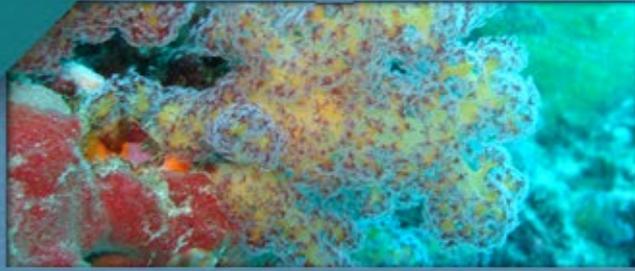




# Bay of Bengal Large Marine Ecosystem Project



Report of the  
**Hilsa Working Group Meeting**  
16 May 2011 • Kolkata India

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## TABLE OF CONTENTS

1. OPENING OF THE MEETING AND ADOPTION OF THE AGENDA.....	2
2. INTRODUCTION TO SELECTED STOCK ASSESSMENT TOPICS AND STATUS OF HILSA ASSESSMENT IN INDIA .....	2
2.1 Information Need for a Defensible Stock Assessment – Dr. Rishi Sharma .....	2
2.2 Hilsa Fisheries in Bay of Bengal (India): Challenges and Management – Dr. V. R. Suresh.....	2
3. HILSA ( <i>Tenualosa ilisha</i> ) STOCK ASSESSMENT NEEDS IN INDIA AND WORKPLAN .....	3
3.1 Lack of Information and future needs for Indian Assessment for Hilsa .....	3
3.1.1 Capacity Building.....	3
3.1.2 Long Term Goals .....	3
3.1.2 Short Term Goals .....	3
3.2 Identification of future assessment approaches and data needs.....	4
3.3 Stock status advice for Hilsa in India .....	4
APPENDIX I: LIST OF PARTICIPANTS .....	5
APPENDIX II AGENDA OF THE MEETING .....	6
APPENDIX III LIST OF DOCUMENTS PRESENTED TO THE MEETING .....	7

## 1. OPENING OF THE MEETING AND ADOPTION OF THE AGENDA

- 1 A Workshop on assessing the data and assessment potential from India occurred on 16<sup>th</sup> May, 2011 at CIFR, Barackpore, Kolkata, India. The BOBLME Stock Assessment Coordinator, Dr. Rishi Sharma welcomed the participants and wished them well in their work
- 2 Dr. Sharma reminded the meeting that BOBLME Project is mandated to develop regional fishery assessments for hilsa, and this meeting was the second step to assessing what data are available and what the current assessment process is in India.
- 3 The meeting was chaired by Dr. A.P. Sharma (India) and the agenda for the Meeting was adopted as presented in Appendix I.
- 4 Dr. A.P. Sharma welcomed everyone, gave an introduction to what CIFRI does and the role between the center, the central government and the state government agencies.
- 5 Dr. Vijaykumar (NC) and Dr. Sugunan (NTA) made comments on the scope of the project, the high priority of the work on Hilsa and Indian Mackerel, and how the data assessment needs should be directed to the scope of the project. With the TDA and SAP in mind, progress on the data and objectives needs to occur soon. However, they also were skeptical that the information on Hilsa is as good as the data on Indian Mackerel in India and whether much could be done with the data. Nonetheless a status report is important.
- 6 The list of participants is provided in Appendix II and a list of the documents presented to the meeting is given in Appendix III.

## 2. INTRODUCTION TO SELECTED STOCK ASSESSMENT TOPICS AND STATUS OF HILSA ASSESSMENT IN INDIA

### 2.1. Information Need for a Defensible Stock Assessment – Dr. Rishi Sharma

- 7 Dr. Rishi Sharma gave a presentation on what are the essential elements of a stock assessment. Crucial to this are catch, CPUE and effort at the resolution that mimics the stock and the life-history of the species. A basic stock assessment was presented using a SP Model and how  $B_{MSY}$  would be estimated as well elements of an age-structured assessment were presented. A discussion regarding the resolution or definition of a stock is essential in an integrated assessment as scientists in India are not of the opinion that it is a common stock and a sub-stock structure exists.

### 2.2. Hilsa Fisheries in Bay of Bengal (India): Challenges and Management – Dr. V. R. Suresh

- 8 The report by Pillai and Rosa (1963) for FAO states that morphological characteristics clearly show a marked difference in fish between different rivers in the region (Padma, Hooghly and Meghna). The information needs are still poor regarding stock structure and migration within the region.
- 9 After Farakka Barrage, Hilsa primarily spawn in the lower Hooghly and Ganga. Brahmaputra catches have declined as well since the 1970's. There is a huge variability in growth maturation and run-timing parameters. In all, the variation makes it difficult to assess whether there is one stock or multiple stocks to be managed, and decide on an optimum management strategy.
- 10 While marine landings and Hooghly Matla landings are well defined from CIFRI, other data from West Bengal may be missing. Effort data is primarily missing though there are data showing that effort has tripled from 50's to the 80's and then again from the 1980's to the 2000's. This is a fully developed fishery with 1,572 trawler 22,992 NM Boats as well as 441,510 gillnets (Milton 2010). Under all probability the resource is fully exploited.
- 11 Based on FISAT, the assessment indicates a large variation in marine sector of India, the Freshwater sector in India and the Bangladesh marine and freshwater sector. Rather than keeping these pieces separate, this assessment should be developed for a stock specific river of origin if a sub-stock structure exists. Based on the assessment, optimal yield estimated is 4,169 t in India Marine sector, and 162,396 t

in Bangladesh. These estimates seem to be inaccurate and perhaps low given recent catches in both countries.

- 12 Information needs for an integrated regional, marine and freshwater assessment appear to lacking. A serious inventory of available data by river needs to be established with WB Government. Possible estimation for changes in effort in the Hooghly and Matla systems need to be developed by Dr. Suresh and Dr. Rishi Sharma, so a simplistic assessment may be developed for the Hooghly Matla sub-system.
- 13 Age structure data is available through the 1970's and 1980's but current information is lacking.
- 14 Based on a decline in mean length at age of landed fish, it appears that growth overfishing is occurring on the stock. Recruitment overfishing is also occurring based on the increasing number of mature females being taken from the population over time.
- 15 Finally, according to Devaraj et al (1997), the annual marine catch increased from 6,000 t during 1986-90 to 23,181 t during 1991-95 along the northeast coast of India. The gillnetters contributed 87.7% to the landings. Considering this data, it appears that the optimum size of Hilsa in the marine waters on the Indian side may be larger than the estimate provided earlier.

### 3. HILSA (*Tenualosa ilisha*) STOCK ASSESSMENT NEEDS IN INDIA AND WORKPLAN

#### 3.1. Lack of Information and future needs for Indian Assessment for Hilsa

- 16 A three pronged approach was suggested by Dr. Vijaykumaran. These would include the following: i) on building capacity, ii) long-term objectives , and iii) short-term needs and objectives. They are described below.

##### 3.1.1. Capacity Building

- 17 In order to build capacity, the needs for establishing the quality needs for the data in the region need to be adequately developed and addressed. These include both temporal and spatial resolution of the hilsa in the West Bengal, and Assam region.
- 18 Improvements on understanding stock structure using morphometry and size distribution could be developed.
- 19 A joint session with all the stake-holders in the region needs to occur to assess what exists and what improvements might occur.

##### 3.1.2. Long Term Goals

- 20 Long term monitoring protocols at the sub-stock level needs to be prioritized. Government funding needed to be dedicated for this. This could possibly be developed as part of the next 5 year plan for India.

##### 3.1.3. Short Term Goals

- 21 The short term goals are included in the following. This will be the priority of some of the funding available from BOBLME in the near-term (2011-2012 year). A rapid and comprehensive study following uniform strategy, methodology and carried out simultaneously in India over multiple regions (at rivers, inshore estuarine areas and also the oceanic areas together) to study:
  - Biological characterization (maturity, breeding season, growth)
  - Migratory pattern, and breeding ground locations
  - Catch and effort, biomass abundance estimates, so we can develop MSY using a population dynamics model
  - Stock identification (including marine and inshore areas and rivers) through morphological and genetic means
  - Development of common data bank for the Bay of Bengal. This would also include all possible archived literature
  - Protection and improvement of hilsa habitat so that population persistence is improved.
  - Eventually develop studies to assess the impact of climate change on hilsa

### 3.2. Identification of future assessment approaches and data needs

- 22 Based on the information presented on hilsa at the meeting and subsequent discussions, the Indian Workgroup (WG) identified the following fundamental activities that should be undertaken to support the advancement of a regional stock assessment of hilsa. The WG noted that most recent assessment by both Bangladesh, and India are length based assessment using FISAT (see [www.fao.org/fishery/topic/16072/en](http://www.fao.org/fishery/topic/16072/en)). However, it appears that sufficient data exists to undertake an assessment using use Stock Synthesis based approaches and/or Surplus Production Models.:
- a. To evaluate the results of the existing length based Stock Assessment approaches using FiSAT. While FiSat is unlikely to yield a definitive assessment and reliable estimates of MSY, etc it should highlight the key areas of uncertainty and identify areas for direction of data collection in future. On the otherhand, it may enable more specific conclusions regarding exploitation pattern (estimation of selectivity and compare to maturity, etc) and has the potential to evaluate suitability of current management approaches such as mesh size restrictions.
  - b. The sources of data were identified and a review of the data is proposed for future working group meetings. However even at the current meeting in Kolkata the data appears patchy at best and considerable effort may be needed to develop the data in India.
  - c. The use of Stock Synthesis and simplistic Surplus Production Model approaches are recommended oif the data exist and can be organized. If the data are patchy and scattered simplistic life stage based models could be developed to assess sensitivity of different management activities on long-term persistence. If the data exist, with respect to the Stock Synthesis analysis, a statistical catch at age model could be developed for Hilsa Shad where recruitment would be estimated as a function of the available Biomass and CPUE data. In this model, the components such as total catch by sector and the available length/age data would also be incorporated into the statistical likelihood that the model estimates would be fitted to.
  - d. The assessment approaches developed will need to consider stock structure issues, or at the very least management units that may consider geographical boundaries (India, Myanmar and Bangladesh stocks).
  - e. The WG noted that there was an immediate need to increase stock assessment capacity in each country through future training on Fishery Statistics and Stock Assessment, including running some simplistic assessments such a surplus production models, length based models, etc with regional technical teams.

### 3.3. Stock status advice for hilsa in India

- 23 The workshop conducted in India considered the range of information available, and adopted the following stock status advice for the regional (India) hilsa fish stock in the Bay of Bengal.

The stock status of hilsa in India is uncertain.

In India, current catch is around 60000 t in the marine sector, while the freshwater sector is not known well (12000 t average in late 2000's in Hooghly and Matla Rivers in India). It not clear whether there are distinct sub-stocks that the people are fishing on in West Bengal (India), and they are distinct from Bangladesh. Furthermore, it is not clear whether the current level of catch is sustainable

While Hilsa, is a highly productive species and this may protect it to some extent from overfishing, pollution and loss and degradation of habitat are affecting the distribution and probably the productivity of the stock.

### ADOPTION OF THE REPORT

The Report of the First meeting of the BOBLME Hilsa Working Group in India was adopted by email on July 26, 2011.

## Appendix I LIST OF PARTICIPANTS

INDIA	
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RCU	
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## Appendix II AGENDA OF THE MEETING

Sustainable Management of the Bay of Bengal Large Marine Ecosystem (BOBLME) Project  
Central Inland Fisheries Research Institute (CIFRI)

### Group Consultation on *Hilsa Fisheries Stock Assessment*

Venue: Central Inland Fisheries Research Institute, Kolkata

Date: Monday, 16 May 2011

Time: 10.00 AM

Nos. of participants: 12-15 persons

Date: 16 May 2011	
2.00	Registration
2.05	Ice breaking/Self introduction
2.10	Welcome Address & Introduction to the Consultation Meeting on Hilsa Fisheries – Dr. AP. Sharma, Director, Central Inland Fisheries Research Institute (CIFRI).
2.30	Overview of Hilsa fisheries stock assessment in Bangladesh, India and Myanmar – Dr. Rishi Sharma, Stock Assessment Coordinator, BOBLME Project, RCU, Thailand.
3.00	Country status paper on Hilsa fisheries and its stock assessment in India -Dr. Suresh, CIFRI
3.20	<i>Tea break</i>
3.40	Open discussion and consultation
4.10	Recommendations and plan of actions
5.00	End of Meeting

**Appendix III LIST OF DOCUMENTS PRESENTED TO THE MEETING**

<b>Presenter</b>	<b>Title</b>
Dr. Rishi Sharma	Hilsa: Information Needs for a Defensible Stock Assessment
Dr. V.R. Suresh	Hilsa Fisheries in the Bay of Bengal: Challenges and Management



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)



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