



**SOUTH ASIA CO-OPERATIVE ENVIRONMENT PROGRAMME**



**SOUTH ASIAN SEAS PROGRAMME**

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**SOUTH ASIAN SEAS PROGRAMME**

**3<sup>rd</sup> Intergovernmental Meeting of Ministers**

**Thimphu, Bhutan**

**26<sup>th</sup> August 2005**

**REPORT OF THE THIRD MINISTERIAL MEETING  
OF THE  
SOUTH ASIAN SEAS PROGRAMME**



**South Asia Co-operative Environment Programme**

**South Asian Seas Programme  
No. 10, Anderson Road, Colombo 5, Sri Lanka**

**CERTIFICATE**

The Report of the Third Intergovernmental Ministerial Meeting of South Asian Seas Programme held on 26<sup>th</sup> August 2005 at the Royal Banquet Hall, Thimphu, Bhutan is herewith submitted to the members of the Intergovernmental Ministerial Meeting and the Consultative Committee, in fulfilment of the financial and administrative procedures of SACEP and SASP.

A handwritten signature in black ink, appearing to read "Arvind Boaz".

**Dr. Arvind Anil Boaz  
Director General**

30 August 2005

**SOUTH ASIAN SEAS PROGRAMME**  
**REPORT OF THE THIRD INTERGOVERNMENTAL**  
**MINISTERIAL MEETING**

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## SOUTH ASIAN SEAS PROGRAMME

**Third Intergovernmental Meeting of Ministers (IMM)  
26<sup>th</sup> August 2005  
Thimphu, Bhutan**

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## **SOUTH ASIAN SEAS PROGRAMME**

**Third Intergovernmental Meeting of Ministers (IMM)  
26<sup>th</sup> August 2005  
Thimphu, Bhutan**

### **REPORT**

#### **1. INTRODUCTION**

The Third Intergovernmental Meeting of Ministers (IMM) of the South Asian Seas Programme was held in Thimphu, Bhutan on the 26<sup>th</sup> of August 2005.

#### **2. ATTENDANCE**

The Intergovernmental Meeting of Ministers (IMM) was attended by Representatives from the following Member Countries viz: Bangladesh, India, Maldives and Sri Lanka. There was also representation from the Royal Government of Bhutan

Representatives from the following United Nations Agencies and International Organisations also participated: United Nations Environment Programme (UNEP), UNEP's Coral Reef Unit (UNEP CRU) & World Meteorological Organisation (WMO).

List of Participants is in Annex I.

#### **3. INAUGURATION**

The Third Intergovernmental Meeting of Ministers (IMM) of the South Asian Seas Programme was inaugurated by Hon A. H. M Fowzie, Minister of Environment & Natural Resources, Government of Sri Lanka

A copy of his Address is in Annex II.

The Director General of SACEP, Dr. A. A. Boaz delivered the Welcome Address

The text of his Address is in Annex III.

#### **4. ELECTION OF OFFICE BEARERS**

In accordance with the provisions of Articles of Association of SACEP, Hon Mr. Ahmed Abdullah, Minister of Energy, Water and Environment, Government of the Republic of Maldives was elected Chairman of the 3<sup>rd</sup> IMM of SAS. Mr. Jafar Ahmed Chowdhury, Secretary Ministry of Environment & Forest, Bangladesh was elected as Vice Chairman of the Meeting. Dr. B. R. Subramanian, Project Director, Integrated Coastal and Marine Area Management (ICMAM) Project Directorate, India was elected as Rapporteur.

#### **5. AGENDA**

The 3<sup>rd</sup> IMM discussed and adopted the Agenda of the Meeting. A copy of the Adopted Agenda is at **Annex IV**.

#### **6. STATEMENTS OF HEADS OF DELEGATIONS**

The Heads of Delegations from Bangladesh, India, Maldives & Sri Lanka made presentations of their country statements to the 3<sup>rd</sup> IMM.

All statements reflected the initiatives taken by the countries in the area of environmental protection and management of the marine environment. The Country Statements clearly recognised the very crucial and pivotal role played by SAS in the promotion of environmental management in the South Asian Seas region and noted that it needs to be further strengthened.

The respective Country Statements are found in Annexes V to VIII.

#### **7. OTHER STATEMENTS**

Representatives of the UN Agencies and International Organisations attending the Meeting also addressed the 3<sup>rd</sup> IMM and their statements are found in Annexes IX & X.

#### **8. PRESENTATION OF THE REPORT OF THE MEETING OF NATIONAL FOCAL POINTS BY THE RAPPORTEUR.**

Under this Agenda Item, the Rapporteur of the NFP Meeting presented a brief summary of the Report of the Meeting of National Focal Points held on the 25<sup>th</sup> of August 2005. The detailed Report of this meeting is given in Annex XI

#### **9. ENDORSEMENT OF RECOMMENDATIONS AGREED UPON AT THE MEETING OF NATIONAL FOCAL POINTS**

The 3<sup>rd</sup> IMM then endorsed the following decisions recommended by the Meeting of the National Focal Points.

## **A) INSTITUTIONAL**

### **a) Appointment of Staff Approved for SAS Programme**

The meeting noticed that the post of the Regional Co-ordinator, which is a key position, approved by the 1<sup>st</sup> IMM to carry out all functions related to the SAS Programme, is remaining unfilled since the year 2001. The meeting strongly urged SAS Secretariat to fill up the position without any further delay and in any case not later than 31<sup>st</sup> March 2006. The procedures for appointment of the Regional Co-ordinator to be adopted by SAS Secretariat would be as follows:

1. SAS Secretariat will widely publicise the vacancy by itself and through the National Focal Points using the qualifications prescribed for this position by the 1<sup>st</sup> IMM. The applications will be received at the SAS Secretariat.
2. SAS will constitute a panel of 5 experts nominated one by each member country with DG, SACEP as the Chairman. The panel will scrutinise the applications and recommend a short list of eligible candidates to be called for the interview. The panel will interview the short listed candidates and select the Regional Co-ordinator. DG SACEP can make the appointment of the selected candidate.

### **b) Interim arrangement to meet staff requirement**

The meeting noted that in the absence of a regular Regional Co-ordinator, SACEP has been implementing the SAS programme through an Interim co-ordinator who is being paid an amount of US \$ 1,000 p.m. from the funds provided by United Nations Environment Programme. Since the workload has increased substantially the Interim Co-ordinator requested for appropriate compensation. The meeting considered the request and suggested a payment of US \$ 500 per month from the SAS trust fund for the period up to, which UNEP provides funding that is 31 Dec 2005. For any need for continuation of services of the Interim Co-ordinator beyond this period, the meeting requested the DG SACEP to make an appropriate proposal to the Governments of the member countries as it may result into creation of additional staff position in the SAS Programme.

## **B. PROJECTS & PROGRAMME MATTERS**

The Meeting directed the SAS Secretariat to do the following with respect to projects and programmes for 2005 - 2007

- 1) Persuasion of implementation of projects approved by 1<sup>st</sup> and 2<sup>nd</sup> IMMs, the details of which are given in Annex XII.
- 2) Undertaking new programmes relating to Management of Natural Oceanogenic Disasters and Management of Coastal and Marine Protected Areas. The details of aspects to be undertaken along with prioritisation is given in Annex XII

- 3) The 3<sup>rd</sup> IMM recommended that SAS sign the Letter of Agreement with the International Maritime Organization. The copy of the Letter of Agreement is in Annex XIII.
- 4) The meeting recognised the importance of the early operationalisation of South Asian Regional Oil Spill Contingency Plan and requested the 2 countries who have yet to agree to the signing of the concerned MOU to kindly pursue with the relevant authorities and convey their concurrence to the SAS Secretariat so that the SAS Secretariat could convene a Special Meeting for the formal signing of the MOU followed back to back with IMO Regional Training Exercise pertaining to some important elements of the plan.

## C. FINANCIAL

### a) Contributions to SAS Trust Fund

The meeting noted that the countries have arrears in contribution to the trust fund. The details of the arrears to be paid by the Governments are given in the Report of the National Focal Points. The meeting requested the concerned countries to clear the arrears as soon as possible.

The Secretariat sought an increased contribution by member countries at a rate of 10% increase per annum from the year 2000 onwards. The meeting found that as there has been considerable savings from the previous year contributions, it was agreed that the status quo on annual contribution at the present rate would be maintained up to 2006.

The agreed levels of contributions to the SAS Trust fund are follows:

<b>COUNTRY</b>	<b>% Contribution</b>	<b>2005 US \$</b>	<b>2006 US \$</b>
Bangladesh	14.5	13,335	13,335
India	35.0	32,185	32,185
Maldives	6.5	5,975	5,975
Pakistan	29.5	27,130	27,130
Sri Lanka	14.5	13,335	13,335
<b>TOTAL</b>	<b>100.0</b>	<b>91,960</b>	<b>91,960</b>

**b) Secretariat Budget for 2005 - 2006**

The meeting approved the Secretariat budget for 2005 & 2006 as per 2004 with an allocation of US \$ 10,000 for Programme Development from Country Contributions

The approved budget is given below:

**SECRETARIAT BUDGET FOR 2005 & 2006**

	<b>2005</b>	<b>2006</b>
	<b>Cost in US \$</b>	<b>Cost in US \$</b>
<b>PERSONNEL</b>		
<b>International</b>		
Regional Co-ordinator	36,000	36,000
<b>Local</b>		
Senior Programme Officer	4,200	4,200
1 Junior Programme Officer	3,000	3,000
1 Secretary	2,750	2,750
<b>PROJECT FORMULATION</b>	10,000	10,000
<b>OFFICE INFRASTRUCTURE</b>		
Furniture, Office Equipment & Consumables	5,000	5,000
<b>RENTAL AND MAINTENANCE</b>	6,000	6,000
<b>ADMINISTRATION COSTS</b>	5,000	5,000
<b>MEETING &amp; INTERNATIONAL TRAVEL</b>	12,500	12,500
<b>DOCUMENTS</b>	5,510	5,510
<b>CONTINGENCIES</b>	4,000	4,000
<b>TOTAL</b>	<b>91,960</b>	<b>91,960</b>

**c) Annual Audit Reports for 2001 - 2004**

Based on the recommendations of the Meeting of National Focal Points the Annual Audited Reports for the financial years 2001 – 2004 were approved.

The meeting authorized the SAS Secretariat that the Auditors be changed every 3 years commencing from 2005.

It also requested that the annual audit reports be sent at least 6 weeks prior to the IMM Meetings so that the National Governments would have sufficient time to scrutinize the reports. This to be effective for the Annual Audit Report of 2005

**10. ADOPTION OF THE REPORT**

The 3<sup>rd</sup> IMM considered and adopted this Report on the 26<sup>th</sup> of August 2005.

## **11. CONCLUDING SESSION**

The Director General of SACEP expressed his gratitude initially to the Royal Government of Bhutan for agreeing to host this meeting and to the Chairman and the other Office Bearers unstinted co-operation in making this meeting a success.

Dr. B. R. Subramanian from India speaking on behalf of all the Delegates present thanked the Chairman of the 3<sup>d</sup> IMM and the Royal Government of Bhutan for the warm hospitality extended to all the participants and for the excellent arrangements made for the 3<sup>d</sup> IMM. He also thanked the Director General of SACEP and the Secretariat for the outstanding substantive and logistical support provided by them for the smooth and efficient conduct of the Session.

The Chairman Hon. Ahmed Abdullah, Minister of Environment, Energy & Water, Republic of Maldives thanked all Delegates and the Director General and the SAS Secretariat for their wholehearted co-operation in ensuring the success of this meeting.

**SOUTH ASIAN SEAS PROGRAMME**  
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**Inaugural Address**  
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**Minister of Environment & Natural Resources**  
**Government of Sri Lanka**

**Honourable Ministers**  
**Senior Officials of the Member States of the South Asian Seas Programme ,**  
**Distinguished Invitees**  
**Ladies and Gentlemen**

I consider it a privilege for me to address this August gathering of the Ministers and Senior Officials of the South Asian member countries in my capacity as the outgoing Chairman of the Second Intergovernmental Ministerial Meeting of the South Asian Seas Programme.

On behalf of the member governments of the South Asian Seas Programme, I extend my sincere gratitude to the Royal Government of Bhutan, particularly my honourable colleague His Excellency Dasho Nado Rinchen, for agreeing to hold this 3rd Inter Ministerial Meeting in Bhutan, though the Royal Government of Bhutan is not a member country of the programme.

I consider this as the spirit of the regional corporation for which we all in the region are committed to. I also must complement the SACEP Secretariat for making use of the opportunity of the SACEP Governing Council for arranging this meeting back to back.

I am aware that since we met last in the year 2002 in Colombo, Sri Lanka, the South Asian Seas Programme has made significant progress in meeting the aspirations of the member governments.

I have been made to understand that, a number of Programmes such as preparation of National Action Plans to Prevent the Marine Environment from Land Based Activities, Promoting Integrated Coastal Area and River Basin Management, Coral Reef Initiatives, activities related to management of Oil Spills in the sea have been undertaken during the last three years.

I am happy to note that the Regional Oil Spill Contingency Plan has been completed and three countries out of the five member states have signed the MOU for its implementation. Therefore, I would like, to take this opportunity to urge the remaining countries to consider early signing of the MOU so that it could be put into implementation for the benefit of the region.

It is a pleasure to note that the Governments of Bhutan and Nepal have also prepared their National Action Plans to prevent the marine environment from the land based activities despite the fact that they do not belong to the Seas Programme. As the outgoing chairman of the Second Inter Ministerial Meeting, I fail in my duty if I do not recognize the support extended by SACEP Secretariat for the implementation of the South Asian Seas Programme.

While making significant progress in the activities of the Seas Programme, the December 2004 Tsunami has added a new dimension to the environmental programmes of three of our member countries. Therefore, such post tsunami environmental impacts have brought about more challenges to us. It is not only that we have to remedy the post tsunami environmental damages, but also prepare for such natural calamities in the future. Therefore, I am confident that the Government of Maldives in its capacity as the new Chairman of the Inter Ministerial Meeting of the SAS, will provide able leadership and guidance to meet with these challenges.

Now I am honoured to invite my honourable colleague, His Excellency Ahmed Abdullah, Minister of Environment Energy & Water of the Government of Maldives to take over the chairmanship of the 3<sup>rd</sup> Intergovernmental Ministerial Meeting of South Asian Seas Programme.

Having known him as a personal friend for a long time, I am quite confident that your able guidance and dynamic leadership will take the South Asian Seas Programme to new heights.

On behalf of all my Ministerial colleagues let me extend our well wishes to the Government of Maldives and to Your Excellency Abdullah for success in carrying out the responsibilities of the Chair.

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On behalf of all my Ministerial colleagues let me extend our well wishes to the Government of Maldives and to Your Excellency Abdullah for success in carrying out the responsibilities of the Chair.

I thank you.

**Welcome Address by  
Dr. A. A. Boaz,  
Director General  
South Asia Co-operative Environment Programme**

Your Excellencies

Honourable Ministers from the South Asian Region

Distinguished Delegates from all the member countries of SACEP

Ladies and Gentlemen

As the Director General of SACEP it is a great privilege and honour to welcome you on behalf of SACEP. It is indeed a great opportunity for us to further strengthen our regional cooperation and friendship.

At the very outset, let me thank the Royal Government of Bhutan and in particular H. E. Dasho Nado Rinchhen, Honourable Deputy Minister, NEC for having so graciously agreed to offer host facilities for this meeting.

Your Excellencies, Distinguished delegates,

This is the Third Intergovernmental Meeting of Ministers of the South Asian Seas Programme. We have had two productive IMM meetings in Islamabad, Pakistan in March 1999 and in Colombo in 2002.

I hope that today's meeting will also be very successful, and its contribution to the future development of the South Asian Seas will be remarkable, especially as the SAS Secretariat with support from UNEP and other UN Agencies such as IMO, UNEP, CRU and our Focal Points have drawn up an ambitious work programme for 2005 - 2007.

Your Excellencies, Ladies and Gentlemen,

We should treasure our oceanic resources. The Indian Ocean and our coastal and marine ecosystem have diverse habitats such as coral reefs, estuaries, mangroves, sea grass beds, and salt marshes. All these habitats are very productive with a rich biodiversity. We cannot protect these marine and coastal resources without regional cooperation. Regional cooperation is very important in dealing with all our common environmental problems besides those associated with the marine resources. We have to protect our seas from human activities in our region, but we need to take measures to prevent the impacts from any such activities in other regions in the world. Indian Ocean is one of the active seas in the world. Several human activities can have negative impact on our marine resources. Unless we strengthen our regional position, we will not be able to make a voice at the global fora to protect our seas.

In the light of the above, as I mentioned earlier the ambitious work programme we have drawn up is based on confirmed commitments that we have received from UNEP, UN affiliated organisations and other bilateral agencies.

At this juncture, may I seek the support of the member countries to strengthen the financial base of SAS. There has not been any increased country contributions towards the SAS Trust Fund since 2000 though the workload for the Secretariat has increased almost three fold. As such, we need to recruit additional hands to strengthen the secretariat.

We have proposed a revision in the country contributions to meet this demand. We are confident that member countries would support this recommendation.

I wish to place on record the support we have received from our Focal Points, UNEP and related UN agencies in taking this programme forward and I look forward to their continued support.

I wish today's meeting a great success and I thank each and every one of you for being present here in spite of your busy schedules and other pressing commitments.

Thank you

**SOUTH ASIAN SEAS PROGRAMME**

**3RD INTERGOVERNMENTAL MINISTERIAL MEETING**

**SOUTH ASIAN SEAS PROGRAMME (SASP)**

**THIMPHU, BHUTAN**

**26<sup>TH</sup> AUGUST 2005**

**AGENDA**

1. Opening of the Meeting
2. Election of Office Bearers & Country Statements
3. Adoption of Agenda and Organisation of Work
4. Statements by United Nations Agencies, International / Regional Organisations and Aid Consortia
5. The future of South Asian Seas within the framework of the Global Regional Seas Programme – Presentation by UNEP
6. Presentation of Report of the Preparatory Meeting of National Focal Points by the Rapporteur
7. Endorsement of Recommendations Agreed Upon at The Preparatory Meeting of National Focal Points
  - a) Institutional
  - b) Projects & Programmes
  - c) Financial
8. Approval of the Annual Audited Report of Accounts for years 2001, 2002, 2003 & 2004
9. Any Other Business
10. Adoption of the Meeting Report
11. Closure of Meeting

**Bangladesh Country Statement by  
Mr. Jafar Ahmed Chowdhury  
Secretary, Ministry of Environment & Forests  
Government of the People's Republic of Bangladesh**

I am greatly honoured and privileged to be here in this beautiful city of Thimphu to attend the third Intergovernmental Ministerial Meeting of the South Asian Sea Programme. On behalf of the Bangladesh delegation and on my personal behalf, I extend my sincere gratitude to the people and the Royal Government of Bhutan for hosting such an important meeting. I would take this opportunity to congratulate Hon. Ahmed Abdullah on your unanimous election to the chair of this meeting. I thank the SACEP Secretariat for kindly organizing the meeting.

**Mr Chairman,**

The South Asian region has a number of biologically rich marine ecosystems. These ecosystems are habitats for a large number of aquatic fauna, including endangered marine turtles. We need to protect them. I am happy to note that since formation of the South Asian Seas Programme back in 1995, a number of activities have been undertaken by its secretariat, SACEP. It is also heartening to note that the South Asian Seas Action Plan has focused on integrated coastal zone management, development and implementation of national and regional oil-spill contingency plan and human resource development through strengthening regional centres of excellence.

**Mr. Chairman**

Pollution created by human interventions finally finds its place in the sea and other water bodies. Toxic wastes and effluent discharge from industries, leaching of agro-chemicals, salinity intrusion due to up-stream withdrawal of water, all adversely affect our watersheds and marine eco-systems. For a better management of our marine eco-systems, we are to act locally, regionally and internationally.

**Mr. Chairman,**

I would like to reiterate our viewpoints that we give due emphasis to the regional oil spill contingency plan. We are trying to develop reception facilities for implementation of MARPOL Convention at our ports. However, we require technical and financial support in our efforts. It may be worthwhile to mention here that very important / significant issue.

**Mr. Chairman,**

We must all admit that tangible progress is yet to be visible in our South Asian Seas Action Plan. I consider, more efforts from SACEP Secretariat should be directed to monitor the implementation of its programmes in the member countries. Let me, in this context, highlight some of the partnership programmes which we have initiated with support from Global Environmental Facility (GEF) and **European Commission (EC)**. These are activities relating to "Improving the Viability and Sustainable Management of Marine and Coastal Protected Areas (MCPA) in South Asia" and "Institutional Strengthening and Capacity Development for the Long-term Management and Conservation of MCPAs encompassing Coral Reef Resources in South Asia".

**Mr. Chairman,**

I am pleased to inform you that very recently, we have finalized our Coastal Zone Management Strategy. We have also undertaken the projects entitled "Coastal and Wetland Biodiversity Management Project (CWBMP)" and "Conservation of Biodiversity, Establishment of Marine Park, Development of Ecotourism at St. Martin's Island" with the assistance of GEF and UNDP to protect our wetland bio-diversity and marine ecosystem from further degradation. We are also implementing a project entitled "Safe and Environment Friendly Ship Recycling" with assistance from UNDP and ILO.

**Mr. Chairman, distinguished Guests, Ladies and Gentlemen,**

I hope that the main message from Thimphu would be that we the Ministers, Country Focal Points of SACEP and Environmental Experts present here are committed to work jointly for conservation of our marine eco-systems and make it free from all sorts of pollution. Once again on behalf of my delegation and on my personal behalf I would like to express my sincere appreciation to the Royal Government of Bhutan for the excellent arrangement of the meeting and generous hospitality extended to us. My thanks are also due to SACEP Secretariat for their secretarial support to this meeting.

I thank you all for your patient hearing.

**Indian Country Statement By  
Dr. B. R. Subramanian  
Department of Ocean Development  
Government of India**

India has a coastline of 7500 km. The coastal and marine environment is rich several specialized coastal and marine ecosystems such as mangroves, coral reefs, turtle breeding grounds and lagoons. The Andaman, Nicobar and Lakshadweep islands have extensive coral reef formations. The Government of India has initiated a number of actions to protect the coastal and marine environment. These national actions fulfill several requirements of provisions of the SAS action plan.

India has made significant progress in the areas of Integrated Coastal Zone Management (ICZM). Pilot ICZM plans for Chennai, Goa and Gulf of Kutch coasts have been prepared and modern scientific tools and techniques have been applied in analysing the coastal problems and for developing integrated management solutions. Significant advancement has been made in applying tools like remote sensing and GIS in the management of critical habitats like mangroves, coral reefs.

India has developed short and long-term programmes for protection of marine environment from the land based activities. The Coastal Ocean Monitoring and Prediction systems (COMAPS) programme of DOD gives in detail the status of marine pollution in the seas around the country. The Govt. of India through Ministry of Environment and Forests and State Governments have been implementing a number of programmes for prevention, control and mitigation of pollution arising due to discharge of untreated domestic sewage and industrial wastes into the coastal waters directly and indirectly through the rivers and creeks. The Bombay Municipal Corporation has already established marine outfalls at three locations for disposal of sewage at 5 km offshore after primary treatment. Onshore disposal of sewage in Bombay at 4 locations after secondary treatment is also in progress. Similar proposal of treatment of sewage before disposal is already in progress for Chennai. Sewage generated by towns along river Ganga and its tributaries are treated under the Ganga Action Plan to ensure clean river water quality. The Ministry of Environment and Forests have launched a National River Conservation Plan in 1995 to cover 18 major rivers in 10 states of the country. Under this action plan pollution abatement works are being taken up in 46 towns in the states of Andhra, Gujarat, Karnataka, Maharashtra, Madhya Pradesh., Orissa, and Tamil Nadu. About 1928 mld of sewage is targeted to be intercepted, diverted and treated. This would reduce flow pollutants into estuaries of rivers like Godavari, Krishna, Mahanadi, Subernereka, Tapi and Narmada. Regarding the wastes from industries, the Environmental laws have provisions for installation of waste treatment plants for large industries and Common Effluent Treatment Plants (CETPs) for small and medium scale industries. A number of CETPs have already been established at industrial estates along the coastal areas of the country and more numbers have been planned in the future. The country encourages adoption of Clean technologies in industrial sector and provides several incentives for this purpose.

The pollution problems which are prevalent at present along the coastal areas are localised and characteristics of pollutants are traceable up to a maximum distance of 1 km from the coast except in the sea off Mumbai. The extent of affected area, which varies from one location to the other, is about 2 to 4 sq. km of coastal water. These localised pollution problems are likely to decrease in the coming future on accomplishment of the above pollution control/mitigation programmes.

A long-term coral reef monitoring programme namely Indian Coral Reef Monitoring Programme (**ICRM**) to monitor the status of coral reef is under implementation by the Ministry of Environment and Forests. Distribution of coral reefs have been mapped by the Department of Ocean Development through the Integrated Coastal and Marine Area Management (ICMAM) programme using GIS in Kadamat island of Lakshadweep, in all 21 islands of Gulf Mannar and in certain parts of Gulf of Kachchh. It has been proposed to map coral reef areas of 3 islands of Andaman group by DOD during the 10<sup>th</sup> plan period. In order to conserve coral reef and prevent damages, the coral reefs have been included under Schedule – I of Wildlife Protection Act, which stipulates stringent punishment including imprisonment for illegal mining of corals. Several new colony formations have been reported in the Gulf of Mannar and Gulf of Kachchh. Environmental Impact Assessment has been made mandatory with stringent standards for projects near the coral reef areas.

Under the programme of Management of mangroves, afforestation programmes have been initiated at 35 mangrove locations along the country.

The recent tsunami has devastated Nicobar islands and parts of Andaman group of islands besides parts of east and west coast of India. India has conducted extensive field survey for mapping of inundation of seawater in coastal areas that occurred during 2004 Indian Ocean Tsunami. Few islands of Andaman and Nicobar and large areas of Tamil Nadu and Kerala have been mapped. Lots of lessons have been learned from the damages occurred during tsunami. The country has been undertaking a massive ecological restoration and human rehabilitation programmes in the tsunami affected areas.

India has a National Oil Spill Contingency Plan prepared by the Indian Coast Guard. The country has the capability to combat oil spills up to 1000 tonnes at present. India's possible assistance to other countries to deal with oil spill emergencies has already been reflected in the Regional Oil Spill Contingency Plan. The country has proposals to establish Port Reception Facilities especially at Mumbai and other locations to receive waste oil stored by ships during their voyage.

India has signed several international conventions relating to marine environment and pollution. It has extensive national legislations to deal with all coastal and marine environment related problems. Enormous positive results have emerged in the form of protection of habitats on implementation of these legislations. For e.g., the Coastal Regulation Zone Notification which stipulates set back lines for human settlement along the coast, has greatly helped in minimizing human loss and damage properties during storm surges and tsunamis.

India can offer training facilities to the other countries in Integrated Coastal Zone Management, control of coastal erosion and beach protection, prevention of siltation in river mouths, modeling and mapping of inundation of seawater in coastal areas due to storms and tsunami etc.

I would conclude that the country is strongly committed to implement the provisions of SAS action plan and continue to work with the member countries in achieving the goal of sustainable development in the Seas bordering the South Asia.

**Maldives Country Statement by  
Hon. Ahmed Abdullah  
Minister for Environment, Energy and Water  
Maldives**

Distinguished Delegates, Director General of SACEP, Dr. Boaz, Mr. Surendra Shrestha, Representative of UNEP, Ladies and Gentleman.

It is a great honour and pleasure to attend this important meeting in the beautiful and hospitable country, Bhutan. I am greatly honoured to accept the chairmanship of this meeting. I know I have a tremendous task ahead. I must congratulate the outgoing chairman, H.E. Fowzie for his guidance and hard work which he put in to initiate the reform process for the South Asian Seas Programme. We all agree the programme needs a major reform as to shape for the present needs of the region. I am confident that I would receive the guidance and wisdom from member countries to this deliberation and to undertake the activities in the coming year to continue the work which we have initiated.

I wish to express my sincere gratitude and appreciation to the South Asian Cooperative Environment Programme, South Asian Seas and the Royal Government of Bhutan for the excellent arrangements made for this meeting and for the generous hospitality extended to us.

The South Asian Seas Region have distinctive geographical groups where the Maldives and Sri Lanka are island nations, Bangladesh, India and Pakistan are situated on the mainland. The region has some of the largest, biologically rich marine ecosystems and host one of the diverse coral ecosystems in the world.

For Maldives, an archipelago of 1900 tiny islands scattered in the central Indian Ocean, sea is part of our life. Our people are sea farers and the backbone of our economy thrives upon the sea and its resources. We are very fortunate to be blessed with bountiful resources. Fishing and tourism has been progressively developed and diversified resulting in very impressive economic growth.

However the Indian Ocean Tsunami of December 2004 have awakened us that the sea which surrounds us is not only important as friend and partners of our life progress and prosperity. But tsunami was a living proof that the sea can be monstrous and grab away our livelihoods, and takeaway property and wealth in a few minutes. The pain and human suffering caused has shivering shocks to our population. It took many months for us to recover from the shocks. But the loss and destruction of our infrastructure economy will take 10 years to recover and reconstruct. It is a such a worst tragedy and painful disaster that we have experienced in our living.

The tsunami tragedy severely impacted and damaged significant portion of our coast in a large number of islands. This is causing beach erosion to alarming proportions as visible. The coral reef provides protection to the islands; top soil and sand were washed from the beach which coated the coral reefs. Though the tsunami did not have direct physical impact, the powdering on the coral reef is a concern for the reef users, as the tsunami had knocked of a new generation of recruitment, which will be visible only a few years later.

Presently we are in a long and arduous process of recovery and reconstruction phase. We realize the importance of integrating sustainability into reconstruction, strengthen environmental monitoring and management capacities, assessment and minimize coastal vulnerability. The tsunami disaster and the months which followed have highlighted the critical need of empowering and strengthening a regional environmental institution to provide the necessary assistance in environment related disasters. In this regard, South Asian Regional Seas Programme can be enhanced to play a key role in responding to environmental disasters related seas, reefs and coastal zone in our region as much as possible.

The fact that our country consists of low lying small islands make our country extremely vulnerable to many environmental factors. Over 80% of the land area is less than one meter above mean sea level. The islands are prone to beach erosion. One of the key areas South Asia Seas is the integrated coastal zone management. We are pleased that SAARC Coastal Zone Management Centre has been inaugurated by H.E. Maumoon Abdul Gayoom on 25 June 2005 in Male. The Centre is critically important for sharing our knowledge and cooperation in areas of coastal zone management. I hope the centre would provide a platform to South Asian Seas to create a valuable partnership in research and operations in coastal zone management. I am sure it would be a valuable resource for improving the health of our coastal ecosystems in the region.

Before I conclude, let me thank the Royal Government of Bhutan for the excellent arrangements that it had made for this important meeting and the warm hospitality extended to me and to my delegation.

I would like to express our hope that this forum would provide us a valuable opportunity to draw up a mechanism to review and strengthen the existing capacity and collaboration to care for our future and manage our environment for a better and healthier future for all us.

Thank You!

**Sri Lanka Country Statement by  
Hon. A.H.M. Fowzie, MP  
Minister of Environment & Natural Resources,  
Government of Sri Lanka**

**Honourable Ministers,  
Senior Officials of the South Asia Seas Programme member States,  
Distinguished Invitees,  
Ladies and Gentlemen,**

At the outset, please allow me to extend our sincere gratitude to the Royal Government of Bhutan for hosting this Third Intergovernmental Ministerial Meeting of the South Asian Seas Programme, although Bhutan is not a member country of the programme.

Based on the decisions of High Level Officials Meeting convened in Colombo, Sri Lanka in 1981, the coastal and island states of the South Asian Seas have decided that within the context of SACEP, a Regional Seas Programme should be developed.

This decision has been followed up with the development of an Action Plan for the South Asian Seas Region, which was formally adopted during 1995 in New Delhi, India. However, since the decision of 1981, a series of programmes in the South Asian Seas region have been undertaken with support from other partners.

The Action Plan has prioritised four areas for action.

These are;

- Integrated Coastal Zone Management
- Development and Implementation of National and Regional Oil and Chemical Spills Contingency Plan
- Human Resources Development through Strengthening Regional Centres of Excellence
- Protection of the Marine Environment from Land Based Activities.

Sri Lanka being a member of the Seas Programme has been benefited from these programmes. I am extremely pleased to mention that, Sri Lanka has already signed the Memorandum of Understanding to implement the Regional Oil Spill Contingency Plan.

Although there is an unavoidable delay in the implementation of the Regional Plan, my Government has already initiated actions to implement the National Oil Spill Contingency Plan through the Marine Pollution Prevention Authority, which falls under the purview of my Ministry. We have also started developing Port Reception Facilities with its inauguration on the World Environment Day, 5th of June this year.

We have also completed the preparation of the National Action Plan to Protect Marine Environment from land-based activities. In Sri Lanka, the landform is such that any activity that is undertaken in the central highlands has long-term impact on the marine environment.

Central highlands of Sri Lanka are the centre of agricultural activities particularly for tea and vegetable cultivation. Therefore, invariably any pesticides or agrochemicals used in these agricultural fields end up in the sea affecting the marine environment.

As you all are aware, Sri Lanka is one of the most favoured destinations for beach tourism. We have seen some impact of the tourism industry on the marine environment. Therefore, it is important for us to protect the coastal resources to promote tourism while protecting the marine environment from such activities.

The Tsunami of December 2004 has brought about more challenges to our efforts in the maintenance of the coastal and the marine environment. Most of the coastal and marine ecosystems have been polluted due to debris and other waste materials.

The land drainage has also been severely affected. More than 15,000 fresh water wells have become unusable due to salt-water intrusion. We have now embarked on a large-scale environmental recovery programme with the generous support from UNEP and other development partners.

Management of coral reefs is another challenge we are faced with. The El Nino effect during the late nineties and the recent tsunami has done much damage to our pristine coral reef ecosystems. Adverse impacts on our coral reefs also have a direct impact on the marine biodiversity as well.

I am aware that, there are similar problems in other member countries of the South Asian Seas Programme. Also, problems in one country will have definite negative impacts of the marine waters of the other. Therefore, the programmes such as the South Asian Seas Programme are ideal platforms to address the common regional problems of this nature.

I strongly welcome the implementation of priority project areas as identified by the National Focal Points. Accordingly, projects for Natural Disaster Management with respect to storm surges & tsunamis and management of coastal & marine protected areas should be undertaken for the next coming two years. Already there are regional experiences in these areas. Therefore, I would like the SACEP Secretariat to explore all possibilities in involving these countries within and outside the region in developing such programmes.

Before concluding let me once again thank the Government of Bhutan for hosting this meeting today. I also would like to extend my best wishes to the success of the South Asian Seas Programme.

I thank you.

**Statement by Mr. Surendra Shrestha  
Regional Director for Asia and the Pacific  
United Nations Environment Programme**

**A. GLOBAL**

1. The Regional Seas Programme (RSP), an alliance between the Regional Seas Conventions and Action Plans (RSCAP), has since its inception 30 years ago constituted a unique approach to the protection of the coastal and marine environment. The Regional Seas programmes of work are mandated by the Governing Bodies of the RSCAP. The Regional Seas have a long history of challenges, successes and lessons learnt, that can be beneficial in optimizing the potential and prospects of both individual RSCAP and the global RSP.
2. Changes in the development agenda, the state of the coastal and marine environment, the international policy framework, scientific knowledge as well as socio-economic realities and trends, constitute challenges that RSP must meet, but at the same time provide opportunities for strengthening the programme as a whole.
3. Recognizing this, the UNEP Governing Council requested in its Resolution 22/2 III A, the development and strengthening of RSCAP in promoting the conservation and sustainable use of the marine and coastal environment and requested UNEP to encourage and support RSCAP to incorporate new strategic elements in their programmes of work, bringing those elements to the attention of their respective Member States through governing bodies and other relevant *fora*.
4. In order to effectively address evolving challenges and the priorities identified in UNEP GC Decision 22/2 III A, and to contribute to reaching the relevant targets of Agenda 21, the WSSD Plan of Implementation and the Millennium Development Goals, the RSP must be strategically adaptive and proactive.

**B. STRATEGIC DIRECTIONS FOR THE REGIONAL SEAS PROGRAMME 2004-2007**

5. Increase Regional Seas' contribution to Sustainable Development, through the enhancement of local, national, regional and global partnerships with relevant social, economic and environmental stakeholders, and through the strengthened implementation of the mandates of the Regional Seas, as a major contribution to the implementation of the WSSD Plan of Implementation and the goals and targets associated with the Millennium Declaration.
6. Enhance the sustainability and effectiveness of Regional Seas Programmes through increasing country ownership, incorporating Regional Seas conventions and protocols into national legislation, promoting compliance and enforcement mechanisms, involving civil society and the private sector, building capacities, ensuring viable national and international financial arrangements, as well as developing assessment/evaluation procedures where appropriate.
7. Enhance Regional Seas' visibility and political impact in global, regional and national policy setting, through strengthening the Regional Seas Partnership, increasing political and public awareness on the economic, social, and environmental importance of coastal and marine resources, promoting concerted information and communication policies, and ensuring participation and promotion of Regional Seas in relevant national, regional and global *fora*.

8. Support knowledge-based policy making, enhanced public participation, education, awareness, and improved reporting on the state of the coastal & marine environment, its resources, and possible threats to them, through amongst others, contributing to appropriate national and regional monitoring and assessment activities.
9. Increase the use of Regional Seas as a platform for developing common regional objectives, promoting synergies and co-ordinated regional implementation of relevant MEAs, global and regional initiatives, and responsibilities of United Nations Agencies and other international actors, as a contribution to the sustainable management of the coastal and marine environment.
10. Develop and promote a common vision and integrated management, based on ecosystem approaches, of priorities and concerns related to the coastal and marine environment and its resources in Regional Seas Conventions and Action Plans, introducing amongst others proactive, creative and innovative partnerships and networks and effective communication strategies.

### **C. SOUTH ASIA SEAS PROGRAMME**

11. The SAS Programme is one of the 17 individual Regional Seas Programmes (RSPs) for which the UNEP Regional Seas Programme provides a comprehensive institutional framework for regional and global co-operation on issues pertaining to the coasts, oceans and seas. At the last Global Meeting of the Regional Seas Programmes, in November 2004, a set of new Strategic Directions were agreed upon and endorsed by the Chairpersons of the Conference of the Parties and Intergovernmental Meetings of the individual RSPs. These list of actions needed to effectively address the evolving challenges and strengthen the RSP at the global level, while continuing to implement the work programmes of the individual RSPs.
12. The South Asian Seas Action Plan (SASAP) was developed since 1984. It was adopted on 24 March 1995 and is supported by the People's Republic of Bangladesh, Government of India, the Republic of Maldives, Islamic Republic of Pakistan and Democratic Socialist Republic of Sri Lanka. The South Asia Cooperative Environment Programme (SACEP) acts as the Action Plan secretariat.
13. The overall objective of the SASAP is to protect and manage the marine environment and related coastal ecosystems of the region in an environmentally sound and sustainable manner. During the last ten years, the SASAP has been focusing on Integrated Coastal Zone Management (ICZM), oil-spill contingency planning, human resource development and the environmental effects of land-based activities.
14. Since its initiation in 1984 and adoption in 1995, there have been many changes in the region and evolving challenges within the international policy framework that SASAP needs to address, among others, to contribute to reaching the relevant targets of Agenda 21, the WSSD Plan of Implementation and the Millennium Development Goals (MDGs).

15. At the International Coral Reef Symposium (ICRS) and the General Meeting of the International Coral Reef Initiative (ICRI) held in Okinawa, Japan in June/July 2004, the urgent need for increased support of the international and national efforts to reverse the degradation of coral reefs in the South Asian region was repeatedly stressed.
16. In light of these clear messages, the UNEP Coral Reef Unit (CRU) and the ICRAN Coordinating Unit (ICU) have contacted a number of funding organizations. There appears to be a high level of interest from both the European Union and the Global Environment Facility, and we have been encouraged to submit two proposals, one to be considered for funding from the European Union and a complementary proposal through the GEF Preparatory Project proposal stream (in support of a Medium-Sized Project concept).
17. The focus of both proposals is broadly on the conservation and sustainable management of coral reefs in the South Asian region in support of the national and regional implementation of the UN Millennium Development Goals, the commitments made at the World Summit on Sustainable Development and the decisions adopted at the 7<sup>th</sup> Conference of Parties to the Convention on Biological Diversity.
18. Proposal: After 10 years of implementing the current Action Plan it is now time to consider if there is a need to augment the Programme in light of the current realities, and shift the focus from project-oriented to a broader regional marine policy mandate, strengthen regional networks, and enhance cooperation with relevant partners in the region in order to effectively assist countries to develop national capacities, amongst others to ensure sustainability of the SAS Programme.
16. In the above context, Ministers might wish to discuss the following questions:
  1. Is there a need to augment the Action Plan?
  2. What are the major areas of economic and environmental development within the region that need to be considered by SAS (e.g. trade, security, natural resources, climate change etc.)?
  3. To which existing programmes and policies should SAS be linked (e.g. SAARC, ADB)?
  4. How can SAS ensure financial and institutional sustainability at the national and regional level?

**Statement by Mr. Caifang Wang  
Senior External Relations Officer  
World Meteorological Organisation**

Distinguished Delegates and Guests  
Ladies and Gentlemen

I wish to take this opportunity to express my deep appreciation to the Government of Bhutan for hospitality recorded to me during my stay in the beautiful city of Thimphu. I also would like to express my thanks to the South Asia Co-operative Environment Programme (SACEP) inviting WMO to participate in this important meeting.

The World Meteorological Organization is an intergovernmental organization with a membership of 187 Member States and Territories including all Member countries of SASP. As a specialized agency of the United Nations, WMO is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.

WMO acts as a catalyst in improving our understanding of weather, water and climate and the application of derived information to socio-economic development, environment protection and related policy formulation. Over 90% of all natural disasters are of weather, climate or water origin. Human and material losses caused by natural disasters are a major obstacle to sustainable development. WMO's objective is to reduce by 50 per cent, over the decade 2010-2019, the associated 10-year average fatality of the period 1995-2004 for natural disasters of meteorological, hydrological and climatic origin.

The WMO Marine Programme has traditionally been under the responsibility of the Joint WMO/IOC Commission for Oceanography and Marine Meteorology (JCOMM). JCOMM is an intergovernmental body of experts, which provides the international, intergovernmental coordination, regulation and management mechanism for an operational oceanographic and marine meteorological observing, data management and services system. The second session of JCOMM will be held from 19 to 27 September 2005 in Halifax, Canada. All Members of SASP are warmly welcome to attend the session and to discuss cooperation between SASP and WMO on seas issue.

As regard to the tsunami issue, I would like to inform the session that WMO actively involved the establishment of tsunami early warning systems in the Indian Ocean. WMO ensures that its Global Telecommunication System (GTS) is fully operational in the Indian Ocean and through its Space Programme, WMO works with satellite operators to utilize satellite capabilities for data collection and dissemination with a view to further expand the capabilities of the GTS. In order to strengthen cooperation with Members in the region, the Secretary-General of the World Meteorological Organization will visit Maldives and Sri Lanka in the near future. He will discuss with dignitaries of the countries in common interest including tsunami early warning in the region.

Ladies and Gentlemen,

The mission of SASP is similar with the WMO Marine Programme. In this context, WMO is willing to support the activities of SASP and look forward to enhance cooperation with SASP in future.

I wish a most successful session.

Thank you.

## **SOUTH ASIAN REGIONAL SEAS PROGRAMME**

### **PREPARATORY MEETING OF NATIONAL FOCAL POINTS FOR THE THIRD INTERGOVERNMENTAL MINISTERIAL MEETING 25<sup>TH</sup> AUGUST 2005 THIMPHU, BHUTAN**

#### **REPORT**

#### **INTRODUCTION**

1. The Preparatory Meeting of National Focal Points for the Third Intergovernmental Ministerial Meeting was held on 25<sup>h</sup> of August 2005 in Thimphu, Bhutan.
2. It was convened in order to discuss all substantive issues concerning the Institutional, Programme and Financial Matters of South Asian Seas Programme. It was also agreed that the Report of the Preparatory Meeting of National Focal Points on the various agenda items would form the basis of discussion of the Third Intergovernmental Ministerial Meeting.

#### **ATTENDANCE**

3. The Meeting was attended by Representatives from the following Member Countries: - Bangladesh, India, Maldives and Sri Lanka. There was also representation from Bhutan.
4. It was also attended by Observers from the following UN Agencies and International Organisations: - World Meteorological Organisation (WMO), United Nations Environment Programme (UNEP) and UNEP Coral Reef Unit (UNEP CRU)

The List of Participants is in **NFP Annex I**.

#### **OPENING OF MEETING**

5. Mr. W. R. M. S. Wickremasinghe, Additional Secretary, Ministry of Environment & Natural Resources, Sri Lanka the current Chair of the IMM inaugurated the Meeting. This was followed by a welcome address by Dr. A. A. Boaz, Director General SACEP.

#### **ELECTION OF OFFICE BEARERS**

6. In conformity with the Rules of Procedure of the Governing Council of SACEP, the following Office Bearers were elected.

Chairman	-	Mr. Ahmed Jameel, Maldives
Vice Chairman	-	Mr. Jafar Ahmed Chowdury, Bangladesh
Rapporteur	-	Dr. B. R. Subramanian, India.

## **ADOPTION OF AGENDA AND ORGANISATION OF WORK**

7. The Draft Agenda prepared by the Secretariat for this Meeting was then discussed. The Agenda item 9 – Draft Ministerial Declaration was deleted from the draft agenda. The adopted Agenda is contained in **NFP Annex II**.

### **AGENDA ITEM 4: REPORT FROM THE SECRETARIAT ON THE FOLLOW UP FROM 2<sup>ND</sup> IMM**

8. Under this Agenda Item, the SAS Secretariat presented an Overall Report on the activities of the Secretariat since 2<sup>nd</sup> IMM. (SAS / NFP / IMM3 / WP 1). It included the following matters; The Secretariat – Staffing etc; Programme Activities & Financial Matters. This report is given in **NFP Annex III**.

The meeting noted progress made under various programmes. It was suggested that a bi-annual progress report be circulated among National Focal Points. In order to ensure smooth implementation of the projects, a meeting of National Focal Points be convened once in 6 months.

### **AGENDA ITEM 5: BRAINSTORMING ON THE VISION FOR THE FUTURE AND WAY FORWARD**

9. Under this Agenda Item, the meeting deliberated upon the vision and way forward of the SAS Programme.

Mr. Surendra Shrestha, Regional Director, UNEP ROAP briefed the meeting on the future of SAS within the framework of the Global Regional Seas Programme. A copy of his presentation is given in **NFP Annex IV (Refer 3<sup>rd</sup> IMM Report Annex IX)**

The National Focal Points then presented their visions/views on programmes / projects, partners and institutional expectations and the possibilities for the future. The countries informed the meeting about various ongoing programmes relating to coastal zone management, preservation and conservation of marine biodiversity including coral reefs, control of pollution due to land based sources and other new initiatives such as extensive afforestation of mangroves, monitoring of coral reef health, health of marine environment that are being implemented. These programmes are relevant to the provisions of SAS action plan. The meeting noted with appreciation the efforts made by the countries.

Regarding the programmes to be carried out in the future, after intensive deliberations, the meeting identified Natural Disaster Management and Management of Coastal and Marine Protected Areas as possible areas that need immediate attention.

**AGENDA ITEM 6: DISCUSSION ON PRIORITY ACTION AREAS FOR THE PROGRAMME OF WORK (POW) 2005 - 2007 AND DECISIONS**

10. Under this Agenda Item, there were deliberations on the following
  - a) Tsunami follow-up
  - b) Oil Spill Contingency Planning, Port Reception Facilities, Globallast Water Management etc.
  - c) Implementation of the Global Programme of Action for the Protection of the Marine Environment From Land-based Activities (GPA)
  - d) Conservation and Management of Coral Reefs

Dr. B. R. Subramanian of India made a presentation on “Preliminary Assessment of the Tsunami in Selected Coastal Areas of India”. A copy of his presentation is in **NFP Annex V**

Dr. Kristian Teleki, Managing Director, ICRAN made a presentation on International Coral Reef Action Network with special emphasis on the proposed two projects in the South Asian Seas region with SAS. His presentation is in **NFP Annex VI**.

Next was a presentation from Mr. Califang Wang, Senior External Relations Officer, World Meteorological Organisation. His presentation is given in **NFP Annex VII (Refer 3<sup>rd</sup> IMM Report Annex X)**

The meeting noted the efforts made by SACEP in implementing the projects especially the workshops and training on oil spill management, Control of land based sources of marine pollution and coral reef management. The meeting noted that 2 countries in the region yet to endorse the MOU on Regional oil spill management. It was also noted that lack of complete staff for the SAS programme was the major constraint in the implementation of the projects identified by 1st and 2nd IMMs.

**AGENDA ITEM 7: FINALISATION OF THE DRAFT PROGRAMME OF WORK 2005 – 2007 (IN LIGHT OF ALL THE ABOVE)**

11. Based on the discussions on Agenda Items 4, 5 & 6, a Draft Programme of Work 2005 – 2007 was drawn up for submission and approval of the 3<sup>d</sup> IMM. The meeting suggested following in this regard:
  - i) Persuasion of implementation of projects approved by 1<sup>st</sup> and 2<sup>nd</sup> IMMs, the details of which are given in **NFP Annex VIII (Refer 3<sup>rd</sup> IMM Report Annex XII)**

- ii) Undertaking new programmes relating to Management of Natural Oceanogenic Disasters and Management of Coastal and Marine Protected Areas. The details of aspects to be undertaken along with prioritisation is given in **NFP Annex VIII (Refer 3<sup>rd</sup> IMM Report Annex XII)**
- iii) The meeting recognised the importance of the early operationalisation of South Asian Regional Oil Spill Contingency Plan and requested the 2 countries who have yet agree to the signing of the concerned MOU to kindly pursue with the relevant authorities and convey their concurrence to the SAS Secretariat so that the SAS Secretariat could convene a Special Meeting for the formal signing of the MOU followed back to back with IMO Regional Training Exercise pertaining to some important elements of the plan.
- iv) The meeting agreed to recommend to the 3<sup>rd</sup> IMM that SAS sign the Letter of Agreement with the International Maritime Organization. The copy of the Letter of Agreement is in **NFP Annex IX (Refer 3<sup>rd</sup> IMM Report Annex XIII)**

**AGENDA ITEM 8: FUNDING**

12. Under this Agenda Item, the Secretariat presented the Financial Status of the Secretariat

The meeting deliberated on the following aspects

- (a) Review of Country Contributions from Member States for the South Asian Seas Trust Fund
- (b) External Funding (GEF, ADB and others)
- (c) Draft Secretariat Budget 2005-2007
- (d) Presentation of Annual Audited Report of Accounts for years 2001, 2002, 2003 & 2004

**A. Contributions to SAS Trust fund**

The meeting noted that the countries have arrears in contribution to the trust fund. The details of the arrears to be paid by the Governments are given in the **NFP Annex X**. The respective countries have agreed to clear the arrears.

The Secretariat sought an increased contribution by member countries at a rate 10% increase per annum from the year 2000 onwards. The meeting found that as there has been considerable savings from the previous year contributions, it was agreed that the status quo on annual contribution at the present rate would be maintained up to 2007.

The agreed levels of contributions to the SAS Trust fund will as follows:

<b>COUNTRY</b>	<b>% Contribution</b>	<b>2005 US \$</b>	<b>2006 US \$</b>	<b>2007 US \$</b>
Bangladesh	14.5	13,335	13,335	13,335
India	35.0	32,185	32,185	32,185
Maldives	6.5	5,975	5,975	5,975
Pakistan	29.5	27,130	27,130	27,130
Sri Lanka	14.5	13,335	13,335	13,335
<b>TOTAL</b>	<b>100.0</b>	<b>91,960</b>	<b>91,960</b>	<b>91,960</b>

The meeting also recommended for using the trust fund for preparation of the project proposals identified for 2005-07 with a budgetary allocation of US \$ 10,000 per year.

#### **B. Appointment of Staff approved for SAS Programme**

The meeting noticed that the post of Regional Co-ordinator, which is a key position, approved by the 1<sup>st</sup> IMM to carry out all functions related to the SAS programme, is remaining unfilled since the year 2001. The meeting strongly urged SACEP to fill up the position without further delay and in case any not later than 31<sup>st</sup> March 2006. The procedures for appointment of Regional Co-ordinator to be adopted by SACEP would be as follows:

1. SACEP will widely publicize the vacancy by itself and through the National Focal Points using the qualifications prescribed for this position by 1<sup>st</sup> IMM. The applications will be received at SACEP.
2. SACEP will constitute a panel of 5 experts nominated one by each member country with DG, SACEP as the Chairman. The panel will scrutinize the applications and recommend a short list of eligible candidates to be called for the interview. The panel will interview the short listed candidates and select the Regional Co-ordinator. DG SACEP can make the appointment of the selected candidate.

#### **C. Interim arrangement to meet staff requirement**

The meeting noted that in the absence of a regular Regional Co-ordinator, the SACEP has been implementing the SAS programme through an Interim co-ordinator who is being paid an amount of US \$ 1,000 p.m. from the funds provided

by United Nations Environment Programme. Since the workload has increased substantially the Interim Co-ordinator requested for appropriate compensation. The meeting considered the request and suggested a payment of US \$ 500 per month from the SAS trust fund for the period up to, which UNEP provides funding that is 31 Dec 2005. For any need for continuation of services of the Interim Co-ordinator beyond this period, the meeting requested the DG SACEP to make an appropriate proposal to the Government's of the member countries as it may result into creation of additional staff position in the SAS Programme.

The Secretariat Budget for 2005 – 2007 for approval by the IMM is given in **NFP Annex XI (Refer NFP Annex XII)**

**D. Annual Audited Report of Accounts for years 2001, 2002, 2003 & 2004**

The meeting recommended IMM for approval of Audited Reports of Accounts for the years 2001 to 2004. It was also suggested the reports should have more details on items of expenditure.

**AGENDA ITEM 9: ANY OTHER BUSINESS**

13. Under this item, no additional agenda proposed.

**AGENDA ITEM 10: ADOPTION OF THE REPORT AND CLOSURE OF MEETING**

- 14, The Meeting considered and adopted this Report on 25<sup>th</sup> August 2005.

The meeting also considered a document prepared by the Secretariat, which spelt out the recommendations that will be submitted to the IMM for endorsement. The agreed recommendations seeking the approval by the 3<sup>rd</sup> IMM are attached as **NFP Annex XII**.

The Chairman Mr. Ahmed Jameel thanked all the delegates for their co-operation in making this meeting a success.

Mr. Jafar Ahmed Chowdhury speaking on behalf of all the delegates thanked the SAS Secretariat for conducting this meeting in a very professional manner and thanked the Royal Government of Bhutan for agreeing to offer for the conduct of the meeting in their country and for their very warm hospitality.

## **SOUTH ASIAN REGIONAL SEAS PROGRAMME**

**PREPARATORY MEETING OF NATIONAL FOCAL POINTS  
FOR THE THIRD INTERGOVERNMENTAL MINISTERIAL MEETING  
25<sup>TH</sup> AUGUST 2005  
THIMPHU, BHUTAN**

### **LIST OF ANNEXES**

Annex No	Title
I	List of Participants
II	Adopted Agenda
III	Overall Report on the activities of the Secretariat since 2 <sup>nd</sup> IMM.
IV	Presentation by Mr. Surendra Shrestha, Regional Director, UNEP ROAP (Refer 3 <sup>rd</sup> IMM Report, Annex IX)
V	Presentation by Dr. B. R. Subramanian of India on “Preliminary Assessment of the Tsunami in Selected Coastal Areas of India”.
VI	Presentation by Dr. Kristian Teleki, Managing Director, ICRAN on International Coral Reef Action Network in relation to SAS
VII	Presentation by Mr. Califang Wang, Senior External Relations Officer, World Meteorological Organisation (Refer 3 <sup>rd</sup> IMM Report, Annex X)
VIII	Draft Programme of Work 2005 – 2007 (Refer 3 <sup>rd</sup> IMM Report, Annex XII)
IX	Draft Letter of Agreement with the International Maritime Organization. (Refer 3 <sup>rd</sup> IMM Report, Annex XIII)
X	Country Contribution Arrears
XI	Draft Secretariat Budget for 2005 – 2007 (Refer NFP Annex XII)
XII	The agreed recommendations seeking the approval by the 3 <sup>rd</sup> IMM

**PREPARATORY MEETING OF NATIONAL FOCAL POINTS FOR  
3RD INTERGOVERNMENTAL MEETING OF SASP  
THIMPHU, BHUTAN  
25TH AUGUST 2005**

**Annex X1  
NFP / Annex I**

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**PREPARATORY MEETING OF NATIONAL FOCAL POINTS FOR  
3RD INTERGOVERNMENTAL MEETING OF SASP  
THIMPHU, BHUTAN  
25TH AUGUST 2005**

**Annex X1  
NFP / Annex I**

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## **SOUTH ASIAN SEAS PROGRAMME**

### **PREPARATORY MEETING OF NATIONAL FOCAL POINTS FOR THE 3RD INTERGOVERNMENTAL MINISTERIAL MEETING OF THE SASP THIMPHU, BHUTAN 25<sup>TH</sup> AUGUST 2005**

#### **AGENDA**

1. Opening of the Meeting
2. Election of Office Bearers
3. Adoption of Agenda and Organisation of Work
4. Report from the Secretariat on the Follow up from 2<sup>nd</sup> IMM
5. Brainstorming on the Vision for the future and Way Forward
  - The future of SAS within the framework of the global Regional Seas Programme – Presentation by UNEP
  - Presentation of visions/views by National Focal Points (NFP's) - (programmes/projects, partners & institutions): expectations and possibilities for the future
  - Moderated discussions and agreement on the action agenda
6. Discussion on priority action areas for the POW 2005-6 and decisions:
  - Tsunami follow-up
  - Oil Spill Contingency Planning, Port Reception Facilities, Globallast Water Management etc.
  - Implementation of the Global Programme of Action for the Protection of the Marine Environment From Land-based Activities (GPA)
  - Conservation and Management of Coral Reefs
  - Others
7. Finalisation of the draft Programme of Work 2005 – 2007 (in light of all the above)
8. Funding
  - (a) Review of Country Contributions from Member States for the South Asian Seas Trust Fund
  - (b) External Funding (GEF, ADB and others)
  - (c) Draft Secretariat Budget 2005-2007
  - (d) Presentation of Annual Audited Report of Accounts for years 2001, 2002, 2003 & 2004
- 9.. Any Other Business
10. Adoption of the Meeting Report & Closure of Meeting

## REPORT OF SOUTH ASIAN SEAS PROGRAMME ACTIVITIES SINCE 2<sup>ND</sup> IMM – JUNE 2002

### 1. PREAMBLE

#### **BACKGROUND TO SOUTH ASIAN SEAS PROGRAMME**

In the light of deteriorating environmental conditions, the countries of the South Asian Region, thoughtfully came together, and signed a Declaration in Colombo, now known as the "Colombo Declaration". The countries concerned were Afghanistan, the current member states of the South Asian Association for Regional Co-operation (SAARC), Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka and Iran. Through this association, they formulated South Asia Co-operative Environment Programme (SACEP) to be the nerve centre of environmental activities in the areas of regional concern as a collaborative effort of the Member Countries. SACEP, since it became a 'legal entity' in 1982, has been implementing the programmes and policies approved by its Governing Council, which constitutes ministerial representation of the member countries.

The various aspects of Coastal and Marine Environmental Management is presently being covered in three of SACEP's fifteen Priority Subject Matter Areas, namely Conservation of Corals, Mangroves, Deltas, Coastal Areas, Conservation of Island Ecosystems and Regional Seas Programme, which were identified by experts of the region at its formative stages. SACEP since then has actively been involved in various programme activities in these subject areas.

The Stockholm Conference in 1972 on the Human Environment was the spiritual father of the United Nations Environment Programme. The Conference underlined the "vital importance" for humanity of the seas and all the living organisms, which the oceans support. UNEP in its very First Governing Council Sessions in 1973 set the "Health of the Oceans" as one of its priority concerns. Even today this remains as one of its major concerns.

For a variety of historical reasons, a Regional Seas Programme for the South Asian Seas was not initiated. The emergence of SACEP saw with it the revival of interests of the concerned member states towards the establishment of a Regional Seas Programme for the South Asian Seas.

Based on the decisions of a High Level Meeting of Officials convened in Colombo, 18 - 21 February 1981 the coastal and island States of the South Asian Seas decided that within the context of the South Asia Cooperative Environment Programme (SACEP), a Regional Seas Programme should be developed.

In response the Tenth Session of the Governing Council of the United Nations Environment Programme (UNEP) in May 1982, requested the Executive Director in decision 10/20 *"...to enter into consultation with the concerned States of the South Asia Cooperative Environment Programme (SACEP) to ascertain their views regarding the conduct of a Regional Seas Programme in the South Asian Seas"*.

The Action Plan for the South Asian Regional Seas Programme was formally adopted at a Meeting of Plenipotentiaries of the concerned countries held in New Delhi, on March 24th 1995.

The Action Plan of the South Asian Seas Programme approved at this Meeting of Plenipotentiaries had certain important elements, which will assist the member countries in protecting the marine environment of the region.

The Action Plan in addition to specifying the needs under the main components of Environmental Assessment, Environmental Management, Environmental Legislation & Institutional and Financial Arrangements, identified the areas where priority activities need to be developed for implementation under the Action Plan. These priority activities are in four specific areas.

1. Integrated Coastal Zone Management
2. Development and Implementation of National and Regional Oil and Chemical Spill Contingency Planning
3. Human Resources Development through Strengthening Regional Centres of Excellence
4. Protection of the Marine Environment from Land-based Activities

However the Action Plan did not preclude the Secretariat from undertaking activities in areas other than those mentioned above.

## **2. THE SECRETARIAT – STAFFING ETC**

The South Asia Co-operative Environment Programme (SACEP) has been designated as the Secretariat of the SASAP. The role of the Secretariat as defined in the Action Plan is twofold. Firstly, it should *ensure the harmonious and integrated evolution of each of the components of the Action Plan*. Secondly, it should *assume responsibility for its technical and administrative co-ordination*. As mandated by the Action Plan, SACEP Secretariat has assumed full responsibility for the planning, programming, co-ordination and implementation of the major components and priority activities of the Action Plan.

At present the SAS Staff is as follows:

- A. Interim Co-ordinator - Supported by UNEP
- B. One Programme Officer – Supported by SAS Trust Fund
- C. One Secretary – Supported by SAS Trust Fund

In addition following a recommendation made at the 1<sup>st</sup> IMM, the rest of SACEP Staff receives an allowance of 15% of their salary for the additional work they perform for SAS Activities.

## **PROPOSAL FOR STAFFING 2005 – 2007**

In the overall organisational structure the following staffing is proposed for SAS Secretariat.

- A. Regional Co-ordinator
- B. Three Programme Officers – (2 Additional Staff to be recruited)
- C. One Secretary

### **A. POST OF REGIONAL CO -ORDINATOR**

The 1<sup>st</sup> IMM of SAS held in March 1999 based on the Secretariat requirements authorised recruitment within 6 months from the date of issue of Report of the First IGMM, one Senior Programme Officer (Regional) and within 3 months one Programme Officer (Local) and a Secretary. The posts will be on a contractual basis for a period of 3 years or a maximum of four years purely at the discretion of the Director General of SACEP.

At the 2<sup>nd</sup> IMM held in June 2002, as the recruitment of a Senior Programme Officer had not been completed, UNEP offered to support the post of an Interim Co-ordinator from their budget at US \$ 1,000 per month as a partial supplement. Accordingly taking into the fact the SACEP's Deputy Director Programmes had been involved in the SAS programme since its inception in 1983, he was recruited as Interim Co-ordinator effective 1<sup>st</sup> January 2003.

Since this appointment the Post of the Regional Co-ordinator has not been filled till date and it is proposed to fill the post at the earliest.

### **B. PROGRAMME OFFICERS – (2 ADDITIONAL STAFF TO BE RECRUITED)**

Taking into consideration that fact the SAS programme has achieved much progress and that there are many projects in the pipeline for immediate implementation, there is the urgent need for strengthening the staffing with respect to both programme and secretarial staff

In the Proposed Secretariat Budget for 2005 – 2007 it envisaged that over the coming biennium 2 additional Programme Officers will be recruited.

### **C. SECRETARY**

The Secretary recruited in 2003 has left to pursue higher studies and as such a new Secretary will be recruited shortly.

### 3. MAIN PROGRAMME ACTIVITIES

Within the reporting period the secretariat has carried out a variety of activities ranging from awareness creation, capacity building, networking for better collaborative efforts and commissioning or participating in assessments. Following are some key highlights:

#### A. INTEGRATED COASTAL ZONE MANAGEMENT

The various aspects of Coastal and Marine Environmental Management is presently being covered in three of SACEP's fifteen Priority Subject Matter Areas, namely Conservation of Corals, Mangroves, Deltas, Coastal Areas, Conservation of Island Ecosystems and Regional Seas Programme, which were identified by experts of the region at its formative stages. Throughout the year the secretariat has undertaken several activities on this issue:

- **Promoting the ICARM Concept:** The new concept of Integrated Coastal Area and River Basin Management (ICARM) was introduced to the region through a workshop for coastal and river basin managers from Bangladesh, India, and Sri Lanka, together with resource persons from Denmark and the Netherlands in India from 7-10 April 2003.
- **Testing of ICARM in Sri Lanka:** As a result of a proposal submitted following the above mentioned meeting the secretariat and the Coast Conservation Department of Sri Lanka are implementing a pilot project on Integrated Coastal Area and River Basin Management (ICARM) at the Attanagalu Oya river basin. UNEP-Regional Seas Programme is providing the financial support for the first phase, which will culminate with an integrated management framework and an action plan for the river basin by the end of 2004.
- **Coral Reef Activities:** The Secretariat has worked with a number of coral reef initiatives to promote the better management of the regions' coral reefs .

A report on "Alternative Livelihoods through Income Diversification as a Management Option for Sustainable Coral Reef and Associated Ecosystem Management in Sri Lanka" has been published.

Also a project proposal titled "Improving Site-Based Coral Reef Management in South Asia: The Identification of Demonstration & Target Sites for Coral Reef Management and Networking for Experience Sharing" has been prepared and the secretariat is currently seeking funding for this.

In connection with the above there have been discussions with UNEP's Coral Reef Unit, ICRAN. And presently there are 2 activities under consideration are

- ✚ Medium-sized Project proposal REQUEST FOR GEF FUNDING PROJECT TITLE: Improving the viability and Sustainable Management of Marine and Coastal Protected Areas (MCPAs) in South Asia

- ✚ EC Proposal on Institutional strengthening and capacity development for the long-term management and conservation of MCPAs encompassing coral reef resources in South Asia
- **Conservation and Integrated Management of Marine Turtles:** A project proposal entitled Conservation and Integrated Management of Marine Turtles and their Habitats in the South Asian Seas Region, through implementation of the IOSEA Marine Turtle Memorandum of Understanding was developed by SACEP and IOSEA Secretariat. The aims and objectives of the project proposal developed by SACEP and the IOSEA include: 1) Information gathering and sharing on the status of marine turtles in the region, 2) Reviewing and strengthening national legislation; 3) Making recommendations for designation of critical sites for marine turtles; and 4) Developing standardised research techniques. This proposal has been circulated to the relevant authorities in the 5 maritime countries of South Asia.

## **B. DEVELOPMENT AND IMPLEMENTATION OF NATIONAL AND REGIONAL OIL AND CHEMICAL SPILL CONTINGENCY PLANNING**

Due to the strong ties that have been established with the International Maritime Organisation (IMO), a major share of the work carried out has been to assist in aspects of maritime conventions such as OPRC and MARPOL 73/78. Towards this, efforts were made to put in place a Regional Oil Spill Contingency plan. The need for a Contingency plan, having available well prepared human and physical resources and timely regional support to carry out the responses proved to be useful in July 2003 when an Oil Spill disaster occurred close to the Karachi Port in Pakistan. (The MT TASMAN Spirit carrying 67,000 tonnes of light crude oil was grounded 1.5 nautical miles off Karachi Port with over 27,000 tonnes of oil spill.

Skills and capacity development for officials involved in oil spill management issues have taken place both regionally and locally. During 2003 alone over 100 officials from the region were trained on compliance and enforcement of IMO Conventions. Within this year the following training courses were carried out in collaboration with IMO:

- **A Regional Workshop on the Implementation and Enforcement of MARPOL 73/78**  
The South Asia Regional MARPOL 73/78 implementation and enforcement workshop was held from 30 June to 4 July in Sri Lanka. Two participants from each country were trained in national and regional implementation and enforcement of the convention.
- **A Regional Training Course on How to Deal with Oil Spills:** In order to have in place a workforce that is better prepared to handle oil spills, an OPRC Level 2 Training Course for Supervisors and On scene Commanders from the South Asia Seas Region was carried out in Sri Lanka from 22-26 September, 2003. The objectives of the course were to elaborate on how to command and coordinate responses to an oil spill and to facilitate the elements needed for the implementation of the OPRC Convention. Thirteen personnel from the region engaged in this training that

- covered oil spill behaviour, effects, containment, recovery, contingency planning (national/regional), response management, operations planning, site safety, liability
- and compensation, media relations etc. Syndicate exercises were carried out to emulate possible scenarios in the event of an oil spill.
- **A National OPRC Level 3 Training for Pakistan:** A National training programme on OPRC (Level 3) was conducted from 9 – 11 December in Pakistan. The objective of the course was to inform senior officials on the responsibilities of the members of an oil spill response team organization to effectively respond to an oil spill through the development of equipment and resources at the national level. The training course mainly focused on the operational management and policies involved in responding to oil spills. There were 25 participants representing government, private sector, NGOs participated at the workshop.

The following activities under the SAS / IMO project cycle could not be held as the respective countries requested for a postponement.

TITLE	COUNTRY
• National OPRC Level 3 (Contingency Planning Workshop)	Maldives
• National OPRC Level 3 (Contingency Planning Workshop)	Bangladesh
• National MARPOL/Ship Recycling Workshop	Bangladesh

Following discussions with IMO, fairly full programme of activities have been included for the rest of 2005. They are as follows:

**i. Regional workshop on measures to collect, handle, treat and dispose of waste generated in applying Anti Fouling System (AFS) Convention**

🚩 Workshop confirmed for 2 – 6<sup>th</sup> October 2005 in Chennai

**ii. Development of a project proposal related to port reception facilities following a feasibility study of technical and operational aspects (Bangladesh, India, Maldives, Pakistan, Sri Lanka),**

🚩 Confirmed for 12 - 30 September

**iii. Regional seminar/workshop on ratification and implementation of the International Convention on Oil Pollution Preparedness, Response and Co-operation, and Highly Noxious Substance (OPRC-HNS )Protocol, the AFS Convention and identification and establishment of Particularly Sensitive Sea Areas (PSSAs) & National OPRC Level 3 for Maldives Male, Maldives**

🚩 **Suggested Time Frame**

31 October - 4 November      Regional Workshop and

7 - 11 November              National OPRC Course.

🚩 Host Country      **Maldives**

**iv. National OPRC Level 3 for Bangladesh (MED/SACEP), Dhaka, Bangladesh**

- ✚ Suggested Time Frame **1 - 23 December**
- ✚ Host Country **Bangladesh**

**V. Follow Up On Globallast Programme**

- ✚ As a follow up to the initial Phase of this programme, IMO is currently developing a stakeholder consultation plan for the Globallast Partnerships PDF-B process.
- ✚ As South Asia was in the initial regions included, the share in this phase will be minimal. There is a possibility that some funds will be available for implementing some areas identified in the Regional Action Plan which was finalised at the Singapore Regional Meeting.
- ✚ They will keep us posted of the developments.

**Vi. Follow Up On Regional Oil Spill Contingency Plan**

- ✚ There are 2 countries which have to formally agree to this Plan.
- ✚ Once this is obtained the Secretariat would make arrangement for a Special Signing Ceremony followed back to back with a Training Exercise on Communications with respect to the Plan. In the Interim, the countries will be expected to update their contingency plan

A major initiative has been the reaching of the Agreement of Co-operation between SACEP/SAS and IMO.

The 3<sup>rd</sup> IMM will be requested formally endorse the signing of this Agreement of Co-operation after which this will be formally submitted to IMO Assembly for endorsement (Attachment).

**C PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (GPA)**

Given that land based sources are the main culprits of seas and ocean pollution, protecting the seas also requires addressing land based issues. The SAS secretariat functions as the regional node for GPA programming activities and has engaged in facilitating activities to achieve the objectives minimizing land based pollution. Major initiatives undertaken under these areas of work are given below:

- **Formulation of the Regional Plan of Action for GPA 2003-2006:** The Secretariat in association with the UNEP GPA Coordination Office and the International Water Management Institute (IWMI) organised the South Asia Regional Consultation Workshop to prepare the Regional Plan of Action for GPA 2003-2006 from 28-30 April, 2003 in Sri Lanka. This workshop was convened in line with the results of the 1<sup>st</sup> Inter-governmental Review Meeting of the GPA held in Montreal in November 2001 and the commitments pertaining to GPA in the Plan of Implementation of the World Summit on Sustainable Development. The workshop identified activities requiring regional collaborative efforts emphasising the potential for public and private partnerships, capacity building, and specific activities to which the GPA Coordination Office could add value.
- **National Action Programme (NPA):** The development and implementation of Pilot National Programme of Action (NPA) for the Protection of the Marine Environment from Land-based Activities in Sri Lanka with GPA Funding was undertaken. Inputs were given by secretariat for the development of NPA.
- **“Strategic Planning and Developing Market Based Instruments for the Medium to Long Term Strategic Planning of the Implementation of the Sri Lanka National Program of Action (MBI/NPA)”**

UNEP/GPA has identified environmental financing strategies, environmentally related market based instruments reviews and other supporting methods as tools, which may assist countries to utilize their own resources most effectively and efficiently, identify possible new domestic resources, make the most of foreign assistance and optimize possibilities of utilizing IFI and commercial financing.

The aim of the overall follow-up project to the Sri Lanka NPA- is to assist the government of Sri Lanka to further develop their NPA in order to facilitate fully resourced, transparent and politically endorsed national programmes that incorporate appropriate public spending programmes, pollution command and control regimes, market and/or fiscal incentives for pollution prevention and capacity building initiatives. The main focus will be on land based sources of pollution, however, all environmentally related issues may be considered – with the potential in general to strengthen the GPA programme area through a holistic approach to environment. This project is currently under implementation

- SAS is a partner of an EU Proposal submitted by UNEP GPA to the European Union, The title of the project is **“Planning and implementation of Coastal Reconstruction in Tsunami affected countries according to the Cairo Guiding Principles within the context of the UNEP GPA in the South Asian Region”**. The involvement of partner activities of SAS will be Project Backstopping regional; Preparation of Stakeholder meetings, material including preparation of background papers; Identification of specific needs and be a Steering Committee member.

#### **D. OTHER MAJOR PROGRAMME ACTIVITIES**

Listed below are some of the other important activities outside the 4 main priority areas that were undertaken through the year:

- A regional report on the State of the Marine Environment in the South Asian Seas Regional (UNEP Regional Seas Reports & Studies No. 123), based on the country reports was published in 1985, This was based on National Reports prepared by National Consultants UNEP has provided support for a similar exercise and the currently National consultants are preparing their national reports and a Regional Consultant will prepare a Regional Report. It is expected to be complete before the end of this year.
- The Secretariat has been collaborating to take forward the activities of the **Global International Waters Assessment**, in the Sub Region 53 (Bay of Bengal) along with UNEP, GEF and Kalmar University of Sweden. The final workshop for the Global International Waters Assessment, Sub Region 53 - Bay of Bengal assessment programme, in Colombo, Sri Lanka from 28-30 June, 2003. The workshop brought together 27 participants from various fields (ecologists, economists, engineers, planners, politicians etc.
- **Development of Harmonised National Environmental Quality Criteria for Seawater for the South Asian Seas (SEAQUAL)** with Norwegian Institute for Water Research (NIVA) for NOK 14.98 Million (US \$ 2 Million) for Implementation during 2004. This project is currently being expanded to include Tsunami related activities and also possible co-financing from SIDA. The Secretariat would receive during the course of September the revised proposal from NIVA and before the end on this year we are hopeful the project will be operational. This would be the biggest project ever undertaken by SAS .
- There are undergoing negotiations with the UNEP's GEF POP's Unit for development of PDF B Proposal for the South Asian Seas Programme.
- SAS Secretariat also will be entering into a collaborative programme with the Indian Ocean Global Ocean Observation System (IO-GOOS) the Secretariat which is based in Hyderabad, India. The proposed IOGOOS Agreement is attached for consideration at this meeting

#### 4. FINANCIAL STATUS

Basis that the SASAP Trust Fund be financed, at least for the initial two year period, by annual contribution according to the ratios in the SAARC Scale of Assessment agreed upon by SAARC member States, where the maximum contribution from a member State is 35% whilst the minimum contribution is 5%. The % contribution and the current level of contributions are as follows

	<b>% Contribution</b>	<b>Pledged in US \$ 2004</b>
<b>Bangladesh</b>	14.5	13,335
<b>India</b>	35.0	32,185
<b>Maldives</b>	6.5	5,975
<b>Pakistan</b>	29.5	27,130
<b>Sri Lanka</b>	14.5	13,335
<b>Total</b>	<b>100</b>	<b>91,960</b>

The financial status with respect to the country contributions continues to be very unsatisfactory though we received some arrears and that too only in 2004

Given below is a composite chart of the current position of country contributions from 1997 - 2004.

	<b>% Contribution</b>	<b>Pledged in US \$ 1997 - 2004</b>	<b>Received in US \$ 1997 - 2004</b>	<b>Shortfall in US \$ 1997 - 2004</b>	<b>% Arrears of Country 1997 - 2004</b>	<b>% Arrears of Total 1997 - 2004</b>
<b>Bangladesh</b>	14.5	100,183	82,330	17,853	17.8	9.9
<b>India</b>	35.0	241,810	177,440	64,370	26.6	35.6
<b>Maldives</b>	6.5	44,898	20,426	24,472	54.5	13.5
<b>Pakistan</b>	29.5	203,823	129,598	74,225	36.4	41.0
<b>Sri Lanka</b>	14.5	100,188	100,188	0	0	0
<b>Total</b>	100	690902	492464	180,920		100

It is very important that for the Secretariat to function effectively, as such the financial commitments pledged by the countries should be remitted within the 1<sup>st</sup> quarter of the SAS Financial year which is January to December.

The Secretariat 's proposal for the revitalisation of the SAS Trust Fund and the proposed Secretariat Budget will be presented and discussed under Agenda Item 8

## 5. GENERAL OBSERVATIONS

From the above it is very evident that much work has been undertaken by the SAS Secretariat with limited staff resources.

Much more could have been achieved had there been quick responses from the Governments. A case in point is the signing of the MOU with respect to the Regional Oil Spill Contingency Plan. This matter has been pending for more than 2 years and as a result of this SAS Secretariat has not been able to put this plan into operation despite a firm decision taken at the Ministerial Level. The countries have been denied training opportunities and possible granting of essential equipment.

The Secretariat is hopeful that this MOU will be signed and the Contingency Plan operational.

## 6. ACKNOWLEDGEMENTS

The Secretariat wishes to place on record the support it has received from its Focal Points. It also wishes to thank **Ms. Veerle Vanderweerd Coordinator, UNEP/GPA and Head Regional Seas Programme, Dr. Ellik Adler, Senior Programme Officer Regional Seas Programme Coordinator, UNEP, Nairobi, Dr. Anjan Datta, Programme Officer, GPA, Ms. Anne Muchai, Associate Programme Officer, UNEP GPA, & Ms. Hanneke VanLavieren, Programme Officer, UNEP Regional Seas Programme, Nairobi** for their unstinted co-operation.

The Secretariat wishes to place on record specially the support IMO has given this programme especially **Jiixin Zhu, Director / Head Asia and Pacific Section of Technical Co-operation Division, Jean-Claude Sainlos, Director, Marine Environment Division & John Ostergaard, Senior Adviser on Marine Pollution, Marine Environment Division**

The support given by the Norwegian Institute for Water Research (NIVA), UNEP's World Conservation Monitoring Centre (WCMC), Cambridge UK, The Secretariat for the implementation of the Indian Ocean & South East Asia (IOSEA) Marine Turtle MoU, Global International Water Institute (GIWA), Secretariats of International Coral Reef Initiative (ICRI), International Coral Reef Action Network (ICRAN) & Coral Reef Degradation in the Indian Ocean (CORDIO) & Indian Ocean Global Ocean Observation System (IO-GOOS) is gratefully acknowledged.

# Preliminary Assessment of Impact of Tsunami in Selected Coastal Areas of India<sup>(a)</sup>



**Compiled by**

**Department of Ocean Development  
Integrated Coastal and Marine Area Management  
Project Directorate  
Chennai**

**June 2005**

<sup>(a)</sup> Data collected by institutions should not be reproduced without the consent of Department of Ocean Development.

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## **1 Background**

Tsunamis are among the most terrifying natural hazards known to man and have been responsible for tremendous loss of life and property throughout history. Because of their destructiveness, tsunamis have notable impact on the human, social and economic sectors of our societies. In the Pacific Ocean, where the majority of these waves have been generated, the historical record shows wide scale destruction. In Japan, which has one of the most populated coastal regions in the world and a long history of earthquake activity, tsunami has destroyed large coastal populations. There is also a history of tsunami destruction in Alaska, in the Hawaiian Islands in South America, Japan and elsewhere in the Pacific.

Destructive tsunamis have also occurred in the Indian Ocean and in the Mediterranean Sea. The most notable tsunami in the region of the Indian Ocean was that associated with the violent explosion of the volcanic island of Krakatoa in August 1883. A 30 m (100 feet) tsunami resulting from this explosion killed 36,500 people in Java and Sumatra. The violent eruption and explosion of the volcano of Santorin, in the fifteenth Century B.C. generated a giant tsunami which destroyed most of the coastal Minoan settlements on the Aegean Sea islands acting as the catalyst for the decline of the advanced Minoan civilization.

Tsunamis that can travel across an ocean and attack a coastal area far away from the source of generation are called distant Tsunamis or Teletsunamis, while tsunamis that are confined in an area near the source are called local Tsunamis.

## **2 History of Tsunamis affecting Indian Ocean**

Although not as frequent as in the Pacific Ocean, tsunamis generated in the Indian Ocean pose a great threat to all the countries of the region. The most vulnerable are: Indonesia, Thailand, India, Sri Lanka, Pakistan, Iran, Malaysia, Myanmar, Maldives, Somalia, Bangladesh, Kenya, Madagascar, Mauritius, Oman, Reunion Island (France), Seychelles, South Africa and Australia.

Tsunamis occur seldom in the Indian Ocean region, and in the last 300 years, this region recorded 13 tsunamis (Table 1) and 3 of them occurred in Andaman and

Nicobar region for which the details of location of epicentre, death/damage caused etc. are not known, data on run-up heights indicate to the extent of 4 m in Port Blair with Nicobar recording very low (0.76 m). (Run –up level is defined as the max. elevation in land upto which it is inundated by seawater during tsunamis). Among these, the 1945 tsunami had a maximum run up of 13 m in Pakistan and resulted in death of 4000 people following an earthquake of magnitude 8.2 Ms in the Arabian Sea. Overall, the run-up levels varied from 1 to 13 m. In 1977, one of the strongest earthquake of magnitude Ms 8.1 struck west of Sumba Island in Indonesia, but there were no reports of casualties in India due to this tsunami. Apart from those listed in Table 1, there may be additional destructive tsunamis in the Indian Ocean that have not been properly documented. For example villagers of Simeulue Island, off the coast of Sumatra, speak of a destructive tsunami in 1907 that had killed thousands of people.

**TABLE 1. Run-up level for Tsunami occurred between 1700 and 2004 in the Indian Ocean**

S. No	Name of affected location	Run up heights (m)	Year/ Date	Earthquake Magnitude at source	Source location
1.	Tributaries of the Ganges river (Bangladesh)	1.83	12.04.1762	NA	Bay of Bengal
2.	--	--	1847	--	Great Nicobar Island
3.	Port Blair, Andaman Islands	4.00	19.08.1868	MW 7.5	Bay of Bengal
4.	Car Nicobar Island, Nicobar Islands	0.76	31.12.1881	MS 7.9	Car Nicobar Islands, Andaman Sea
5.	Dublat, India	0.30			
6.	Nagapattinam, India	1.22			
7.	Port Blair, Andaman Islands	1.22			
8.	Chennai	1.5 (wave height)	26.08.1883	Krakatao volcanic eruption	Islands of Java and Sumatra
9.	Andaman & Nicobar Islands	NA	26.6.1941	MW 7.7	Andaman Sea (12.5°N; 92.57°E)

S. No	Name of affected location	Run up heights (m)	Year/ Date	Earthquake Magnitude at source	Source location
10.	Mumbai, India	1.98	27.11.1945	MS 8.3	Arabian Sea (24.5°N; 63°E)
11.	Karachi, Pakistan	1.37			
12.	Ormara, Pakistan	13.00			
13.	Pasni, Pakistan	13.00			
14.	Victoria, Mahe Island, Seychelles	0.30			
15.	Not felt in India	--	19.08.1977	MS 8.1	West of Sumba Island, Indonesia (11.09°S; 118.46°W)
	Cocos Islands, Australia	0.30	18.06.2000	MS 7.8 MW 7.9	Arabian Sea

Source: National Geophysical Data Centre, NOAA, USA  
([www.ngdc.noaa.gov/nmdc/servlet/ShowDatasets](http://www.ngdc.noaa.gov/nmdc/servlet/ShowDatasets))

### 3. Earthquake of 26<sup>th</sup> December 2004:

On 26<sup>th</sup> December 2004, the Indian coastline experienced the most devastating tsunami in recorded history. The tsunami was triggered by an earthquake of magnitude Mw 9.3 at 3.316°N, 95.854°E off the coast of Sumatra in the Indonesian Archipelago at 06:29 hrs making it the most powerful in the world in the last 40 years. (Fig.1)

The earthquake of 26<sup>th</sup> December 2004 occurred off northwest of Sumatra is not an unusual earthquake from the Plate Tectonics point of view. It has occurred in the vicinity of seismically active zone, close to Sunda Trench in the water depths of about 1300 m. The earthquake hypocenter is located relatively at shallow depth, about 30 km below the ocean floor. The high magnitude, Mw 9.3 of the earthquake and its shallow epicenter have triggered tsunami in the northeast Indian Ocean. These were travelled in open ocean of the Bay of Bengal and subsequently transformed into a train of catastrophic oscillations on the sea surface close to coastal zones of Sri Lanka, east and west coasts of India.

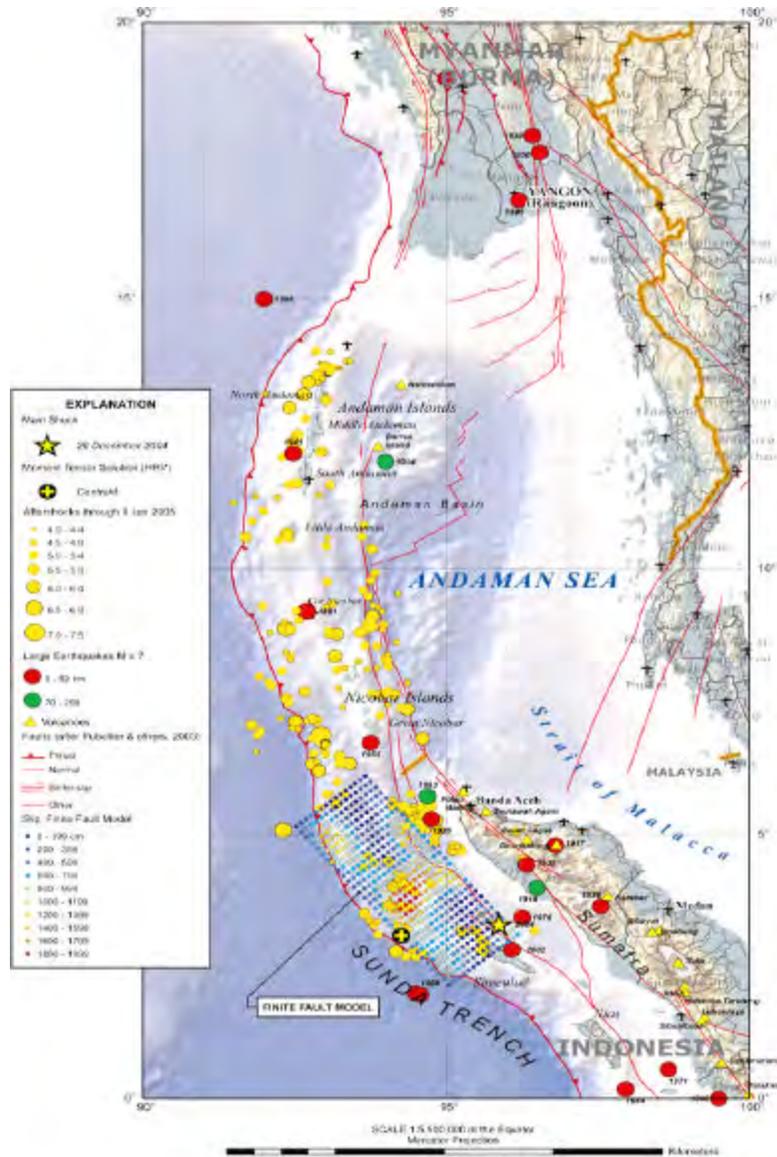
### **3.1 Diving Indian plate**

The earthquake of December 26 that occurred off the west coast of northern Sumatra took place at the interface between the Indian and Burma plates, where Burma plate has been referred by Andaman/Nicobar ridge that acts as a small tectonic plate (Curry *et al.*, 1982). In this region, the Burma plate is characterized by significant strain partitioning due to oblique convergence of the India and Australia plates to the west and the Sunda and Eurasian plates to the east. It is a typical oceanic-oceanic convergent plate boundary where the Indian plate moving at a rate of 6 cm a year relative to the Burma plate came together, collided and the Indian plate dived (subducted) under the Burma plate. Volcanic eruptions are commonly seen at such convergent boundaries. "Two major plate tectonic features on either side of a narrow strip show how seismically active the region is."

### **3.2 Lethal combination**

A lethal combination of huge magnitude and shallow depth focus led to high vertical displacement of the Burma plate that acted like a great piston deforming the sea. The aftershocks within two hours at the Andaman islands following the main earthquake in the Burma plate have gone further to fracture and move the Burma plate boundary by 1000 km. That in essence is the power of the earthquake that struck off the Sumatra coast. The U.S. Geological Survey has called this event a mega thrust earthquake referring to the large cracking of the plate boundary. According to them, mega thrust earthquakes often generate large tsunamis that can cause damage over a much wider area than is directly effected by ground shaking near the earthquake's rupture. Aftershocks are distributed along much of the shallow plate boundary between northern Sumatra (approximately 3°N) to near Andaman Island (at about 14°N).

Shallow focus earthquakes measuring 6.5 can also cause tsunamis. But such tsunamis will die out after some distance. The vast expanse of the Indian Ocean posed little challenge to the movement of the killer tsunami. Reaching a distance of 2000 km to hit the Indian coast was not difficult. Perhaps giant tsunamis can travel as far as 5000 km. This was the first time that a tsunami of this magnitude had struck the Indian coast.



**FIG 1. Base map of the Sumatra subduction zone showing seismicity associated with the 2004 earthquake (Source: USGS).**

Since a large amount of pent-up energy in the compression zones along the plate boundaries has been released in the recent earthquake of 26<sup>th</sup> December 2004, it will take years for another incident of the same magnitude to recur. But countries in the Indian Ocean should pay more attention to earthquakes and tsunamis in the future.

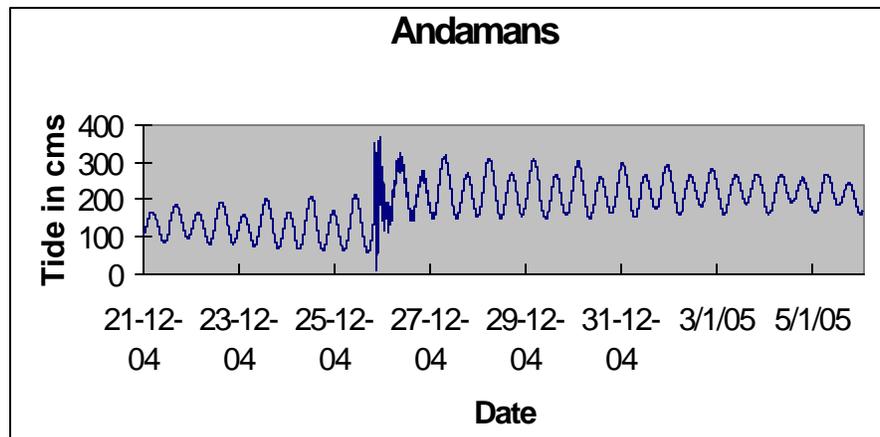
#### **4 Observations of December 26, 2004 Tsunami in India**

Tsunami was generated in the fast slip area (first 650 km at taut length) and the waves propagated in all directions. The propagation of tsunami waves is much

stronger in east-west direction than north-south direction. Further, due to slow slip in the remaining northern areas, it appears that no tsunami was generated there. As a result, strongest waves hit the coasts of Thailand, Indonesia and other nearby areas which are closely located on the east of the epicenter. The intensity of these tsunami waves that hit along the coastline of Orissa and Andhra Pradesh was weak due to their diagonal propagation. However, southern east coast of India and Sri Lanka experienced much stronger tsunami waves due to their location in mere western side of epicenter. Though the Palk Strait and further southern areas of Tamilnadu are shadowed by Sri Lanka, the waves refract around island and inundated these coastal areas. The damage to Kerala coast on the west coast of India is also due to this wave refraction beyond Kanyakumari.

#### 4.1 Physical Observations

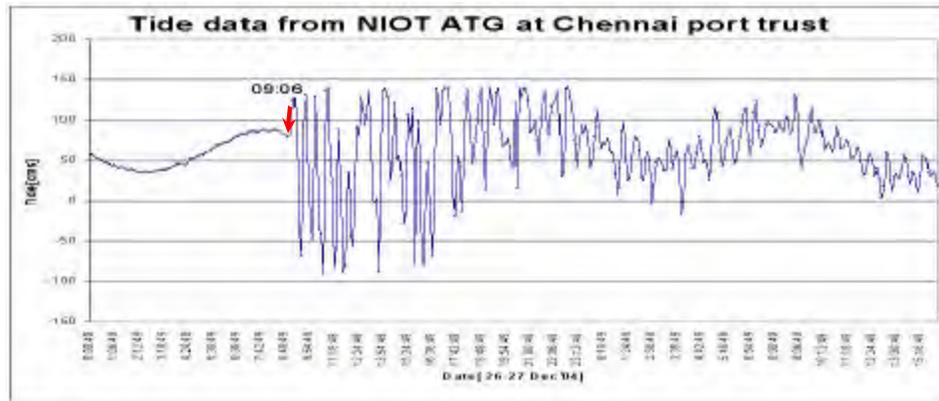
National Institute of Ocean Technology (NIOT), Chennai has deployed Acoustic Tide Gauges (ATG) at selected places along the Indian coast and Port Blair. The tide gauge at Port Blair, S.Andaman recorded gradual rise in water level by 0.9 m from 6.50 hrs to 7.01 hrs (compared to normal tide that would have prevailed) on 26<sup>th</sup> December 2004 which might be due to land subsidence caused by the earthquake (Fig. 2). At 7:25 hrs tide gauge showed abnormally high water level of 3.39 m, an increase of water level by 1.0 m compared to level observed at 7.01 hrs indicating arrival of Tsunami waves.



(Courtesy: NIOT, Chennai)

**FIG 2. Variation of Tide at Port Blair during Tsunam**

NIOT's ATG at Chennai has also recorded the first signal of tsunami in the form of "receding water" at 09:06 hrs at Chennai Port Trust followed by abnormality in tide level at 09:15 hrs on 26<sup>th</sup> December 2004 (Fig.3). The tide gauge was overwhelmed



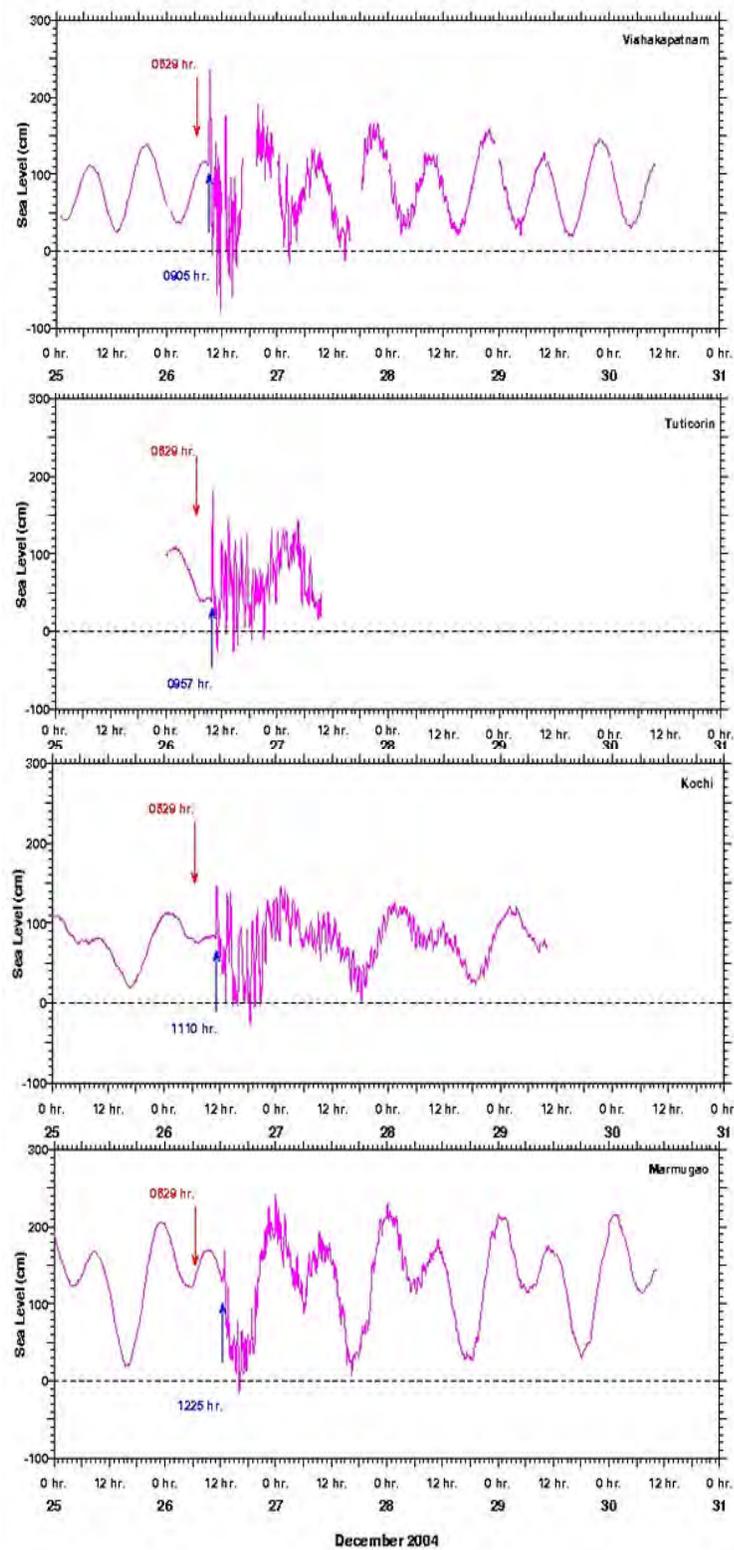
(Courtesy: NIOT, Chennai)

**FIG 3. Variation of Tide at Chennai Port Trust during Tsunami**

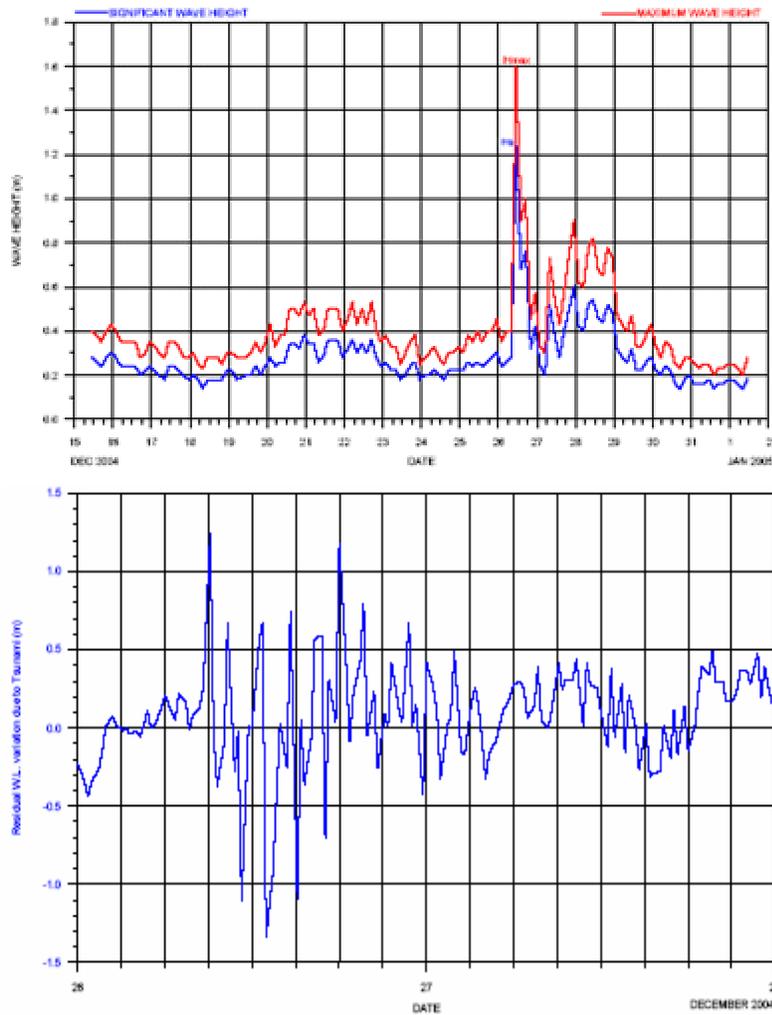
by the sudden and abnormally high water level and harbour oscillations due to which the tide record showed a saturation at around 1.5 m. However, the lower ranges clearly show that the water level should have been much above 1.5 m. The difference between the time of occurrence of tsunami at Port Blair, Andaman and Chennai is around 2 hrs and corresponds well with the distance between Chennai and Port Blair and the speed of the tsunami wave.

The Tide gauge data from major Ports of India maintained by Survey of India has been processed by National Institute of Oceanography which showed that the tsunami hit Chennai at 09:06 hrs, Machillipatanam, Visakhapatnam and Paradip, at 09:05 hrs, Tuticorin at 09:57 hrs, along the east coast and on the west coast it hit Kochi at 11:10 hrs and Mormugao at 12:25 hrs (Fig.4). The non-tidal oscillations continued at Visakhapatnam, Tuticorin, Kochi and Mormugao well after the main event took place. NIOT's ATG at Kochi has also recorded first hit of tsunami at 11:12 hrs coincided with that of Survey of India tide gauge.

There were no reports of inundation of coastal areas due to tsunami in the northern Andhra Pradesh and Orissa as the water level rose by less than 0.5 m. However, the inland areas like Ports and Harbours, for example, Visakhapatnam Fishing Harbour and Port experienced amplification of tide due to coning effect from outer harbour to entrance channel and unusual current speed in the order of 5 to 10 m/s (Fig.5).



**FIG 4. Observed Tide at different Ports showing the sea level changes on December 26, 2004.** Red arrow indicates the approximate time of occurrence of the earthquake off Sumatra and the blue arrow indicates the time of arrival of the disturbance at respective places. (Courtesy: Survey of India and NIO).



**FIG 5. Variation of Wave height and Water level during Tsunami at Visakhapatnam Port** (Courtesy: INDOMER, Chennai)

These strong flood and ebb currents have forcefully pulled 15-20 fishing boats out of harbour. During the course few boats encountered minor damage.

Although Tuticorin is situated south of Rameswaram, Tamilnadu, it witnessed tsunami at 09:57 hrs, almost an hour later it hit Chennai coast. It is to notice that when high energy tsunami waves traverse horizontally across Indian Ocean, the east coast of Sri Lanka has absorbed the devastating tsunami energy and the refracted waves with low energy only reached its west coast and southern east coast of Tamilnadu, which is confirmed by the wave modelling studies. Thus most of the southern coastal belt of Tamilnadu, shadowed by Sri Lanka, were less affected. It is for this reason, the refracted tsunami waves took more time to reach Tuticorin.

## **4.2 Extent of Inundation along Tamilnadu and Andaman & Nicobar Islands - observations by ICMAM-PD, DOD, Chennai**

### **4.2.1 Chennai coast**

A team of scientists from ICMAM-PD visited Besant Nagar Beach in Chennai immediately after hearing the first hit of tsunami to Chennai at 09:00 hrs and monitored the water level fluctuation from 10:00 hrs to 18:00 hrs on 26.12.2004 using sophisticated Real Time Kinematic GPS (Leica SR530, having accuracy of 1 cm for position and 15 cm for elevation) and DGPS (Leica GS5+) and analysed the impact of tsunamis.

At 09:00 hrs as the tsunami hit the Chennai coast, water excursed to a maximum of 200 m inside the beach (up to kerb wall of the beach) with a surge height of 2.5 m. Subsequently a series of waves hit the coast at 10:45 hrs, 12:30 hrs, 15:10 hrs and 17:10 hrs and the sea level returned to the original level around 18:30 hrs. At 14:50 hrs water line receded by 150 m from the original shore. The observations revealed that the run-up height at Chennai is about 3 m.

Elevation of beach/land and presence of sand dunes are controlling factors for water excretion and extent of damage caused by the waves. Marina beach, a few centimeter above mean sea level, experienced maximum inundation. About 1.8 km<sup>2</sup> of coastal area between Adyar and Cooum rivers along Chennai coast is inundated. The sea water excursed up to 590 m at Foreshore estate (Adyar river side) and 480 m at MGR memorial (Cooum river side) with a narrow excursion of 290 m at mid-stretch. The series of tsunami waves had a positive effect on Adyar and Cooum rivers, which are sewage carriers, whose mouths closed for most part of the year due to sand accretion, got opened, though temporarily, due to which these heavily polluted waters with sludge were flushed out to a great extent which might be having significant impact (but temporarily) on the water quality and biota of adjoining coastal environment. This can be clearly seen by the occurrence of bacteria up to or beyond 10 km offshore after tsunami when they were sighted at a maximum distance of 3 km offshore before tsunami at selected locations (Table 2).

**TABLE 2. Distribution of Bacterial population before and after Tsunami along Tamilnadu coastal waters**

Bacteria	Before Tsunami		After Tsunami	
	Stations	Distance (km)*	Stations	Distance (km)*
THB (Max)	All stations	0.5, 1 & 3	Pondy	10
E.Coli & Faecal coliform	All stations	Hot Spots & 0.5	Ennore	10
Salmonella LO (Max)	Tuticorin & Chennai	0.5, 1 & 3	Nagapattinam	10
Bacteria	Before Tsunami		After Tsunami	
	Stations	Distance (km)*	Stations	Distance (km)*
SFLO (min)	Ennore coast	0.5 & 1	Ennore	3 & 5
Water/ Sediment	All stations	Water low/ Sediment high		Water & sediment slight variation

\* distance from the coast.

(Source: CAS in Marine Biology, Parangipettai)

#### 4.2.2 North Chennai between Ennore and Pulicat

Observations made along the north Chennai coast indicated that the water level at Ennore creek rose by a maximum of 5 m and water excused up to 300 m at the adjoining coast (Table 3). Though the Katupallikuppam fishermen settlement, located 6 km north of Ennore Port and 190 m away from the coast has escaped without any damage due to their occupation on a sand dune, the sea water inundated to about 500 m in low lying areas around the village (Fig.6). Further north, the Kalanji fishing hamlets were not affected by waves as the inundation is seen only up to 45 m.

**TABLE 3 – Run-up level of sea water during tsunami at selected locations along Tamilnadu coasts**

Location	Max, run up level (m)	Distance of seawater inundation inland (m)
<b>TAMILNADU COAST</b>		
Nagapattinam (Light House transect)	3.9	750
Chennai (Besant Nagar)	2.8	200
Chennai (Kattupalli)	1.8	190
Chennai (Kalanji)	1.4	45
Sathan Kuppam	3.5	80

Tsunami in one way benefited the Pulicat Lake by wide opening its mouth, but its fishing community, except a beach hamlet, is least affected due to presence of sand dunes. The above observations indicated that the extent of inundation decreased from Ennore to Kalanji due to the presence of shoals at north of Ennore Port, which acted as “wave dampers” in reduction of wave energy. Though this coastal belt is prone to accretion/erosion due to construction of Ennore Port, the ongoing studies of ICMAM-PD revealed that these shoals are acting as a natural barrier to the wave energy thereby controlling the intensity of erosion at north of Ennore Port. They also predicted that by considering the dimensions of these shoals, they may last for another few years. If the damage occurred to these shoals due to tsunami is significant, it will have considerable impact on the extent of their natural protection to this coast. In view of this, ICMAM-PD will soon undertake the monitoring of these shoals to ascertain the extent of damage to them due to tsunami.

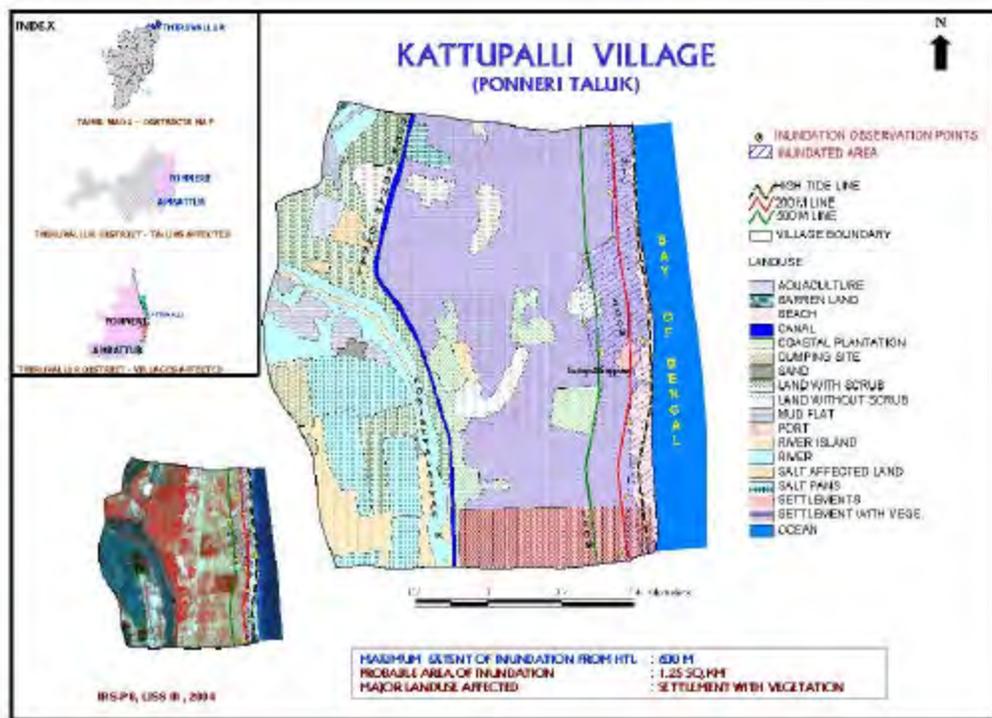


Fig.6 Tsunami inundation map of Kattupalli village near Chennai

### 4.2.3 South of Chennai

The preliminary results indicated that the southern Chennai upto Mahabalipuram along east coast road has not been affected much due to steep land elevations and the maximum inundation is seen up to 250 m. Presence of sand dunes and plantations at most of the locations played a vital role in protection of coastal villages in this area. However in the Kalpakkam area where the Nuclear Power Plant is situated, the terrain is nearly flat and slightly elevated above mean sea level, greater inundation is seen in this zone.

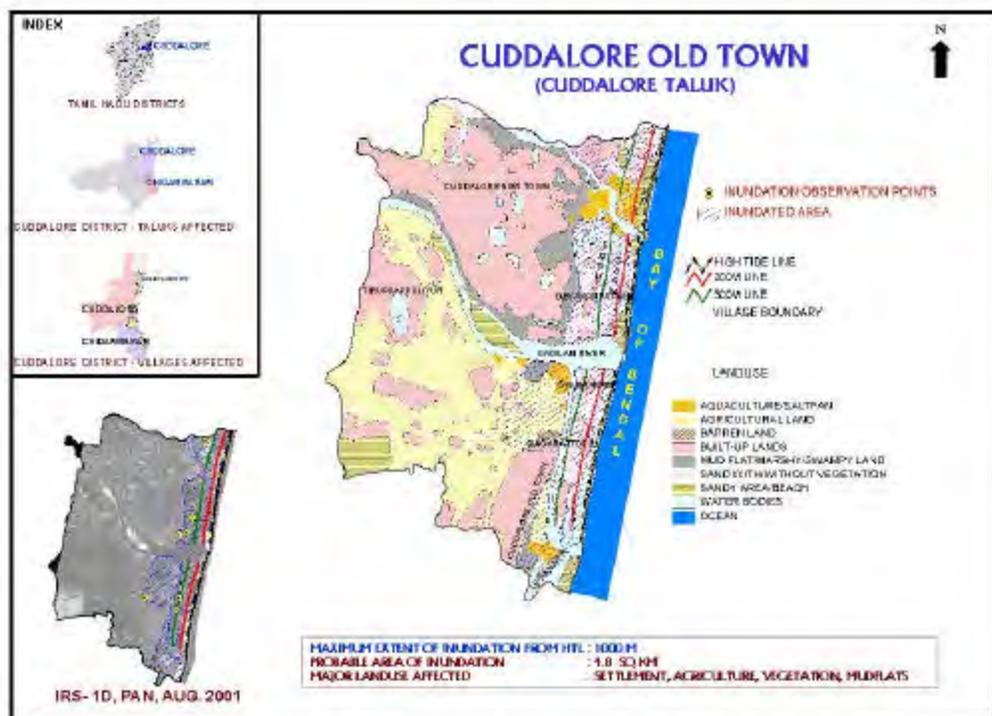
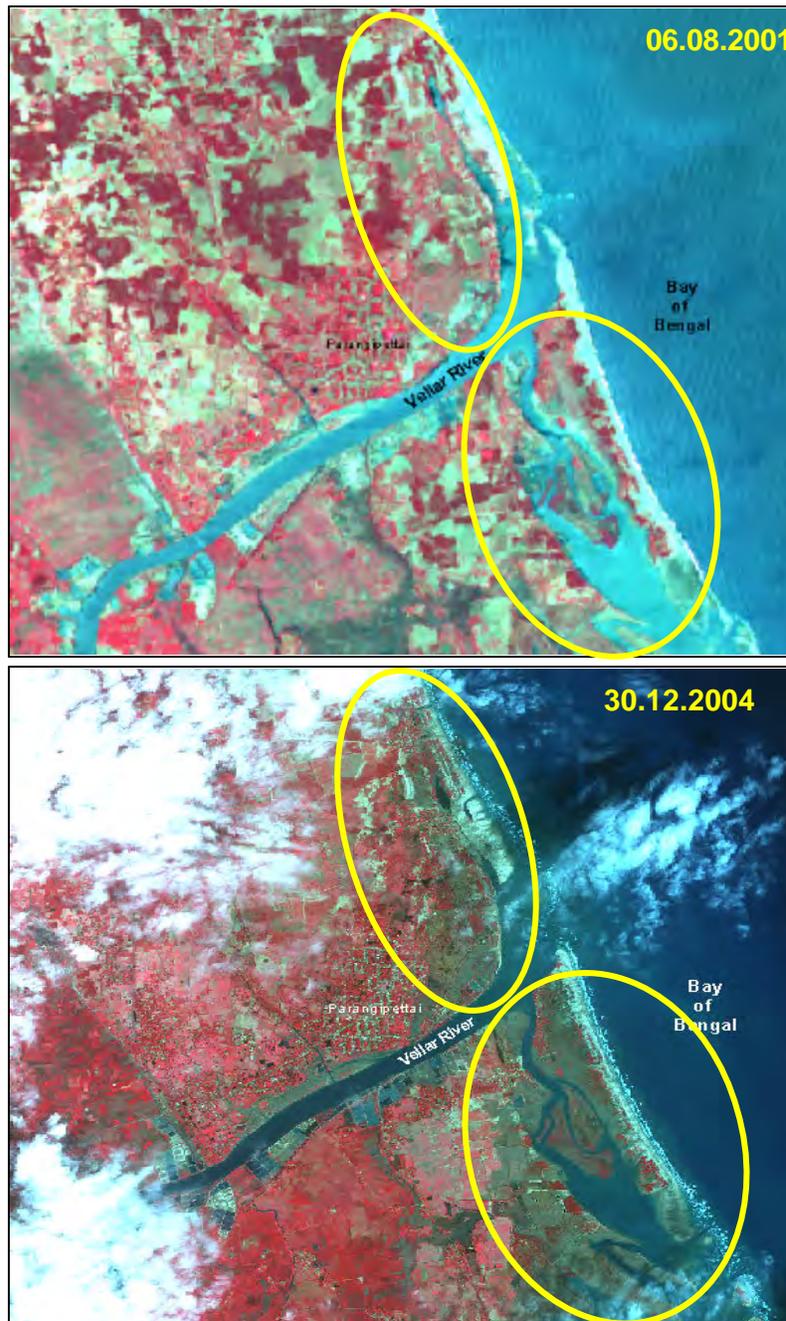


Fig. 7 Inundation map of Cuddalore Old Town (Tamilnadu)

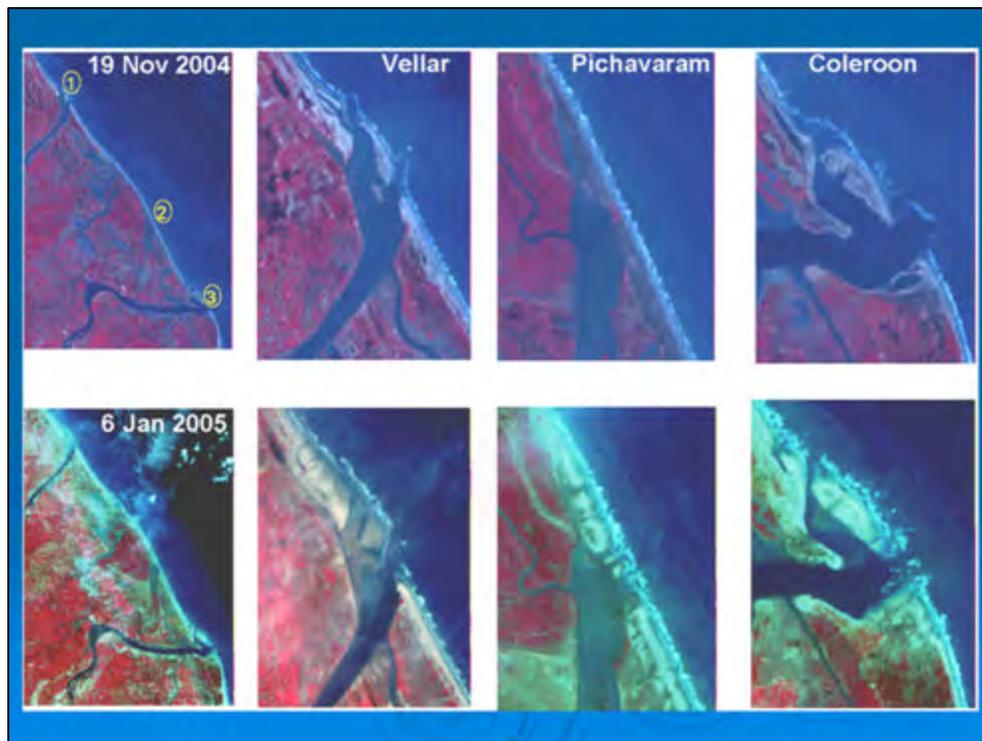
A death toll of about 500 is reported from the coastal area of Cuddalore with an inundation of 1 km at Devanampattinam coast mainly due to successive wave propagations through the backwaters (Fig.7). Severe damage is also noticed to fishing boats of this area. Further south of Cuddalore, the areas adjoined to the river mouths of Vellar, Chinna Vaikal (Pichavaram) and Coleroon were severely damaged claiming more than 1000 lives. The Parangipettai village (adjacent to Vellar river) witnessed maximum inundation up to 2.5 kms as the initial terrain slope (from coast) is very gentle and far reaching areas are low lying. The areas adjoined to Vellar inlet

and its backwaters which were marked as a green region with dense plantation acted as a barricade to tsunami waves which resulted in reduction of wave energy, otherwise the intensity of the damage could have been much more severe. The satellite images before and after tsunami of this region clearly explain this bio-shielding effect wherein the loss of vegetation after tsunami can be noticed (Fig. 8).



**FIG 8.** Loss of vegetation in and around Vellar inlet (in yellow circles) showing the bio-shielding effect to Tsunami waves.

The Vellar inlet which is having two openings each of about 290 and 235 m width as observed by a team of scientists from ICMAM-PD and IIT, Chennai on 24.12.04, a day before tsunami occurred was made opened to a great extent by tsunami waves resulting the seawater ingression up to 5 km inside. The satellite imageries of these mouth inlets before and after tsunami are presented in Figure 9. The flow of tidal waters inside the estuary has inundated the paddy fields with seawater.



(Courtesy: NRSA)

**FIG 9. Satellite imageries before and after Tsunami showing the extent of opening to various inlets of Pichavaram area. (Source: NRSA)**

#### 4.2.4 At Nagapattinam

Nagapattinam, a coastal town, located about 400 km south of Chennai is the worst affected place in India due to tsunami claiming more than 6000 death toll and extensive damage to the public and private property. It is believed that the dual wave effect (straight waves plus diffracted waves from Sri Lankan coast), gentle slope of continental shelf and gentle elevation of hinterland coupled with the presence of Uppanar river and Vedaraniyam canal in the southern side triggered the deadliest impact of tsunami waves. The preliminary observations revealed that the impact on the southern part is deadliest than northern part due to the presence of

these water bodies through which the successive progression of tsunami waves pushed the waters to distances beyond 1 km towards landside (Fig.10). However, the runup level in the northern part of Nagapattinam near Light House is close to 4 m with a maximum inundation up to 1.1 km from the coast.

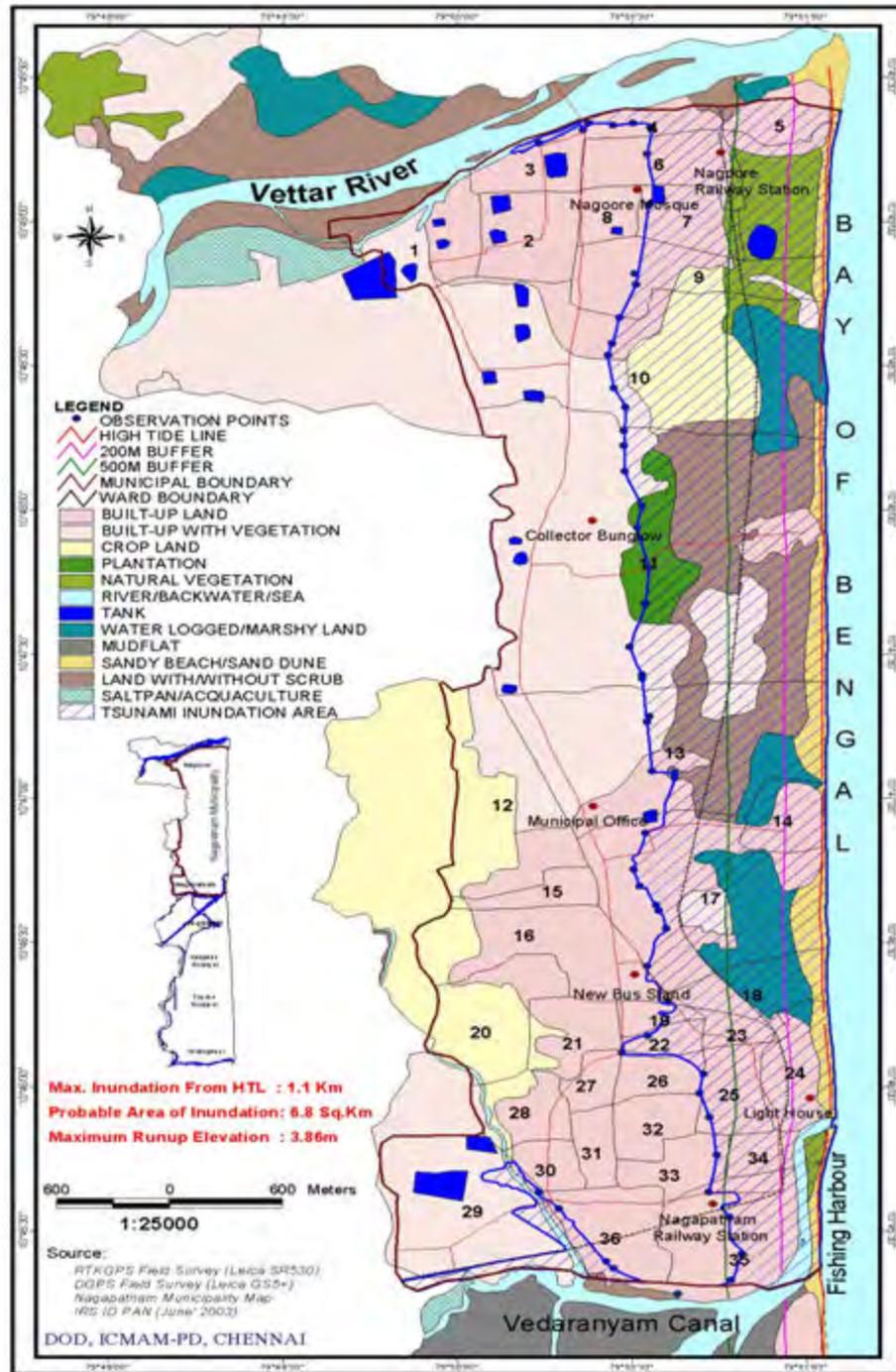


FIG 10. Extent of inundation of seawater in Nagapattinam due to Tsunami.

Despite presence of wide beach (~200 m), the gentle land topography facilitated landward intrusion of seawater up to 1.1 km. Because of this, the high energetic waves crossed the beach and flooded the human settlement. Severe damage has been noticed to hundreds of fishing boats, several acres of agricultural land and also to beach tourism.

#### 4.2.5. Tsunami in Andaman and Nicobar islands and observations on run up levels

The Andaman and Nicobar islands located in the subduction zone of Burma Plate is classified as Seismic zone 5 indicating high level of risks due to earthquake. Tsunami waves hit the Nicobar group of islands within few minutes and reached Port Blair in South Andaman at 7.25 hrs. The waves transformation varied at different locations (depending on the coastal geomorphology) and the tips of islands faced more fury of tsunami waves.

The Nicobar group of islands namely Great Nicobar, Katchall, Teressa, Nancowry, Trinkat, Car Nicobar etc. were severely affected by tsunami waves as they are closer to the tsunami and also smaller in nature surrounded by the sea all around. The impact on Andaman group of islands were less except on Little Andamans due to their remoteness to tsunami source and due to less intensity of tsunami waves. Since the settlement in South Andaman islands is largely confined in sheltered areas like bays and they are far from the coast and more importantly the settlement areas are in elevated areas except in certain low elevated far inland locations like Sippighat area, there were almost no loss of life, but damage to properties especially to fishing vessels were considerable. The extent of loss of life in A & N islands due to tsunami is given in Table 4.

**Table 4. Death toll in A & N islands as of 23.1.05 due to Tsunami**

S. No	Islands	Population on (2001 census)	Dead	Missing	Persons in camp*
<b>NICOBAR DISTRICT</b>					
1.	Car Nicobar	20292	790	348	15550
2.	Teressa	2026	50	9	3296
3.	Katchal	5312	345	4310	1818
4.	Nancowry	927	1	2	934

5.	Camorta	3412	51	387	1476
6.	Great Nicobar	7566	336	219	4690
7.	Other Islands of Nicobar (evacuated)	2533	288	266	--
	<b>Sub-total</b>	<b>42068</b>	<b>1861</b>	<b>5541</b>	<b>27764</b>
<b>ANDAMAN DISTRICT</b>					
1.	Andaman includes, Port Blair	181949	5	--	2833
2.	Little Andaman	17528	56	14	6569
3.	Other Islands of Andaman	114607	3	--	5000
	<b>Sub total</b>	<b>314084</b>	<b>64</b>	<b>14</b>	<b>14402</b>
	<b>Total (UT)</b>	<b>356152</b>	<b>1925</b>	<b>5555</b>	<b>42166</b>

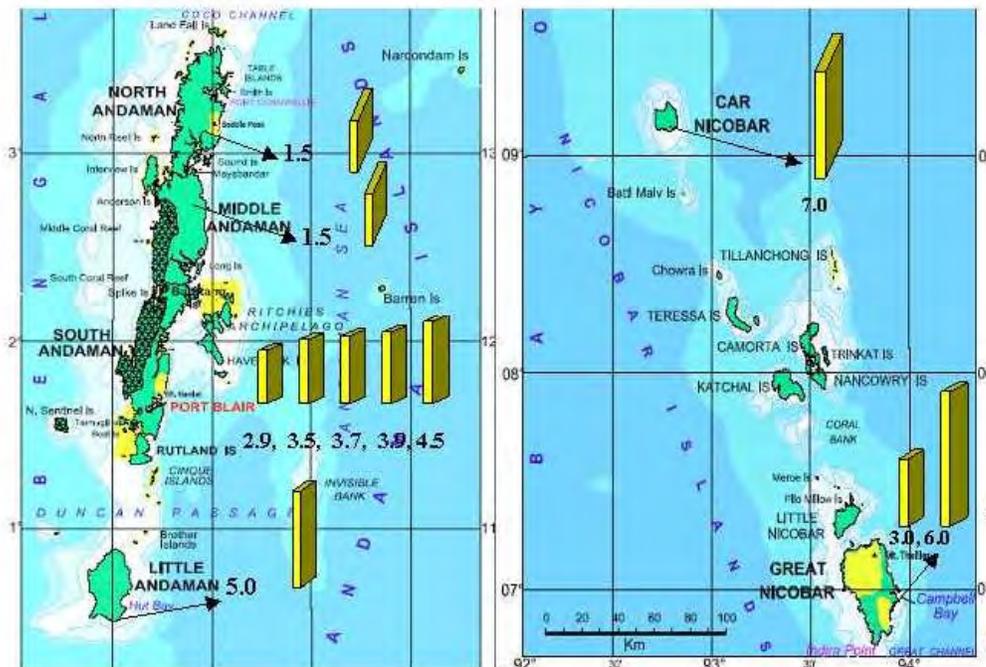
\* includes persons from other affected islands.

(Source: A & N Administration)

The inundation of seawater into the land with high velocity and their retreat with same or higher velocity cause extensive damage to human life and property. As said extent of inundation is measured in term of vertical run-up. The extent of vertical run-up of seawater depends on earthquake parameters, nearshore bathymetry, beach profile, land topography and velocity of tsunami waves and their frequency. Due to these parametric variations in Andaman and Nicobar islands, the run-up level and landward penetration characteristics of seawater varied from one location to the other within an island. The geometry of the islands and existence of offshore barriers like islets, trenches also play a role in the landward propagation of tsunami waves. Keeping these issues in mind and in order to get an idea on run-up levels, they were measured at a few selected locations which are considered to be representative. Due to logistics and other constraints, the measurements were restricted to north Andaman, Great Nicobar, Car Nicobar, Port Blair and Little Andamans.

A team of Scientists of Integrated Coastal and Marine Area Management (ICMAM) Project Directorate of Department of Ocean Development, Chennai assisted by Scientists from Andaman and Nicobar Centre for Ocean Science and Technology (ANCOST) of NIOT conducted run-up measurements in Andaman and Nicobar islands from January 18 - February 5, 2005. The locations were selected based on local enquiry. Elevations at clearly visible seawater mark on building/ structures were taken as the Run-up levels for measurements. Table 5 gives the details of measured run-up levels which have been corrected to Mean Sea Level (approx. 0.8m

added to existing MSL to accommodate the land subsidence occurred during earthquake). Figure 11 shows locations at where inundation of run-up levels measurements were made.



**Figure 11 - Run-up levels (in meters) at selected locations in Andaman & Nicobar Islands (Names of locations are available in Table 1 against their run-up values)**

## Results and discussion

In general, the extent of vertical run-up of seawater during tsunamis depends on earthquake parameters, geographical location, velocity of tsunami waves and their frequency, nearshore bathymetry, beach profile and land topography. Due to these parametric variations in Andaman and Nicobar Islands (A & N) and Tamilnadu coasts, the run-up levels and landward penetration characteristics of seawater were location specific and varied within a location and even in an island (Table 5). In the case of A & N, in the North and South Andaman group of islands the run up levels varied from 1.5 m to 4.5 m and the distance penetration from the coast ranged from 100 to 250m (Table 5). The little Andaman recorded a run up of 5 m with the distance of penetration 1200m. In the two Nicobar islands, the run up levels varied from 3 to 7 m with distance of penetration ranging from 50 to 1000m with higher run up levels and longer penetration noted in Car Nicobar (Table 5). Preliminary conclusions drawn by Bilham *et.al.* (2005) on the slip pattern of 26 Dec 2004 indicate

that due to high rate of slip in the southern 650 km of the 1300 km North -South rupture zone of 2004 Andaman-Sumatra earthquake, the principal tsunami was generated in the Sumatra area. Time lag between earthquake and land subsidence in Port Blair (S.Andaman) on 26 Dec 2004 which is estimated to be 30-38 min has been interpreted as that the rate of slip was slow in the Andaman region resulting generation of no tsunami in this zone. Therefore, the wide variation in the run up levels between Andaman and Nicobar islands was primarily due to the remoteness of North, Middle and South Andaman islands relative to Nicobar group to the tsunami source zone and also due to nature of land topography in the run-up level measurement locations. The wide variation between Andaman and Nicobar islands was primarily due to the above said parameters and also due to land subsidence caused by earthquake. Similar types of diversified results were observed in 26<sup>th</sup> December 2004 Tsunami affected coastal areas in Indonesia and Srilanka. Run up levels varying from 0.3 to 32 m were recorded in Indonesia and from 2.5 to 10 m in Sri Lanka (Yalciner, *et.al*, 2005).

**Table 5. Run-up level of sea water during tsunami at selected locations in Andaman & Nicobar Islands**

Location	Max, run up level (m)	Distance of seawater inundation inland (m)
South Andaman (Port Blair)		
JNRM College, Aberdeen	2.9	130
Bamboo Flat	3.5	250
New Wandoor	3.7	215
Wandoor	3.9	215
Chidiyatopu	4.5	130
Sippighat (Creek)	2.0	2000
North Andaman		
Diglipur	1.5	100
Rangat	1.5	200
Little Andaman		
Hut Bay	5.0	1200
Car Nicobar		
Malacca	7.0	1000
Great Nicobar		
Campbell Bay (central)	3.0	300
Campbell Bay (North)	6.0	50

**Table 6. Coastal land slope values of various locations in Andaman and Nicobar Islands and Tamilnadu**

Location	Distance of seawater penetration (in metres)	Slope	Nature of Coastal land
Chidyatopu (South Andaman)	130	1 in 32	Short beach followed by steep elevated land
Hut Bay (Little Andaman)	1200	1 in 325	Low lying coastal land with gentle slope for long distance
Malacca (Car Nicobar)	1000	1 in 167	Gentle coastal land upto 800 m and steep rise beyond
Campell Bay (Great Nicobar)	300	1 in 89	Elevated beach followed by gentle slope of coastal land

The coastal land slope values were calculated based on RTKGPS data and these values are given in Table 6. The data indicates penetration of seawater to a short distance in Andaman islands (except Little Andaman) compared to the Nicobar group, which was the possibility of larger tsunami waves due to the presence of elevated areas within short distance from the coasts in the North, Middle and South Andaman. The little Andaman and the Car Nicobar islands that had relatively gentle slopes along the coast compared to the South Andaman island, experienced farthest penetration of seawater. The slope value of 1 in 32 for Chidyatopu in South Andaman compared to slope values of 1 in 325 for Little Andaman and 1 in 167 for Car Nicobar support this interpretation (Table 6). This clearly indicates the vulnerability of low lying areas with gentle beaches/land slopes to inundation of seawater during storms, tsunamis etc. The low lying areas adjoining the creeks which facilitate travel of tsunami waves far inland, are too vulnerable as indicated by the landward penetration of seawater upto 2 km from the creek in Sippighat area of Port Blair (Table 5).

Another major reason for inundation of seawater in South Andaman and Nicobar islands is land subsidence. Location specific interpretations made by ICMAM PD using the data of Andaman, Nicobar and Lakshadweep Harbour Works indicate subsidence of 0.8m around Port Blair and 1.3 m in Great Nicobar. Such a land subsidence is evident from the high tide water entering into the paddy fields of

Sippighat area that registered penetration of seawater upto 2 km during tsunami. Inundation of inland low lying areas during high tide has become a cause for concern to local population as their houses are marooned in seawater. The concern is likely to get aggravated during the monsoon months when the rain water antagonizes movement of high tide water. The net effect would depend on the velocity of rain water flowing from low lying areas through sluice gates to the adjoining bay. If the tidal force dominates, it may be possible that the rain water may accumulate in all low lying areas and both the freshwater and sea water would increase the height of water level and likely to spread to the neighbouring elevated areas too. However, atleast a full year observation is required to confirm this apprehension.

#### 4.3 Run-up level and beach profile changes along Kerala coast - by CESS, Trivandrum

The December 26, 2004 tsunami had a devastating impact on the Kerala coast too. The locations of Kerala coast affected by the tsunami are shown in Figure 12.



**Fig 12. Locations of Kerala coast affected by Tsunami. The size of the circles indicates the relative severity of the damage**

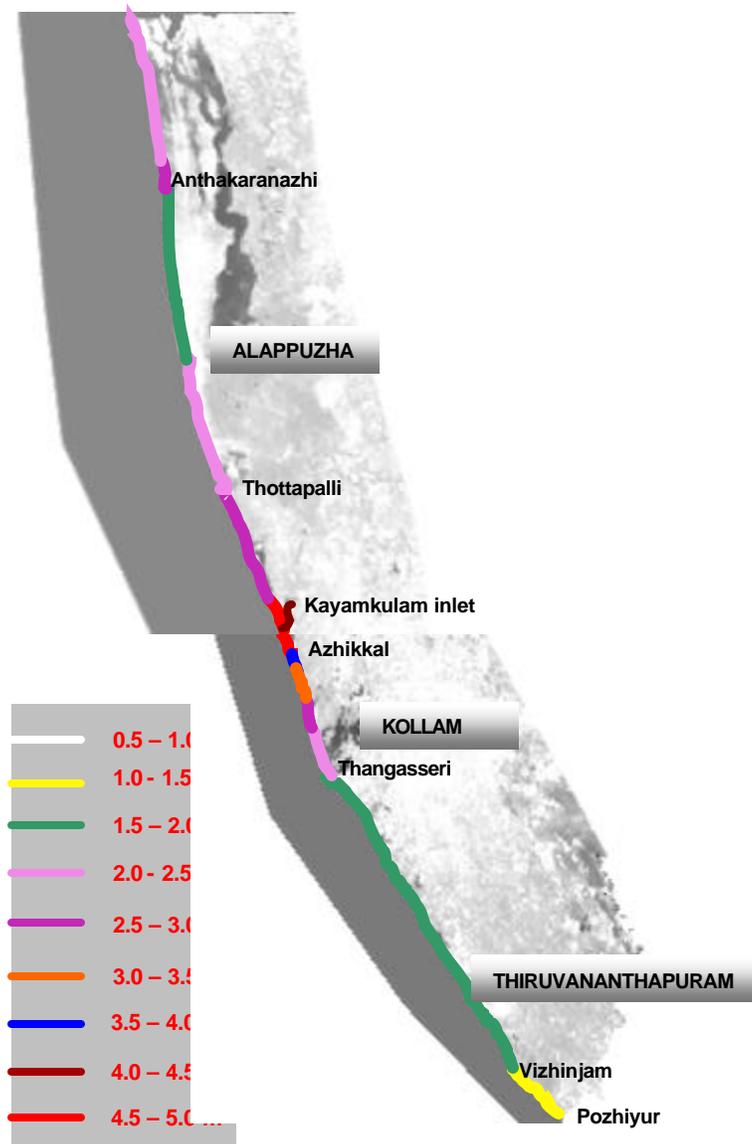
Though this coast was in the shadow with respect to the direction of propagation of the tsunami waves, it had its access to the Kerala coast, obviously due to the processes of refraction, diffraction and reflection. Its destructive power left nearly

200 people killed and hundreds injured in addition to the loss of houses and properties worth several crores of rupees. The highest toll was reported from Kollam district followed by Alappuzha and Ernakulam districts. A large number of fishing boats and implements were washed away as tidal waves hit the coast. Hundreds of families had been shifted to relief camps as police, fire force and medical personnel swung into relief operations.

A team of Scientists from CESS, Trivandrum have conducted field visits all along the Kerala coast and estimated the run-up level along the shore and beach profile changes at the worst affected areas of the coast. For estimation of run-up level, the field signature such as trapped floating objects in plants/trees/buildings and information collected from local populace were relied upon. The beach profile and volume changes were measured for the worst affected regions of the Kollam and Alapuzha districts where the pre-tsunami beach profile changes were available.

#### **4.3.1 Run-up level along the Coastal Zone of Kerala**

The run-up levels for different stretches of Kerala coast are presented in Figures 13 - 15. The run-up levels given are with reference to the mean water level at each location. The southern zone between Thiruvananthapuram and Alappuzha had its most disastrous effect. Though the run-up level and inundation was less for Trivandrum coast it picked up towards north in the Kollam coast. North of Kovilthottam, there was a drastic increase in the level reaching as high as 5.0 m at Azhikkal, just south of the Kayamkulam inlet. This was the location where the inundation and loss of life and property was maximum. In the sector immediately to the north of Kayamkulam inlet also the run-up level was up to 5.0 m. The devastation here also was quite extensive, though not as much as at Azhikkal. The run-up levels in the central zone between Alapuzha and Kozhikode varied in the range 1.0 - 3.5 m (Figs.13 & 14). However, the northern zone run-up levels varied between 0.5 and 2.5 m (Fig.15). In Balathuruth, an island in Kadalundi river, near Kozhikode tsunami waves flooded the whole island and water level rose to 2 m high.



**FIG 13. Run-up level map for southern Kerala coast and Alappuzha-Andhakaranazhi sector of central Kerala coast**

To sum-up, the run-up level distribution along the Kerala coast shows that it was least in the northern most sectors encompassing the Kasargod district. The sectors adjoining the Kayamkulam inlet between Kollam and Alapuzha recorded the highest level of 5 m. Significantly flooding of only up to 2 m level occurred along the Thiruvananthapuram coast, which is close to Kolachel, the location of maximum devastation along the west coast. It is summarised that the observed distribution of

run-up is caused by refraction, diffraction and reflection processes. The data collected may be very useful in the calibration of the tsunami inundation model to be set up for the coast.

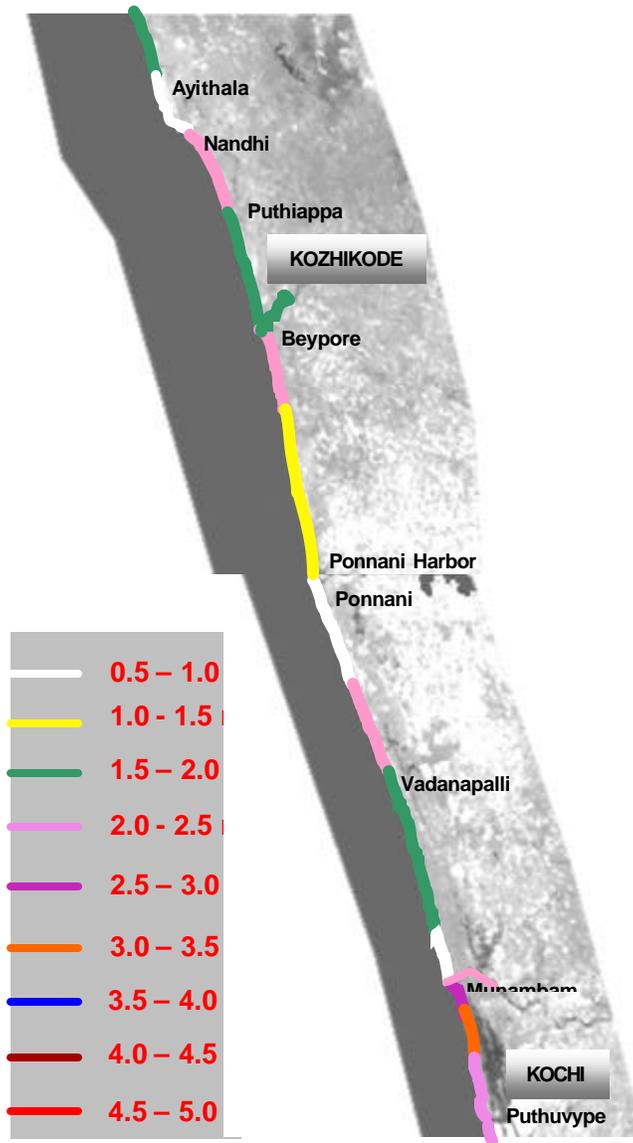


FIG 14. Run-up level map for Kochi-Beyppore sector of Central Kerala coast and Kozhikode region of Northern Kerala coast

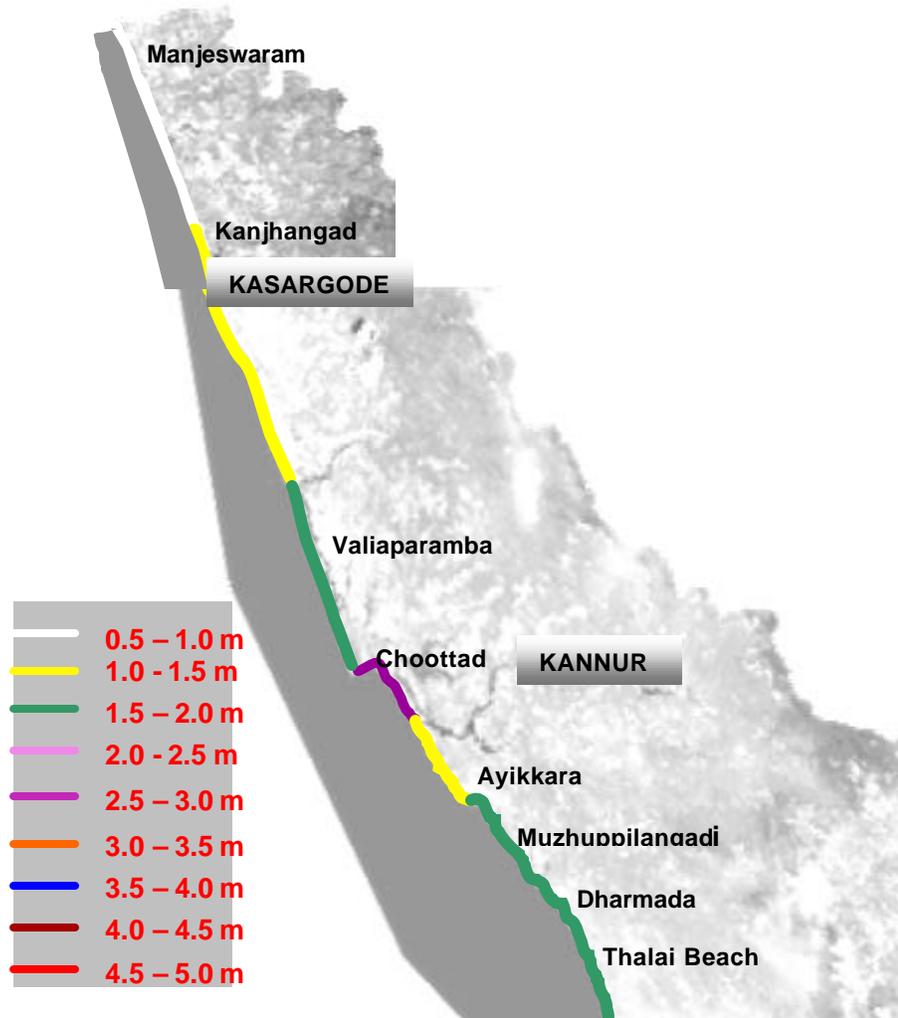


FIG 15. Run-up level map for Kannur-Kasargode sector of Northern Kerala coast.

#### 4.3.2 Beach Profile variations and Volume Changes adjoining Kayamkulam inlet

Post-tsunami beach profiles were measured on 14<sup>th</sup> January 2005 at 9 stations where pre-tsunami beach profiles (16<sup>th</sup> November 2004) were available and where the reference stones were intact without any damage due to the tsunami. The stations for which profile changes were studied happens to be in the worst affected region surrounding the Kayamkulam inlet. This inlet has two breakwaters, north and south, jetting out into the sea for about three-fourth of a kilometer, as part of the Kayamkulam Fishing Harbour. The volume changes computed from the beach profiles are presented in Table 7.

**TABLE 7. Volume changes at different stations adjoining the Kayamkulam inlet**

<b>S.No</b>	<b>Station</b>	<b>Status</b>	<b>Volume change (m<sup>3</sup>/m width of beach)</b>
1	N I	Erosion	53.4
2	N II	Erosion	16.1
3	N III	Erosion	66.5
4	N IV	Erosion	4.0
5	N V	Erosion	7.3
6	S I	Deposition	91.4
7	S II	Erosio n	38.1
8	S III	Deposition	64.8
9	S IV	Deposition	12.6

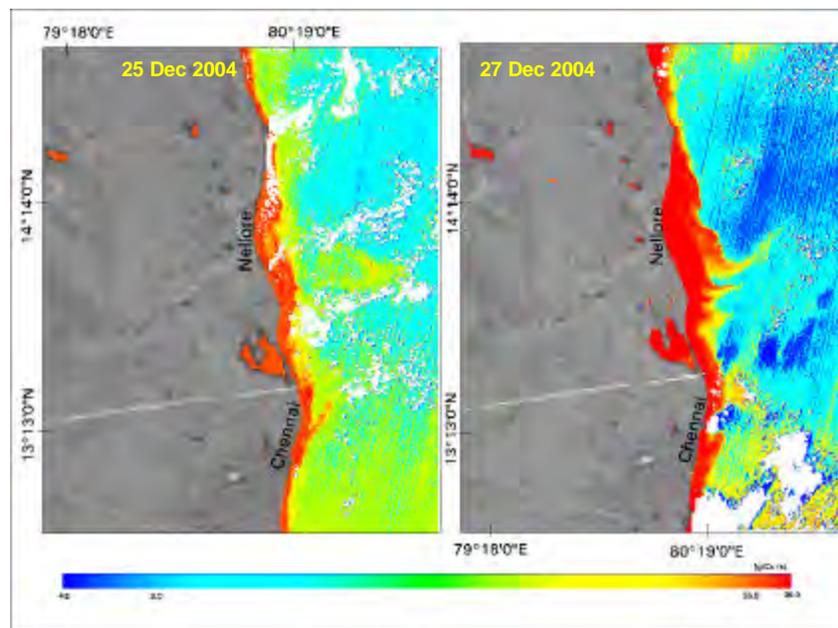
It is seen from the Table 7 that erosion is seen in the northern side of breakwater (I1 to N V), while deposition was mostly noticed in the southern side. The erosion/deposition obtained has to be seen in the backdrop of the coastal sedimentation processes prevalent in the area, in addition to the erosional impact of the tsunami waves. The breakwaters at the inlet, jetting out into the sea is acting as a groin, ever since the construction started a couple of years ago. Thus huge accretion has been taking place in the southern side of the inlet due to the predominant northerly longshore currents during fair weather. Erosion has been taking place in the northern side due to the groin effect of the breakwater. In the present case, the pre-tsunami beach profiles were taken on 14<sup>th</sup> November, 42 days prior to the tsunami onslaught. Thus the beach in the southern side of the inlet must have considerably accreted with respect to the pre-tsunami profile at the time of onslaught of the tsunami and thereafter till the post tsunami beach profiling on 14.1.2005. The field signatures on both the sides of the inlet showed scouring and erosion. However, the erosional effect of the tsunami was not sufficient enough to offset the depositional trend in the southern side except at station S II. In a similar way, the erosion observed in the northern side may not be entirely due to the tsunami.

Another point that has to be noted in the present case is that the erosion that took place due to the tsunami is not similar to the loss of sediment in the conventional sea-beach interaction where the sediment is lost to the sea. In the present case, the

eroded sediments might have been carried further inland and got deposited in the lagoon in the hinterland side.

#### 4.4 Analysis of Oceansat OCM Data – by NRSA, Hyderabad:

The observation of sea surface temperature data showed the fall in temperature in coastal waters of Andaman and Nicobar waters up to 1°C on the day of tsunami. The tsunami had also an impact on the seawater turbidity as the successive waves churned the seabed and the reversal waves carried lot of land based wastes and soils resulting an increase in suspended particulate matter of the coastal waters as noticed from the satellite imageries between Chennai and Nellore coasts (Fig.16).



**FIG 16. Distribution of Suspended sediment concentration before and after the tsunami event along Andhra Tamilnadu coast.**

The analysis of OCM data showed that suspended sediment concentrations have considerably increased along the Andhra and Tamilnadu coasts besides Andaman Islands after the tsunami event on 26 December 2004. The ranges of SSC are 9 - 21 mg/m<sup>3</sup> on 25 December 2004 and 4-36 mg/m<sup>3</sup> on 27 December 2004. Besides the increase in concentrations, the area of high SSCs had also increased from 15 km (50 m depth) to 45 km (1000 m depth) away from the north of Chennai coast. Though this is a temporary phenomenon as most of the sediment particles tend to be either dissipated towards offshore or settled to bottom, this might be having

significant effect on the marine biota. Inundation of sand spit near Kakinada, closer of inlet mouth and presence of a new channel near the Pulicat Lake are some of the important observations.

The effect of tsunami is also seen on chlorophyll concentration but is gradual compared to the SSCs. Chlorophyll concentrations on 25 and 31 December 2004 are shown in Figure 17. The increase in chlorophyll concentration from 0.1 to 0.3 mg/m<sup>3</sup> is clear from the figure. Since the chlorophyll is increasing gradually the analysis is continuing.

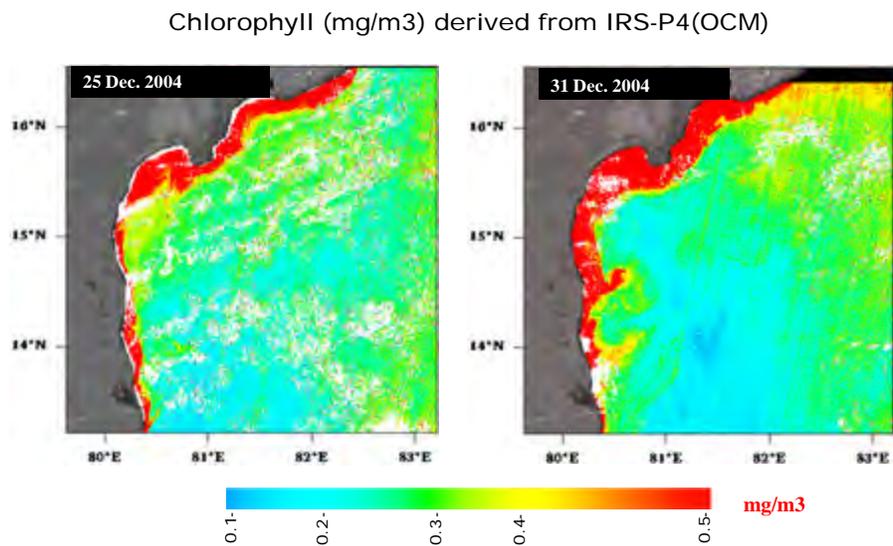


FIG 17. Spatial distribution of Chlorophyll before and after Tsunami event.

#### 4.5 Impact of Tsunami on Biological Resources – by CAS in Marine Biology, Annamalai University, Parangipettai

The post tsunami survey made between Chennai and Nagapattinam was found to have variable results in terms of water quality, microbiology, plankton and benthos. In general the tsunami impact was found to alter the mouth region of the estuaries and backwaters. Equally the 5 and 10 km of the offshore waters also found to have more variations.

The sudden entry of tsunami waters into mouth of the rivers resulted in the release of more total nitrogen not only from the bottom derived tsunami waters but also the disturbances caused in the sediments of the mouth waters. Thus the Cooum river

waters of Chennai recorded the maximum total nitrogen of 165  $\mu\text{M}$  in the water column, whereas the earlier observations before tsunami was only 90.6  $\mu\text{M}$ . Similarly the Nagapattinam, Cuddalore and Parangipettai waters were found to record higher levels of nutrients at 0.5 and 1 km stretch coastal waters. In general the Karaikal coastal water was found to record fairly lower level of nutrients compared to other areas.

The microbial population was found to have only marginal differences between sediment and water column after tsunami. However, the sediment was found to record higher values in all the investigated areas compared to the water column. The Salmonella like organism was found to be recorded only in Nagapattinam and Chennai coastal stretches up to 10 km in the water, a unique feature after tsunami. Most of the forms were recorded more in the 0.5 and 1 km stretch was now recorded in the 5 and 10 km stretches (Table 2). This could be the post tsunami case for most of the coastal areas.

The blooming of phytoplankton *Lauderia borealis* (1,05,000-3,22,993 nos/l) was recorded only in coastal waters of in and around Chennai (Ennore, Cooum, Chennai harbour, Muttukadu). However, it is not recorded in other areas.

The occurrence of zooplankton pollution indicator species like *Cresis sp.*, Lucifer and *Oikopleura sp.*, is felt in parts of Tamilnadu and Pondicherry after tsunami. The distribution of zooplankton *Cresis sp.* was restricted to Cuddalore and Ennore coasts. The Lucifer having restricted distribution before tsunami is seen significantly all along Tamilnadu and Pondicherry coast after tsunami. The zooplankton *Oikopleura sp* was found to record higher (35,000/95,000 nos/ $\text{m}^3$ ) in the Tamilnadu and Pondicherry coastal waters, instead of restricted distribution in harbour waters.

In general very low numbers of benthic fauna (1-9/0.08  $\text{m}^2$ ) and species (15) were recorded from Chennai to Nagapattinam coastal as well as the hot spot areas after tsunami survey. However, higher number (~146/0.08  $\text{m}^2$ ) and diversity (35 species) were recorded at Cooum 0.5 km. Besides, the polychaete *Polyodontes melanonotes* (~2500/0.08  $\text{m}^2$ ) was found to record only in Pondicherry hot spot area for first time.

The net impact of tsunami is that significant amount of nutrients were added to the coastal waters from terrestrial sources, mixing up of nutrient rich bottom waters, as well as from sediments which seems to trigger the biological production and leads to the promotion of chlorophyll levels. Added to this, the sewage mixed in coastal waters extended to distances even up to 10 km from shore which has promoted sewage feeding microbial organisms like *E.coli*, *Faecal* coliforms, *Salmonella*, etc. to these far off places when they were seen up to 3 km from coast before tsunami.

#### 4.6 Ecological impact of Tsunami on the southwestern coast of Kerala and Tamilnadu - by RRL, Trivandrum

The coastal belt from Thottapally in Kerala to Kanyakumari in Tamil Nadu was monitored during January 2005. Transects were selected based on the basis of the intense impact of Tsunami. At each transect, stations were chosen at 5 km intervals, up to a distance of 25 km from shoreline. Water quality data after tsunami showed a slight deterioration at some of these transects (Table 9).

**TABLE 9. Comparison of water quality of selected coastal transects before and after Tsunami**

Parameter	Kayamkulam		Aleppey		Vizhinjam	
	Before	After	Before	After	Before	After
Temp (°C)	28.26	28.26	28.53	28.50	28.26	28.26
Salinity	33.24	33.62	33.54	33.75	33.24	33.82
pH	8.30	8.21	8.32	8.16	8.30	8.16
DO (mg/l)	5.67	4.84	5.61	5.85	3.16	4.69
NO <sub>2</sub> (µM)	1.69	0.18	0.13	0.38	0.04	1.69
NO <sub>3</sub> (µM)	3.22	3.25	--	3.88	1.29	4.25
SiO <sub>4</sub> (µM)	4.01	2.34	1.90	2.72	1.30	2.52
PO <sub>4</sub> (µM)	0.30	1.58	0.60	1.96	0.19	1.86

The post-tsunami results indicated that the marine environment in the southwest coast between Thottapally and Muttam has been affected as a result of the impact of tsunami. This is reflected by the following assessments:

- ♣ The concentrations of nutrients have decreased.
- ♣ Primary productivity has been drastically reduced.

- o The species diversity of plankton is lowered.
- o The fish catch is affected.
- o The microbial population has decreased.
- o The sediment samples collected offshore, have more of coarse sands, indicating their transportation from the coast.
- o The presence of heavy minerals in the sediment samples collected as far as 25 km offshore indicate that along with coarse sands these have also been transported due to high-energy backwash.
- o The impact of Tsunami was maximum at Vizhinjam due to the geomorphic feature resembling inland basin.

#### **4.7 Coral reef ecosystems of Gulf of Mannar and Palk Bay - by Madurai Kamaraj University**

Diving personnel of the Coral Reef Research and Monitoring group attached to the Center for Marine and Coastal Studies of Madurai Kamaraj University, made a rapid survey on the post-tsunami impact in selected islands of Gulf of Mannar and reef areas of Palk Bay on the northern side of Rameswaram and Mandapam.

The underwater surveys using Line Intercept Transect Method (LIT) revealed that there were no appreciable changes in the Bio-physical status of corals in the Gulf of Mannar. Coral species of the family Acroporidae which are vulnerable to the natural disturbances did not show any damage in their structures after the tsunami waves in the Gulf of Mannar. Also the massive corals and associated fishes, algae and sea grass beds were not affected by the tsunami waves. There was the slight displacement of the coral rubble walls lying near the edges on the seaward side of some of the islands of the Gulf of Mannar.

However, the survey of the corals of the Palk Bay region showed an increase in sedimentation near the coral reef areas after the incidence of tsunami waves. This is based on sediment traps already placed in several locations of the Palk Bay coral habitats for an ongoing research work. The sedimentation rate recorded earlier as 32.5 mg/d in November 2004 had increased to 53.4 mg/d after the incidence of tsunami tidal wave flushing in the Palk Bay region. Some corals exhibited partial bleaching near Pamban viaduct. Reports of people and fishermen in the region

confirmed that the water level raised up to 1 meter and then receded back to normal. There was no significant flooding in the nearby coastal areas.

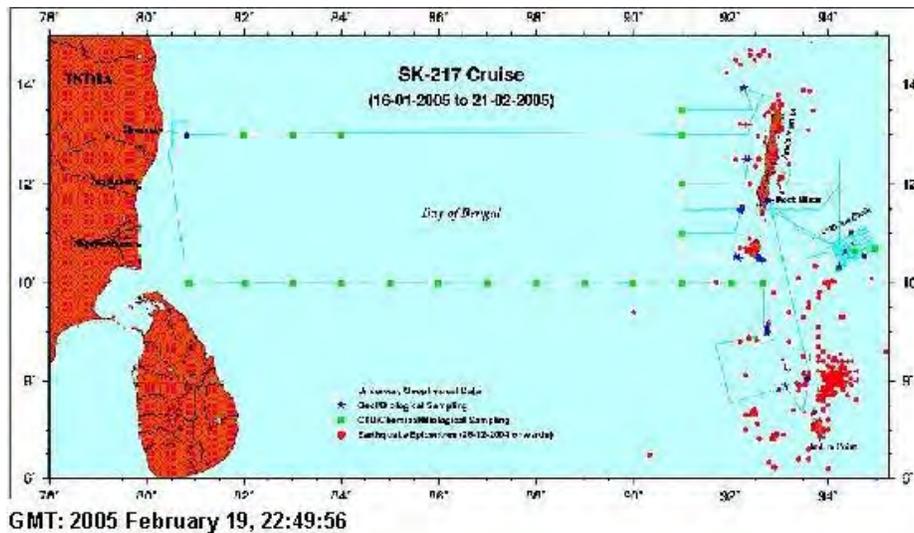
As described earlier, the island nation of Sri Lanka has blocked and deflected the approaching tsunami waves and hence the coastal areas of the districts of Pudukottai, Ramanathapuram, Tuticorin and Tirunelveli were saved. Because of the deflection of the waves, the water had receded temporarily in some places before returning to normal. For instance the rocky bed which used to be always under water in Tiruchendur coast (near Tiruchendur temple) got exposed because of the receding water up to 50 meters from the normal low tide mark. Indications are that sediment load might have increased due to the sudden flushing effect of the tsunami waves and hence there is a need to make a complete survey of all the coral reef habitats around the chain of 21 islands in the Gulf of Mannar. The preliminary survey concluded that the impact of tsunami waves on either the corals or on the ecosystem was only minimal.

## **5. Assessment of impact of tsunami in the Andaman & Nicobar and Bay of Bengal by Ocean going vessels of DOD**

The DOD's vessels ORV Sagar Kanya and FORV Sagar Sampada were deployed for studying the impact of tsunami on the ocean environment and its resources in the Bay of Bengal and Arabian Sea during January – February 2005.

### **ORV Sagar Kanya**

Immediately after the tsunami, the vessel ORV Sagar Kanya sailed from Goa on 3<sup>rd</sup> January 2005 with scientists from NCAOR, NIO, Goa and NIO, Regional Centre, Visakhapatnam and carried out multi-disciplinary observations along the affected coastal areas of Malabar coast and Nagapattinam, Cuddalore, Pondicherry and Chennai on the Coromandal coast. The vessel reached Chennai on 15<sup>th</sup> January 2005 and sailed for a cruise in Bay of Bengal and Andaman & Nicobar region, immediately. The vessel returned to Chennai on 21<sup>st</sup> February '05 after completing the 37-day post-tsunami cruise.



**FIG. 20 - SK 217 Cruise Track Map with sampling locations: Bay of Bengal & Andaman Sea**

A 31-member team led by Dr K.S.R. Murthy, Scientist-in-charge of NIO RC, Visakhapatnam, comprising 9 Scientists from NCAOR, 8 from NIO, Goa and 7 from NIO, Regional Centre, Visakhapatnam, one from NPOL, Kochi, besides 6 from NORINCO, Chennai, participated in this cruise. The multi-disciplinary and multi-parameter data collection was so planned as to reoccupy some of the areas where earlier data were available and also to collect new data in some areas, which were not covered earlier.

**Preliminary observations made during the cruise in are given below:**

**Physical Parameters:** The sea surface temperature increased from 27°C off Chennai to 28°C at 92°40' E. The mixed layer depth, which was inferred from temperature profiles, varied from 50 to 100m between 80° 52' and 87°E and thereafter it decreased to 70m towards Andaman. A temperature maximum was observed at 84°E at ~80m. Along the west-east section, the near-surface salinity varied from 32.8 to 33.9 psu, with low salinity water (31.7psu) identified near the Andaman Islands. A conspicuous feature identified in the vertical profiles is the occurrence of high salinity core (35.2 psu) at 100 m between 83° and 84°E; in the same region the temperature maximum (~29°C) was also encountered. In general, surface freshening occurred near Andaman region.

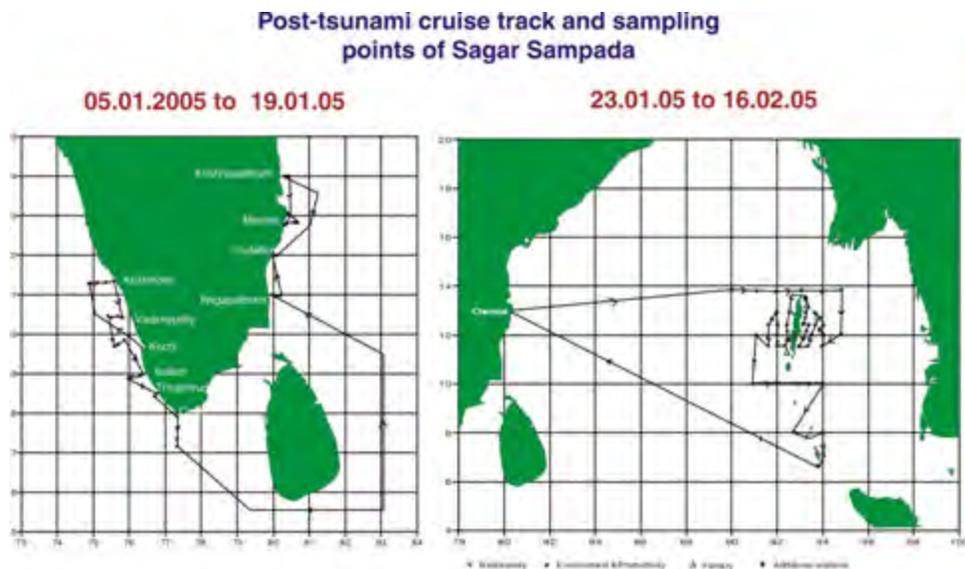
**Geophysics:** The long-range profiles taken across the Bengal Fan following 10 and 13° N showed the characteristic bathymetry and gravity anomalies associated with the continental margin, the continent – ocean boundary (COB) and the deep sea Bengal basin, including 85° E and 90° E ridges. Towards the east, a sharp gravity low of the order of 124 mGal was noticed over the Andaman Trench region. The Andaman fore-arc region was characterised by a broad gravity high of 122 mGal with a width of 150 km. This overall broad gravity high was associated with a series of highs and lows of the order of 20-25mGals. These anomalies may be due to the presence of volcanic intrusions. In the back-arc basin, a distinguished regional feature was observed parallel to the Andaman Island chain between the latitudes 10° 30'N and 12° 30'N. The free-air gravity anomaly over this feature varied in amplitude between 150 and 75 mGals having a variable width of 70 km to 30 km. The Andaman Trench was characterised by a significant gravity low with broad gravity highs on both the sides due to Ninety-east ridge on the west and volcanic intrusions on the east, respectively. The irregular nature in the eastern side gravity high suggests a series of volcanic out pouring. The overall amplitude variation of the gravity anomaly over the trench area was from 60 to 100 mGals. Along 13° N the gravity anomaly was characterised by a high over the 90° E Ridge and a low over the 85° E Ridge. A detailed analysis of bathymetry, free-air and sub-bottom profiler data and its correlation with earlier geophysical data collected in this region will help us to demarcate any physiographic and tectonic changes that might have taken place in the Bengal Fan and Andaman and Nicobar regions, due to the earthquake. Chemical and biological parameters as well as sediment cores collected during the expedition are being analysed at the shore-based laboratories.

During the entire survey period in the Nicobar region, aftershocks of the Sumatra Earthquake of magnitude more than 5.0 have occurred at a fairly high frequency (at the rate of 2 to 3 per day). Plotting of the epicenters indicated that the area east of Katchal and Nancowry Islands was associated with more than 75 aftershocks forming a huge cluster around this part of the Nicobar Region, most of which occurred after 24<sup>th</sup> January, 2005. An interesting part of the cruise was that the cruise members experienced vibrations on the vessel for a few seconds on 24<sup>th</sup> January 2005, around 0946 hrs due to one such event of magnitude 6.3, with the epicenter located around 140 km SW of Katchal Islands. This epicenter position was confirmed by three

independent sources and the vessel was hardly 120 km east of this epicenter at the time of the event.

### **FORV Sagar Sampada**

Leading scientists and media have raised apprehensions with regard to the impact of tsunami on the fishery resources also. In the given scenario, a team of scientists from Cochin University of Science & Technology, NIO-RC, Kochi, Annamalai University and CMLRE, Kochi sailed out from Kochi onboard FORV Sagar Sampada on 5.1.2005 to carry out detailed investigations on the impact of tsunami on the benthic communities, water chemistry and productivity patterns of the coastal waters covering Kerala, Tamil Nadu and Andhra coasts and Andaman and Nicobar Islands. Impact assessment was made through comparison of the results with previous data collected from these areas by the earlier cruises of FORV Sagar Sampada. Concurrent measurements on the near coastal waters i.e. up to 30 m depth were also undertaken by involving scientists from NIO-RC, Kochi; CUSAT; CMFRI, CMLRE and Annamalai University.



**FIG. 21 Post-tsunami cruise track and sampling points of Sagar Sampada**

The observations made in the cruise on the Kochi – Chennai track during 05.01.2005 to 19/01/05, were:

- Sea surface temperature (SST) varied between 26.62° and 27.25° C. Mixed Layer Depth (MLD) ranged from 58 m to 82 m along the southeast coast.
- Except for silicate and phosphate values, all other chemical parameters viz. salinity, dissolved oxygen and pH were normal. Surface values of silicate were below 1.5µM. High phosphate values (up to 7.27µM) were observed at 30m and 50m stations off Nagapattinam, as against the normal values below 3.0µ M.
- Benthic organisms were recorded from all the stations. Study of major groups from samples collected from 30 m and 100 m depth and comparison with data earlier recorded during 1998-99 indicate that the major groups, which supported the number and the benthic biomass was not significantly affected. Since most of the organisms have a life span of one year or less, it is possible that even if there was a decrease in their numbers as noticed in the west coast, it was within the limit of recovery.
- Statistically sand and silt content variation was not found significant. A significant variation of clay particles in the east and west coasts at 30 and 100 m depths was recorded. The data indicate a substantial increase in the finer particles at 30 m depth at Kollam, Thiruvananthapuram and Kozhikode in the west coast and Chennai and Krishnampattinam in the east coast. At 100 m depth also an increase in finer particles was recorded off Kollam, Kochi and Kozhikode and in the east coast off Karaikal and Krishnampattinam. Statistically total sediment character change was significant at 30 and 100 m depth both in the east and west coasts.
- In the demersal fishery catches nothing unusual was observed. Neither algal blooms were observed, nor was abnormal swarming of zooplanktons noticed.

In the track of the tsunami from Andaman to Chennai (23/01/05 to 16/02/05) a number of observations were made. Both earthquake and the tsunami have affected the coastal regions of southern Andaman and Nicobar Islands. In the northeastern

region, the coastal area was not much affected as evidenced by the status of corals in the near shore waters. Corals, gorgonids and coral reef associated fauna were alive and in good condition in this region, indicating the stability of the bottom.

Even though the surface salinity and temperature didn't show much variation in the middle Andaman, coral and associated fauna were heavily damaged in the Wandoor and Jolly boy region. This could be due to sedimentation and deposition of the debris over the coral reef beds by heavy force of tsunami waves and beach erosion.

Comparatively high values of nutrients concomitant with high dissolved oxygen promoted the phytoplankton production in the near shore waters of Viper Island and Minnie Bay, where the intensity of tsunami waves was high. A part of the beach was either submerged or eroded due to earthquake and tsunami.

In the fishing ground of northeast region, benthic organisms including sponges, gorgonids, echinoderms, etc., were alive and abundant, while in the southern region it was less but a large number of nautilus of various sizes was observed.

The areas having thick mangrove vegetation were least affected. In such areas beach erosion was very much reduced,

## **6 Inferences**

The tsunami is an eye opener on set back lines decided for protection/conservation of coastal resources, beaches, protection of land, people, etc. Generally setback lines are decided in terms of distance from High Tide Line as done under the CRZ Notification. The run-up levels due to increase of sea level during tsunamis as well as during storm surges have added another dimension of elevation to be taken into consideration in the principle of setback line based coastal zone management. It is necessary to incorporate the elevation levels for new/expanded settlement areas under the Town and Country Planning Acts so that the human and property are saved from the natural hazards/vulnerabilities. The low lying areas like Nagapattinam, Nellore to Machilipatnam, Paradip to Bangladesh border, Kachchh coast in Gujarat, Andaman & Nicobar islands, etc. need immediate attention in this regard. Maps demarcating the extent of land areas vulnerable to seawater inundation

and safe locations for settlement, schools and vital infrastructure need to be prepared for all areas in the country. Where possible, the settlements and other human gathering locations like schools, theme parks, etc. need to be located at safer locations in a phased manner.

The fact of less damage to coastal villages located in elevated areas with wide beach front like Kalanji in north Chennai, mangroves shielding Killai village in Pichavaram mangrove have laid great importance for the need to protect beaches, mangroves, coral reefs, offshore shoals, etc. as they act as excellent natural barriers. It is necessary all developmental activities both existing and planned in the future need to adopt the construction codes stipulated for their region (for example, seismic codes for high risk zones like Andaman and Nicobar islands, Kachchh areas) and adopt best environmental practices to minimise loss or damage of natural barriers and to ensure protection of human life. The huge loss of human life (about 8000) in villages located close to the coast (like Keechankuppam, Akkaraipettai, Devanampattinam in Tamilnadu) amply demonstrate the vulnerability of human settlement located/occupied close to the coast, despite these areas had a beach front of 100-200 m.

### **Acknowledgements**

Our sincere thanks to Dr.Harsh K.Gupta, Secretary, Department of Ocean Development for his keen support in preparing this report. Thanks are also due to Dr.V.Krishnamurthy, Director, Fisheries and Science & Technology, Andaman and Nicobar Islands and other A&N Administration Departments for their logistic support while carrying out the survey. The technical staff of ANCOST, NIOT helped to a great extent in data collection.

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General Information about Tsunami	Internet

**Statement by Dr. Kristian Teleki  
Managing Director  
International Coral Reef Acton Network (ICRAN)**

Your Excellencies, distinguished colleagues and friends,

It is my great honour to address you on this occasion of the 3<sup>rd</sup> Intergovernmental Ministerial Meeting of the South Asia Co-operative Environment Programme here in Bhutan.

First let me say how grateful I am to the Royal Government of Bhutan in hosting this meeting and the most excellent hospitality they have shown all of us during the last few days. I am confident that this has been a critical element to the success and smooth running of this meeting.

The International Coral Reef Action Network (ICRAN) was established in 2000 by a group of local, regional and international conservation organizations including the United Nations Environment Programme (UNEP). It operates by sharing traditional knowledge, current research, and lessons learned from practical experience to ensure the future not only of the coral reef ecosystems but also of the communities that the coral reefs sustain. In 2002 at the World Summit on Sustainable Development (WSSD) ICRAN made a commitment to include the regions of South Asia and the Arabian Seas to explore opportunities and implement coral reef related activities that would be of great benefit to the region. As a result ICRAN has been working closely with SACEP to develop a set of coordinated and coherent activities which builds upon and complements, in many cases, existing and past efforts. I think you will agree that there is no need to 'reinvent the wheel' which is why it is critical that we all work closely together on any initiatives which are implemented in the region to avoid any duplications and substantial overlap.

In your meeting papers you will have seen the two projects which SACEP, ICRAN and the UNEP Coral Reef Unit have developed.

The focus of both proposals is broadly on the conservation and sustainable management of coral reefs in the South Asian region in support of the national and regional implementation of the UN Millennium Development Goals, the commitments made at the WSSD and the decisions adopted at the 7th Conference of Parties to the Convention on Biological Diversity.

Each proposal has been designed to be effective as a 'stand alone' project. However, we hope that funding of both proposals will be successful, as they have been specifically designed to support each other and combined will maximize benefits and generate a greater overall regional impact. The actions proposed are highly compatible and complementary, and I would like to briefly introduce them to you here:

## **1. GEF – Medium-Sized Project:**

### **Improving the Viability and Sustainable Management of Marine and Coastal Protected Areas (MCPAs) in South Asia**

It is proposed to have an initial planning workshop, with a PDF A preparatory grant of US \$ 25,000, to develop a GEF Medium Sized Project of around \$ 700,000. The workshop will ensure that all needs and concerns are taken into account and that there is regional and local ownership of the project. For this project to be effective this must be a transparent process and channels of communication established. Without mutual understanding and agreement from the beginning this project will be difficult to implement, which is why this initial planning meeting is critical.

This project will:

- Assess the management effectiveness at existing MCPAs
- Develop a regionally applicable MCPA management 'best practice'
- Review and implement viable sustainable financing mechanisms at MCPA sites
- Integrate communities for improved sustainable use of coral reef resources

This initial planning/preparatory phase of this project has been endorsed by UNEP and will be sent to the GEF Secretariat for final approval once the outstanding letters of endorsement from India and Sri Lanka are received. I have been encouraged by my discussions in the margins of this meeting with the distinguished delegates from both countries, and I am confident, that with their support, we will be able to proceed with this planning workshop before the end of the year.

## **2. European Union Project:**

### **Institutional strengthening and capacity development for the long-term management and conservation of MCPAs encompassing coral reef resources in South Asia (€ 700,000)**

This project will:

- Establish a South Asia Coastal Resource Task Force
- Improve information exchange and data management across the region
- Develop standardised training curricula for MCPA management staff
- Strengthen the capacity of policy makers, planners and managers to design and implement viable livelihood diversification for poor reef users

The EU Project has been favourably reviewed in Brussels and we expect to have some positive news before the end of October 2005. I will be very happy to keep the distinguished delegates attending this meeting informed of further developments.

I am pleased that the International Coral Reef Action Network (ICRAN) has been able to participate in the deliberations and discussions regarding SACEP and the South Asian Seas Programme. I view this as an important juncture for continued and productive collaboration not only between SACEP, ICRAN and the UNEP Coral Reef Unit but also with the governments and stakeholders in the region.

On behalf of the UNEP Coral Reef Unit and ICRAN, I would like to extend my gratitude to the Director General of SACEP and the Interim Coordinator of the SAS for their support and continued productive collaboration in the development and evolution of these and other projects.

Your Excellencies, distinguished colleagues and friends – I thank you for this opportunity to address you on this august occasion. I look forward to future collaboration for the benefit of coral reefs and especially the communities in the South Asian region whose livelihoods and existence are dependent on the marine and coastal resources.

**SAS TRUST FUND**  
**COUNTRY CONTRIBUTIONS**  
**ARREARS FROM 1995 - 2004**

<b>COUNTRY</b>	<b>% of Total Arrears</b>	<b>Total Arrears in US \$</b>
Bangladesh	9.9	17,853
India	35.6	64,370
Maldives	13.5	24,472
Pakistan	41.0	74,225
Sri Lanka	0.0	0
<b>TOTAL</b>	<b>100</b>	<b>180,920</b>

## **RECOMMENDATIONS TO THE 3<sup>rd</sup> INTERGOVERNMENTAL MINISTERIAL MEETING ON SOUTH ASIAN SEAS PROGRAMME**

The meeting of National Focal Points considered the agenda items relating to progress made on the projects approved by the 1<sup>st</sup> and 2<sup>nd</sup> IMMs, Programme of Work for the years 2005 - 2007 and budgetary requirements of the SAS programme for the years 2006 -2007. The details of deliberations are given in the report of the National Focal Points (Appendix 1). Based on the deliberations, the National Focal Points propose the following recommendations for adoption by the 3<sup>rd</sup> IMM:

### **A) IMPLEMENTATION OF PROGRAMME OF WORK APPROVED BY THE 1<sup>ST</sup> & 2<sup>ND</sup> INTERGOVERNMENTAL MINISTERIAL MEETING**

The meeting noted progress made under various programmes. The details are given in Annex III of Report of the Meeting of National Focal Points.

It was noted that lack of complete strength of staff was the major constraint in accomplishment of tasks assigned to the secretariat. In order to ensure smooth implementation of the projects, a bi-annual progress report be circulated among National Focal Points and a meeting of National Focal Points be convened once in 6 months.

Regarding the recruitment of key staff namely the Regional Co-ordinator, the SACEP is requested to fill up the position without further delay and in case any not later than 31<sup>st</sup> March 2006. The procedures for appointment of Regional Co-ordinator to be adopted by SACEP would be as follows:

1. SACEP will widely publicize the vacancy by itself and through the National Focal Points using the qualifications prescribed for this position by the 1<sup>st</sup> IMM. The applications will be received at the SACEP.
2. SACEP will constitute a panel of 5 experts nominated one by each member country with DG, SACEP as the Chairman. The panel will scrutinize the applications and recommend a short list of eligible candidates to be called for interview. The panel will interview the short listed candidates and select the Regional Co-ordinator. DG SACEP can make the appointment of the selected candidate.

Regarding the projects that are being implemented, the project on Regional Oil Spill Contingency Planning has attained the stage of signing MOU among countries and 2 countries are yet to sign. These countries are requested to take steps for signing the MOU. Meanwhile, the meeting approves signing of Letter of Agreement with the International Maritime Organization. The copy of the Letter of Agreement is in Annex IX of Report of the Meeting of National Focal Points

**PROGRAMME OF WORK 2005 – 2007**

Based on discussions among the National Focal Points and Experts from UNEP, IMO etc., the following programme of work is recommended for the period 2005-07

- i) Persuasion of implementation of projects approved by 1 and 2<sup>nd</sup> IMMs, the details of which are given in Annex VIII of Report of the Meeting of National Focal Points
- ii) Undertaking new programmes relating to Management of Natural Oceanogenic Disasters and Management of Coastal and Marine Protected Areas. The details of aspects to be undertaken in these programmes along with prioritisation are given in **Annex VIII of the** Report of the Meeting of National Focal Points.
- iii) The meeting recognised the importance of the early operationalisation of South Asian Regional Oil Spill Contingency Plan and requested the 2 countries who have yet agree to the signing of the concerned MOU to kindly pursue with the relevant authorities and convey their concurrence to the SAS Secretariat so that the SAS Secretariat could convene a Special Meeting for the formal signing of the MOU followed back to back with IMO Regional Training Exercise pertaining to some important elements of the plan.

**B) SOUTH ASIAN SEAS TRUST FUND AND CONTRIBUTIONS BY MEMBER COUNTRIES**

- i) It is noted that the countries have arrears in contribution to the trust fund. The details of the arrears to be paid by the Governments are given in the **Annex X of** Report of the Meeting of National Focal Points. The respective countries are requested to clear the arrears.
- ii) The Secretariat has sought an increased contribution by member countries at a rate of 10% increase per annum from the year 2000 onwards. As there has been considerable savings available from the previous year contributions, status quo on annual contribution at the present rate be maintained up to 2007.

<b>COUNTRY</b>	<b>% Contribution</b>	<b>2005 US \$</b>	<b>2006 US \$</b>	<b>2007 US \$</b>
Bangladesh	14.5	13,335	13,335	13,335
India	35.0	32,185	32,185	32,185
Maldives	6.5	5,975	5,975	5,975
Pakistan	29.5	27,130	27,130	27,130
Sri Lanka	14.5	13,335	13,335	13,335
<b>TOTAL</b>	<b>100.0</b>	<b>91,960</b>	<b>91,960</b>	<b>91,960</b>

iii) The Draft Secretariat Budget for 2005 - 2007 for approval is given below

	<b>2005</b>	<b>2006</b>	<b>2007</b>
	<b>Cost in US \$</b>	<b>Cost in US \$</b>	<b>Cost in US \$</b>
<b>PERSONNEL</b>			
<b>International</b>			
Regional Co-ordinator	36,000	36,000	36,000
<b>Local</b>			
Senior Programme Officer	4,200	4,200	4,200
1 Junior Programme Officer	3,000	3,000	3,000
1 Secretary	2,750	2,750	2,750
<b>PROJECT FORMULATION</b>	10,000	10,000	10,000
<b>OFFICE INFRASTRUCTURE</b>			
Furniture, Office Equipment & Consumables	5,000	5,000	5,000
<b>RENTAL AND MAINTENANCE</b>	6,000	6,000	6,000
<b>ADMINISTRATION COSTS</b>	5,000	5,000	5,000
<b>MEETING &amp; INTERNATIONAL TRAVEL</b>	12,500	12,500	12,500
<b>DOCUMENTS</b>	5,510	5,510	5,510
<b>CONTINGENCIES</b>	4,000	4,000	4,000
<b>TOTAL</b>	<b>91,960</b>	<b>91,960</b>	<b>91,960</b>

- iv) The Trust Fund may also be used to meet the expenditures for preparation of the project proposals identified for 2005-07 with a budgetary allocation of US \$ 10,000 per year. Further, in order to cope up with increasing workload and in the absence of regular Regional co-ordinator, the Interim Co-ordinator be paid an amount of US \$ 500 per month from the SAS Trust Fund up to 31 Dec 2005. For any need for continuation of services of the Interim Co-ordinator beyond this period, the meeting requested the DG SACEP to make an appropriate proposal to the Government's of the member countries as it may result into creation of additional staff position in the SAS Programme.
- v) Audited Reports of Accounts for the years 2001 to 2004 be approved with a suggestion that the reports should have more details on items of expenditure. SACEP may appoint a more professional auditor for auditing of accounts

### PROGRAMME OF WORK 2005-2007

A. The Secretariat made known to the meeting that following are the confirmed programme activities for the coming months.

#### CONFIRMED ACTIVITIES FOR 2005

<b>TIME FRAME</b>	<b>ACTIVITY</b>	<b>COLLABORATORS</b>	<b>VENUE</b>	<b>COST IN US \$</b>
12 - 30 September 2005	Development of a project proposal related to port reception facilities following a feasibility study of technical and operational aspects (Bangladesh, India, Maldives, Pakistan, Sri Lanka)	IMO and SAS	SAS Secretariat	30,000
October 3 - 6 2005	Regional workshop on measures to collect, handle, treat and dispose of waste generated in applying Anti Fouling System (AFS) Convention	IMO, Govt of India and SAS	NIOT, Chennai, India	65,000
Between 1 - 23 December 2005	National OPRC Level 3 for Bangladesh (MED/SACEP), Dhaka, Bangladesh	IMO, Govt of Bangladesh and SAS	Bangladesh	31,000
To be completed by December 2005	Preparation of National & Regional report on the State of the Marine Environment in the South Asian Seas Regional under UNEP Regional Seas Reports & Studies	Govts of Bangladesh, India, Maldives, Pakistan & Sri Lanka, UNEP and SAS	SAS Secretariat	30,000
By Dec 2005	Development of Project Proposal on POP's with UNEP Nairobi	UNEP & SAS		10,000
By Dec 2005	Development of Project Proposal on Marine Litter	UNEP & SAS		26,000
16 - 20 January 2005	Regional seminar/workshop on ratification and implementation of the International Convention on Oil Pollution Preparedness, Response and Co-operation, and Highly Noxious Substance (OPRC-HNS) Protocol, the AFS Convention and identification and establishment of Particularly Sensitive Sea Areas (PSSAs)	IMO, Govt of Maldives and SAS	Maldives	52,000

23 – 27 January 2006	National OPRC Level 3 for Maldives Male, Maldives	IMO, Govt of Maldives and SAS	Maldives	34,000
TBD	Medium-sized Project proposal REQUEST FOR GEF FUNDING PROJECT TITLE: Improving the viability and Sustainable Management of Marine and Coastal Protected Areas (MCPAs) in South Asia	ICRAN & SAS	Marine States SAS	
TBD	EC Proposal on Institutional strengthening and capacity development for the long-term management and conservation of MCPAs encompassing coral reef resources in South Asia	ICRAN & SAS	Marine States SAS	
TBD	Development of National Water Quality Criteria for Different Uses of Sea Water with NIVA & SIDA	NIVA, SIDA & SAS	Marine States SAS	4,000,000
TBD	Projects with IMO after signing of Oil Spill MOU	IMO, SAS and All member countries		
TBD	“Planning and implementation of Coastal Reconstruction in Tsunami affected countries according to the Cairo Guiding Principles within the context of the UNEP GPA in the South Asian Region”.	GPA & SAS	India, Maldives & Sri Lanka	

- B. The preparatory meeting of National Focal Points after intensive discussions, recommended that following programmes to be taken under SAS programme for the period 2005-2007:

**1. Persuasion of projects approved by the 2nd IMM seeking funding for their implementation:**

A list of projects approved is given in Annexure 1. Out of these projects, the project on Development of harmonised National Environmental Quality Criteria for Seawater for the South Asian Seas has received assurance for funding by Norwegian Institute of Water Research. The expected funding would be in the order of US \$ 4 million. The project would be commenced soon.

**2. New project areas identified by the meeting:**

**i) Natural Disaster Management with respect to Storm Surges and Tsunamis**

- Identification of coastal areas vulnerable for seawater flooding 2005-06
- Education and awareness 2005-06
- Adoption and Evaluation of Ecosystem services in Coastal and marine areas. 2006-07
- Capacity building in mitigation measures such as creation/maintenance of natural defences like sand dunes, coastal plantation, coral reef, mangroves 2006-07

**ii) Management of Coastal and Marine Protected Areas**

- Coral Reefs and Sea Grass-2006-07
- Mangroves-2005-06
- Lagoons-enhancing the tidal influx 2006-07

**3. South Asian Regional Oil Contingency Plan:**

The meeting recognised the importance of the early operationalisation of South Asian Regional Oil Spill Contingency Plan and requested the 2 countries who have yet agree to the signing of the concerned MOU to kindly pursue with the relevant authorities and convey their concurrence to the SAS Secretariat so that the SAS Secretariat could convene a Special Meeting for the formal signing of the MOU followed back to back with IMO Regional Training Exercise pertaining to some important elements of the plan.

## ANNEXURE I

**List of Projects Approved by the  
1<sup>st</sup> & 2<sup>nd</sup> Intergovernmental Ministerial Meeting of SAS Programme**

**1. Integrated Coastal Zone Management**

<b>PROJECT TITLE</b>	<b>TIME FRAME</b>	<b>BUDGET IN US \$</b>
1) Capacity Building for the control of coastal erosion in the context of ICZM in the South Asian Seas Region <ul style="list-style-type: none"> <li>• Course Development Meeting</li> <li>• Workshop on Coastal Erosion</li> </ul>	12 Months	40,000 95,000
2) Assessment of Areas Vulnerable to Sea Level Rise in the South Asian Seas Region	18 Months	406,500

**2. National and Regional Oil Spill Contingency Planning:**

<b>PROJECT TITLE</b>	<b>TIME FRAME</b>	<b>BUDGET IN US \$</b>
1) Capacity Building in the Development and Operation of National Oil Spill Contingency Planning	12 months	336,775 (3 seminars / Workshops)
2) Capacity Building Activities with IMO	24 Months	200,000

**3. Human Resource Development through Strengthening Regional Centres of Excellence**

<b>PROJECT TITLE</b>	<b>TIME FRAME</b>	<b>BUDGET IN US \$</b>
1) Identification of Capacity Building Requirements in Coastal and Marine Environmental Protection and Management <ul style="list-style-type: none"> <li>• Course Development</li> <li>• Cost of Course Material and Course expenses for 8 Courses</li> </ul>	12 Months	75,000 600,000
2) Strengthening the Capacity of the Regional Centres of Excellence in the Protection and Management of the Coastal and Marine Environment	6 Months	225,000

### 3. Protection of the Marine and Coastal Environment from Land-Based Activities

<b>PROJECT TITLE</b>	<b>TIME FRAME</b>	<b>BUDGET IN US \$</b>
1) Approval of Draft National Action Plans prepared by National Consultants for implementation of the GPA at a National Forum	6 Months	5,000 per country for 7 countries
2) Regional Workshop to finalise Draft Regional Overview and Action Plan on the Implementation of the GPA and implementation of components of Regional Action Plan	6 Months	30,000
3) Development of National Pilot Programmes of Action for the Protection of Marine Environment from Land-based Activities	18 Months	75,000 per country for 5 countries
4) Setting up of a Clearing House Mechanism for GPA in the South Asian Seas Region with South Asia Environment and Natural Resources Information Centre (SENRIC) functioning as the central node	To be determined	To be determined
5) Participation in GPA Project on Physical Alterations and Destruction of Coastal Habitats: Guidelines for Action and Role of Stake Holders	To be determined	To be determined
6) Assistance for Development of a Proposal for a GEF Block B PDF Grant under the GPA	To be determined	To be determined

### 4. Management of Coastal and Marine Protected Areas in the South Asian Seas Region

## MODEL

**TERMS OF AN AGREEMENT OF CO-OPERATION BETWEEN  
THE INTERNATIONAL MARITIME ORGANIZATION (IMO) AND  
SOUTH ASIA CO-OPERATIVE ENVIRONMENT PROGRAMME (SACEP)**

1 The **International Maritime Organization** (hereinafter referred to as "IMO") and the **South Asia Co-operative Environment Programme** (hereinafter referred to as "**SACEP**") will consult each other on matters of common interest to the two Organizations with a view to ensuring maximum co-ordination of the work and activities of the respective Organizations in respect of such matters.

2 Subject to such arrangements as may be necessary for safeguarding confidential information, the **Secretary-General of IMO** and the **Director General of SACEP** will exchange information and keep each other fully informed of projected activities and programmes of work in fields of common interest. Accordingly, when either Organization proposes to initiate a programme or activity on a subject in which the other has or may have a substantial interest, consultation will be initiated between the Organizations with a view to harmonizing their efforts as far as possible, taking into account their respective responsibilities and any decisions or wishes of the appropriate governing bodies of the respective Organizations.

3 The **Secretary-General of IMO** will invite the **Director General of SACEP** to send representatives to observe meetings or conferences convened by or under the auspices of **IMO** to consider matters in which **SACEP** has an interest, in accordance with procedures applicable to each meeting or conference. The **Director General of SACEP** will invite the **Secretary-General of IMO** to send observer to meetings or conferences convened by or under the auspices of **SACEP** to consider matters in which **IMO** has an interest, in accordance with the procedures applicable to each meeting or conference.

4 The **Secretary-General of IMO** and the **Director General of SACEP** may consult, where appropriate, on the use of personnel, material, services, equipment and facilities for joint undertakings which may be agreed between them in fields of common interest to **IMO** and **SACEP**

5 **IMO** will, at the request of **SACEP**, render assistance to **SACEP** with respect to matters within the scope of activities of **SACEP**; and **SACEP** will, at the request of **IMO**, render assistance to **IMO** in matters falling within the scope of **IMO's** activities. Where assistance which is required by either party under the terms of this Agreement involves substantial expenditure, consultation will take place with a view to determining the most equitable manner for meeting such expenditure.

6 It is further agreed that nothing in this Agreement shall bind any of the Member States of **SACEP** jointly or severally. Similarly, the Agreement shall not bind any of the Member States of **IMO** jointly or severally.

7 This Agreement shall be subject to revision by agreement between the **Secretary-General of IMO** and the **Director General of SACEP**

8 The **Secretary-General of IMO** and the **Director General of SACEP** may terminate this Agreement by giving six months written notice to the other party.

9 This Agreement shall come into force on its approval by the **Assembly of IMO** and **SACEP**

Agreed for the SACEP by:

Agreed for IMO by:

Dr. A. A. Boaz  
Director General

E.E. MITROPOULOS  
Secretary-General

Date: .....

Date: .....

\_\_\_\_\_

**This Agreement once is done has to be put back on one line space.**