia-Pacific (NACA) <<http://www.enaca.org/>>

### References

1. Bay of Bengal Large Marine Ecosystem Transboundary Diagnostic Analysis.  
<http://iwlearn.net/iw-projects/1252/reports/boblme-tda-volume-1>, (accessed March 31, 2015)
2. Bay of Bengal. <http://omp.gso.uri.edu/ompweb/doe/science/descript/bengal1.htm>, (accessed March 31, 2015)
3. Bay of Bengal: LME #34.  
[http://lme.edc.uri.edu/index.php?option=com\\_content&view=article&id=80:lme34&catid=41:briefs&Itemid=72](http://lme.edc.uri.edu/index.php?option=com_content&view=article&id=80:lme34&catid=41:briefs&Itemid=72), (accessed March 31, 2015)
4. United Nations Environment Programme (UNEP). Global Environmental Outlook 3. Earthscan, London and New York, 2002. <http://www.unep.org/geo/geo3.asp>, (accessed March 31, 2015)
5. World Wildlife Fund, 2015. Bengal Tiger.  
<https://www.worldwildlife.org/species/bengal-tiger> (accessed March 31, 2015)
6. BBC News, 2015. Bangladesh finds only 100 Bengal tigers in Sunderbans.  
<http://www.bbc.com/news/world-asia-33672602>, (accessed March 31, 2015)
7. History of the Ganges. <http://web.bryant.edu/~langlois/ecology/gangeshistory.htm>, (accessed March 31, 2015)
8. FAO, 2008. Sustainable Management of the Bay of Bengal Large Marine Ecosystem (BOBLME).  
[http://www.thegef.org/gef/sites/thegef.org/files/gef\\_prj\\_docs/GEFProjectDocuments/International%20Waters/Regional%20-%20Preparation%20of%20a%20TDA%20and%20Preliminary%20Framework%20SAP%20for%20the%20Bay%20of%20Bengal%20Large%20Marine%20Ecosystem/02-14-08%20ID1252%20BOBLME%20project%20document.doc](http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/International%20Waters/Regional%20-%20Preparation%20of%20a%20TDA%20and%20Preliminary%20Framework%20SAP%20for%20the%20Bay%20of%20Bengal%20Large%20Marine%20Ecosystem/02-14-08%20ID1252%20BOBLME%20project%20document.doc), (accessed March 31, 2015)
9. Hutchinson, S.; Hawkins, L.E., 2007. Oceans: A Visual Guide. Shinjusha Co., Ltd.: China, 2007. Japanese translation