

# **BAY OF BENGAL LARGE MARINE ECOSYSTEM (BOB LME) AND THE CAPACITY GAPS AND NEEDS RELATED TO SUSTAINABLE MANAGEMENT- WITH SPECIFIC REFERENCE TO BOB, BANGLADESH**

By  
**Md. M. Maruf Hossain, Ph.D**  
**Professor**  
**Institute of Marine Sciences (IMS),**  
**University of Chittagong, Bangladesh**  
E-mail: [marufimsfcu@gmail.com](mailto:marufimsfcu@gmail.com)

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# Transforming Our World : The 2030 Agenda for Sustainable Development (UN)

- Each UN Country commit to engage in systematic follow up and review of implementation of the UN SDGs (17) over the next 15 years, including SDG-14 (Life Below Water).
- A robust, voluntarily, effective, participatory and integrated follow up and review framework will make a vital contribution to implement & will help countries to maximize and track progress in implement this agenda in order to ensure that no one is left behind.

Follow up and Review process at all levels will be guided by the following principles:

They will be voluntarily & country led , will take into account diff. **national realities, capacities** and levels of development and will respect policy space and **priorities**.

As national ownership is key to success on achieving Sustainable development, the outcomes from the national levels will be the foundation for the reviews at regional and global levels; and primarily based on the national official data sources.

**The goals and targets will be followed up & reviewed using a set of global indicators (eg- DPSIR, LME approach, TDA approach, SAP (Strategic Action Plan), at national and regional levels, in addition to outcomes of work undertaken for the development of the baseline for those target , where national & global baseline data does not exist.**





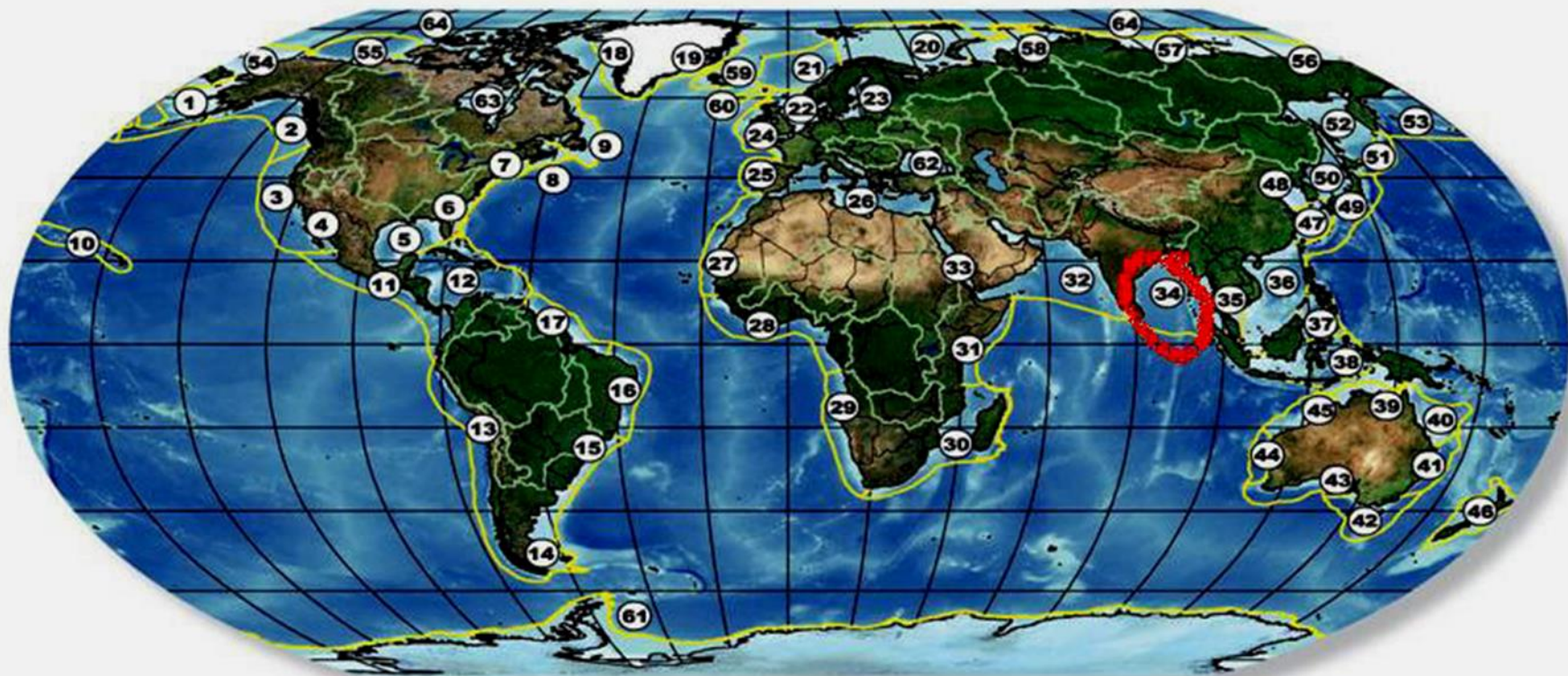
The Bay of Bengal LME is a relatively shallow embayment in the northeastern Indian Ocean encompassing the Bay of Bengal, Andaman Sea and Straits of Malacca and bordered by 8 countries, namely Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka, Myanmar and Thailand. The LME covers an area of about **3,660,130 km<sup>2</sup>**, of which **0.49%** is protected and contains **3.63%** and **0.12%** of the world's coral reefs and sea mounts, respectively (Sea Around Us 2007).

## Bay of Bengal Large Marine Ecosystem





# Large Marine Ecosystems of the World and Linked Watersheds



- |                                     |                         |                           |  |                      |                  |
|-------------------------------------|-------------------------|---------------------------|--|----------------------|------------------|
| 1 East Bering Sea                   | 13 Humboldt Current     | 25 Iberian Coastal        | 37 Sulu-Celebes Sea                                  | 48 Yellow Sea        | 60 Faroe Plateau |
| 2 Gulf of Alaska                    | 14 Patagonian Shelf     | 26 Mediterranean Sea      | 38 Indonesian Sea                                    | 49 Kuroshio Current  | 61 Antarctic     |
| 3 California Current                | 15 South Brazil Shelf   | 27 Canary Current         | 39 North Australian Shelf                            | 50 Sea of Japan      | 62 Black Sea     |
| 4 Gulf of California                | 16 East Brazil Shelf    | 28 Guinea Current         | 40 Northeast Australian Shelf-<br>Great Barrier Reef | 51 Oyashio Current   | 63 Hudson Bay    |
| 5 Gulf of Mexico                    | 17 North Brazil Shelf   | 29 Benguela Current       | 41 East-Central Australian Shelf                     | 52 Okhotsk Sea       | 64 Arctic Ocean  |
| 6 Southeast U.S. Continental Shelf  | 18 West Greenland Shelf | 30 Agulhas Current        | 42 Southeast Australian Shelf                        | 53 West Bering Sea   |                  |
| 7 Northeast U.S. Continental Shelf  | 19 East Greenland Shelf | 31 Somali Coastal Current | 43 Southwest Australian Shelf                        | 54 Chukchi Sea       |                  |
| 8 Scotian Shelf                     | 20 Barents Sea          | 32 Arabian Sea            | 44 West-Central Australian Shelf                     | 55 Beaufort Sea      |                  |
| 9 Newfoundland-Labrador Shelf       | 21 Norwegian Shelf      | 33 Red Sea                | 45 Northwest Australian Shelf                        | 56 East Siberian Sea |                  |
| 10 Insular Pacific-Hawaiian         | 22 North Sea            | 34 Bay of Bengal          | 46 New Zealand Shelf                                 | 57 Laptev Sea        |                  |
| 11 Pacific Central-American Coastal | 23 Baltic Sea           | 35 Gulf of Thailand       | 47 East China Sea                                    | 58 Kara Sea          |                  |
| 12 Caribbean Sea                    | 24 Celtic-Biscay Shelf  | 36 South China Sea        |  | 59 Iceland Shelf     |                  |





# THE BOBLME AT A GLANCE

## Area:

Total maritime area = 6.2 million km<sup>2</sup>

Total area of countries' EEZs = 4.3 million km<sup>2</sup>

Total area of high seas = 1.9 million km<sup>2</sup>

Combined length of coastline = ~14 000 km

## Productivity:

Primary production concentrated in coastal areas and major rivers. Low elsewhere.

## People:

Total population of countries = 1.8 billion (25% of the world)

Population of the coastal zone = 450 million

## Fisheries and other Resources:

Employment in fisheries = 4.5 million

Number of fishers = 2.2 million

Number of fishing boats = >415 000

Total fisheries production = 6 million tones(>7% of World Marine Catch), 12% of World Mangroves Forest, 8% of the World Coral Reefs & Sea grass beds.

Value of fisheries production = USD 4 billion, Fish & Sea food products a significant contribution of animal protein (52%-76%). Huge Natural Resources (Gas, Oil & mineral resources)







*Eight countries, connected by  
one ecosystem, working together  
to secure its future.*



Food and Agriculture  
Organization of the  
United Nations

## **8 BoB LME countries first time together under a project (2001-04) & ( 2009-2014) did an integrated assessment of BOB LME through TDA analysis :**

- Thus, TDA identifies, quantifies and ranks water-related environmental transboundary issues and their causes
- According to the severity of environmental and/or socio-economic impacts.
- The TDA of the BOBLME draws on numerous studies and extensive regional and national consultations with stakeholders.
- Importantly, the TDA provides the scientific basis for the development of the Strategic Action Programme (SAP) that sets out a strategy for the countries to collectively deal with transboundary issues.





**BY TDA ANALYSIS, EIGHT BAY OF BENGAL COUNTRIES HAVE IDENTIFIED THREE MAJOR PROBLEMS (OR AREAS OF CONCERN) AFFECTING THE HEALTH OF THE BAY, THAT THEY CAN WORK ON TOGETHER.**

## **1. Overexploitation of Living Marine Resources**

### **The major issues**

- A decline in the overall availability of fish resources.
- Changes in species composition of catches.
- High proportion of juvenile fish in the catch.
- Changes in marine biodiversity, especially through loss of vulnerable and endangered species.

### **The main causes of the issues**

- Open access to fishing grounds.
- Government emphasis on increasing fish catches.
- Inappropriate government subsidies provided to fishers.
- Increasing fishing effort, especially from trawlers and purse seiners.
- High consumer demand for fish, including for seed and fishmeal for aquaculture.
- Ineffective fisheries management.
- Illegal and destructive fishing.





# TDA (TRANS-BOUNDARY DIAGNOSTIC ANALYSIS) OF BOB LME:

## 2. Degradation of Critical Habitats

### The major issues:

- Loss and degradation of mangrove habitats.
- Degradation of coral reefs.
- Loss of, and damage to sea-grasses.

### The main causes of the issues:

- Food security needs of the coastal poor.
- Lack of coastal development plans.
- Increasing trade in products from coastal habitats.
- Coastal development and industrialization.
- Ineffective marine protected areas and lack of enforcement.
- Upstream development that affects water-flow.
- Intensive upstream agricultural practices.
- Increasing tourism.





# TDA OF BOB LME:

## 3. Pollution and Water quality

### The major issues:

- Sewage-borne pathogens and organic load.
- Solid waste/marine litter.
- Increasing nutrient inputs.
- Oil pollution.
- Persistent organic pollutants (POPs) & Persistent toxic substances (PTSs).
- Sedimentation.
- Heavy metals.

### The main causes of the issues

- Increasing coastal population density & urbanization.
- Higher consumption, resulting in more waste generated per person.
- Insufficient funds allocated to waste management.
- Migration of industry into BOBLME countries.
- Proliferation of small industries.





# The BOBLME Project has Five Components

**Component 1:** Strategic Action Plan (Finalizing TDA & adoption of SAP).

**Component 2:** Coastal/Marine Natural Resources Management and Sustainable Use (Regional fishery assessments & critical habitat management).

**Component 3:** Improved Understanding and Predictability of the BOBLME Environment (Promote use of MPAs & Improved regional co-operation with regional and global assessment and monitoring programmes).

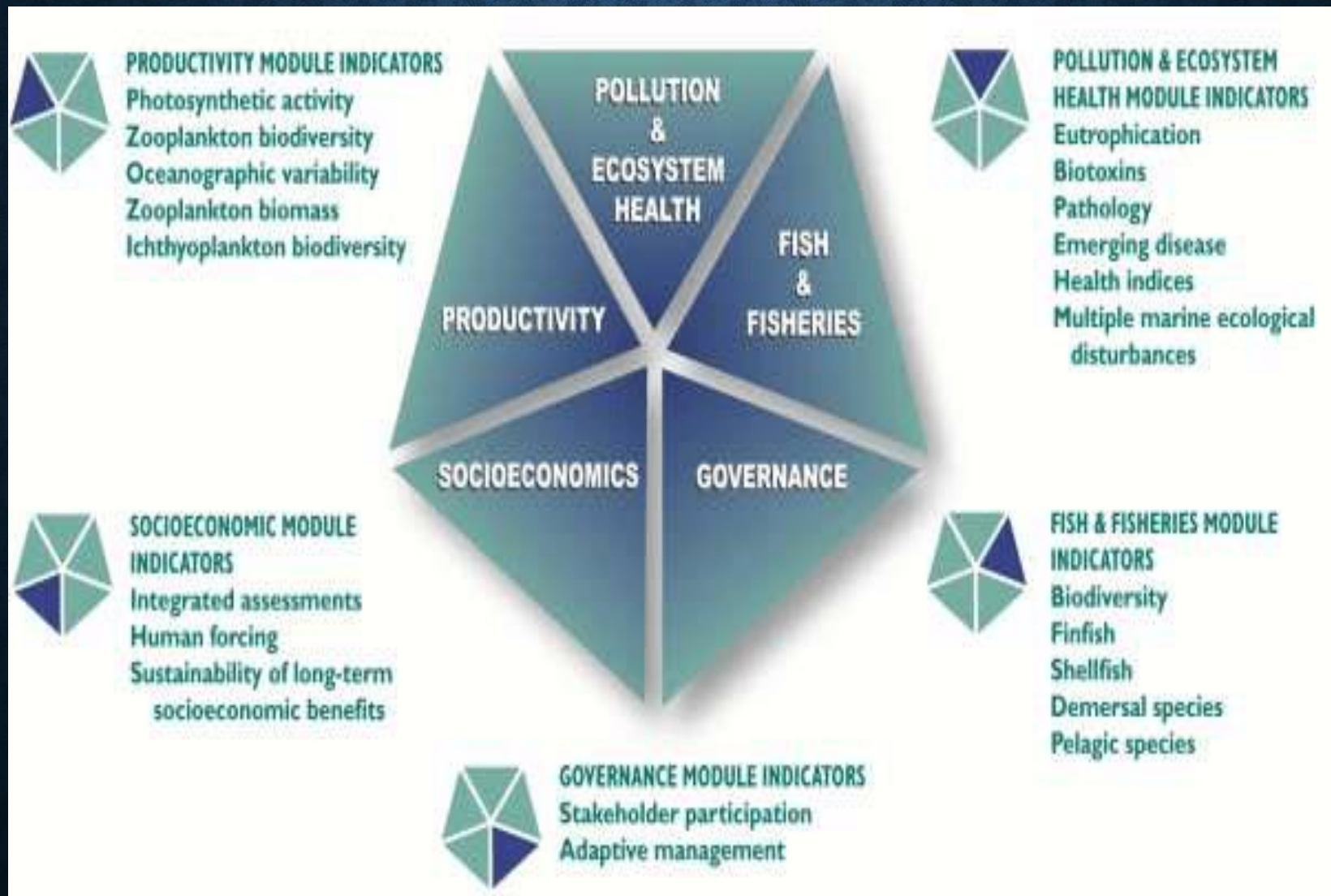
**Component 4:** Maintenance of Ecosystem Health and Management of Pollution (Establishment of an effective ecosystem indicator framework & Develop a regional approach to identifying and managing important coastal pollution issues).

**Component 5:** Socio economics and good governance.





# 5 MODULES WITH INDICATOR PARAMETERS





# BANGLADESH CONTEXT: ROLE OF BOB IN BANGLADESH ECONOMY

- Fishery resources play a vital role in the economy of Bangladesh
  - 6.22% of GDP
  - Source of animal protein - 63%
  - Employment of its population- 9 %
  - Second most important source of the foreign exchange earning commodity - 5%
  - 1.28 million fishermen, 3.08 million fish farmers and 0.44 million fish and shrimp seed collectors in the country.
  - The Marine and coastal capture fisheries sector of Bangladesh is the primary source of income and nutrition for over 484,000 households and 2.7 million family members in the coastal region of Bangladesh.





# STATUS OF BOBLME ECO-INDICATORS- BANGLADESH

## ➤ Productivity Module :

### Impact indicators

- Primary productivity (no time series data available on coastal water, except global satellite data).
- Chlorophyll a (same applicable).
- Surface and water column temperature (no time series data, except global data ).
- Nitrogen /DIN (no data all over the coast, except global data if any from that area !).
- Zooplankton biomass/biodiversity (Some published data available).





# **POLLUTION AND ECOSYSTEM HEALTH**

## **MODULE/COUNTRY**

### **STATUS**

#### **Impact indicators:**

- Water Clarity (no inventory /data through out the coastal water of BD).
- Dissolved Oxygen (same applicable).
- Coastal Wetland Loss( Mangrove forest, Coral reefs) (Mangrove forest data can be get, but for Corals no exact current data).
- Eutrophic Condition (N, P, Si con.) (no coastal water data).
- Water & Sediment Contamination (Heavy metals, oils, POPs, health Indicator bacteria etc.) (except a few data on coastal water).
- Benthic Index (except few fragmentary data on intertidal zone).
- Fish Tissue Contaminants (heavy metals, POPs, PAHs etc)( few data from individual analysis, but no time series data).
- Invasive /alien Species (no data so far known for marine water).
- Multiple Marine Ecological Disturbances.
- Sea level rise/acidification (a good number of reports/ publications are available on Sea level rise).





# FISH AND FISHERIES MODULE

## **Impact indicators:**

- Demersal & Pelagic fish species surveys.
- Reported landings.
- Invertebrate surveys (clams, scallops, shrimp, lobster, squid & other fishery resources.
- Catch –Stock Status and Trends.
- Catch Potential.





# FISHERY & OTHER RESOURCES OF THE BAY OF BENGAL, BANGLADESH

- Fish: 475 (about 100 commercial spp.)
- Shrimps: 36 spp.
- Algae: 185 spp.
- Crabs: 15 spp.
- Mollusks: 301 spp.
- Corals: 66 spp.
- Lobsters: 5 spp.
- Sharks, Skates Ray fishes: 53 spp.
- Turtles: 5 spp.
- Oil, gases, minerals etc.

\* Many of those resources under severe threats/endangered due to anthropogenic & natural causes, like other BOB LME country.





# TRANS-BOUNDARY COASTAL POLLUTION ISSUES

- ❑ **Sea level rising -CO<sub>2</sub>, CO, N<sub>2</sub>O, NO<sub>2</sub>, VOC<sub>s</sub>**
- ❑ **International rivers (54 Int. rivers, mighty are GMB)**
- ❑ **Sewage**
- ❑ **Rivers and run-off**
- ❑ **Floods**
- ❑ **POPs - (PCBs DDT, BHC, Dieldrin, Methoxy-chlorin etc)**
- ❑ **Industry**
- ❑ **Agriculture and aquaculture**





# TRANS-BOUNDARY COASTAL POLLUTION CONCERNS

## CONCERNS:

- ❑ Since Bangladesh is one of the most vulnerable area, there must be needed cooperation from developed countries, donors agencies etc.
  - No National information & data bank a on long term time series data on Persistent Pollutants ( **OCPs, PCBs Metals, Marine liters etc**). **DIN & others hazards as identified in TDA of BOBLME analysis.**
  - No management & safe disposal.
- \*\*\*It is very essential to get support from UN bodies (e.g.- GEF, IAEA, WHO, IOC, UNEP) & developed countries for management, safe disposal, capacity building.





## GAPS (IMPLEMENTATION ISSUES)

- ❑ Lack of trained man-power.
- ❑ Lack of awareness.
- ❑ Financial problem.
- ❑ In addition to IMS, C.U., recently Bangladesh govt. has started 'Bangladesh Oceanographic Research Institute (**BORI**)', also opened '**Blue Economy Cell**' and a no. of Oceanographic/Marine Science related courses /department in different University for trained manpower and capacity development in this highly potential sector of Blue economy.





## **GAPS (POLICIES AND LEGISLATION)**

- ❑ No strong net-working among the policy makers.
- ❑ No integration at operation level.
- ❑ Wide gap in GO-NGO collaboration.
- ❑ Deteriorating of laws & poor management systems.
- ❑ Blindness of laws & legislations among the peoples.

### **GAPS (Report Card):**

- ❖ No postering,
- ❖ No remarkable report card of pollution status to public.





# GLOBAL SUSTAINABLE MARINE ECO-SYSTEM MANAGEMENT:

**For sustainable global marine ecosystem management need:**

- Scientific understanding of the ocean services.
- Assessment of the level of food production which results for various ecological process in order to address food security and safety.
- Assessment of aesthetic uses of ocean environment and the level of capacity building reflects among other things.
- The identifying knowledge gaps in sciences /technology.  
Know How development of human skills and  
infrastructure facilities.





## NEEDS/WHAT SHOULD BE DONE

- Support programme to implement interventions for capacity development and to strengthen monitoring and reporting.
- Linkage established among BOBLME initiatives and regional/global ecosystem health networks.
- Need to develop a national strategy to fill the data gaps in “Ecosystem Indicators” of BOB, Bangladesh.
- Developing a regional approach for identifying and managing important coastal pollution issues.
- Need strong linkages and support from UN relevant bodies & other oceanographic Centres.

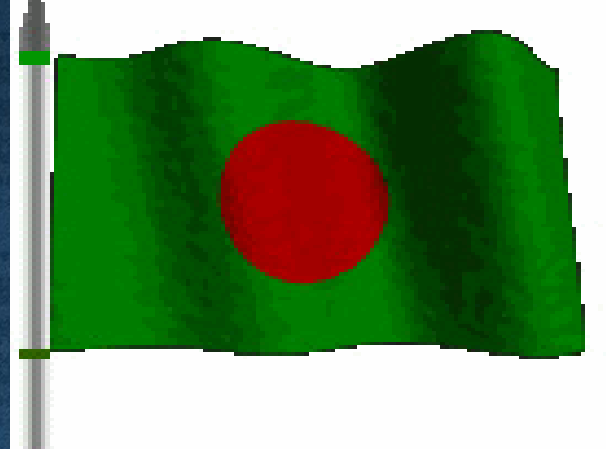




# CAPACITY DEVELOPMENT FOR MARINE ASSESSMENT & MANAGEMENT ( UN REGULAR PROCESS)

- Need co-operation both short/long terms (Technological/Financial) among developing countries, North-south co-operation.
- Capacity building through identifying opportunities and facility linkage for international co-operation in order to improve capacity in those geographical area (Developing country) to undertake integrated assessment.
- It is also important that gaps are identified and priority shared so that a coherent integrated assessment using DPSIR methodology can be applied.
- The regional workshop of the regular process for Indian ocean and adjacent seas already identified the gaps for capacity buildings and the action is needed for sustainable development.





THANKS TO ALL

