



Bay of Bengal Large Marine Ecosystem Project



Report of the
Hilsa Working Group Meeting
10-11 October 2011 • Dhaka Bangladesh

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1. OPENING OF THE MEETING AND ADOPTION OF THE AGENDA

- 1 A Workshop on assessing the data and assessment potential from Bangladesh was held on 10th and 11th of October, 2011 at BARC, Dhaka, Bangladesh. 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 third one to that end. The focus of the meeting was to understand the current assessment approach, pursue alternative approaches and develop some research and M&E initiatives for the region that will further the understanding of Hilsa in the BOBLME Region.
- 3 The meeting was opened by Mr M. Shamsul Kibria (Project Steering Committee Member) and Dr Yahia Mahmud (Bangladesh) National Coordinator, Bangladesh facilitated the meeting. A meeting address was made by Mr Kibria, followed by Dr Sharma. The rest of the meeting was chaired by Dr Rishi Sharma.
- 4 The participants of the meeting are listed in Appendix I and the agenda for the Meeting was adopted as presented in Appendix II.
- 5 Mr Kibria informed the meeting about the scope of the project, and how far the work has proceeded. The agenda was adopted (Appendix II); and the participants were introduced.
- 6 The list of documents presented to the meeting is given in Appendix III.

2. INTRODUCTION TO SELECTED STOCK ASSESSMENT TOPICS AND TECHNIQUES OF HILSA ASSESSMENT IN BOBLME REGION

2.1. Information needs for a defensible stock assessment – Dr Rishi Sharma

- 7 Dr Rishi Sharma gave an overview on the BOBLME Project and mandate. Crucial to this are the stock assessment components which are essential to the entire project success. This is why the meeting and Hilsa assessment is extremely important in the region. Essential elements of a stock assessment are 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 Surplus Production (SP) Model and how B_{MSY} would be estimated as well as elements of an age-structured assessment were presented. Methods that use different sources of data from different countries and gear-types could be integrated into the overall fitting procedure using Maximum Likelihood Estimation (MLE) techniques. Essential in this would be to stratify catch and effort by gear, sector and country. In this manner fleet catchability could be assessed as well so we could compare effort controls, and a desired outcome in fishery yield.
- 8 The working group discussed the adequacy (quality) of the data in the various countries. Alternative assessment options should be pursued, rather than a single approach taking into account data from uncertain sources. Life history based modelling approaches like Leslie Matrix models, age-structured integrated assessments, FISAT based assessments, Surplus Production based assessments and PSA approaches should be developed.

2.2. Hilsa fisheries assessment in Bay of Bengal (Bangladesh) – Dr M. Anisur Rahman

- 9 Hilsa is the national fish of Bangladesh and numerous people are involved in the fishery.
- 10 Habitat destruction and overfishing are major factors affecting the abundance of Hilsa. A recent survey indicated that Hilsa has disappeared from 35 out of 235 rivers. Other anthropogenic effects such as pollution and poor floodplain management are affecting the Hilsa population in a negative manner.

- 11 Freshwater catches have remained fairly stable, but in recent years catches from the marine sector have increased markedly. In 2010, the marine sector took 209 450 t, while the freshwater sector took 103 162 t. The catches of the marine and freshwater sectors are given in the table below:

Table 1: Catch by marine and inland sectors since 1984 (source M. A. Rahman, BFRI).

Year	Freshwater	Marine	Total
1984	90,082	56,000	146,082
1985	73,388	71,050	144,438
1986	94,797	96,294	191,091
1987	91,167	103,814	194,981
1988	78,551	104,950	183,501
1989	81,641	110,311	191,952
1990	112,408	113,943	226,351
1991	66,809	115,358	182,167
1992	68,356	120,106	188,462
1993	74,715	123,115	197,830
1994	71,370	121,161	191,531
1995	84,420	129,115	213,535
1996	80,625	126,660	207,285
1997	83,230	131,204	214,434
1998	81,634	124,105	205,739
1999	73,809	140,710	214,519
2000	79,165	140,396	219,561
2001	75,060	154,654	229,714
2002	68,250	152,343	220,593
2003	62,944	136,088	199,032
2004	71,000	184,438	255,839
2005	77,500	198,363	275,860
2006	78,273	198,850	277,123
2007	80,453	199,875	280,328
2008	89,900	200,100	290,000
2009	95,507	202,951	298,458
2010	103,162	209,450	312,612

- 12 Starch Gell Allozyme analysis performed by CSIRO indicated that Hilsa is a single stock in the region shared by Bangladesh, India and Myanmar. However, some Bangladesh scientists are of the opinion that a sub-stock structure may exist.

- 13 Gonadal Somatic Index (GSI) indicates that peak spawning occurs in September to October in 4 distinct areas in Bangladesh, namely Kalirchar (down of Sandwip), (2) Moulavirchar (south of Hatia), (3) surrounding of Monpura (east of Bhola) and (4) Dhalchar Island (Charfashion, Bhola). These areas were found as the most significant areas of Hilsa spawning. Nursery areas are both freshwater and estuarine and nursery areas have been established in major parts of the Meghna River.
- 14 Results using the FISAT program indicate a large variation in exploitation on the stock between 1992-2003 (Table 2). However this analysis did not estimate what the spawning biomass targets should be and this could be one area of possible improvement in an integrated assessment. The results from 2009 was presented as well in this meeting, and indications are that the Exploitation levels have not dropped over the period, as initially thought.

Table 2: Results from FISAT of multiple years of length based data assessments

Parameters	1992	1995	1996	1997	1998	1999	2000	2002	2003	2009
Asymptotic length (L_{∞}) cm	61.10	58.30	59.97	61.50	66.00	60.00	62.50	53.70	53.60	53.00
Growth constant (K)/yr	0.74	0.74	0.99	0.83	0.67	0.82	0.72	0.86	0.60	0.83
Total mortality (Z)/yr	2.41	2.61	3.19	3.29	3.43	3.77	2.79	3.51	3.03	3.23
Natural mortality (M/yr)	1.16	1.18	1.41	1.28	1.25	1.28	1.17	1.36	1.09	1.36
Fishing mortality (F/yr)	1.25	1.43	1.78	2.01	2.18	2.49	1.62	2.15	1.94	1.87
Exploitation rate (E)	0.52	0.55	0.56	0.61	0.63	0.66	0.58	0.61	0.64	0.58
Maximum yld/recruit (E_{max})	-	-	0.71	0.69	0.60	0.59	0.46	0.58	0.63	0.57
Size at first capture (L_c) cm	35.00	30.00	30.34	30.25	27.06	22.80	13.12	19.87	21.21	26.00
Growth performance (\bar{AE})	-	3.40	3.55	3.50	3.46	3.47	3.45	3.51	3.03	3.37

- 15 Based on the assessment conducted using data up to 2005 the conclusion Bangladesh scientists arrived at were the following:
- Hilsa fishery is suffering from serious recruitment over-fishing (indiscriminate catching of *jatka*, i.e. juvenile Hilsa)
 - There is growth over-fishing (indiscriminate killing of mature female Hilsa)
 - The fishing mortality has increased due to fishing pressure with decrease in size at first capture.
- 16 DOF and BFRI have undertaken many research initiatives that are dealing with community partnership programs such as giving the *jatka* fishers and alternative source of livelihood, as well as more community outreach programs.
- 17 However, indications from 2009 still show a slightly higher than optimal harvest rate that should be around 50%.

- 18 BFRI pointed to some short-comings in the current survey systems and designs, as being outdated in terms of the sample frame, as well as being short-staffed to do an adequate job.

2.3. Hilsa fisheries assessment in Bay of Bengal (India) – Dr D. Panda

- 19 A detailed overview of the stock assessment techniques used in India were presented. The overview was comprehensive showing how length at age methods were used and reconstructed giving a clear outline of the assumptions involved. FISAT appears to be the model of choice.
- 20 As far as collecting a dataset for examination the following were the criteria and parameters measured:
- i. Selection of landing centres based on fleet and type of gear under operation
 - ii. To avoid gear selectivity different landing sites must be selected based on different gear operations, which are used to catch different size group of fishes on their availability
 - iii. Length frequency (Total length/ Fork length)
 - iv. Weight of the sample
 - v. Total weight of the catch
 - vi. Average number of effort units per boat per unit time
 - vii. Random Samples representing reasonable proportion of total catch
- 21 The data set used inputs the following parameters: monthly length-frequency analysis, a and b from length weight relationships, and catch and effort details. The following was the data collected and examined in India:
- i. 1545 specimens measured during March, 2009 to February, 2010
 - ii. Size range of 170- 475mm.
 - iii. The length range of 240 to 360 mm mainly dominant in the catch.
- 22 India chose not to use the Pauly approximation of natural mortality (M) as it appeared to be too high and went with Alagaraja (1984) instead which had a lower value of M.
- 23 Assessment details using FISAT indicated the following for the Indian sub-component of the stock:
- i. At present at $E=0.59$, Y/R' is 0.043, where the B/R' reduces to 28% of virgin biomass.
 - ii. This indicates that further increase in effort will lead to overexploitation of the stock, which in turn may lead to total collapse of spawning stock biomass.
 - iii. Hence, there is a need to reduce the exploitation level to $E=0.5$, where Y/R' is 0.042 and biomass will be at 40% of virgin Biomass, which is better for sustainable fisheries management
- 24 Based on steady state stable equilibrium assumptions the following could be estimated for the Indian component of the stock:
- i. Annual catch (Y) = 10,150 tons , the Total stock (Y/U) = 19,519 tons and the average Standing Stock (Y/F) = 8,087 tons
 - ii. Average MSY = 8,492 tons
 - iii. Present fishing pressure 1.25/year needs to be reduced nearly 16% to harvest at MSY

2.4. Hilsa fisheries assessment in Bay of Bengal (Myanmar) – Mr Khin Maung Soe

- 25 A general overview on Hilsa Fisheries in Myanmar was presented. There is no method to understand stock status health being conducted in the region currently.
- 26 Hilsa is found in numerous parts of the Rakhine coast on the Bay of Bengal, the Irrawaddy River and the Tanintharyi River in the Andaman Sea. Fishing occurs year round though September to October and February to April are the peak and moderate fishing periods respectively.
- 27 Prior to 2005, landings information is poor, and the trend from 2006 to 2010 to current years indicate a declining trend in catches (16920 to 4157 Mt, though 2009 had a peak catch of 19,021 Mt).
- 28 Myanmar scientists attribute the following as possible characteristics to the decline:
- i. Possible impacts by the climatic changes (change in migratory route or physical ocean characteristics)
 - ii. Degradation of ecosystem and habitats
 - iii. Man made impact such as
 - Irresponsible fishing
 - Increase fishing pressure
 - Increasing market demand
- 29 As counter measures the following are strategies being explored by the government:
- i. Not allow fishing net with mesh size narrower than 4"
 - ii. Further consideration on using purse-seine in Hilsa fishing.
 - iii. Limit on issuing license for Hilsa fishing vessel
 - iv. Stop allowing the use of trammel net in finfish fishing
 - v. Limit the mesh size of cod end with 2" in stow net
 - vi. Not allow fishing by using a net with lesser than 0.5" except in the case of mysid fishing
 - vii. All type of stow net should not operated during the month of April through June
 - viii. Explore the spawning and nursery grounds of Hilsa so as to establish closure season and space.
 - ix. Further consider to establish Hilsa conservation areas.
 - x. To organized national task force to extending hisa fisheries and resources management activities.
- 30 Juveniles appear to be targeted by beach seines, and thus growth over fishing appears to happen on these stocks (71% of catch is from juveniles in Beach seine catches), though whether this is a trend with all gears is uncertain at this time.
- 31 Myanmar's focus is on more life-history based studies to identify the migratory route, spawning site and nursery grounds. In addition they would want to build assessment models like Myanmar and India to estimate changes in catch, recruitment capacity, fishing pressures and consequential livelihoods of the resources users. This is not possible with building capacity for scientists to assess resources status, and would require a large effort with BOBLME and other countries help to do this.

3. HILSA (*Tenualosa ilisha*) STOCK ASSESSMENT RECOMMENDATIONS AND WORKPLAN

3.1. Capacity Building

32 There is a strong need for capacity building to support the implementation of a Fisheries Management Plan for the region. While the status and current knowledge may be sufficient for India and Bangladesh, Myanmar will need help to develop its plan. The countries were all supportive of an Integrated Fisheries Stock Assessment Tool for the region, that is developed to address the life-history and peculiarities of Hilsa in the region. This will work in conjunction with the existing FISAT and ELEFAN tools that the countries are already using in the region.

Recommend

- *Establish a Regional Body of experts (ie. The Hilsa Assessment Working Group, (HAWG*)) that will share knowledge across the region*
- *Encouraging exchange of regional transnational knowledge and sharing in management planning processes through the HAWG for transboundary fisheries, and/or fisheries with similar characteristics*
- *Provide workshops and trainings on newer stock assessment approaches for the region*
- *Create a regional and national pool of experts that would facilitate development of plans*
- *Strengthen the knowledge of decision makers*
- *Build more effective fisher organizations within the sector*
- *Governments to initiate capacity building, but with responsibilities and capacity development carried out at a decentralized level, and inclusive of many stakeholder groups*

33 To this effect the HAWG Working group members were established from each country and are the following:

Bangladesh: Lead Dr Anisur Rahman, Ms Mome, Ashraful Alam & Kamruzzaman Hussain.

India: Lead Dr D. Panda (CIFRI), Mr Sajeevan (FSI), Mr Gulati (FSI) and Dr Suresh (CIFRI)

Myanmar: Lead Mr Khin Maung Soe, Mr Htay Win, Mr Myint Thein

3.2. Develop a fishery management plan for the region in hilsa

34 All countries expressed concerns of unilateral implementation of management recommendations that were not standardized in other areas. Bangladesh, Myanmar and India recommend using a standardized time area closure mechanism as well as standardized gear regulations on gillnet use. Enforcement must be an integral part of this approach if it is to succeed. In addition standardized regulations as well as standardized data assessment programs need to be developed for this region. Fishery Survey of India will take the lead on data assessment programs as they collect standardized data by gear/ fisheries sector, and by marine and inshore areas. These programs will be standardized across the region.

Recommend

- *BOBLME to start developing elements of a FMP (or FIP) for Hilsa Assessment in the BOB Region*
- *FSI to develop a systematic Stratified Random Sampling design to estimate effort and catch by sector and gear in the marine and freshwater areas. By April/May of 2012 we will review this design and have a report. Mr Gulati & Mr Sajeevan will follow up on this*
- *Trainings held by BOBLME and FSI to train people in the region to collect the right sort of information by sector*
- *Standardized regulation package developed by an advisory body and implemented in the region*

3.3. Develop a standardized model framework for stock assessment

35 The integrated type approach presented by BOBLME that uses all sources of data in all sectors estimating catchability, and vulnerability by sector, gear and area and fitting to indices of CPUE and Survey based indices is the approach that could be pursued in parallel with the exiting FISAT, and ELEFAN based approaches.

Recommend

- *BOBLME in collaboration with BGD, IND and MYA to start developing the framework for the model, and then provide guidelines on what data to collect for the region*
- *Train people on the understanding of the model and the dynamics*

36 Based on the information presented on Hilsa at the meeting and subsequent discussions, the HAWG identified the following fundamental activities that should be undertaken to support the advancement of a regional stock assessment of Hilsa. The HAWG noted that most recent assessment by both Bangladesh and India are length based assessment using FISAT (see [http:// 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 proposal to examine alternative models including existing length-based assessment, integrated assessment and Leslie Matrix approaches could be investigated to address the following objectives:

- 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 other hand, 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 to minimize age of first capture, as is currently being conducted in Bangladesh and India and proposed in Myanmar.
- b. The sources of data were identified and a review of the data is proposed for future working group meetings. Bangladesh catch data is quite good (based on Dr Anis). However effort data needs to be improved and methods to estimate how the effort varied over time through examining different covariates should be investigated. This

would be a high priority and could possibly lead to development of a simple Biomass dynamics (SP) assessment.

- c. The use of Stock Synthesis and simplistic Surplus Production Model approaches are recommended if the data exist and can be organized within the next year. Bangladesh has indicated that this is a high priority and will pursue this in 2011 and 2012. If the data are patchy and scattered simplistic life stage based models (or Leslie Matrix 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), and possibly even a finer sub-stock structure (e.g. river of origin).
- e. The HAWG 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.

3.4. Develop a standardized short and long term program for ecosystem health and resource evaluation for the river systems that these hilsa occupy in Bay of Bengal region

- 37 A long discussion occurred on the range and existence of Hilsa in this region, and how the rivers have changed over the last 100 years. The three systems being studied have a wide range of activities that have impacted them and the group proposed to develop a joint study on the health of these river systems over the duration of the project. The three river systems that will have a cross-section time series analysis are the following:
- i. Lower Meghna River (BGD)
 - ii. Lower Ganga, i.e. Hoohly-Matla River (IND)
 - iii. Lower Irrawaddy River (MYA)

Recommend

- ***BOBLME fund a longer more comprehensive study on health of the three ecosystems that Hilsa occupy to understand the following:***
 - 1. Water Quality across these river systems***
 - 2. Habitat Quality and quantity in the river systems***
 - 3. Species Biotic integrity in the systems, along with Juvenile Hilsa measurements***
 - 4. Surveys on economic livelihoods of locals in the lower rivers***
- ***Standardize methods and data to be collected on these attributes by the region***
- ***Long term study that will capture ecological connections and functions in the estuary and freshwater sections of this region that tie in with Hilsa Recruitment and resiliency over time***

- *What is a properly functioning FW/estuary/marine ecosystem and how can we improve habitat to keep populations resilient. This will be the focus of the longer term study*

3.5. Other priority items for consideration

38 Other priorities were discussed at the meeting, and are outlined below:

- 39 Develop a committed workgroup to make progress on Hilsa Assessment and a Fishery Management Plan for the region. These workgroup members will be consistently present at the subsequent Hilsa WG meetings so that real progress is made on the resource and management.
- 40 Develop a standardize index of abundance survey for the region. Dedicated ship-time is only available to India, so India will have to take a lead on this to collect survey based CPUE indices for Hilsa during a peak migration month (probably September) in the region. FSI will follow up on this (Mr Sajeevan and Mr Gulati)
- i. Data Repository for the region collating information on catch and length than can be used for analysis. This repository will assemble all the age-length data over time for each country. CIFRI/BFRI will be the repository. MOU between countries for data sharing would be required for this, and facilitated by BOBLME.
 - ii. Reports on methods and techniques used in presentation will be delivered by individuals within a week.

3.6. Proposals for research and M&E work in 2011-2013

- 41 Proposals were presented by each country, but due to insufficient detail in the workplan and the budgets were requested to be resubmitted again by the 25th of October. However, due to having all countries present at the location an integrated design where similar work would be conducted across all regions was discussed and presented. The common elements suggested were:
- i. Collection of length frequency data both from commercial landings and experimental fishing.
 - ii. Collection of time series data on catch, effort and recruitment.
 - iii. Assessment of age, growth, mortality and stock with the help of length based models, or other newer techniques.
 - iv. Feasibility of tagging to understand migratory routes and how many tags we need:
 - a. Standardized time of tagging (Jatka (juvenile) migration to marine environment) and minimum fish size (range of tagging fish 15cms to 25 cm)
 - b. Recovery program?
 - c. Explore SEAFDEC tags for Mackerel as approach on Jatka.
 - v. Habitat/ecosystem indicator monitoring for assessing water quality
 - vi. In addition standardized methods for assessing length and developing a manual for this and shared across the countries was a desired objective.

- 42 In addition to this country specific proposal would perform additional work identified by country below:
- i. Bangladesh: Assess Habitat quality with respect to historic and current levels for prioritization and protection
 - ii. India: Estimate abundance through independent surveys, and identify present spawning grounds
 - iii. Myanmar: Identify current spawning grounds.

3.7. Stock status advice for hilsa in BOBLME region

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

The stock status of Hilsa (*Tenualosa ilisha*) in the Bay of Bengal region remains uncertain.

It appears possible growth and recruitment over-fishing patterns are discerned in the stock in Bangladesh, India and Myanmar. Consequential management measures have tried to control the selectivity of gear to delay the age of first capture (closure of the juvenile *jatka* fishery) in Bangladesh, though not in other countries. Both India and Myanmar are investigating possibilities of implementing such measures.

It is not clear whether the current level of catch is sustainable in the countries. In Bangladesh, current catch has averaged 202,245 t in the marine sector for the last 5 years, while the freshwater sector 89,459 t averaged in the last 5 years. It is not clear whether the current level of catch is sustainable, though Bangladesh scientists think that the *jatka* closures are primarily the reason for the continuous increase in catch and continued persistence of the stocks in their waters.

In India, current catch is around 60000 t in the marine sector (2004 CMFRI data), 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.

In Myanmar there is declining trend in overall landings and a drop in CPUE as well as indicators of growth overfishing. Landings in 2010 were 75% below 2006 levels.

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 Bangladesh Fisheries Assessment Working Group in Dhaka was adopted by email [November 9th 2011].

Appendix I LIST OF PARTICIPANTS

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Appendix II AGENDA



BOBLME HILSA FISHERIES ASSESSMENT WORKING GROUP Dhaka, Bangladesh on 10-11 October 2011.

Programme- Day 1 October 10th

10.00	Registration
10.05	Ice breaking/Self introduction
10.10	<ul style="list-style-type: none"> · Welcome Address & Introduction to Assessment Workshop on Hilsa Fisheries from BOBLME- Dr Rishi Sharma · Address by Bangladesh Dignitary (secretary, MOFL) to the meeting
10.30	Country Assessment Techniques paper on Hilsa fisheries and its stock assessment in Bangladesh Dr M. Anisur Rahman, Riverine Station, BFRI, Chandpur
11:00	Country Assessment Techniques paper on Hilsa fisheries and its stock assessment in India Dr Panda, CIFRI, Kolkata.
11.30	Tea break
11.45	Country Assessment Techniques paper on Hilsa fisheries and its stock assessment in Myanmar- Mr Soe,
12.30	Wrap up (Dr Sharma)
13.00	Lunch
14:00	Integrated Assessment for the Region: Dr Sharma
14:30	Group Discussion on the Improvement of current models and an alternative approach
15:30	Alternative Models to be used- Use of Computers and how to develop an integrated model- Dr Sharma
16:30	Wrap up for the day

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9.00	Day 1 Discussion- Dr Sharma
10.00	Data Needs and Sampling Coverage for the Region for supporting current assessments or alternative models
11.00	Tea Break
11.15	Improving current sampling for integrated models- Getting good measures of effort: Group Discussion
12:00	Independent Surveys of Biomass- Who, what and How?
13.00	Lunch
14.00	Next steps- Proposals on Hilsa- Each country will present their proposals for BOBLME (a draft of this based on discussion in May, 2011 will need to be submitted before the meeting by each country in BOBLME format)
15.00	Timeline to finalize these proposals and work-plans
15.30	Short and Long term strategies
16.00	Tea Break
16:15	Wrap Up- Concluding Remarks
16.30	End

Appendix III LIST OF DOCUMENTS PRESENTED TO THE MEETING

Presenter	Title
Dr Rishi Sharma	Hilsa: Information Needs for a Defensible Stock Assessment Current status and Alternative Approaches
Dr Anisur Rahman	Country Assessment Paper on Hilsa Fisheries and its Stock Assessment in Bangladesh
Dr D. Panda	Growth, mortality and stock assessment of <i>Tenualosa ilisha</i> (Hamilton, 1822) in River Hooghly, India
Mr Win, Mr Thein & Mr Soe	Hilsa Fisheries in Myanmar, Status of Resources and Trends to Sustainability



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.

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