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working together to secure its future.*



# TDA Synthesis Report

Bay of Bengal Large Marine Ecosystem Project



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For bibliographic purposes, please reference this publication as:

BOBLME (2011) TDA Synthesis Report. BOBLME-2012-Project-01

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# Synthesis Report of the BOBLME TDA Validation Consultations February 22, 2012

Derek Staples, Hewawasam Fernando and Kuperan Viswanathan

## 1. Background

One of the two major outputs of the BOBLME Project is an agreed Transboundary Diagnostic Analysis (TDA) that identifies and prioritizes the major transboundary environmental issues and their causes in the Bay of Bengal. This in turn forms the basis to the other major output, the Strategic Action Programme (SAP) that will address the issues and propose solutions.

BOBLME Project Component 1: Strategic Action Programme underpins the preparation of a SAP whose implementation will ensure the long-term institutional and financial sustainability of the BOBLME Programme. Subcomponent 1.1: TDA Preparation is to develop an agreed TDA building on the BOBLME's existing draft TDA. The TDA is expected to be finalized in March 2012.

The process for finalising the TDA is:

1. Review and redraft the TDA (2010) – completed;
2. Develop a roadmap for national TDA consultations (2010) – completed;
3. Undertake national consultations (2011) – completed;
4. Synthesise the recommendations from the national consultations - to be undertaken by a small team at a meeting held 24-26 January 2012 – completed;
5. National coordinators and National TDA managers meet to consider the results of the TDA consultations and confirm the nature and extent of the document (13-14 February 2012);
6. The TDA is "finalised"; and
7. PSC meet to consider adopting the TDA (20-23 March 2012).

This report provides a synthesis of the comments presented from the national consultations as considered in step 3 and 4 above.

## 2. National consultations

### 2.1 Consultation objectives

The objectives of the national consultations as provided in the terms of references were:

1. Review/challenge/verify the information of the TDA;
2. Note errors, note points that might need verification, and recommend deletions/additions; and
3. Assess the information and conclusions from a transboundary perspective and decide whether 'on balance, this TDA is appropriate for the development of the Strategic Action Programme (SAP).

### 2.2 Approaches taken by the different countries

Although each country was provided with the same terms of reference, the approaches taken to implement them varied amongst countries. Some countries requested changes to the wording and information content of the TDA, some held extensive workshops where the participants provided their views on the issues and causes (mainly at the provincial/state level), many moved forward and provided their suggestions for future actions that could be taken up in a SAP. A summary of approaches is in Table 1.

Table 1: Approaches and responses received from each BOBLME country

	Indonesia	Malaysia	Thailand	Myanmar	Bangladesh	India	Sri Lanka	Maldives
1. Confirmations	x	X	X	X	X	X	X	X
2. TDA wording					X			
3. TDA content changes		X	X		X	X	X	X
4. Provincial/state issues/causes	X		X			X	X	
5. TDA Scope changes		X					X	X
6. Comments subsequently not accepted					X			
7. SAP suggestions		X	X	X	X	X	X	X

Indonesia, Thailand, India and Sri Lanka carried out consultations at both the national and province/state levels, while Malaysia, Myanmar, Bangladesh and Maldives conducted national consultations. The number of consultations and the number of stakeholders consulted are given in Table 2.

Table 2: Number of consultations and number of stakeholders involved in each BOBLME country [To be updated- numbers requested]

	Indonesia	Malaysia	Thailand	Myanmar	Bangladesh	India	Sri Lanka	Maldives
Number of national workshops	2	1	2	2	1	4	1	1
Number of stakeholders consulted	64	?	37	69	53	30	26	15
Number of Province/state workshops	4		6			5	7	
Number of stakeholders consulted	100		161			572	191	

Participants in all countries covered a wide range of stakeholders including senior officials of the Central and Provincial/state governments from both environmental and fisheries agencies, civil society organizations, representatives of small scale fishers, trawler operators, fish traders, security agencies such as Navy and Coast Guard, scientists from research organizations and Universities.

### 3. Synthesis methodology

The comments of the reports provided by all BOBLME countries were sorted into 7 categories:

1. Confirmations;
2. Easily-fixed changes to wording;
3. Country, and in some cases Provinces/states analysis of issues (and causes): gap analysis;
4. Requested changes, including updated statistics,
5. Changes to the scope of the TDA;
6. Comments not accepted; and
7. Suggestions for future SAP actions.

The comments in each of these seven categories were then scrutinized and appropriate responses developed. These analyses were then used to modify the TDA (highlighted in yellow in the draft TDA).

## 4. Synthesis outputs

### 4.1 Confirmations

Malaysia, Thailand, Myanmar, Bangladesh, Sri Lanka and Maldives all provided written confirmations. As an example, that provided by Sri Lanka is quoted below:

*“endorsed that TDA has accurately identified, quantified and ranked, according to the severity of environmental and/or socio-economic impacts, water-related environmental transboundary issues and their proximate and root causes of the BOBLME and accepted that this TDA is an appropriate basis for the development of the Strategic Action Programme”.*

Although Indonesia and India did not provide such a clear statement, the fact that the issues and causes raised at the different Provincial/state workshops aligned with the issues identified in the TDA can also be taken as a confirmation (see Issue/cause by country & province/states below).

### 4.2 Easily fixed changes

A few minor changes were made to the wording (highlighted in yellow in revised TDA).

### 4.3 Issue and causes by country & province/states: gap analysis

The alignment of provincial/state issues with those in TDA are given in Appendix 1. Many issues (and causes) identified in the TDA were also covered by the countries that used their workshops to explore issues. All Provinces/states recognized overexploitation of marine living resources, and most also recognized critical habitat degradation and pollution as areas of concern. The most frequently stated issue was illegal, unreported and unregulated fishing (IUU) both by national and foreign boats. The need for better compliance/enforcement was also widely recognized.

Some issues not identified as high priority in the TDA but raised by some Provinces/states included:

1. Alien species introductions, including from ballast water;
2. Coastal erosion;
3. Policy harmonization among Provinces/states and central government; an
4. Reducing water flows due to construction of dams/irrigation

The synthesis team considered that alien species are covered in the TDA but was not assigned a high priority transboundary issue by the BOBLME countries. Coastal erosion is indeed an issue but again not considered as important as overexploitation, habitat degradation and pollution.

Policy harmonization should be part of the SAP and the SAP implementation. Reducing water flows has been added as another cause of habitat degradation in the final draft TDA.

Given the extensive consultative process that took place to reduce the number of issues to those that were of the highest priority as published, it was felt that these additional issues would be better dealt with under the existing issues or under national actions, where appropriate.

#### 4.4 Requested changes, including statistics, and responses

A compilation of the suggested changes and the synthesis team's response is included at Appendix 2. Where it was considered that it was adequately covered by the TDA, a cross-reference to the paragraph is made.

A number of suggestions were incorporated into the modified draft TDA. Requests for more information on high seas/offshore areas and climate changes were noted and the TDA strengthened accordingly.

Several countries noted that the statistics used in the TDA had become outdated in some sections. The TDA has now been updated in those areas where new statistics are readily available. In carrying out this exercise, it was found that, in many cases, the statistic for a more recent year was similar to that of the previous year and little change occurred to the conclusions or thrust of the TDA.

The draft TDA has been modified according to the comments received (highlighted in yellow).

#### 4.5 Changes in TDA scope

Four countries requested changes to the scope of the TDA.

Malaysia recommended three more habitats be included in the TDA, namely,

1. Mudflats,
2. Seaweed beds, and
3. Estuaries

and also the inclusion of red tide phenomena.

Sri Lanka also requested to add lagoons, estuaries and sand dunes under degradation of critical habitats in addition to mangroves, coral reefs and sea grass.

The eastern province and southern provinces of Sri Lanka mentioned invasive plants and India requested more attention be given to alien species introductions as well as climate change.

The participants of the Maldives also highlighted the issue of maritime piracy and terrorism in the Indian Ocean as an area of concern for the BOBLME.

##### 4.5.1. Habitats

In response to the request to add more habitats three arguments can be developed to restrict the TDA habitats to its current scope.

- 1 The TDA was developed through a long consultative process involving all BOBLME countries. A number of issues were canvassed, but through a priority setting process, the three areas of concern and the habitats to be considered were agreed. As a result, theme papers were commissioned and the national papers only considered the agreed habitats. To include more at this point of time would delay the TDA finalization considerably.
- 2 In the context of the sustainable management of a LME, (Angell, 2004) defined a critical habitat as one whose services are necessary to the LME's sustainability. e.g., by providing centers of biodiversity and sources of food, serving as breeding, feeding, nursery and refuge areas, moderating the influence of nutrients, sediments and pollutants from land, supporting coastal and offshore productivity, and protecting the coast from the effects of storms and floods. The criteria of "criticality" included the habitat's exceptional ecological value and/or its being at risk in terms of imminent threats, inherent vulnerability, and/or

rarity (issue of global significance). Mudflats, seaweed beds, estuaries and sand dunes proposed for addition do not satisfy the criteria for 'criticality' and are not present in all countries. It is suggested that the issues/threats to these habitats could be addressed under the national action plans for mangroves, sea grass beds and pollution since the above habitats are part of the estuary, lagoon and mud flats ecosystems. Sand dunes are also considered under integrated coastal management plans. In this context, there is no need to expand the critical habitats already included in the TDA.

To be able to expand the TDA, a compelling case would need to be made that could be accepted by the project steering committee

#### **4.5.2. Red tides**

The red tide phenomenon is covered in the TDA under the term "Harmful Algal Blooms (HABs). These are a consequence of pollution and are transboundary in nature, as harmful effects of algal blooms are felt across the boundaries. The TDA has been expanded with information collected by the BOBLME country reports on pollution, but red tides have not been raised to a high priority issue.

#### **4.5.3. Alien species**

It was noted that introduction of alien species is covered in the TDA where it concluded that it was difficult to decide whether a species is an exotic or not when a comprehensive inventory is not available for indigenous species. Recent work on transboundary spread of aquaculture diseases has been included under "Status of Aquaculture".

#### **4.5.4. Maritime piracy**

With respect to the issue of maritime piracy and terrorism in the Indian Ocean it was felt that this is an issue that can be taken up in the SAP in terms of governance, MCS and oceanographic research capabilities.

### **4.6 Comments not accepted**

A small number of requests were not accepted for the following reasons:

#### **Bangladesh**

##### **Regarding the Continental Shelf Claim;**

Bangladesh put her continental shelf claim to commission on the limits of the Continental Shelf of UN on 25 February, 2011. It is expected that our claim will be accepted soon.

For this reason, the participant suggested that the area's shown in the BOBLME TDA (draft) report (vol.2, fig.no.2.1, p.6 and in vol.1, p.9) (also the NF in his PP presentation on TDA doc's) for Bangladesh Territorial water cannot be accepted as a concrete basis or legal boundary until the disputes settled.

So, it is hoped that contradictory delineations of EEZ boundary as shown in figure for Bangladesh would not be shown in the final TDA report of BOBLME. Percentage of the EEZ area of Bangladesh in BOBLME shown in the table 2.1 (p.6, vol.2 of TDA Doc.) should be corrected (should be 164,000 km<sup>2</sup> until the matter settled) or the contradictory table should be omitted.

**Not accepted as the matter is still being considered by the court**

**Issue of no. 1 in 'Overexploitation of marine living resources: Decline in overall availability of fish resources;** The group suggested that, in issue no. 1, instead of 'Decline of overall availability of fish resources', should be 'The total catch of the fish resources is increasing, but the CPUE is declining'.

**Note: Availability of fish reflects the CPUE decline. Also the total catch may be increasing in some countries but not in others (e.g. declining in Thailand and Malaysia.**

- **Wording changes:** 'Many fish stocks' should be replaced by 'Many fish and other species' -----  
'fish or larvae' should be replaced by 'fish and other species'.

**Note: Fish as defined by FAO is a collective term, includes molluscs, crustaceans and any aquatic animal which is harvested**

**Similarly: Fish stock is defined as the living resources in the community or population from which catches are taken in a fishery. Use of the term fish stock usually implies that the particular population is more or less isolated from other stocks of the same species and hence self-sustaining. In a particular fishery, the fish stock may be one or several species of fish but here is also intended to include commercial invertebrates and plants.**

## 4.7 SAP recommendations

Many countries, Provinces/states provided suggested actions that could be relevant to the SAP. These have been compiled in Appendix 3.

## 5. Conclusions

- A varied approach was taken by the BOBLME countries, all of which provided valuable feedback;
- All BOBLME countries endorsed TDA, either implicitly or explicitly;
- Although not specifically requested to do so, many countries provided recommendations and suggestions to implement the TDA through a SAP – a positive step forward;
- TDA has now been updated with recent statistics/information;
- TDA changes requested by countries were incorporated, as appropriate (few not accepted);
- TDA strengthened with sections on offshore/high seas area and more on climate change and red tides; and
- SAP recommendations can be used as resource material for the SAP development.

## Appendix 1: Issue/cause identification by Province/state

	Sri Lanka			Thailand					India					Indonesia					
	Northern	Eastern	Western	Southern	Ranong	Phuket	Phangna	Krabi	Trang	Satun	A Pradesh	Orisha	A & N	Tamil Nadu	W/Bengal	Aceh	Sumut	Riau	Sumbar
<b>Overexploitation of living resources</b>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<b>Issues</b>																			
Decline in fish stocks	√				√		√	√			√			√	√	√	√	√	
Changes in species composition																√	√		
High proportion of juvenile fish					√	√		√	√	√	√			√			√	√	
Changes in marine biodiversity,		√													√				
<b>Proximate Causes</b>																			
Excessive fishing effort and overcapacity	√			√			√				√	√		√	√				
Destructive fishing methods	√		√								√	√							
Unselective fishing practices and gear					√						√	√			√				
IUU fishing	√	√	√	√	√	√				√	√	√	√	√	√	√	√	√	√
<b>Degradation of critical habitats</b>	√	√		√	√	√	√	√			√	√	√	√	√	√	√	√	√
<b>Issues</b>																			
Mangroves	√			√	√	√					√	√	√		√				
Coral reefs											√		√						
Seagrass																			
<b>Proximate Causes</b>																			
Conversion of mangroves		√									√					√	√	√	√
Expanding coastal development		√	√		√		√		√			√			√				
Unsustainable logging of mangroves		√										√							
Increasing pollution, eutrophication and sedimentation			√								√					√	√	√	√
Destructive fishing practices											√								
Coastal modification,	√	√									√	√							
Natural causes, especially coral bleaching							√		√				√						

Pollution Issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sewage-borne pathogens and organic load		✓			✓	✓		✓	✓			✓
Solid waste/marine litter	✓		✓		✓		✓			✓		
Increasing nutrient inputs						✓				✓	✓	✓
Oil pollution			✓			✓						
POPs and PTSs	✓		✓			✓						
Sedimentation	✓				✓					✓	✓	✓
Heavy metals												
<b>Proximate Cause</b>												
Untreated or only partially treated-sewage												
Untreated or partially treated industrial discharges												
Discharges of solid waste							✓			✓		
Burning of solid waste												
Increasing fertilizer use in agriculture							✓					
Increasing aquaculture												
Increasing atmospheric emissions of nitrogen												
Operational discharges of oil from shipping												

## Appendix 2: Suggested changes and the synthesis team's responses

### Indonesia

No specific changes requested to TDA but gaps were identified in Provincial issues analysis.

### Malaysia

All the facts/figures are correct and only a few need to be added or corrected as follows:-

2.1. Table 3.1. of Volume 2

Malaysia has not yet rectified the FAO Compliance Agreement.

(amended)

2.2. Table 3.4 Volume 2

To be added to the list under Malaysia are:-

2.2.1. Ministry of Natural Resources and Environment

2.2.2. Department of Marine Parks

2.2.3. National Oceanography Directorate

2.2.4. Universities

(amended)

2.3. Table 4.16 Volume 2

Another important seagrass area found in West Coast off Johor is at Tanjung Piai. (amended)

### Thailand

The meeting ended up with many *suggestions and issues from Transboundary Diagnostic Analysis*, which are;

1. The Department of National Park, Wildlife and Plant Conservation should be added as one of the institutes that are responsible for environmental and marine concerns among the countries in Bay of Bengal in part of Thailand. This is because the main marine resources such as coral reef and seagrass beds exist in the area under the responsibility of the National Park Department. (added)

2. According to the root of problem of the natural resources degradation, a poor fishermen village was mentioned as one of the cause of problems. The meeting viewed that it was impossible because the root of the problem should be on the wealth, demanding, and insufficiency. For example: although the small-scale fishermen can catch fish in a few kilograms, it is enough for their livelihood while the large-scale fishermen have to increasingly catch fish in order to have money for hiring and the family's expenses. (the point made in the TDA was that poverty contributes to overexploitation)

3. In relation to marine pollution problem issues, organizing tourism activities and marine aquatic food processing should be added as causes of the marine pollution problems. (added bullet to table in section 4.3)

4. According to the transboundary diagnostic analysis in Thailand, the problems should be analyzed and ranked for their significances and urgency. (National action)

5. Thailand and this region still lack knowledge about the sea bed ecosystem at a deep sea level up to hundreds feet. For example: sponge ground and a pinnacle area which are fishing grounds of large

trawling and has been heavily utilized. Therefore, it is possible that the marine ecosystem in this area may be in a serious degeneration which needs to be studied on its present conditions in all aspects, in order to apply the obtained knowledge for further management. (added sentences and paras on high seas)

6. The problem of political influences, and immoral, dishonest and corrupted politicians, has the root of problem from people. This is because the people like to elect the politicians who are the same as them without proper decision. Therefore, the change should be started from the people by raising their awareness and having proper voting.

7. The determination on the procedure for local community development in Thailand is only managed by the group of people at administrative level, thus, villagers or people in communities rarely take part in this decision making. Another main issue is the valuing on the ecosystem which is found that the environment and resources are valued at very low level. (covered under community participation)

## Myanmar

No specific suggestions for changes in the TDA were made, but many suggestions of SAP inclusions.

## Bangladesh

According to IUCN and other local agencies, one of the major threats in Bangladesh Sundarbans is the use of destructive fishing practices or poison fishing including in the sanctuaries where fishing is not generally allowed. This has catalyzed unprecedented losses in breeding and survival of mangrove and coastal species including amphibians, reptiles, cetaceans apart from other fish. Micro-habitats are severely disturbed by the recent increase in destructive fishing which signals to lack of *monitoring, control, surveillance and enforcement* problems. On the Indian side, Sundarbans face similar problems. This should be considered as a vital concern for BOBLME transboundary intervention in the Sundarbans. (covered in 4.1 and is also compliance/enforcement issue)

### Area no. 1: Overexploitation of Marine Living Resources:

**Issue no. 1: Decline in overall availability of fish resources;** The group suggested that, in issue no. 1, instead of 'Decline of overall availability of fish resources', should be 'The total catch of the fish resources is increasing, but the CPUE is declining'. (Not accepted)

**Issue no. 2: Changes in species composition of catches;** Comments on that issue by group was that, percentage composition of the total fish catch is changing remarkably in terms of species contribution. (i.e. Last few years catch data statistics suggested that, shifting remarkably from high valued fish species to low valued fish species) (Ref. BOBLME /BFRI pub. on Fishery, 2010; DOE Fisheries Statistical Year book, Dhaka, Bangladesh (April, 2010) (NF comments). (covered in 4.1 – change in species composition)

**Issue no. 3: High proportion of juvenile fish in the catch;** Group agreed with this statement.

**Issue no. 4: Changes in marine biodiversity, especially through loss of vulnerable and endangered species;** In this issue, group suggested to replace the word 'especially through' with 'and'. (Done)

**3rd issue:** 'All countries ----- especially the ecosystem approach' - group's opinion was OK.

- **4th issue:** Regarding 'BOBLME countries contribute significantly to the global problem of loss of vulnerable and endangered species.'-the group suggested that, to what extent the issue significant (i.e. contribution) should be mentioned. (Deleted the word significantly)

Regarding 'The root causes of the issues' in the area of 'Overexploitation of marine living resources'- as mentioned in the TDA documents were OK as said by the group.

Regarding suggestions from other group ('Marine Environment & Habitat degradation') - fishery group suggested that, information from satellite data should be considered nationally and then regionally.(SAP suggestion)

#### 4.0. Inputs on TDA (draft) documents by the NF, BOBLME TDA, Bangladesh:

Sl. No.	Name of Issue (Bangladesh)	Title in the table/fig.	Table No./Fig. no.	Page No.	Existing Data	Update Data (Ref.)	Remarks
1	Estimated area of the EEZ km <sup>2</sup> & percentage area	EEZ areas of the countries in the BOBLME (BD.)	2.1	6 (vol.2) 9 (vol.1)	78,540 km <sup>2</sup> & 1.3%	<b>164,000 km<sup>2</sup></b> <b>Percentage: 2.62% (Hussain &amp; Hoq (eds.), (2010))</b>	Existing figure 2.1& table 2.1 should be replaced or omitted.
2	Population (millions) density / km <sup>2</sup> (2010)	BOBLME national population statistics in 2010 (BD.)	2.2	10	164 million & 1142/ km <sup>2</sup>	<b>146.1 million &amp; 990 / km<sup>2</sup> (Bangladesh Economic Review, 2010)</b>	Previous data should be updated.
3	GDP Growth: Agriculture, Industries & Services (2000-2005)	Estimates of GDP (per capita) for BOBLME countries 2007 (in 1990 US dollars) (BD.)	2.3	12	455, (5.4%); Agriculture: 19% (2.5%); Industries: 29%, (7.4%); Services: 53% (5.7%)	<b>684(4.57%); Agriculture: 11.56% (5.02%); Industries-17.78%, (5.92%); Services: 49.67% (6.25%) in 2008-2009 (BBS 2009)</b>	Previous data should be updated.
4	% Contribution of capture fisheries to GDP (2006)	Percentage contribution of capture fisheries & tourism to GDP (BD.)	2.4	13	2%	<b>3.68% of GDP in 2008-2009 (BBS, 2009)</b>	Previous data should be updated.
5	Employment in Fisheries	Number employed and number of active fishermen in BOBLME countries. (BD.)	2.5	14	Number employed : 1095,000 fishermen	<b>Number employed: 1280,000 fishermen (Fisheries Statistical Yearbook of Bangladesh, 2009)</b>	Previous data should be updated.
6	Adult literacy Rate (% aged 15 and over)	Education indicators in BOBLME countries	2.8	19	53.5 Adult literacy rate in 2007	<b>Adult literacy rate 59.07% in 2008 (BBS 2009)</b>	Previous data should be updated.

7	Social Protection	Social protection in the BOBLME countries (BD.)	2.10	22		<b>i. Allowance for poor old, widow &amp; disabled person (Poverty). ii. Stipend for all school going girls from class vi- xii. (education) iii. Support for medical treatment for poor pregnant/ breast feeding mothers, disabled women (health) iv. Others: allowance for freedom fighters (Social protection 21 June, 2100, article in Prothom Alo, Nat. Daily by Sk. Hasina, PM, GOB.)</b>	Should be included
8	Legislation (Marine Fisheries, Env., Habitat)	Marine related legislation in BOBLME countries (BD.)	3.3	30		<b>Update policy, rules &amp; regulation on fisheries, marine env. ((BoBLME/ BFRI workshop, 2011; Hossain, M.M. 2010)</b>	Should be updated
9	Marine production	Estimation of Marine production value for each country of the Bay of Bengal, 2006 (BD)	4.1	42	486,000 MT	<b>514,644 MT (Fisheries Statistical Yearbook of Bangladesh, 2009)</b>	Previous data should be updated.
10	Fish Catch profile	Major species group contributing to fisheries production in the BOBLME countries (%) (BD.)	4.2	43	Others 10.7% in 2008	<b>Misc. Pelagic Fishes (Bombay duck &amp; Indian salmon)- 12.82%; Shrimps, Prawns - 10.15%;Others- 17.09%; (Fisheries Statistical Yearbook of Bangladesh, 2009)</b>	Missing data should be included & previous data should be updated.
11	Fishing Fleet	Number of fishing vessels operating in the BOBLME countries (BD.)	4.4	45	Trawlers-122	<b>Trawlers-141 (Fisheries Statistical Yearbook of Bangladesh, 2009)</b>	Previous data should be updated.
12	Status of coastal aquaculture	Trends in aquaculture production, 1950-2005 (2008?) (Bd.)	4.9	55	Production fig. till 2005 (BD.)	<b>Production from Culture of shrimp/prawn: 1,005,542 (mt.) (2007-08); 1,062,801(mt.) (2008-09 Fisheries Statistical Yearbook of Bangladesh, 2009)</b>	Previous data should be updated.
13	Mangroves	Major mangrove forest in the BOBLME (2004)	4.12	65	Need to know current status/ data (Sunderbon mangrove forest)	<b>Need regional /national study to know the update status of Sunderbon Mangroves (Bd./India)</b>	Recommendation on "Sunderbon mangroves" based on the outputs of TDA Consultation, 2011 Dhaka, BD. could be incorporated in TDA documents for SAP.

14	Coral reef	Coral Reef status in the BOBLME (2004).	4.15	72	St.Martin's coral Island & its biodiversity needed to be studied thoroughly. (BD.)	App.8.00 km <sup>2</sup> (7.6% coverage on S-E coast), Update information on St.Martin's Bd: Tomaascik (1997); Rajasuria <i>et.al.</i> (2004); Hossain <i>et.al.</i> 2009 & Hossain & Ahammed (2010) (unpublished)	Need regional cooperation & international support (e.g BoBLME/ SAS/ GCRMN) to assess the overall status of corals in St. Martin's Bangladesh.
15	Sea grass	Status of Sea grass beds in BOBLME (Bd.)	4.16	78	Bakkhali estuary, Bd.	5 species reported; In addition availability of sea grass in St. Martin', Sunderbon's, Naf river estuary, were reported (Shafuddin, 2010).	Need to be studied for identify the area covered by sea grass meadows in Bangladesh for management (transboundary significance).
16	Regional Plan of Action (RPOA) to promote Responsible fishing practices including combating IUU, MCS fishing in the region (BOBLME)	Fishery Resources management (marine) issues in BOBLME country.				Recommendations of GoB/ DANIDA/ BOBP-IGO Nat. Workshop on "Monitoring ----- Marine Fisheries, Bangladesh. ((BOBP/ REP/ 110) (2008)	For fishery resource management in BOBLME countries, recommendation in BOBP/Rep./110, 2008) may be considered.

(All statistics updated where possible)

## India

NOTE: The final expert's report from India was received after the Synthesis Workshop (24-26<sup>th</sup> January 2012). The following is a copy of the response sent back to India based on an examination of the summary points by two members of the synthesis team (Derek Staples and Hewawasam Fernando), the BOBLME Regional Coordinator (Chris O'Brien) and the BOBLME Chief Technical Adviser (Rudolf Hermes).

1. During the late 1990s, in view of the importance of the BOBLME to the health, wellbeing and livelihoods of the millions of people living in the Bay of Bengal (BoB) region, the Advisory Committee (AC) of the then Bay of Bengal Programme (BOBP) requested the Food and Agriculture Organization of the United Nations (FAO) to assist in the development of a project proposal that could be submitted to the Global Environment Facility (GEF) and other donors for funding.

### *Background information*

2. At the 24th Advisory Committee Meeting of the BOBP in 1999, which was also its last formal meeting, the BOBP member-countries listed down the important problems and issues confronting fisheries development and management in the BoB region and agreed that several of the problems could be addressed better through a regional mechanism. Besides strongly endorsing the need to continue BOBP or to evolve a new regional mechanism, the 24th AC also formally agreed to support initiation of GEF supported Block-B activity leading to the BOBLME Project.

### *Background information*

3. The present TDA document started taking shape through regional consultations in 2003 and 2004. It was further updated in 2009-10. The TDA document aims to identify, quantify and rank transboundary water-related problems and provides scientific basis for a Strategic Action Programme (SAP), which will lay the foundation of regional cooperation for addressing the identified issues.

### *Background information*

4. The present TDA document is a compilation of local-level scientific information and folk knowledge extrapolated to derive a regional picture. Thus the TDA is grossly correct at the regional level, but the same picture is not reflected at the national level.

*Agreed. The TDA is a regional document and is not intended to cover all national issues. This is a confirmation that the TDA, on balance, is an acceptable basis the development of a regional SAP.*

*National issues are expected to be further considered within the NAPs - the national action plans (within the SAP). The TDA had added a paragraph that accepts the diversity within the region and the fact that the issues and causes do not uniformly affect all countries.*

5. The document has clubbed shared and common issues for the sake of promoting regional and/or local solutions. But, in effect, the distinction between common issues and transboundary issues has got blurred, resulting in loss of focus in better understanding of the transboundary issues in the BoB region.

*Agreed - the distinction between common and shared issues blurred the TDA consultations in several countries. This led to many issues being raised that were not of a TB nature - but important to consider from a national perspective. The TDA now clarifies what TB issues are in accordance with GEF usage.*

6. The major inputs for preparation of the TDA were the eight national papers prepared by individual consultants- one for each country. The process adopted for preparation of country reports, especially for larger and diverse countries like India, suffers from inadequate information and a multi-disciplinary approach. This inadequacy is subsequently reflected in the TDA document also.

*This is a lesson learned - the job given to the national consultant from India was very difficult. However the national reports are just one of many inputs to the current analysis. The national TDA consultation process undertaken by India in 2011 was expected to identify relevant new information and errors and have these corrected in the revised TDA.*

7. The TDA does not provide an eco-system model of the BOBLME or any functional specifications of the causal tree. Thus, it cannot form guide for implementation of the 'ecosystem approach'; rather at best it can create awareness on the ecosystem approach.

*There is currently no ecosystem model (eg eco-path or eco-sim) existing for the Bay of Bengal. However, the BOBLME Project is currently developing a programme of work that will fill this gap. As defined by the CBD, the existence of an ecosystem model is not a prerequisite for the implementation of an ecosystem approach to management.*

8. As per the Project Document, the TDA is internationally peer reviewed, but to the best of our knowledge, neither the Indian National Report nor the TDA document is formally reviewed by leading scientific institute(s) in the country.

*The TDA was expected to be reviewed by leading experts in each country as part of the national consultations.*

9. A major weakness of the TDA preparation process is the lack of consultation with existing regional organizations including the BOBP or its successor the BOBP-IGO.

*The TDA was expected to be reviewed by leading experts in each country as part of the national consultations. If a regional body was considered to have expertise relevant to the TDA, then it was expected that it would be invited to comment on the document. In the case of BOBP-IGO, this organisation was on the expert panel for India.*

10. The TDA document identifies overexploitation of fish stocks as a major transboundary issue in the BoB region. This assumption is more or less on a gross basis and not on hard data on species or stocks.

The Indian position is that:

- i. The threshold of overexploitation and overcapacity is considerably higher for tropical stocks and this threshold has not been reached for majority of the Indian marine fish stocks.
- ii. Catch trends do not show decline, although stock estimates suggest overexploitation during the last ten years. Similarly, in spite of 30-40 percent extraction of juveniles in India, there is no decline in catches. This stresses the fact that tools and standards evolved for temperate fish stocks may not be applicable in tropical waters.
- iii. In India, studies show that proliferation of climate-driven fisheries such as the small pelagics, leading to 'fishing down the food chain' is not due to fishing alone, but also under influence from the climate.

*The information available on stock status is complex.*

*The differences in the status of the fisheries off some parts of east coast of India and those in the Andaman Nicobar areas are covered in the TDA.*

*It is a commonly accepted that catch trends are not reliable indicators of stock status compared to indicators such as CPUE (that take effort into account), which Indian scientist use in their stock assessments. The synthesis also showed that Andhra Pradesh, Tamil Nadu, West Bengal and Orissa all identified overfishing (and over capacity) as major issues.*

*In 2011, the BOBLME hilsa fisheries assessment group (including scientists from India, Bangladesh and Myanmar) concluded that the current catches of hilsa are not likely to be sustainable.*

11. There is no open access per se in India as fishing is regulated by many means, such as registration, licensing, local customs and social controls.

*This is a statement*

12. Although India has been setting progressive fish production targets, these are fixed through an elaborate planning exercise involving top experts and using scientific evidences provided by research institutes. Targets are also monitored and reviewed at regular intervals. In addition, setting higher targets is also becoming possible due to scientifically justified investments in the fisheries sector through the Five-Year Plans.

*This is a statement*

13. The diesel subsidy available to fishing vessels in India should be seen in the background of the relatively higher diesel price in India compared to other countries and this high price is mainly accountable for the high duty imposed on import of petroleum. The price rise is further compounded by the unprecedented inflation in world oil price, putting the small-scale fishers in difficulty. In any case, agriculture subsidy is much less in India compared to developed countries.

*This is a statement*

14. Fishing operations are generally driven by private finance (e.g. moneylenders). There is no reason to believe that in the absence of public support, private finance would not contribute to capacity growth if the business is profitable.

*This is a statement. However, global experience, including tropical fisheries has shown that short-term gains are only possible until the point at which a fishery collapses.*

15. The TDA assesses mangrove loss of 9 percent in India against a regional average of 21 percent. However, on scrutiny it is seen that the above conclusions were made based on old information. Specific studies by the Central Institute of Brackishwater Aquaculture using time-series satellite data and GIS, clearly show that mangrove area has increased in Tamil Nadu and West Bengal.

*A major aim of the national TDA consultation was to identify data gaps and errors, and for country experts and organisations to provide new information to the TDA document. The data used in the TDA was recent data from standardised methodology using observations. Losses and gains have been included.*

16. Apart from the fact that critical habitat (mangroves, coral reefs, seagrass) are contributing to global good, their role in development of transboundary fish stocks is not properly investigated.

*Agreed - if there is more information on this please forward it.*

17. In the TDA document, 'climate change' has been used as an umbrella concept for destruction of critical habitats. However, given the global-scale of the problem and capacity of the countries concerned, the concept needs to be properly defined in the context of BOBLME to facilitate policy decisions.

*Agreed - and climate change is cross cutting for all issues (people, fish, large -scale process) identified in the TDA and needs to be considered in the SAP.*

18. The TDA observed that through various oceanic processes and weather events (e.g. cyclone), pollutants within national boundaries may assume a transboundary manifestation. Simultaneously, the TDA also rightly noted that oceanic processes and weather events may also reduce the harmful impact of pollution. However, there is not enough information on the impact of oceanic processes

and weather events (good or bad) on pollution and hence working of these channels is uncertain. The country reports commissioned by BOBLME in India and Bangladesh on pollution state that there is no evidence for transboundary impact. Thus, pollution is localized and more of a common issue, to be addressed by the countries.

*Agreed - and most pollution issues will have to be addressed by the countries. However, pollution is recognised as an issue of global significance and most effectively addressed on a regional scale.*

19. India (and presumably the other seven BOBLME member-countries) is party to many global initiatives and pollution-related international instruments where such issues are being addressed. Besides, in recent years, India has strengthened its policy and legal framework to effectively tackle pollution impacting the coastal waters. The 2011 Coastal Regulation Zone Notification is an important development in this regard.

*The TDA considers many global and national instruments. The 2011 RZN information will be added to the TDA table.*

20. As many of these global initiatives are well-established with active involvement of the countries around the globe, it is presumed that solutions from these initiatives will emerge at an earlier time-frame, which would not only be cost-effective but also beneficial at the national and regional levels. At this stage it is not clear as to how SAP's initiatives on climate change related matters will fit into this larger picture.

*Agreed- the SAP should partner other initiatives and not duplicate them.*

21. One of the major limitations of the TDA is insufficient analysis of structural and functional diversity of the sector when considering its trends and future scenarios. Relevant typological dimensions in BOBLME include: (i) scale of technology and investment separating small-scale and large-scale fisheries; (ii) business organizations, ranging from artisanal (family business) to industrial (corporate); (iii) types of jurisdiction, e.g. national (EEZs) or international fisheries, whether in two EEZs (for shared stocks), in an EEZ and the high seas (for straddling stocks), in the production chain (capture, processing and distribution), etc. Though valid across a wide range of cases, these basic typologies may disguise more complex features. For instance, bottom fish could be of low value and some pelagic fish fetch record-high prices. Some species have bottom and pelagic characteristics. Some fisheries may be both small- and large-scale. Small-scale fisheries may be technologically sophisticated and highly productive and a growing number of them export their production.

*The national plans of actions (within the SAP) will consider the above characteristics.*

22. The present-level of poverty in the BOBLME countries is linked to its colonial past and subsequent constraints in trade and economic matters. However, the TDA does not analyze whether countries are doing their best given the limited capacity or not. The problems reflected in the TDA regarding policy are global problems present both in developed and developing countries.

*The TDA now recognises the different developmental stages of the countries in the region. Future activities (e.g. the SAP - and especially the NAPs) should be based on these capacities.*

23. While the TDA is critical about the lack of political will to reduce fishing effort, it fails to realize the ground-level scenario or to factor in the larger economic situation prevailing in the countries. There is a significant level of unemployment in the primary sector and while the government has introduced new schemes to generate work at the rural level, the benefit is shared among all the primary activities. Therefore, fishers would like to stick to the profession where they have certain advantage. However, in the long-run it is possible to shift fishers from the sector through education, training and skill-building. This is already happening. Some recent studies (e.g. FIMSUL Project) have also indicated that there is in-migration from other sectors to fisheries, largely on account of labour shortage.

*The ecosystem approach to management is a framework that assist countries analyse an balance social, economic, and ecosystem costs and benefits.*

24. Regarding regional arrangements, the TDA over sighted and poorly analyzed the existing regional arrangements. The collaborative structure that was developed in the region during late 1990s when organizations decided to have specific area of work and work collectively in case of an

overlapping issue is not considered. Division of labour is followed as the best practice across the globe and it is also recognised within framework of FAO through the formal Regional Fishery Body Secretariats Network (RSN). It helps in pooling the resources and also not stalling all the process in case an organization faces difficulty.

*The role of the TDA is to provide an analysis of the issues but not the institutional arrangements. This information is needed and an analysis of the institutional arrangements as they relate to the SAP is part of the BOBLME Project.*

25. The TDA identified a set of information gaps, either actual, where information does not exist or perceived, where information exists but is not accessible. Many of these gaps exist not because of capacity but due to lack of finance. It is essential there should be a mechanism to address these gaps to maximum possible extent before formulating the SAP. Otherwise, the discussion on SAP will be information constrained and may not be optimal. In case, some of the information gaps cannot be filled up before preparation of the SAP, they should be addressed while preparing the SAP.

*Agreed- the BOBLME Project is moving to improve the knowledge base to assist the implementation of the SAP.*

26. The TDA document is largely silent on aquaculture practices in the region. Aquaculture is the fastest growing food production sector in the world, especially in the BOBLME countries. Given this, it is likely that aquatic species with farming potential will be exchanged among these countries, both formally and through unauthorized introductions. Learning from past experiences of outbreak of the epizootic ulcerative syndrome (EUS) in late 1980s and the white spot syndrome virus (WSSV) in mid-1990s in the region, these surreptitious introductions have the potential of bringing exotic diseases and pathogens and also impacting the native fauna once they enter the open waters. Therefore, it is essential that the TDA document also takes into account the transboundary movement of aquatic species and build programmes aimed at responsible transboundary movement of aquatic species during the SAP formulation stage.

*A section on Invasive species and diseases due to aquaculture has been added to the TDA.*

27. Lately, there is a concern within the GEF family on how science, especially latest scientific tools and findings are incorporated within the GEF projects and how the science produced by the project is mainstreamed. In this regard a review noted that in some cases, contemporary science is not used or gaps in scientific aspect of the project are not properly addressed. Especially, in case of LME-related projects there is a weak coverage of issues regarding invasive species and diseases, which are gaining high importance due to growing popularity of aquaculture. The review also noted the need to link science and policy and capacity building in the developing countries. While these observations are not pertaining to BOBLME TDA specifically, it is felt that by adhering to some of the suggestions, the TDA can be improved further to serve the requirements of the region.

*The BOBLME Project has a programme to strengthen the link between science and management.*

*Aquaculture and invasive species information is included in the TDA, but on balance this does not displace the existing topics and priorities*

28. The TDA has also not internalized regional/sub-regional political and economic arrangements, including presence of external nations in the region. These issues need to be taken into consideration, especially the existing regional/sub-regional political and economic arrangements.

*See point 24*

29. In conclusion, the TDA is a commendable first attempt to draw attention to the regional nature of fisheries and environmental issues. However, it is partially successful in doing so due to data vacuum and lack of clarity in understanding the nature of diversity and inter-dependency in the region. While developing SAP such partial knowledge can be detrimental. Since, the project is already at halfway mark, updating of the TDA may not be possible. However, before endorsing the TDA it is necessary that the shared and common issues are differentiated and country-level developments are brought out clearly. It is also necessary that the information gaps are filled-up to the maximum extent possible while the SAP process is underway.

*Agree- this is a regional document that cannot go down to the national level; there are data gaps which BOBLME and other partners will fill to the extent possible during the SAP development process. Climate change should be included as a major component of the TDA document. (Covered in Vol 1, Section 3.3 as driving force and also in vol 2 in several places but strengthened in the final draft)*

## Sri Lanka

### General comments

#### Institutional, legal and administrative drivers

2. The existing regulations are not properly enforced since higher authorities interfere with the enforcement of fishing laws and regulations. (covered under para 39 bullet 1)
3. Implementation of existing National Plans is poor. (covered under para 39 bullet 2)
4. There is no coordination between regional plans and provincial plans. (covered under para 37 and 41 )
5. Rules and Regulations are not enforced properly due to Political/Administrative influences. (covered under para 39 bullet 1)
6. The enforcement of laws and plans and police are slow and coordination among the different sectors is poor. (covered under para 39)
7. The policies are unstable (especially political) and changing policies with the government changes are detrimental to fishery resource management. (covered under para 41)
8. No power for local authorities. (covered in para 41 and 24)
9. The law enforcement is generally weak and there is no coordination among different agencies implementing the environmental and fisheries laws. (covered in para 39)
10. No proper monitoring system to check whether the existing laws and regulation are implemented. (covered in para 39)
11. No coordination within the relevant organizations or between sectoral agencies/departments (covered in para 39)
12. Low political priority for fisheries management. (can include a bullet in para 39, say fisheries ministries rank low among the hierarchy of ministries and departments in government structures)
13. The importance of the International agreements pertaining to protection of the marine environment was highlighted since BOBLME consist of waters belonging to eight countries and high seas of the Indian Ocean and stressed on the need for binding of all the eight countries through the relevant International agreements. (covered in para 37)

The Bay of Bengal Large Marine Ecosystem encompasses not only EEZ of the eight coastal counties but also a portion of the high seas outside the EEZ. There is not much information in the TDA about the international waters in the BOBLME outside the EEZ of the bordering eight countries and activities in this area. When a regional body consisting of eight countries is formulated, how they are going to address the issues in the high seas area needs to be mentioned.

(New sections on high seas added)

#### Overexploitation of marine living resources

14. Developed countries are using the modern fishing vessels equipped with efficient gear and preservation facilities and thereby they catch more fish.
15. No proper mechanism for limited entry /to control open access regime to fishing. (covered in para 67)

#### Degradation of critical habitats

16. Development of river catchment areas may cause sedimentation. (covered in para 101)

18. Dumping, encroachment, urbanization, construction of anchorages and harbours, sand mining, erosion, tourism development are the causes for degradation of coastal habitats. (covered in para 101)
19. Sedimentation is the highest contributing factor for coral degradation.
20. Vegetation clearances, harbour and tourism development, encroachment, mineral extraction, dam construction are the main cause for degradation of sand dunes.
21. Lack of awareness and coordination among the agencies is another major cause for lagoon degradation.
22. Although there are some protected areas they are not managed properly.(compliance/enforcement issue)
23. Coastal ecosystems are under degradation due to the development activities such as encroachment, lagoon filling, planned/unplanned and legal and illegal developments. (covered in para 101)
24. Conversion of mangroves to aquaculture farms, use as firewood, use for fencing, and use for drying, coloring of fishing nets has led to destruction/degradation of mangroves.
25. Bottom trawling, bottom set nets, dynamiting and outboard engines of the FRP boats are the causes for destruction of the sea grass. (covered in para 101)
26. The mangroves are also logged for use as firewood and extracting dyes for fish net colouring. (covered in para 186 Vol. 2)

### **Mangrove Restoration**

27. Indiscriminate planting mangroves in barrier-built estuaries and lagoons is a serious problem in Sri Lanka. This is sanctimoniously referred to as „mangrove restoration or mangrove rehabilitation“. The adverse sedimentation consequences of mangrove planting on hydrology / hydraulics and thereby on fisheries are reported in the recent document *“An Appraisal of Mangrove Management in Micro-tidal Estuaries and Lagoons in Sri Lanka”* (IUCN 2011: [http://www.iucn.org/about/union/secretariat/offices/asia/asia\\_where\\_work/srilanka/publication/](http://www.iucn.org/about/union/secretariat/offices/asia/asia_where_work/srilanka/publication/)). It is praiseworthy that a distinction between restoration and planting is included in the Draft Background document – Viz. (page 67; volume 2) *Restoration should be carried out where substrates and other conditions are suitable. Care should be taken that intertidal mudflats that never carried mangroves are not used as mangrove planting areas because they appear to be easy to plant. These mudflats themselves are important coastal habitats (Ertemeijer & Lewis, 1999) and restoration of mangroves should not be at the expense of intertidal mudflats”*. (added a sentence to para 96)

### **Introduction of invasive/Alien species**

28. Alien species has caused problems to the marine ecosystem. (covered in para 91)
29. There is no proper management system for waste disposal. Poor maintenance of treatment plants, lack of funds and absence of awareness among the stakeholders is another reason for the coastal pollution. There is no proper plan and priority given by the local authorities is low for waste disposal and they do not have funds. (covered in para 99)
30. Increasing use of manure and chemical inputs, giving subsidy, irregular poor agricultural practices are also responsible for coastal pollution.
31. Lack of knowledge and awareness about the bad habits of disposal ways and consequences of disposing materials in such way.
32. Release of untreated industrial wastes is a major issue. (covered in para 86, 87,88)
33. Plastic pollutants is one of the major problem.
34. Discharge of waste water from industries without treatment and run-off without treatment accounts for marine pollution. There is no alternative mechanism for discharging industrial water.
35. The discharge of oily engine wastes and bilge water from day-to-day boat operations is another cause for marine pollution. (covered in para 100)
36. Oil exploration in sea bed can be a threat to the marine ecosystem.

- 37. Waste/effluents from services sectors such as hospitals, Municipal councils and others are released without treatment. In some establishments they are partially treated.
- 38. Upstream agriculture causes release of pollutants to the sea. (covered in para 99)
- 39. New developments in the coastal water have created pollution problems. (covered in para 86)

**Development of TDA (Volume 1-page 7 & 8)**

1. The methodology followed in the development TDA needs to be more elaborated to indicate particularly whether the reports such as the national (country) reports and thematic papers are subject to stakeholder and fishing community consultations. (added para 10)

**Boundary and general characteristics/Scope and Characteristics (Volume 1; page 8)**

The Bay of Bengal Large Marine Ecosystem encompasses not only EEZ of the eight coastal counties but also a portion of the high seas outside the EEZ. There is not much information in the TDA about the international waters in the BOBLME outside the EEZ of the bordering eight countries and activities in this area and recommended to add more information on the high seas as much as possible. (added some information about the high seas, outside the EEZ)

4. The basis of demarcation of the boundaries of the BOBLME needs to be mentioned in the TDA. (added LME boundaries of NOAA) →

**Encroachment by Indian Trawlers/ Poaching and destruction caused by the Indian trawlers**

5. The encroachment of the sea around the Northern Province by the Indian trawlers is one of the major issues faced by the fishermen in the Northern Province. The illegal fishing by Indian Trawlers not only leads to overexploitation but also they catch juveniles indiscriminately and destroy the coral habitats. This issue needs to be highlighted in the TDA and programmes to solve this issue are expected in the SAP. (Northern (Jaffna district) Province) (Covered in para 59, 60, 64, 70). (Added para in 5.1.2)

**6. To change the information in the box appearing in page 15 of TDA volume 1 under the heading “The enforcement issue- an example in fisheries”**

The last paragraph in the above box read as “In the case of some transboundary “violations”, the introduction of lines on the water following the United Nations Convention of the Law of the Sea (UNCLOS) meant that many fishermen, who used to fish in their own backyards, were now prevented by law from fishing across the border. For example, in the Indian fishermen versus the Sri Lankan fishermen issue in the Gulf of Mannar area, both sides have a common language and long history of close contacts (and marriage links) and new solutions to the problems resulting from UNCLOS are needed.”

This paragraph appears to give a somewhat distorted picture about the Gulf of Mannar issue. Even before the introduction of lines on the water following UNCLOS, the Indian fishermen were not permitted to cross the border. Therefore it is necessary to make the necessary corrections to the above statement. (Changes made to Box 1)

**Marine related legislation of BOBLME countries (Volume 2; page 29-30)**

7. The legislation for Sri Lanka stated under Table 3.3: Marine-related legislation of BOBLME countries (Volume2; page 29-30) contains only Fisheries and Aquaculture laws published from 1968 to 2002 and four Institutional Acts. Laws on pollution and relevant other Institutional Acts are missing. Therefore, the list of legislation for Sri Lanka needs to be updated by substituting the following list of legislation.

**Table 3.3: Marine-related legislation of BOBLME countries**

**Sri Lanka (The following added)**

- 1968 (No. 15) of 1968
- 1972 (No. 15) of 1972
- 1973 (No. 15) of 1973
- 1974 (No. 15) of 1974



- 18. 1981
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#### Amended

#### Pollution (Volume 1; page 27) 70

8. Marine Transportation, Discharge of Hazardous materials and ballast water needs to be mentioned. (Eastern (B & A) Province) (covered in para 100)

**Change to the Figure 2.2 (Volume 1; page 10)** 10. It was proposed to improve Figure 2.2. (Page 10 volume 1) Distribution of (A) fisheries catch, (B) mangroves and (C) coral reefs across BOBLME countries by indicating percentage and name of the country in the sector of the pie chart where the country is being represented by the colour. (Northern Province (Mannar)) (changes done)

#### Alteration to Table 4.10 (Volume 2; page 63)

11. It shows a loss of 156% of mangroves in Sri Lanka. It should be corrected as 56.7%. (changes done)

#### Mangroves as ecosystems, and as parts of barrier built estuaries.

13. It is first necessary to make a correction to avoid aggravation of „myth-making“ about mangroves that has occurred already in Sri Lanka based on regional generalization, and without giving consideration to regional diversity. In the draft Volume 2; page 61, the case for mangroves as perceived by the author begins thus *“Few valuations of the economic value of mangroves have been conducted in the BOBLME but (Gunawarden & Rowan, 2005) estimated that the Rekawa mangrove lagoon system in Sri Lanka was worth US\$217,600 per year based on the income derived from forestry, fisheries and the services of erosion control and buffer against storms, and existence, bequest and option values to local communities”*. This statement is best deleted unless the methodology is rigorously verified. Otherwise it may represent a non-existent reality. The need for verification emerges from more responsible studies done over period spanning about two decades. The reality for Rekawa Lagoon is vastly different. It is highly degraded because of water control structures that prevent entry of tidal sea water, a causeway that impedes water flow, etc. The tidal inlet is permanently closed unless breached manually during periods of high stormwater flow. Recruitment of marine species by way of tides may occur only during such brief periods of breaching. It has a water spread of 270 ha (Ganewatte et al. 1995). It is physically difficult for it to serve as a nursery for the coastal marine fishery since the tidal connectivity is impeded. The BOBLME National Report for Sri Lanka (Joseph 2004) reports (page 47) that the number of fisher livelihoods in Rekawa Lagoon declined by 48% over a period of time (Sellamuttu 2003). In 2005 the prevailing

situation was reported in the Asia Tribune (<http://asiantribune.com/node/1221>). Today, following further decline, evidence exists that it supports a fishery for less than 10 households mainly consisting of the exotic *Oreochromis sp.* (IUCN 2006; IUCN 2011).

(Para deleted)

## Maldives

1. Participants supported the view that bait fishery has to be given special attention in the TDA. Fishermen from the north have to travel all the way south and vice versa in search of bait fish. A participant highlighted that bait fisheries has changed much over the last two decades. It has changed to a level where bait fisheries can be considered a distortion of the term as it was originally used. What is harvested as bait fish is according to his views totally different in terms of the species, as well as the methods and techniques used for capture of bait fish. He noted that pole and line fishery for skip jack tuna is no longer the main fishery in the Maldives and is replaced by the yellow fin tuna fishery.
2. Mr. Omar Manik stated that the key issue with bait fishery is that the 10 species used as bait in the Maldives are very short lived. Although bait fishery was not a major concern in the 1980s, with the increasing size of the fishing vessels and the increase in the number of vessels bait fishery has become a serious issue. (although this is an issue in resource harvesting it is not a transboundary issue in the sense of shared stocks or transboundary fishing).
3. Some participants questioned whether decline in bait fish is caused by the methods used such as lights and diving. On the other hand, some participants referred to the decline in bait fish larvae. There was consensus that more research needs to be undertaken to better understand the status of bait fishery and the challenges being faced (see above).
4. Participants expressed their concern on the increasing level of mercury detected in the Indian Ocean tuna stocks and called for enhanced research effort to determine the cause of the problem. (covered in para 131)
5. In the last two years fish catch in the Maldives has declined significantly and many fishers and vessel owners faced economic and financial challenges. Vessel owners faced payment difficulties which affected the good relations fishermen had with finance leasing companies (covered in 4.1)
6. Participants also noted floating solid waste as a major area of concern for the BOBLME. The Maldives have recently experienced periods where large container loads of waste floated within the territory of the Maldives. Such waste is a result of ships offloading containers in rough weather conditions and could have devastating consequences for fishermen, marine transport and coastal communities. (covered in 4.3)
7. In the deliberations on TDA, participants referred to the importance of both international agreements and bilateral agreements as a mechanism to address transboundary issues. In this context, participants noted the importance of cross relations with other adjacent large marine ecosystem areas (Eg: the Reunion islands). Participants also clarified the role of the Indian Ocean Tuna Commission in the context of the BOBLME project. (this is covered in para 124 and new section on the high seas)

## Appendix 3: Suggestions relevant to the SAP development

### MALAYSIA

MAJOR AREAS OF CONCERN	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES	IUU Fishing	<i>Insufficient human and institutional capacity</i> -different capacity of member countries in addressing enforcement issues. For Malaysia, the problem is not so much because of weak enforcement but rather due to lack of capacity.	<i>Resources management</i> -The meeting recommended that Malaysia proposed Pulau Langkawi( which include Pulau Payar Marine Park ) as one of the sites for a pilot project in the BOBLME Programme
DEGRADATION OF CRITICAL HABITATS			
POLLUTION	. Impact of Harmful Algal Blooms (HABs)-Red Tide phenomena		To be included in the TDA (and SAP)

## THAILAND

MAJOR AREAS OF CONCERN	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES			<p><b><i>Institutional Arrangements</i></b></p> <p>-The Department of National Park, Wildlife and Plant Conservation should be added as one of the institutes that are responsible for environmental and marine concerns among the countries in Bay of Bengal in part of Thailand. This is because the main marine resources such as coral reef and seagrass beds exist in the area under the responsibility of the National Park Department</p>
DEGRADATION OF CRITICAL HABITATS		<p>In relation to marine pollution problem issues, organizing related to tourism activities and marine aquatic food processing should be added as causes of the marine pollution problems.</p>	<p>-According to the transboundary diagnostic analysis in Thailand, the problems should be analyzed and ranked for their significances and urgency.</p>
POLLUTION		<p>- marine national park conflict with the coastal fishing communities.</p> <p>The current laws of the national park act do not allowed fishing in the national park boundaries.</p> <p>The nomination of the World Heritage Areas</p>	<p><b><i>Joint Resource surveys and assessment (Regional Fish Stock and Ecosystem Assessments)</i></b></p> <p>-Thailand and this region still lack of knowledge about the sea bed ecosystem at a deep sea level up to hundreds feet. For example: sponge ground and a pinnacle area which is fishing grounds of large trawling and has been heavily utilized. Therefore, it is possible that the marine ecosystem in this area may be in a serious degeneration which needs to be studied on its present conditions in all aspects, in order to apply the obtained knowledge for further management</p> <p><b><i>Communication, Information, Education and Awareness</i></b></p> <p>-The problem of political influences, and immoral, dishonest and corrupted politicians, has the root of problem from people. This is because the people like to elect the politicians who are the same as them without proper decision. Therefore, the change should be started from the people by raising their awareness and having proper voting.</p> <p>-The knowledge and the awareness on the benefits of resources</p>

		<p>may increase more conflict with the local fisheries.</p>	<p>conservation should be informed to villagers, concretely, as well as, it is a breeding ground and nursery area of the aquatic animals for the fishermen. Subsequently, the villagers would be more understandable and cooperate for the conservation because they are directly obtained the benefits.</p> <p>-The BOBLME can provide support for the management of coastal communities such as awareness program, coastal zone management preparation and education program to local communities and schools.</p> <p><b><i>Regional Cooperation</i></b></p> <p>- In case of the arrest of fishing boats at the border areas between countries, there should be an agreement on a clear criterion for the arrest, including the concern on two-nations ships. Accordingly, it is suggested that the BOBLME project should take part in cooperating with the agreement between the countries.</p> <p><b><i>Legal Framework</i></b></p> <p>-Regarding the issue on conflicts between communities and national parks, although some areas might have been utilized by villagers before the announcement of establishing a national park, however, when it becomes a national park, the management should rely on a conservation dimension along with the utilization. Thus, in the future there should be the creating of a proper regulation for sustainably utilization of natural resources.</p> <p>-The revision of rules for fishery utilization should be revised in a certain area by holding to a principle of the permission according to season, period of fishing, types of tools to catch aquatic animals, and kinds of permitted aquatic animals for catching.</p> <p><b><i>Capacity building and institutional strengthening</i></b></p> <p>-Local agencies at sub-district, provincial, and group of provinces levels want to make a coastal resources management plan for their own areas which is already under a budget allotment. However, they still lack of organizations or agencies which are specialized in natural resources management to collaborate in this task.</p>
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			<p><b><i>Co-management</i></b>  -The announcement of protected area may increase conflicts between villagers and government officers. Thus, the effective resources management should allow the resource's users to be the owner of the resources because if they feel that they are co-owners, they would have more involvement in the conservation.</p> <p><b><i>Legal Framework</i></b>  -In addition, there should be a support law for the communities in order to keep benefits of their resources in their own areas.</p> <p><b><i>Ecosystem Management</i></b>  -The marine coastal ecosystem conservation should be started from the upper water shade areas because it will continually impact to the end of the river, that is, the coastal ecosystem.</p> <p><b><i>Pilot Projects</i></b>  -With respect to the BOBLME project, it was suggested that there should be a pilot project in the concerned area to concretely see how it works. The meeting has proposed the area of Tha-Jeen canal in Phuket province where there are still a lot of garbage in the canal due to the community along this canal bank still lack of a good awareness for the garbage management and often throw the garbage into the canal. For example: there might be an initiated project by using EM Ball and the campaign for not throwing garbage in to the canal, in order to restore the water quality in Tha-Jeen canal.</p> <p><b><i>Building Capacity/ Mechanisms for information exchange</i></b>  -The BOBLME project would be a great opportunity for creating networks in order to exchange and learn the ways to manage the ecosystem between nations in the Bay of Bengal such as the ecosystem management of the seagrass beds and coral reef in Thailand.</p> <p><b><i>Stakeholder Participation</i></b>  Mr. Tanoo Nabnian (local NGO in Phuket) provides information that, in</p>
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			<p>general, the local NGOs and local communities in the coastal area of the Andaman Sea have agreed with the nomination of the Andaman Sea Nature Reserves to the World Heritage committee. During the management plan preparation, the researchers have many meetings with local communities.</p>
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MAJOR AREAS OF CONCERNS	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERNS	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
<p><b>OVER EXPLOITATION OF MARINE LIVING RESOURCES</b></p>			<p><i>Joint Research/surveys/studies (Joint fish and productivity surveys and assessments)</i>                      -To conduct comprehensive and continuous researches on marine environment and living resources in the region</p> <p><i>Monitoring/Surveillance</i>                      -To monitor national and regional fishing capacity to determine rational fishery exploitation and to mitigate over investment leading to over fishing.                      - GIS and GPS should be compulsory for SME fishing vessels in MCS mechanism in member countries.</p> <p><i>Climate change</i>                      -To study and evaluate the climate change impact on transboundary issues.</p> <p><i>Regional Cooperation</i>                      - To seek cooperation among member countries in eco-friendly small-scale aquaculture, agriculture, community forest and other alternative livelihoods for artisanal fishery communities to reduce pressure on coastal capture fishery.                      -Execution of relevant legislation, regulation and directives should be cooperated among member countries if necessary when out of national jurisdiction particularly in transboundary issues.                      -Since commercially important fish stocks such as mackerel, sardine and hilsa are highly migratory in habit and their habitats are more or less transboundary, a broad understanding of their straddling nature and mutual coordination and close cooperation among neighbouring countries are crucial for rational exploitation and responsible management of the</p>

			<p>resources.</p> <p><b>Planning</b> -Plan of action should be formulated and implemented collaborating with member countries to prevent, deter and eliminate IUU fishing in the region.</p> <p><b>Management</b> -Migratory species such as mackerel, tuna, sardine, hilsa, shark, etc. should be prioritized in transboundary fishery management.</p> <p><b>FAO Code of Conduct for Responsible Fisheries</b> (7) To handle environment and fisheries related transboundary issues, the FAO Code of Conduct on Responsible Fisheries should be followed.</p> <p><b>Capacity Building</b> -Furthermore thorough public awareness and participation among coastal community are of prime important and could be achieved through the development of appropriate training and information transfer projects implemented by adjacent countries.</p>
<p><b>DEGRADATION OF CRITICAL HABITATS</b></p>			<p><b>Regional Co-operation</b> -Integrated coastal zone management system among member countries should be developed by mutual coordination with relevant government institutions, industries, NGOs and local communities. -Establish regional regulations for marine ecotourism in compliance with relevant laws. -Closely coordinate among member countries to make appropriate plans for MPA, artificial reefs and fish refugia in stragglings, contiguous and regional areas and to combat illegal trade of prohibited products from MPA.</p> <p><b>Joint Research/surveys</b></p>

			<p>-Promotion of region wide joint research on hydrographic conditions, marine habitats and their biodiversity.</p> <p><b>Capacity Building</b></p> <p>-Promote collaborative training and education schemes on sustainable use and conservation of natural coastal resources.</p> <p><b>Management</b></p> <p>-Enhance the livelihood of Moken people without adverse impact to their tradition.</p> <p>-Establishment of appropriate Marine Protected Areas MPA eg. coral reef, sea-grass, mangrove, turtle banks in the local and region to protect the fragile aquatic environment.</p> <p>-Restoration of deteriorated marine habitats, degraded mangrove forests and replenishment of depleting fish stock at different level in the region.</p> <p>-Demonstration on use of under utilised resources without damaging habitats and it's ecosystem in the region.</p>
POLLUTION			<p><b>Regional Co-operation</b></p> <p>-Exchange, cooperation and coordination among laboratories of member countries and materials and technical support from regional and international agencies</p> <p>-Data buoy and information network should be set up in the region for natural or manmade disasters and pollutions.</p> <p><b>Joint surveys</b></p> <p>-Regular and ad hoc oceanographic survey and pollution monitoring program should be conducted through collaboration in the region.</p> <p>-Experiences on risk reduction and rehabilitation measures of the disasters should be shared among member countries.</p> <p><b>Balanced habitats for sustainable ecology and environment</b></p>

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			<ul style="list-style-type: none"><li>-Develop and strictly follow regional Good Aquaculture Practices (GAP) regulation and standards in aquaculture</li><li>-Upgrading of antipollution practices and sanitation measures at selected coastal areas and marine environment in the region.</li></ul>
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## BANGLADESH

MAJOR AREAS OF CONCERN	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES	BOBLME is a disaster prone area (natural and anthropogenic).		<p><b>Improving predictability of extreme events</b>  <i>Monitoring and assessment</i>            -Natural disasters like cyclones, tsunami, storm surges, earth quakes should be monitored; and damage assessment study would be necessary with other BOBLME countries.</p> <p><i>Planning</i>            -Need regional (BOBLME &amp; SAARC Countries) action program for possible mitigation measures (NF Comments).</p> <p><i>Development of environmental early-warning system</i>            -Buoy should be set up (in some selected sites throughout the BOBLME) for operational monitoring of Oceanographic data.</p> <p><b>Climate change and sea level Rise</b>  <i>Monitoring</i>            -Regional monitoring program on: a. Climate Change and Sea level Rise issue for BOBLME countries (specifically the vulnerability of the low lying large coastal area of Bangladesh and Maldives);</p> <p><b>Public Awareness, Communication and Education/ Mechanisms for knowledge and information exchange</b>            -Need cooperation, training, capacity building, exchange of data on oceanography, threatened habitats, transboundary marine pollution and pollutants among the BOBLME countries.</p> <p><i>Joint Research under Regional co-operation</i>            -Promotion of research and knowledge-based actions to monitor impacts of climate change based on indicator species such as the Gangetic Dolphin, fish resources-habitats-climate change impacts. Partnerships with other</p>

			<p>international and national organizations would be imperative to develop such mechanisms.</p> <p><b>Planning</b>  <b>Regional Plan of Action (RPOA)</b> to promote Responsible fishing practices including combating IUU, MCS fishing in the region (BOBLME</p> <p><b>BOBP/Rep/110</b>  For fishery resource management in BOBLME countries, recommendation in BOBP/Rep./110, 2008) may be considered.</p>
<b>DEGRADATION OF CRITICAL HABITATS</b>		<p>Literature and interventions are still lacking in detailed fishing practices linking to the health of the Sundarbans forests.</p>	<p><b>Studies through regional co-operation</b></p> <ul style="list-style-type: none"> <li>-Status of Mangroves, its biodiversity and other relevant issues of Bangladesh may be reviewed through study nationally and through regional cooperation to know the present status.</li> <li>-The status of endangered biodiversity of the ecologically sensitive area (ESA's) and the only coral belonging island of Bangladesh (St. Martin's Island) should be studied thoroughly (along with the area covered by corals) for national/regional significance in cooperation with other coral reefs country of the BOBLME.</li> <li>-The sea grass area in the coastal area of Bangladesh should be identified in detail and need to be protected because of its significance in fishery production, nursery ground, nutrient suppliers and also for considering it as a transboundary degraded habitats in BOBLME (NF comments)</li> <li>-Shoreline changes (accretion and erosion) of our coast should be updated</li> <li>- St.Martin's coral Island &amp; its biodiversity needed to be studied thoroughly.</li> <li>-Need to be studied for identify the area covered by sea grass meadows in Bangladesh for management (transboundary significance).</li> </ul>

	Dwindling status of the Sundarbans species	-lack of monitoring, control, surveillance and enforcement	<p><b><i>Environment friendly and social responsive shrimp farming</i></b> Environment friendly and social responsive shrimp farming would be necessary.</p> <p><b><i>Mangrove replantation</i></b> -Intensive coastal afforestation and conservation being needed</p> <p><b><i>Traditional Practices</i></b> -Despite the protected/reserve status of the Sundarbans, fisheries and associated fishing practices require appropriate measures to foster traditional practices with sustainable management of fisheries resources.</p> <p>-Deploying effective strategies have become urgent to prescribe changes in customary fishing practices and use of certain economic instruments (e.g. revenue collection system based on quota/volume, land use charges etc.) to limit or control for fisheries resources conservation.</p> <p><b><i>Co-management</i></b> Promotion of co-management across the borders and for local fishing communities would be vital to share benefits and concerns.</p> <p><b><i>Regional Cooperation</i></b> -Transboundary cooperation to understand the current status of coastal and marine species in the Sundarbans is necessary -Need regional cooperation &amp; international support (e.g BOBLME/ SAS/ GCRMN) to assess the overall status of corals in St. Martin's Bangladesh</p> <p><b><i>Information exchange/sharing</i></b> -Joint cooperation between the countries is needed to share information to prescribe changes/solutions and understanding the 'value of the Sundarbans resources -In addition to recommendation of the shoreline changes, siltation, accretion and salinity problems, IUCN recommends transboundary</p>
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	<p>-unprecedented losses in breeding and survival of mangrove and coastal species including amphibians, reptiles, cetaceans apart from other fish in Sundarabans</p> <p>-Micro-habitats are severely disturbed</p>		<p>cooperation on updating current information on dynamic water regimes with the impacts on fish and aquatic species of Sundarbans. BOBLME could expedite the process of information sharing.</p> <p><b>Joint surveys/studies</b></p> <p>-In particular, fish or other aquatic species movement/tracking, migration, breeding, abundance/distribution should be studied. This again, should ideally differentiate between – i) scale of commercial use, ii) species in need for conservation and protection, and iii) degrading habitats where commercial and other types of harvests or agriculture could be limited or have regulated access.</p> <p><b>Management</b></p> <p>-Need for BOBLME transboundary intervention in the Sundarbans.</p> <p>-Species highly associated or dependent on fish and aquatic resources of the forest could be identified for joint conservation management at the ecosystem level instead of providing piecemeal solutions to conserve a particular species in any vulnerable area or biodiversity hotspots across the Indo-Bangladesh borders.</p> <p>-Identify cost-effective and sustainable harvest mechanisms without compromising the need for protection of species and/or habitats in the Sundarbans.</p> <p><b>Mangrove Replantation</b></p> <p>Intensive coastal afforestation should be based on ecosystem-approach and mangrove species diversity with emphasis on tidal mudflat restorations, conservation of breeding grounds etc.</p> <p><b>Monitoring</b></p> <p>Monitoring species status of mangroves and comparison with management status of the same.</p>
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			<p><b><i>Eco-tourism</i></b> Other commercial activities such as tourism, an important revenue-collection vehicle, should be addressed for critical habitats in the Sundarbans with clear guiding principles and rules of practice.</p> <p><b><i>Institutional Arrangements</i></b> Institutional analysis for joint cooperation for protection of the Sundarbans resources should be addressed holistically and thereby, identify gaps and mechanisms in existing institutions which caused impediments in building joint efforts in the region.</p> <p><b><i>Economic Assessments</i></b> Establish ecological criteria-based assessment for economic activities in the Sundarban for better monitoring and conservation of the natural forest.</p> <p><b><i>Information Collection</i></b> Information from satellite data should be considered nationally and then regionally</p>
<b>POLLUTION</b>			<p><b><i>Monitoring of pollution</i></b> -Internal and External sources of pollution, such as dumping of wastes, oil spills, ship breaking should be monitored. -Persistent (e.g. POPs, PTS's, PAHs, TBTs etc.) and organic pollutants (untreated sewage matters, DOM, SPM etc.) should be monitored -Monitoring of transboundary pollutants will enable us to identify the “<b>hot spots</b>” surrounding the coastal area of the BOBLME for both regional and national management.</p>

## INDIA

MAJOR AREAS OF CONCERN	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES	<p>-fishers from other countries in the region to the shared fish stocks, A&amp;N region stands to suffer</p> <p>-Nutritional and economic benefits accrued to the poor through subsistence fishing should not be ignored.</p> <p>-Catching of turtles by trawlers as well as the local communities</p>	<p>open access</p> <p>-The existing regulations for using TEDs are not enforced well and the system of certification to its compliance is flawed.</p>	<p><b><i>Small scale fishermen</i></b> -While harmonising the fishing and environmental conservation, interests of small scale fishers who depend solely on fisheries need to be protected. Rehabilitation process, if any, needs to match the skill of the people and their aspirations.</p> <p><b><i>Resources Management</i></b> -Controlled breeding, culture and trade of groupers and marine ornamental species need to be encouraged in order to ease pressure on natural populations of these fishes. -Development of aquaculture by involving entrepreneurs can be used a means to increase production and thereby reducing over-exploitation of natural fish stocks -The policy on sea cucumber needs be reviewed by allowing its breeding and culture in controlled conditions in view of the high market demand</p> <p><b><i>Turtle conservation</i></b> While creating awareness among the local tribesmen about the need to conserve turtles, their dependence on turtles from livelihood, food and culture angles needs to be recognized and addressed.</p>

	<p>-Poaching of fish and damaging the ecosystem.</p> <p>Dangers encountered by Fishermen going to waters of the neighbouring countries</p> <p>-Although purse seines are banned, these are being used clandestinely by unregistered fishers.</p> <p>-depletion of stock,</p> <p>-untapped Tuna</p>	<p>-Local communities continue to catch turtles mainly due to ignorance of conservation norms</p> <p>-Foreign fishing vessels who enter the territorial waters of the country in the Andaman</p> <p>-Fishermen are forced to go beyond the territorial waters because of declining catches in the shallow areas.</p> <p>-Too many unregistered boats are operating in the coastal waters which contribute to over-fishing.</p> <p>-Small fishes are caught in large numbers</p>	<p>-As these violations are often driven by livelihood and food and issues; they need to be treated more humanely.</p> <p>- need for effective control regimes and conservation norms.</p> <p><b>Joint Research</b> This needs to be ascertained and scientifically established before fixing country quotas, if any, for mackerel and hilsa.</p> <p><b>Fish Stock Assessment</b>-There is a need to assess the catchable fish stock beyond 50 m depth.</p>
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	<p>-Uneconomic Fishing operations</p> <p>-Concern about trawlers from overseas that fish in Indian waters even during the ban period.</p>	<p>- Indian fishers do not have any specialized gear for catching tuna. The existing incentives for taking up tuna long lining are not implemented effectively.</p> <p>-Fish stocks exploited by different countries are not necessarily drawn from a common pool. It could well be different stocks.</p> <p>-Trawling is not economically feasible here due to high fuel cost</p> <p>-During the ban period, traditional vessels are allowed to operate. But, in the name of country vessels, large boats operate trawl nets, thus defeating the purpose of fishing ban.</p> <p>-Increasing motorization leads to loss of livelihood to those operating traditional non-mechanised vessels</p>	<p><b><i>New Fishing Grounds</i></b> Good fishing grounds are known to exist at 200 – 400 depth, between Mahabalipuram and Karaikkal, but scientific studies are needed to confirm this.</p> <p><b><i>Introduction of Economically viable harvesting methods</i></b> perhaps long lining can be tried.</p> <p><b><i>Uniformity in seasonal banning</i></b> Seasonal ban on fishing needs to be followed uniformly by all countries in order to be effective and fair to the countries that follow the ban.</p> <p><b><i>Increasing production</i></b> Sea ranching of depleted species and sea mouth deepening/widening/dredging need to be considered as options for increasing production and conserving the threatened species.</p> <p><b><i>Protection of Undepleted fishing Resources</i></b> Undepleted fish resources should be protected from overfishing.(Off Nagapattinam, Karaikkal and Pondicherry, good potential for deep sea lobster exists up to 500 metres. Similarly, Puducherry is good for hammer-head sharks and long tail sharks. Good tuna fishery is possible from Visakhapatnam to Sri Lanka.)</p> <p><b><i>Punishment</i></b> Stringent punishment including prosecution should be meted out to the boat owners who catch sea cucumbers at sea and bring them ashore.</p> <p><b><i>Resource Management</i></b> -LoP is a major source of IUU and the permits issued to big</p>
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	<p>-over-exploitation of Fish resources</p> <p>-Overfishing</p>	<p>Fishing fleet operating under Letter of Permission (LoP), leads to IUU and irrational fishing practices.</p> <p>-Unselective fishing practices and gear; - Illegal, unregulated and unreported (IUU) fishing. - Excessive fishing effort and overcapacity of fleets in the Bay of Bengal</p> <p>-Collection for fish/shrimp juveniles and eggs from the wild for aquaculture purposes is a major cause of decline in catch. Capture of tiger prawn for brood stock also depletes the stock</p>	<p>companies should be scrapped.</p> <p>-Fishers and their organizations should take lead in setting norms voluntarily in restricting the fishing fleet, emulating the practice being followed in Gujarat and other States.</p> <p><b>Banning of destructive fishing methods</b> -Destructive fishing methods including multi-day fishing and ring nets need to be banned.</p> <p><b>Shrimp farming/good practices</b> Use of hatchery-bred brood stock and seed should be encouraged for shrimp aquaculture.</p> <p><b>Closed seasons</b> -All boats except the country crafts like catamarans should be banned during the 45 days of closed season. -Closed season should be applicable uniformly in all BOBLME countries in order to be fair to the complying countries.</p> <p><b>Livelihood</b> Livelihood issues of fishers should be addressed ensuring better quality of life and decent income.</p> <p><b>Bilateral Agreements</b> Bilateral agreements need to be worked out between member countries to prevent harassment and ill treatment and death of fishermen trespassing into the territorial waters of other countries.</p> <p><b>Offshore fishing</b> There should be emphasis on development of alternate skills, especially in offshore fishing to achieve sustainability.</p> <p><b>Open Access</b></p>
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	<p>-Fishing becomes unviable for boat operators.</p>	<p>-Use of ring nets and catching of <i>gunda chapalu</i> are detrimental to sustainable fisheries          - Excess number of trawlers, presence of ring nets, bottom trawlers and operation of nets without mesh regulations are the major causes of overexploitation.          -Implementation of existing regulations to prevent overfishing is poor.</p>	<p>Free access for fishing should be stopped.</p> <p><b>Fishing boat Registration</b>          The procedure followed in registering fishing boats needs to be reviewed</p> <p><b>Restrictions on harmful fishing gear</b>          -These need to be restricted.</p> <p><b>Management</b>          - Further addition of fishing craft to the existing fleet should be stopped. When a new boat is added, one should be scrapped.</p> <p><b>Fishermen's Interest</b>          Fishermen's interest needs to be recognized while planning development projects in coastal areas.</p> <p><b>Policy Harmonization</b>          States and Provinces within a country should harmonize policies before attempting this at an LME scale.</p> <p><b>Uniformity of closed seasons \</b>          Closed season should be applicable uniformly in all BOBLME countries in order to be fair to the complying countries.</p> <p><b>Assessment of Fishing Effort</b> There is a need to scientifically assess the optimum fishing effort in the form of number of trawlers, gill nets and traditional nets that can be operated on a sustainable basis. This method should be uniformly followed by across all the BOBLME countries.</p> <p><b>Offshore Fishing</b> There should be emphasis on development of alternate skills, especially in offshore fishing to achieve sustainability.</p> <p><b>Fishing effort</b>          Further increase in fishing effort needs to be restricted, but this has</p>
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		<p>-Over capacity of fishing units in the region.</p> <p>-There is overfishing within 12 nautical miles, which makes fishing operations un-remunerative. This forces fishers to go out into the deeper areas. There is higher catch potential in EEZ and that is why fishers from other countries come there to fish causing over- exploitation of fish stocks</p>	<p>to be done collectively by the different countries on agreement.</p> <p><b>Uniform Implementation</b> -The State of West Bengal has imposed restrictions in hilsa fishing during breeding season <i>i.e.</i>, from 1 March to 15 June to augment natural recruitment of hilsa population. The State has also initiated a number of other steps to prevent over exploitation. But, these steps will be meaningful only if implemented uniformly by all member countries in the BOBLME project.</p> <p><b>Mesh size Regulations</b> Stricter implementation of existing regulations on mesh size is needed to check irrational fishing methods like use of mosquito net, monofilament and other small mesh nets.</p> <p><b>Lop</b> -scrapping of LoP</p> <p><b>Management of Bottom Trawling</b> Bottom trawling needs to be banned in India. If allowed, it should be with the condition that small fishes should be thrown back into the sea. However, livelihood issues should be addressed, when fishers are thrown out of employment due to such bans.</p> <p><b>Shrimp farming/Aquaculture</b> Aquaculture sector should be encouraged to use only hatchery bred seed.</p> <p><b>Rewarding</b> Countries that follow sustainability norms contribute to global public goods and the benefits of these acts accrue to a large section of people in the region and the world at large. Therefore, those who follow the norm need to be rewarded on lines of carbon credit.</p> <p><b>Bilateral agreements</b> - Bilateral agreements need to be worked out between member</p>
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	-Adverse impact on biodiversity	<p>-due to bycatch loss</p> <p>-LoP has been recognized as major source of IUU</p> <p>-Wild seed catch of shrimp and fish seed affects the population and causes biodiversity loss through bycatch losses.</p>	<p>countries to prevent harassment, ill treatment and even death of fishermen trespassing into the territorial waters of other countries. These agreements about treatment of fishermen should be respected.</p>
<b>DEGRADATION OF CRITICAL HABITATS</b>	-Loss of coral reefs is a matter of great concern for the A & N region as this forms the habitat for a number of fish species.	-The recent unprecedented spate in coral bleaching, which resulted in bleaching up to 60-80% is accountable to global climate change. The problem is further confounded due to the slow rate of regeneration due to algal infestation.	<p><b><i>Mechanisms for information exchange</i></b></p> <p>- The Workshop expressed a need for better coordination, synergy and networking among various research projects on mangroves and coral reefs in the country in particular and the region in general for improved sharing of knowledge and benefits from research.</p> <p><b><i>Sustainable utilization</i></b></p> <p>There is a need to approach mangrove conservation from a different angle. Instead of attempting to leave all mangroves untouched, possibilities need to be explored to allow utilization of fishery resources without damaging the mangrove wealth.</p> <p><b><i>Livelihood of Local people</i></b></p> <p>While conserving mangroves, livelihoods of the local people who</p>

	<p>-17% of the mangroves in India are located in the A &amp; N region and these are very vital for conserving the islands' fishery resources.</p> <p>-damaging coral reefs</p> <p>Damage to Ecosystem</p> <p>-depletion of mangroves and other critical habitats -The shrinking Kakinada bay and the resultant habitat loss is a matter grave concern.</p>	<p>- Poachers from other countries indulge in dynamite fishing in Indian waters destroying the ecosystem, especially by</p> <p>Tourism development, if not done on a sustainable basis,</p> <p>-Dwindling river flows into coastal waters</p> <p>Degradation and loss of mangroves are attributed to conversion for aquaculture, salt production, expanding coastal areas for industry, human settlement, tourism,</p>	<p>live traditionally on the natural resources in the mangrove areas should be protected.</p> <p><b>Alternative Employments</b></p> <p>- Development of new technologies and adoption of existing technologies like rearing of ducks and fodder growing in saline areas can be considered.</p> <p><b>Planning</b></p> <p>Sea routes for tourists and coral viewing need to be planned more carefully to protect ecosystems</p> <p><b>Replantation Programme</b></p> <p>-Afforestation programme should be a considered as an option to mitigate the loss.</p> <p><b>Awareness Programmes</b></p> <p>Awareness programmes are needed to make people aware of conservation needs.</p> <p><b>Mangrove replanting</b></p> <p>-Mangrove nurseries for plantation need to be developed in all countries like ornamental fish breeding.</p> <p><b>Conservation</b></p> <p>-Conservation and sustainability norms will be meaningful only if</p>
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	<p>Shorelines are reduced depriving fishers enough shore length for operating long shore seines (<i>pedda vala</i>) and enough beach space for drying fish.</p> <p>-depletion of mangroves and other critical habitats</p> <p>-Interests of the traditional fishers tend to be ignored</p>	<p>unsustainable logging, destructive fishing practices, coral bleaching, oil spillage and sand mining</p> <p>-due to tourism and industrial development,</p> <p>-Dwindling river flows into coastal waters cause</p> <p>-While seeking trade-offs between environmental norms and genuine development/livelihood issues, , as they are not empowered and not visible as a genuine stakeholder.</p> <p>-While setting norms for Marine Protected Areas, genuine needs of the fishers are not taken on board. Rights of traditional</p>	<p>they are followed uniformly by all member countries.</p> <p><b>-Alternative Livelihoods</b> Opportunities for alternate livelihood should be explored when pursuing sustainability goals.</p> <p><b>Integrated Coastal Zone Management project</b></p> <p>-Integrated Coastal Zone Management project sanctioned by World Bank cover 80 villages and 600 SHGs. This model needs to be tried on a wider scale.</p> <p><b>Rewarding the people</b></p> <p>-Orissa has maximum shoreline under protection including turtle breeding areas. There should be a system of rewarding the people of Orissa for following conservation norms, which contribute to a substantial global public good.</p> <p><b>Turtle conservation programme</b></p> <p>-Turtle programme area should be properly demarcated and explained to fishers.</p> <p>-Tradition fishermen should be compensated for loss due to turtle ban. Alternate livelihood to be given matching with their skills</p> <p>-Orissa is fulfilling an international obligation by following turtle protection measures at the coast of fishers' livelihood sometimes up to 9 months. This needs to be recognized and compensated.</p> <p>-Present turtle conservation norms need to be reassessed periodically to ascertain whether the current measures are very effective.</p> <p><b>Awareness and Education</b></p> <p>There is a need to educate fishers about trawler ban concepts and to educate the trawler and other vessels crew on security concerns.</p> <p><b>Conservation of River stretches</b></p> <p>Higher attention is needed on conservation in river stretches and</p>
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	<p>-Sea grass is important as breeding ground for fishes.</p> <p>-In Gulf of Mannar, two islands disappeared</p> <p>- Mangrove loss</p>	<p>fishers are often violated and they are even stopped under section 144.</p> <p>-Man-made destruction of mangroves for habitation, ports and industrialization continues unabated.</p> <p>-these are destroyed by trawling; sometimes turtle is eating/destroying sea grass.</p> <p>due to exploitation of corals for lime industry.</p> <p>- due to loss of habitat through low freshwater flow and pollution. They are destroyed for industries, habitation and brackish water aquaculture farms. Mangroves are also damaged through shipping</p> <p>-Private harbours pose the</p>	<p>their catchments that impact the coastal ecosystem.</p> <p>.</p> <p><b>Conservation</b> A 35 km stretch of boarder between Bangladesh and India border to be de-silted and conserved.</p> <p><b>Protected area</b> Boundaries of protected areas need to be clearly defined and marked. Access to mangroves areas for fishing needs to be allowed</p> <p><b>Mangrove re-plantation</b> Mangrove re-plantations activities need to be taken up jointly by India and Bangladesh in Sunderbans.</p> <p><b>Harbour Development</b> New harbours should be discouraged.</p> <p>.</p>
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		danger of converting the coastal areas into concrete jungles	
<b>POLLUTION</b>	<p>unique problem in waste disposal</p> <p>Development of fish processing is also slow</p> <p>Ballast water pollution transferring pollutants and exotic species across countries and regions</p>	<p>On the one hand, wastes cannot be dumped into the seas; at the same time, there is severe shortage of land to create waste disposal systems. (Absence of dumping sites)</p> <p>problem of waste disposal.</p> <p>-Industries do not follow the norms for treating effluents -Polluting industries are allowed to establish their units near the sea and during public hearing they often mislead/influence the local people through unfair means.</p> <p>-Untreated sewage is a main source of pollution in coastal sea waters.</p> <p>-Industries do not follow the</p>	<p><b><i>New Technologies</i></b> New technologies for safe and economic waste management are needed along with resources/capacity to access them. <input type="checkbox"/> While creating awareness among the local tribesmen about the need to conserve turtles, their dependence on turtles from livelihood, food and culture angles needs to be recognized and addressed.</p> <p><b><i>Best Port Management Practices</i></b> Existing "Best Port Management Practices" protocols need to be implemented more effectively.</p> <p><b><i>Enforcement</i></b> -government machinery needs to enforce these norms more effectively.</p> <p><b><i>Harmonization</i></b> -Norms for setting up industries along coastal region and the effluent treatment norms should be uniform across the eight BOBLME countries, in order to be fair to the countries that comply with norms.</p> <p><b><i>Harmonization</i></b> Norms for setting up industries along coastal region and the effluent treatment norms should be uniform across the eight BOBLME countries, in order to be fair to the complying countries.</p>

	<p>Factory effluents from Tirupur adversely impact the fish stock</p> <p>-Climate change and its various manifestations are fast emerging as a major trans-boundary issue</p>	<p>norms for treating effluents and government machinery is not effective in enforcing these norms.</p> <p>-Polluting industries are allowed to establish their units near the sea and during public hearing they often mislead/influence the local people through unfair means.</p> <p>-Untreated sewage is a main source of pollution in coastal sea waters.</p> <p>- Factory effluents from ONGC, other petroleum-based units and power plants are sources of pollution that adversely impact the fish stock.</p> <p>-CRZ regulations up to 500 m limit are not strictly followed. Chemical factories still discharge effluents into the seas.</p> <p>-Inadequate valuation tools often leads to a situation where the real value of ecosystem services that support fishers' livelihoods are not reflected in EIA process.</p> <p>-Untreated effluents, polythene</p>	<p><b>Common EIA</b> All BOBLME countries need to follow common EIA protocols. EIA should take into account the concern of fisheries sector.</p> <p><b>Pollution from ring seines</b> Problems from land-based pollution and oil pollution from ring seines, need to be addressed.</p> <p><b>Beach conservation</b> - Beach conservation should receive priority.</p> <p><b>Policy Harmonization</b> -Policy harmonization among states within the country should precede any attempt to achieve policy harmonization at regional level.</p> <p><b>Fishermen's interest</b> -Fishermen's interest needs to be recognized while planning development projects.</p> <p><b>Coordination</b> -Better coordination needed between security agencies and agencies dealing with environmental/fishing. The security agencies need to be informed about the conditions under which offenders can be apprehended at sea.</p> <p><b>Alternative Employment</b> -Regulation needed to engage fishers as life guards in tourism centres as alternate employment. Training needed in life guarding.</p> <p><b>Planning of Pollution Control</b> Pollution abatement activities in coastal areas need to be linked with the National River Action Plan.</p>
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		<p>and non-bio-degradable substances are released into the sea, mainly due to tourism sector (Puri alone receive 50 lakh tourists);</p> <p>-Absence of scientific data to quantify pollution from effluents carried from rivers and impact from sand mining</p> <p>-A number of new thermal and nuclear power plants are proposed, which pose serious threat of pollution in the coastal areas.</p> <p>-Intensive aquaculture is a major source of pollution.</p> <p>- Toxic ship breaking and deliberate sinking of ships are a source of pollution</p> <p>-All kinds of industries cause pollution -not only the small industries. Necessary amendments are needed in the TDA document.</p> <p>-Ports are a major source of pollution</p>	<p><b>Control of power plants</b> Such power plants should be discouraged.</p> <p><b>Aquaculture</b> Aquaculture should be practiced in low scale to reduce risk from nutrient loading and toxicity.</p> <p><b>Pollution from fishing boats</b> Pollution from dumping of unused fish and fish wastes from trawlers and factory ships is to be addressed.</p> <p><b>Best Port Management Practices</b> -Best port management norms including ballast water release need to be implemented strictly.</p>
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## SRI LANKA

MAJOR AREAS OF CONCERN	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES	-Decline of fish resources in the EEZ of the BOBLME countries	<p><b>Institutional, legal and administrative drivers</b></p> <ul style="list-style-type: none"> <li>- Existing regulations are not properly enforced since higher authorities interfere with the enforcement of fishing laws and regulations.</li> <li>-Implementation of existing National Plans is poor.</li> <li>-No coordination between regional plans and provincial plans.</li> <li>- Rules and Regulations are not enforced properly due to Political/Administrative influences.</li> <li>-Enforcement of laws and plans and police are slow and coordination among the different sectors is poor.</li> <li>-Policies are unstable (especially political) and changing policies with the government changes are detrimental to fishery resource management.</li> <li>-No power for local authorities.</li> <li>-Law enforcement is generally weak and there is no coordination among different agencies implementing the environmental and fisheries laws.</li> <li>-No proper monitoring system to check whether the existing laws and regulation are implemented.</li> </ul>	<p><b>Institutional, legal and administrative</b></p> <ul style="list-style-type: none"> <li>-“Wellbeing” and “interactive governance” are important concepts that could provide guidelines to BOBLME in formulating appropriate strategies to address the large marine ecosystem concerns in the Bay of Bengal region.</li> <li>-The lack of national/provincial/state coastal development plans should receive high priority.</li> </ul> <p><b>Planning</b></p> <ul style="list-style-type: none"> <li>-To breakdown the characteristics from the national level down to ground level/lowest administrative level as far as possible for planning action programme.</li> <li>-Bottom up approach needs to be followed in implementation stage of SAP.</li> </ul> <p><b>Information gaps for socio-economic characteristics</b></p> <ul style="list-style-type: none"> <li>- Since the socio-economic issues differ from place to place, it is easier to make policies if the district/provincial wise socio-economic characteristics of the countries are considered.</li> <li>-Trend analysis of data for the past 10 years may be useful in formulation of policies.</li> </ul> <p><b>Traditional fishing methods/systems</b></p> <p>Traditional fishing methods/ systems such as beach seines (Madel) system provided sufficient fish for the surrounding community and these methods are operated seasonally and do not harm the ecosystems. Therefore traditional fishing methods which are resource friendly needs to be given priority.</p>

		<ul style="list-style-type: none"> <li>-No coordination within the relevant organizations or between sectoral agencies/departments</li> <li>- Low political priority for fisheries management.</li> <li>-The importance of the International agreements pertaining to protection of the marine environment was highlighted since BOBLME consist of waters belonging to eight countries and high seas of the Indian Ocean and stressed on the need for binding of all the eight countries through the relevant International agreements.</li> <li>-No regional body for MCS activities at the regional level</li> <li>-No harmonization among the fisheries Laws, Regulations among the BOBLME countries &amp; laws should be consistent.</li> <li>-Ignorance of traditional fishing method has led to resource degradation.</li> <li>-Lack of knowledge/unawareness /lack of commitment /negligence on rules and regulation by the stakeholders</li> <li>-Developed countries are using the modern fishing vessels equipped with efficient gear and preservation facilities and thereby they catch more fish.</li> <li>-No proper mechanism for limited entry /to control open access regime to fishing.</li> <li>-High level fish harvesting by foreign vessels in international waters may have impact</li> </ul>	<ul style="list-style-type: none"> <li>-Traditional knowledge and best practices on the management should be counted and traditional fishing methods/practices needs to be considered.</li> <li><b>Management</b></li> <li>-Fishing by DWFN and IUU Fishing activities needs to be controlled.</li> <li>-Limit open access based on the resource potential and introduce limited entry through rotation of fishing operations proportional to fishers' population and areas of operation with the help of fishery authorities.</li> <li>-Measures to stop catching juveniles with nets of very small mesh sizes should be strictly enforced.</li> <li>-Trawling and purse seine fishing should be stopped because these methods destruct fish resources and critical habitats.</li> <li>-While the destructive fishing gear/methods are prohibited, the resource friendly fishing methods need to be introduced.</li> <li>-Marine Protected areas areas needs to be given high priority</li> <li>-To protect breeding grounds of commercially important fish species by declaring such sites as protected areas.</li> <li>-Encourage the use of eco- friendly fishing methods- such as longline.</li> <li>-Identify fish breeding areas and nursery grounds and stop fishing in those areas during fish breeding seasons.</li> <li>-Introduce advanced aquaculture methods to reduce over exploitation of the fish resources.</li> <li>- Other aquaculture practices such as mussel, seaweed culture needs to be considered.</li> <li><b>Harmonisation</b></li> </ul>
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		<p>-No proper monitoring system for tracking foreign vessels.</p> <p>-No programmes for rebuilding of fish stocks and enhancement of the habitats.</p> <p>-No programmes for mariculture. Other fishing practices such as mussel, seaweed culture needs to be considered.</p> <p>- lack of capabilities and scarcity of funds and survey vessels for resech/surveys for stock assessment</p> <p>-Lack of information about the untapped resources in the deep sea</p> <p>-BOBLME has given little attention to invertebrates</p> <p>-Lack of awareness regarding the environment and absence/inadequacy of resources for waste management are two important root causes too.</p> <p>- Awareness/knowledge about the relevant subject/current technologies especially of biodiversity, marine habitats etc. among the staff officers of the Government Ministries, departments and institutions are low</p>	<p>-Regulations on foreign fishing among the BOBLME countries should be harmonized.</p> <p><b>Legal Framework</b></p> <p>-There is need for specific regulations for endangered and vulnerable species.</p> <p><b>Awareness programme</b></p> <p>Awareness programme on resource management for fisher folk is essential.</p> <p><b>Stock Assessment of marine living resources</b></p> <p>-Species wise fish stock assessment to establish the status of a resource and to determine the level at which it may be sustainably exploited is an urgent requirement. Priority needs to given for vulnerable fish species. But this is constrained by the lack of capabilities and scarcity of funds and survey vessels.</p> <p>-Lack of information about the untapped resources in the deep sea and need for surveys.</p> <p>-BOBLME has given little attention to invertebrates. At least the status of key invertebrate groups needs to be assessed. Similarly if any groups could be used for the purpose of bio indicators of coastal health can be investigated.</p> <p><b>Fisheries management</b></p> <p>-Introduction of data recording system/log book for fishermen is one of the solutions to record fish catch and related data required for fisheries management.</p> <p>-It was recommended to establish regional disaster management centre and a centre for Research and Development for successful regional management</p>
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			<p>under a regional Institutional framework.</p> <p>-Fisher women participation/involvement in coastal and marine living resource management is considered as a practical way to promote the fishermen's compliance with laws and regulations and to ensure the sustainability of marine living resources.</p> <p>-The BOBLME "... seeks to improve the lives of coastal populations through improved regional management of the Bay of Bengal and its fisheries". To this end, it could be very useful to give consideration to the findings of the UNDP – Commission on Legal empowerment of the Poor: 'Making the Law work For Everyone' (UNDP 2008). Chapter 5 – recommended reforms. Without structural reforms, it seems unlikely that the lives of the largest concentration of coastal poor could be improved. The UN Economic and Social Survey 2011 would appear to suggest that, carefully planned expansion and management of traditional and small-scale fisheries' could be a responsible way of greening the fishing industry as well as securing the contribution of fish to food security'.</p> <p><b>Lessons Learnt</b></p> <p>Lessons that emerged from the impact of and response to the 2004 Indian Ocean Tsunami provides important lessons for addressing risk. The 'planting mangroves' response in Sri Lanka was mostly irresponsible. Similarly indiscriminate issuing of boats that increased fishing capacity may be regarded in a similar manner. Perhaps these lessons could be important when preparing the SAP.</p> <p>.</p> <p><b>Property rights in fisheries</b></p>
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			<p>-Use of property rights in Fisheries management needs to be considered</p> <p><b>Studies on earnings from fishing in coastal waters</b></p> <p>- Studies on earnings from coastal fisheries could be useful in the formulation of policies.</p> <p><b>Protection of small scale fishermen</b></p> <p>-It is necessary to ensure that small scale fishers are not displaced from their traditional fishing areas.</p> <p><b>FAO Technical paper no. 515 "Towards integrated assessment and advice in small-scale fisheries"</b></p> <p>- To consider the principles and processes embodied in the FAO Technical paper no. 515 in the formulation of SAP.</p> <p><b>Research/Resource surveys</b></p> <p>-Research and investigations are required to be conducted to identify the exact areas of breeding grounds, breeding seasons, fish migratory patterns and stock assessment to demarcate the protected areas.</p> <p>-Research and studies regarding fish and ecosystems should be incorporated.</p>
<b>DEGRADATION OF CRITICAL HABITATS</b>		<p>-Development of river catchment areas may cause sedimentation.</p> <p>-Dumping, encroachment, urbanization, construction of anchorages and harbours, sand mining, erosion, tourism development are the causes for degradation of coastal habitats.</p>	<p><b>Management</b></p> <p>-While taking measures to protect the marine habitats it is necessary to control inland activities which are</p>

		<p>-Sedimentation is the highest contributing factor for coral degradation. -It has been observed sedimentation in the some protected areas lying in Sri Lankan waters have really from Nepal.</p> <p>-Vegetation clearances, harbour and tourism development, encroachment, mineral extraction, dam construction are the main cause for degradation of sand dunes. - Lack of awareness and coordination among the agencies is another major cause for lagoon degradation. - Although there are some protected areas they are not managed properly. -Coastal ecosystems are under degradation due to the development activities such as encroachment, lagoon filling, planned/unplanned and legal and illegal developments. -Conversion of mangroves to aquaculture farms, use as firewood, use for fencing, and use for dying, coloring of fishing nets has led to destruction/degradation of mangroves. -Bottom trawling, bottom set nets, dynamiting and outboard engines of the FRP boats are the causes for destruction of the sea grass. -Mangroves are also logged for use as firewood and extracting dyes for fish net colouring.</p> <p><b>Mangrove Restoration</b> -Indiscriminate planting mangroves in</p>	<p>affecting the marine environment. -To prevent overpopulation of starfish causing destruction to coral reef habitats, such starfish species needs to be identified and control measures are to be taken. - To distinguish between 'mangrove ecosystems' such as shorefront deltas, and 'mangroves as parts of estuaries' in order to manage the latter without harming the 'parent' ecosystem</p> <p><b>Security and livelihoods of Fisherfolk</b> -People security and livelihoods should be included.</p> <p><b>Pollution Control</b> -To consider the diffuse sources of pollution such as agriculture, forestry, aquaculture and tourism from landlocked countries in addition to the countries boarding the BOBLME. (It has been observed sedimentation in the some protected areas lying in Sri Lankan waters have really originated from Nepal)</p> <p><b>Sethusamudra project</b> -If the Sethusamudran project is recommenced it can be damage to the whole ecosystem. Hence it is necessary to keep watch on it.</p> <p><b>Restoration of Mangroves Studies</b> -Few studies have worked out the extent of mangroves but only a handful of studies have quantified the willingness to conserve mangrove among stakeholders. Most mangrove restoration projects are implemented without this fundamental information. As such BOBLME can support studies that would reveal factors that</p>
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		<p>barrier-built estuaries and lagoons is a serious problem in Sri Lanka. This is sanctimoniously referred to as „mangrove restoration or mangrove rehabilitation“. The adverse sedimentation consequences of mangrove planting on hydrology / hydraulics and thereby on fisheries are reported in the recent document <i>“An Appraisal of Mangrove Management in Micro-tidal Estuaries and Lagoons in Sri Lanka”</i> (IUCN 2011: <a href="http://www.iucn.org/about/union/secretariat/offices/asia/asia_where_work/srilanka/publication/">http://www.iucn.org/about/union/secretariat/offices/asia/asia_where_work/srilanka/publication/</a>). It is praiseworthy that a distinction between restoration and planting is included in the Draft Background document – Viz. (page 67; volume 2) <i>Restoration should be carried out where substrates and other conditions are suitable. Care should be taken that intertidal mudflats that never carried mangroves are not used as mangrove planting areas because they appear to be easy to plant. These mudflats themselves are important coastal habitats (Ertemeijer &amp; Lewis, 1999) and restoration of mangroves should not be at the expense of intertidal mudflats”</i>.</p> <p><b>Introduction of invasive/Alien species</b> -Alien species has caused problems to the marine ecosystem.</p>	<p>would enable custom made restoration projects for BOBLME partners.</p> <p><b>Lessons learnt</b> -Lessons that emerged from the impact of and response to the 2004 Indian Ocean Tsunami provides important lessons for addressing risk. The ‘planting mangroves’ response in Sri Lanka was mostly irresponsible. Similarly indiscriminate issuing of boats that increased fishing capacity may be regarded in a similar manner. Perhaps these lessons could be important when preparing the SAP. -Already mangrove re-plantation programmes has started in Sri Lanka but with unsuccessful experiences. These lessons need to be considered when preparing the mangrove restoration programmes under SAP.</p>
POLLUTION		- No proper management system for waste disposal. Poor maintenance of treatment plants, lack of funds and absence of	<p><b>Management</b> -Introduce environmentally friendly</p>

		<p>awareness among the stakeholders is another reason for the coastal pollution. There is no proper plan and priority given by the local authorities is low for waste disposal and they do not have funds.</p> <ul style="list-style-type: none"> <li>-Increasing use of manure and chemical inputs, giving subsidy, irregular poor agricultural practices are also responsible for coastal pollution.</li> <li>- Lack of knowledge and awareness about the bad habits of disposal ways and consequences of disposing materials in such way.</li> <li>-Release of untreated industrial wastes is a major issue.</li> <li>-Plastic pollutants is one of the major problem.</li> <li>-Discharge of waste water from industries without treatment and run-off without treatment accounts for marine pollution. There is no alternative mechanism for discharging industrial water.</li> <li>- The discharge of oily engine wastes and bilge water from day-to-day boat operations is another cause for marine pollution.</li> <li>-Oil exploration in sea bed can be a threat to the marine ecosystem.</li> <li>-Waste/effluents from services sectors such as hospitals, Municipal councils and others are released without treatment. In some establishments they are partially treated.</li> <li>- Upstream agriculture causes release of pollutants to the sea.</li> </ul>	<p>industrialization/products.</p> <ul style="list-style-type: none"> <li>-Solid waste and POP/OTS needs to be given priority.</li> </ul>
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		-New developments in the coastal water have created pollution problems.	
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## MALDIVES

MAJOR AREAS OF CONCERNS	TRANSBOUNDARY ELEMENTS OF MAJOR AREAS OF CONCERN	MAIN ROOT CAUSES	MAIN TYPES OF ACTION
OVER EXPLOITATION OF MARINE LIVING RESOURCES	<p><i>Global climate change</i> Climate change is a major environmental challenge for the BOBLME</p>		<p><b><i>Institutional Arrangement/Governance</i></b> -Decentralized good governance is essential to address water related environmental transboundary issues</p> <p><b><i>Capacity building and institutional strengthening</i></b> -Capacity building is a critical need in the region, particularly at the local levels of governance</p> <p><b><i>Wider co-operation (Linkages, Collaboration and Expanded Cooperation)</i></b> -BOBLME is inter-linked to other large marine ecosystems in multi-facets and hence a mechanism to have dialogue, collaborate and co-operate with countries outside the BOBLME needs to be identified</p> <p><b><i>Communication, Information, Education and Awareness</i></b> -Mechanisms to enable better sharing of scientific data and information among member countries needs to be established or strengthened.</p> <p><b><i>Legal Framework</i></b> -Several international agreements exist that have direct relevance to BOBLME and effort is needed to identify where synergy can be gained</p> <p><b><i>Adaptation to climate change.</i></b> -More emphasis needs to be given to adaptation to climate change and mitigation of climate change. In this context, adaptation related research must become a priority.</p>
DEGRADATION OF CRITICAL HABITATS			
POLLUTION			



Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are working together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and to lay the foundations for a coordinated programme of action designed to improve the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

The Food and Agriculture Organization (FAO) is the implementing agency for the BOBLME Project.

The Project is funded principally by the Global Environment Facility (GEF), Norway, the Swedish International Development Cooperation Agency, the FAO, and the National Oceanic and Atmospheric Administration of the USA.

For more information, please visit [www.boblme.org](http://www.boblme.org)



Sida



Norad

