

# ANNUAL REPORT 20<sup>11</sup>/<sub>12</sub>



NATIONAL CENTRE FOR  
SUSTAINABLE COASTAL MANAGEMENT  
*Ministry of Environment and Forests, Government of India*



# National Centre for Sustainable Coastal Management

*The National Centre for Sustainable Coastal Management has been established by the Ministry of Environment and Forests in collaboration with Anna University, Chennai to develop a world class knowledge base in India, related to management of the coastal and marine areas. It promotes integrated and sustainable management of coastal and marine areas in India and advises the Union and State Governments and other associated stakeholder(s) on policy, and scientific matters related to ICZM.*

## Annual Report 2011 – 2012



**National Centre for  
Sustainable Coastal Management  
Ministry of Environment and Forests**







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# HPSC

- *Union Minister for Environment and Forests [Ex-Officio Chairperson]*
- *Prof. M.S. Swaminathan, Member of Parliament (Rajya Sabha) [Expert Member]*
- *Dr. K. Kasturirangan, Member, Planning Commission [Expert Member]*
- *Dr. K. Radhakrishnan, Chairman, ISRO, Bangalore [Expert Member]*
- *Secretary, Ministry of Environment and Forests (MoEF) [Ex-Officio Member]*

# GC

- *Vice Chancellor, Anna University, Chennai [Ex-Officio Member]*
- *Adviser, Impact Assessment Division, MoEF [Ex-Officio Member]*
- *Director, National Centre for Sustainable Coastal Management, Chennai [Ex-Officio Member]*
- *National Project Director, SICOM, MoEF [Ex-Officio Member Secretary]*
- *Vice Chancellor, Anna University, Chennai [Ex-Officio Chairperson]*
- *Secretary/Additional Secretary, MoEF [Ex-Officio Member]*
- *Dr. K. Kasturirangan, Member, Planning Commission [Expert Member]*
- *Dr. Shailesh Nayak, Secretary, MoES [Expert Member]*
- *Dr. K. Radhakrishnan, Chairman, ISRO [HPSC Representative]*
- *Director, National Remote Sensing Centre, Department of Space [Ex-Officio Member]*
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- *Registrar, Anna University, Chennai [Ex-Officio Member]*
- *National Project Director, SICOM, MoEF [Ex-Officio Member]*
- *Adviser (E&F), Planning Commission [Ex-Officio Member]*
- *Director, NIO, Goa [Ex-Officio Member]*
- *Director General, Survey of India, Dehradun [Ex-Officio Member]*
- *Director, NIOT, Chennai [Ex-Officio Member]*
- *Director, NLSIU, Bangalore [Ex-Officio Member]*
- *Director, Centre for Climate Change & Adaptation Research, Anna University, Chennai [Ex-Officio Member]*
- *Director General (Fisheries), ICAR, New Delhi [Ex-Officio Member]*
- *Prof. A. Jayaraman, National Atmospheric Research Laboratory, Tirupati [Expert Member]*
- *Prof. G.M. Samuel Knight, Professor of Civil Engineering, Anna University, Chennai [Expert Member]*
- *Prof. M. Sekar, Dean, College of Engineering Guindy, Anna University, Chennai [Expert Member]*
- *Director, NCSCM [Ex-Officio Member-Secretary]*

# Preface

Complex and diverse types of natural processes that occur on the coastal zone bring in physical, chemical, and biological changes to the fragile coastlines. Human activities in the coastal zone add yet another dimension affecting changes to our coastlines. Considering the growing need for sustainability of the coast, the Ministry of Environment and Forests (MoEF), Government of India established the National Centre for Sustainable Coastal Zone Management (NCSCM) in February 2011 to be a world class institution for sustainable coastal management with a strong research and knowledge base.

NCSCM, MoEF identified research institutes in each of the Coastal State/UTs under the “Anna University Declaration” to enable representative coastal universities and institutions function in a Consortium mode. NCSCM has an advanced and multi-disciplinary research agenda, spanning physical, chemical, biological, social and economic disciplines through field surveys and extensive remote sensing and GIS applications. NCSCM has for the first time mapped the entire coastline of India to assess the shoreline change and to enhance the country’s preparedness to coastal hazards. The MoEF has evolved the concept of preparing the Integrated Coastal Zone Management (ICZM) Plan for the Country’s coastline for which NCSCM is providing the Guidelines to the Coastal States! UTs. NCSCM is also undertaking the delineation of Coastal Sediment Cells and mapping of Ecologically Sensitive Areas, with emphasis on traditional knowledge.

I wish to thank the Hon’ble Union Minister of Environment and Forest and Climate Change and the High Power Research Steering Committee for setting high standards of research goals for NCSCM. I would like to thank Secretary E&F for the continued support and guidance on the research programmes. The support provided by the Vice Chancellor, Anna University & Chairman, Governing Council, the Registrar and all the members of the Governing Council is greatly acknowledged. The immense support of National Project Director and Shri Tapas Paul, Task Team Leader, World Bank are gratefully acknowledged. The activities and periodic updates are available at the NCSCM website [www.ncscm.res.in](http://www.ncscm.res.in)

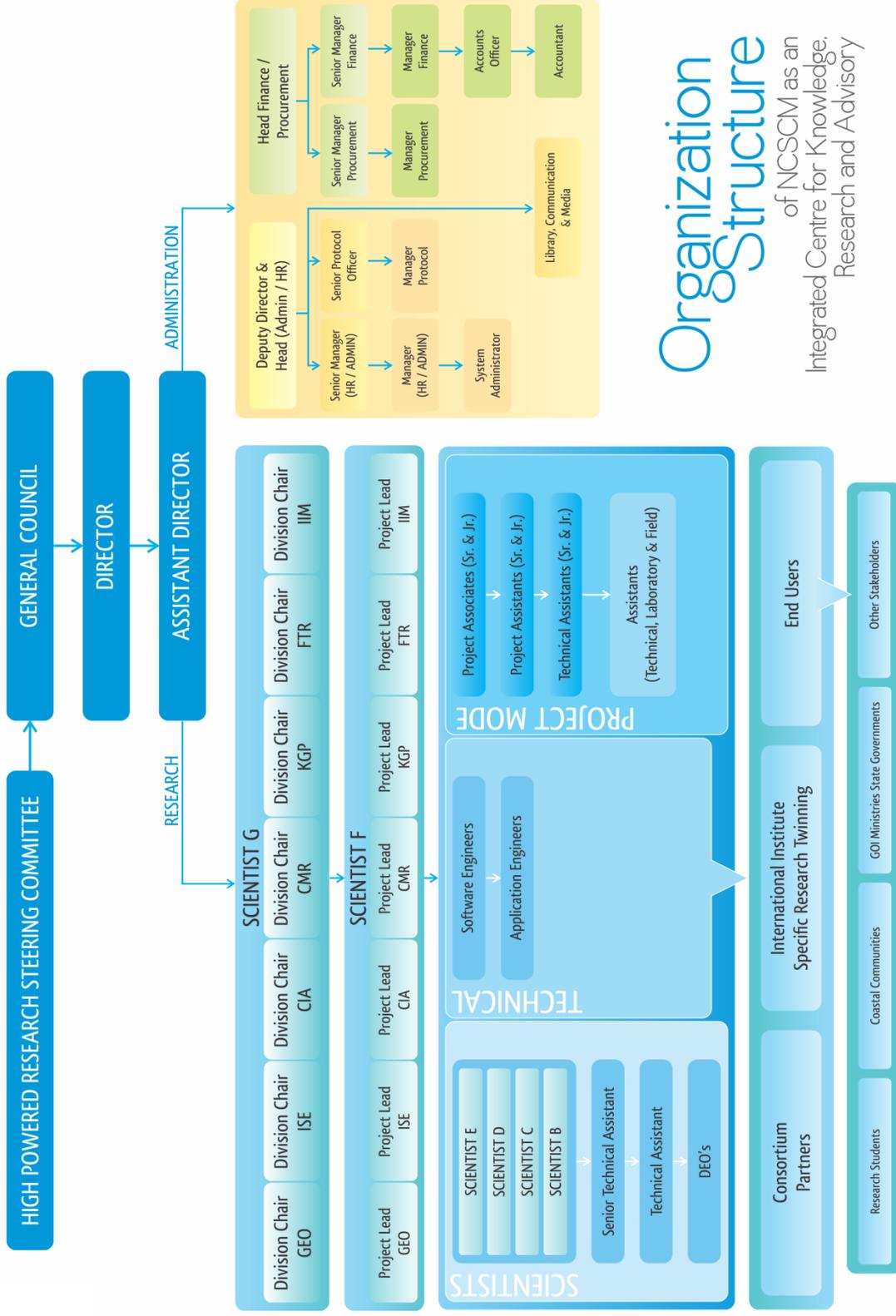
# An Introduction

National Centre for Sustainable Coastal Management (NCSCM) is established as an autonomous institution, with an aim to become a world-class institution for coastal and marine area management with adequate human resources, facilities and assured long-term funding. It would promote integrated and sustainable management of coastal and marine areas in India and advice the Union and State Governments and other associated stakeholder(s) on policy, and scientific matters related to Integrated Coastal Zone Management (ICZM).

The Centre is established within the Anna University Campus, Chennai. Fourteen institutions have formed a consortium with NCSCM, with Anna University Chennai as the Hub. The Centre will become a centre for excellence within India on coastal research, management. The outputs from research at NCSCM would aid in the better protection, conservation, rehabilitation, management and policy design of the coast.

NCSCM would guide and coordinate the implementation of ICZM approaches leading to enhanced conservation of coastal resources and sustainable development along the coast of India through applied and futuristic research. The centre would develop a central repository of information and knowledge on ICZM practices in India and elsewhere. The centre will partner with national and similar international institutes to share knowledge in protection, conservation and management of the coastal areas. Further, NCSCM would promote technically sound and practical management approaches to ICZM.

# Organization Structure



**Organization Structure**  
of NCSCM as an  
Integrated Centre for Knowledge,  
Research and Advisory

## About NCSCM

The National Centre for Sustainable Coastal Management (NCSCM) was established by the Society of Integrated Coastal Zone Management (SICOM) of the Ministry of Environment & Forests (MoEF) in 2010 as an autonomous institution with the vision of promoting sustainable coasts through increased partnerships, conservation practices, scientific research and knowledge management for the benefit and well being of current and future generations. NCSCM is designed to support the nationwide adoption of Integrated Coastal Zone Management (ICZM) approaches through the development and provision of cutting-edge science, knowledge and networking with relevant national and international institutes of repute. These will be realized through inter and trans-disciplinary scientific research, advisory capacities and by imparting knowledge into a seamless, holistic decision support system. The necessary research builds upon and integrates expertise within the coupled social-ecological systems.

## GOALS

NCSCM has the following primary goals:

- To create a world class institution for sustainable coastal management with a strong research and knowledge base
- Create a Consortium of Institutions in India to strengthen capacity in multi-disciplinary research related to coastal management

## Divisions of NCSCM

- Geospatial Sciences (GEO) Division
- Integrated Social Sciences and Economics (ISE) Division
- Coastal Environmental Impact Assessment (CIA) Division
- Conservation of Coastal and Marine Resources (CMR) Division
- Knowledge, Governance and Policy (KGP) Division
- Futuristic Research (FTR) Division
- Integrated Island Management (IIM – A unit of FTR) Division

## VISION

*“Promote sustainable coasts through increased partnerships, conservation practices, scientific research and knowledge management for the benefit and wellbeing of current and future generations”*

## MISSION & ROLE

To support integrated management of coastal and marine environment for livelihood security, sustainable development and hazard risk management by enhancing:

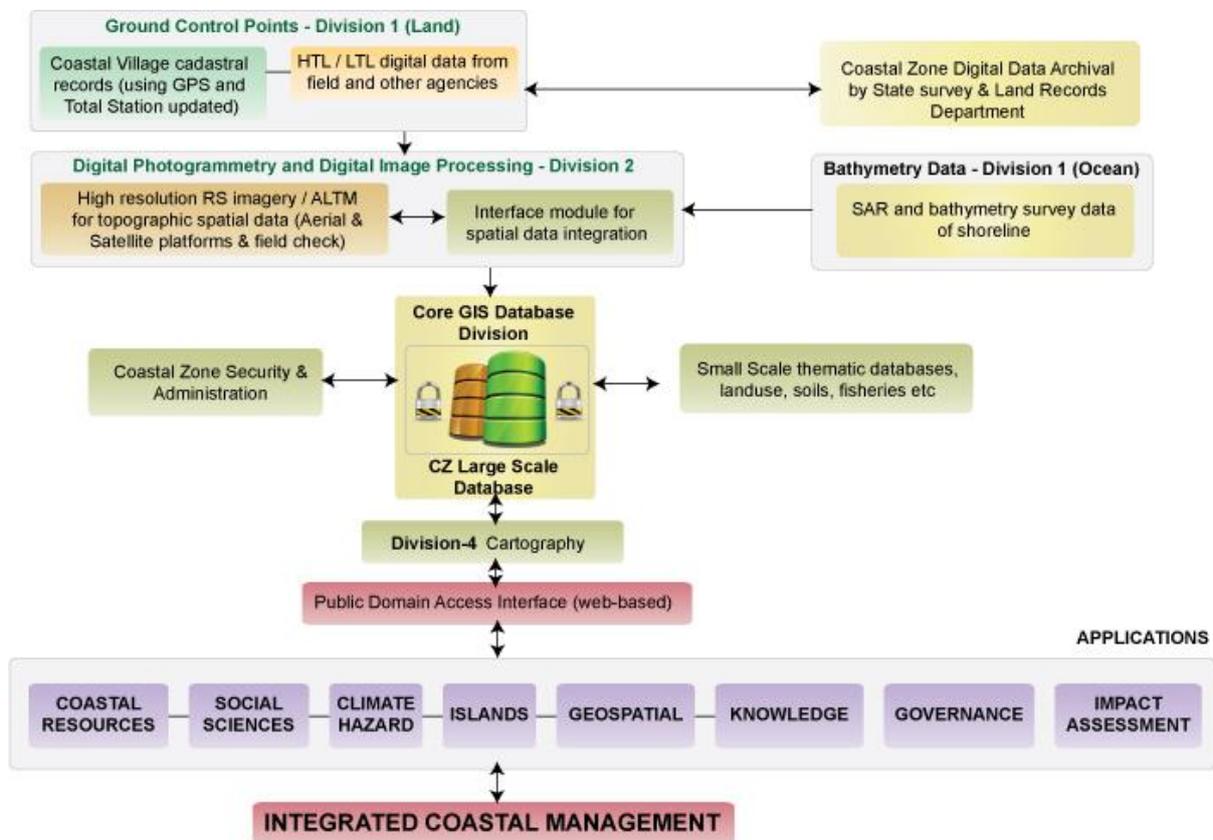
- Knowledge
- Research and Advisory Support
- Partnerships and network
- Coastal Community interface



# Geospatial Sciences Division (GEO)

The Geospatial Sciences Division is designed to provide information on the state of the coastal and marine environment through advanced observing and forecasting systems. The aims of the GEO are to examine the application of Geographic Information Systems (GIS) and Remote Sensing (RS) to coastal management, coastal and marine monitoring, and hazard assessment. The prime focus of GEO would be to integrate coastal data and information to help guide management efforts, such as coastal and marine spatial planning, and coastal zoning to derive science-based strategies towards **Integrated Coastal Zone Management Plan (ICZMP)**.

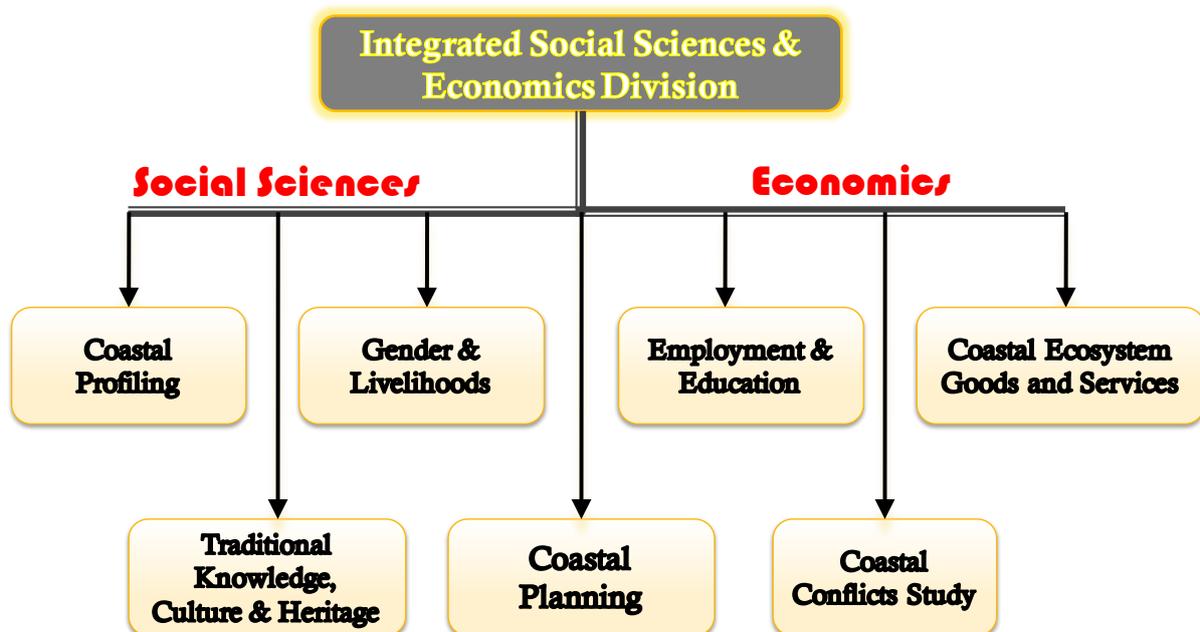
## Major Groups of the Geospatial Sciences Division



## Integrated Social Sciences and Economics Division (ISE)

The Integrated Social Sciences and Economics Division (ISE) would conduct inter- and trans-disciplinary research, which takes account of coupled natural, social and economic systems. ISE's key focus is on community based approach to coastal vulnerability and coastal management. This division actively addresses the social-ecological dynamics in coastal systems, and the transitions towards an ecosystem approach and other means to address integrated coastal management. The goal would be to reduce vulnerability of coastal populations, especially to natural hazards that are likely to be exacerbated by climate change and to ensure true participation of community in coastal management for sustained benefits.

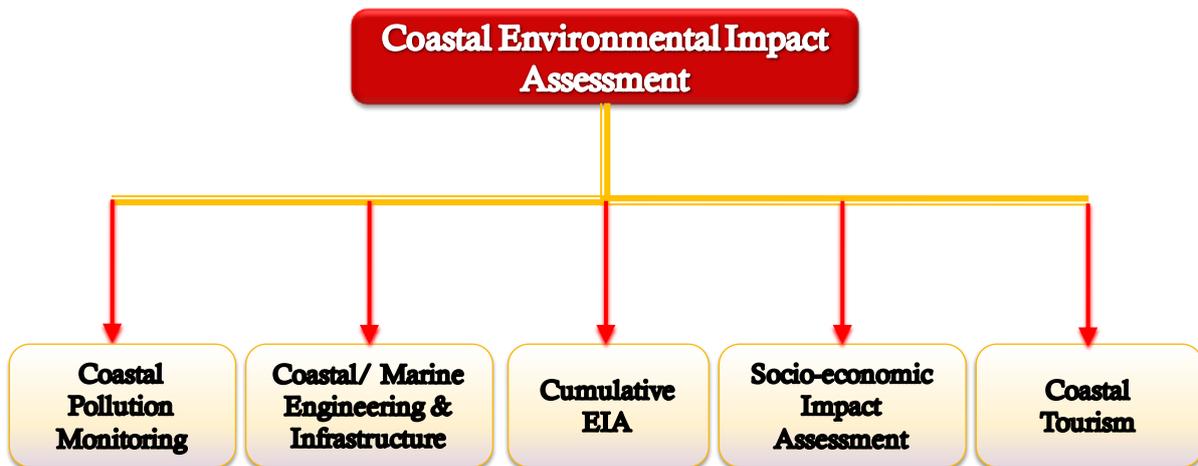
### Major groups of the Integrated Social Sciences and Economics (ISE) Division



## Coastal Environmental Impact Assessment Division (CIA)

The Coastal Environmental Impact Assessment Division (CIA) would undertake systematic monitoring and integration of environmental, social and economic impacts to overcome critical pollution limits on the coast and the adjoining marine environment. This division would provide input and advice on all components of coastal environmental impact assessment. This would incorporate components of a cumulative effects assessment, including identification of sources of environmental impacts, notably- industrial expansion along the coast, port development, waste disposal from land based and sea based sources, coastal aquaculture, etc.

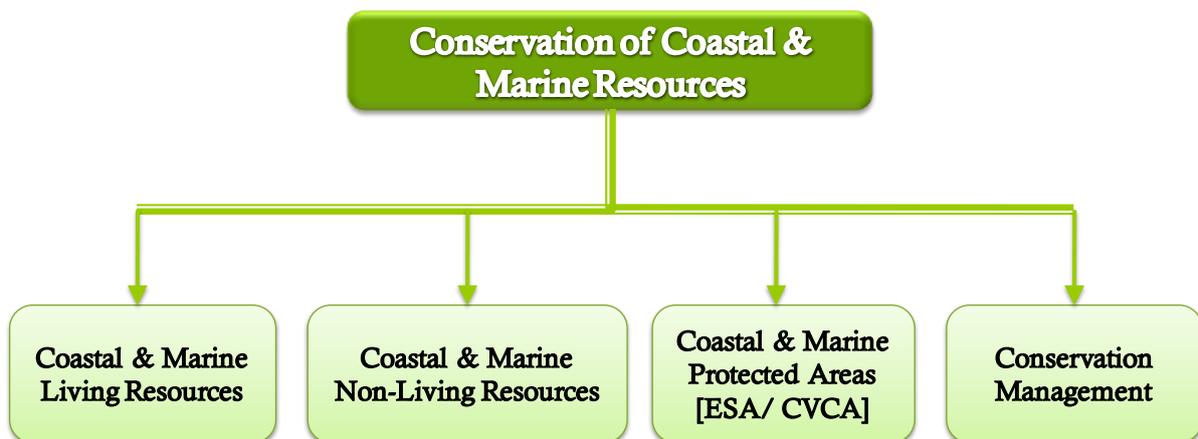
### Major Groups of the Coastal Environmental Impact Assessment Division



## Conservation of Coastal and Marine Resources Division (CMR)

The Conservation of Coastal and Marine Resources Division (CMR) will develop guideline strategies for conservation and long-term sustainable use of coastal and marine resources that encompass societal interests and the integrity of ecosystems. The primary mandate of CMR would be to guide the use of the living and non-living natural resources for diverse, and often conflicting, sectoral activities, so that the continued viability of all aspects of resource usage and ecosystem health can be secured. The important aspect is to strategize the conservation of coastal and marine resources in ways that promote human wellbeing, for present and future generations. Key issues in the management of coastal resources include the loss of biodiversity and habitats through human-related pressures, and the impacts of biodiversity loss to coastal livelihoods.

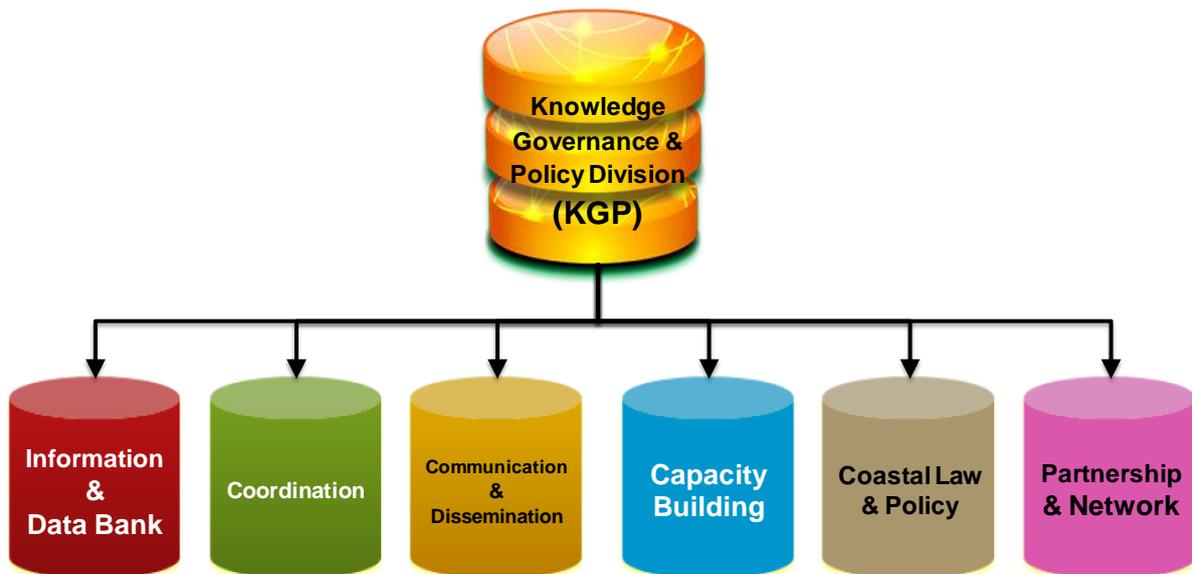
### Major Groups of the Conservation of Coastal and Marine Resources Division (CMR)



## Knowledge, Governance and Policy Division (KGP)

The Knowledge, Governance and Policy Division (KGP) would facilitate the overarching requirement in the area of knowledge and skills development in coastal management, taking into account the needs of the research community, stakeholders, policy makers and the society. The KGP Division would integrate data relevant to coastal management and create a national scientific knowledge base that facilitates improved decision making and policy formulation at the highest government and sectoral levels. The KGP would work as a central repository for the dispersed information on the Indian coast. The division would prepare guidelines for the preparation of ICZM plans for State/UT governments, including the various strategies to be evolved by the other departments such as for shoreline management.

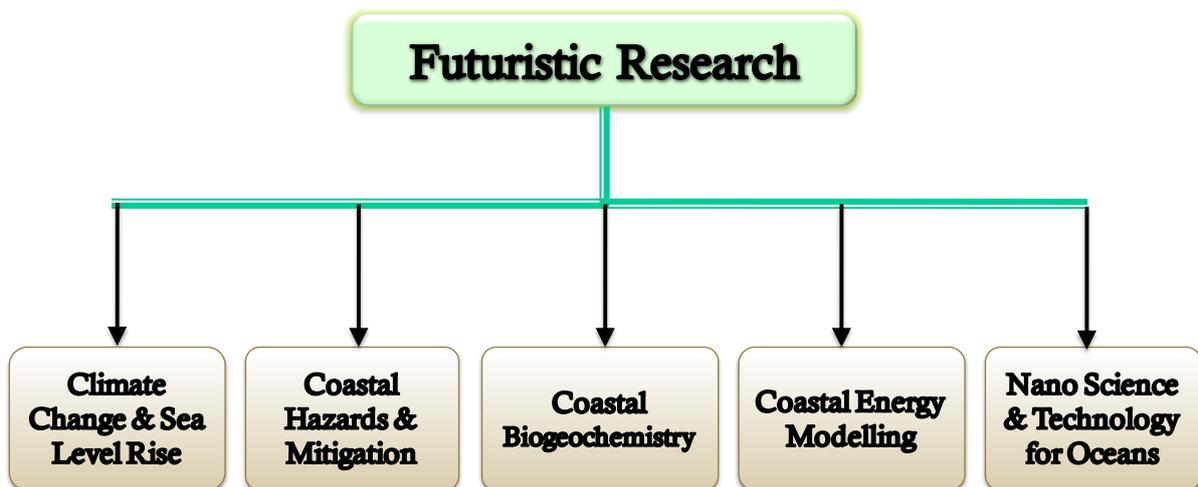
### Major Groups of the Knowledge, Governance and Policy Division (KGP)



## Futuristic Research Division (FTR)

The Futuristic Research Division (FTR) would pursue innovative research and assess technological, policy and societal responses to inform adaptation and mitigation strategies to achieve sustainability and improve the resilience of coastal community. The objectives of the FTR Division are twofold: i) energy security for coastal community and ii) climate change adaptation and mitigation for improved resilience. This division would assess risks, impacts and vulnerabilities through regional and decadal scale analysis and models by improving the usefulness of forecasts of future environmental conditions and their consequences for people. Through innovative research, this division would examine the potentials of energy security from renewable sources and those that have neutral impacts on other aspects of coastal sustainability.

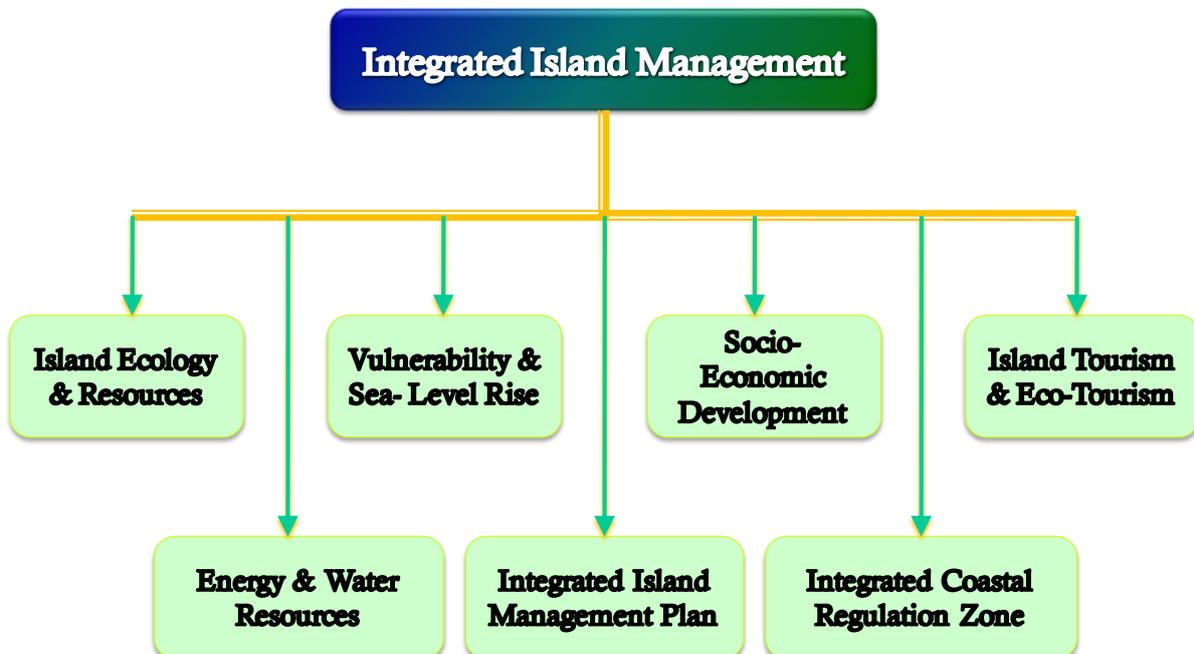
### Major Groups of the Futuristic Research Division (FTR)



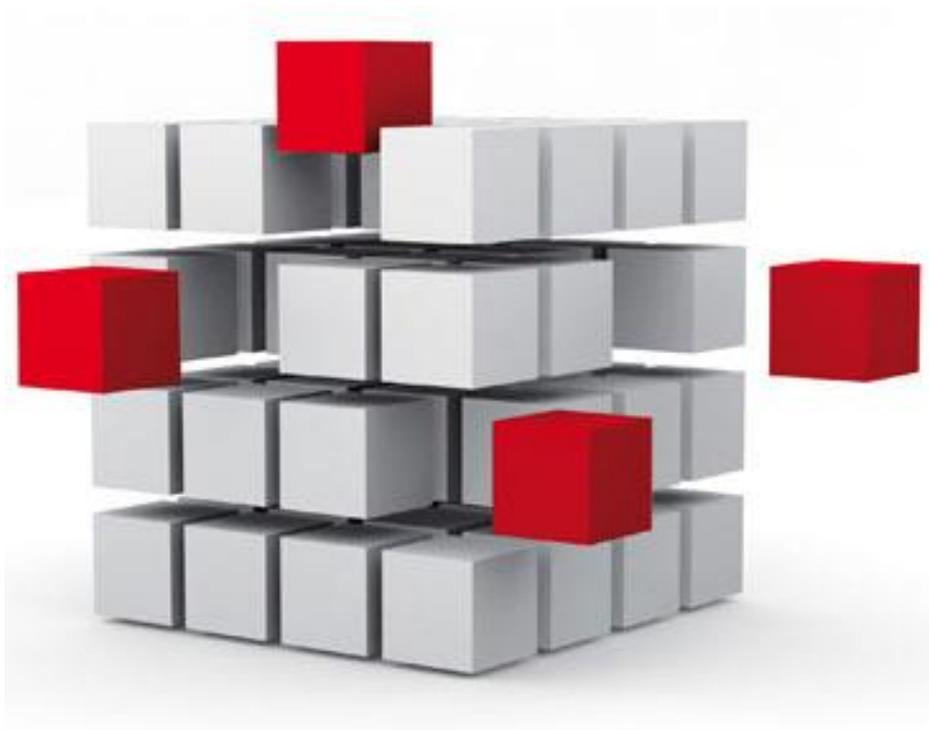
## Integrated Island Management Division (IIM)

The Integrated Island Management Division (IIM) would prepare a model framework for the integrated island management plan. The goal of the IIM is to help ensure the future socio-ecological sustainability of the Indian islands, Andaman and Nicobar and the Lakshadweep by preparing an Integrated Island Management Plan. The IIM would undertake scientific approaches, coupled with indigenous knowledge for the better management of the islands and its resources. The IIM would consider the indigenous governance structures and knowledge - particularly in the tribal dominated islands. The islands being pristine areas, this division would undertake long-term historical analysis, including monitoring of the oscillations of crucial environmental variables.

### Major Groups of the Integrated Island Management Division (IIM)



## Physical Progress Salient Results



# Flagship Projects

(Up to March 2012)

S.No	Title of the Project
	<b>Geospatial Sciences Division</b>
1	National Assessment of Shoreline Changes of India
2	Coastal Sediment Cells – Delineation
	<b>Integrated Social Sciences and Economics Division</b>
3	Coastal Social Wellbeing
	<b>Coastal Environmental Impact Assessment Division</b>
4	Coastal Ecosystem Health Assessment and Report Card
	<b>Conservation of Coastal and Marine Resources Division</b>
5	Guidelines for the Mapping of Ecologically Sensitive Areas
6	Mapping of Ecologically Sensitive Areas/ Critically Vulnerable Coastal Areas (CVCA)
	<b>Knowledge, Governance and Policy Division</b>
7	ICZM Plan – Guidelines for Preparation of ToR
8	Development of Training Modules in ICZM for Coastal Managers [along with SICOM, MoEF]
	<b>Futuristic Research Division</b>
9	Offshore Wind Energy Potentials
	<b>Integrated Island Management Division</b>
10	Sea level Rise Scenarios

## Research Studies along with Consortium Institutions

S.No	Title of the Project	Consortium Partner Institution
1	Preparation of plan for empowering status of coastal women	M.S. Swaminathan Research Foundation, Chennai, Tamil Nadu
2	Preparation of a coastal profile for the coast of Odisha	KIIT, Bhubaneswar, Odisha



# National Assessment of Shoreline Change of India (Phase I)

The National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, in collaboration with the Institute for Ocean Management, Anna University, Chennai, undertook a major study of shoreline change for the entire coast of India. The study examined the potential for cumulative impacts of shore protection structures, ports and harbors on the coastline. The Ministry of Environment and Forests will now evolve a policy for consideration of projects along the coast and particularly the activities relating to the ports, harbours, jetties and expansion of such activities, etc. based on this preliminary

assessment. The maps produced in this assessment are in the scale of 1:50000 and further work is being carried out by the Survey of India on a 1:10000 scale using aerial photography.

The primary objectives of this study were to identify coastal areas where significant erosion and accretion has occurred and continues to occur, quantify these rates of erosion/ accretion, analyze the impacts of coastal structures on the shoreline, create a national database for coastal erosion and accretion with 1972, as the base year and contribute to an understanding and prediction of future shoreline positions.

Mapping has been completed for all the coastal States/ UTs along the east and west coast of India. The shoreline change maps were presented to the officials and in some cases to a wider audience, including NGOs in each of the coastal States/ UTs. The States of Gujarat, Odisha, Kerala and the UT of Puducherry have already approved the shoreline change maps and are available online at <http://www.ncscm.org>. Presentations have been made to the following states and the approvals are awaited: i) West Bengal; ii) Maharashtra; iii) Andhra Pradesh, and iv) Tamil Nadu. The State of Karnataka invited NCSCM recently to make the presentation for the shoreline change along Karnataka's coastline. The State of Goa is yet to respond for presentation and clarifications.

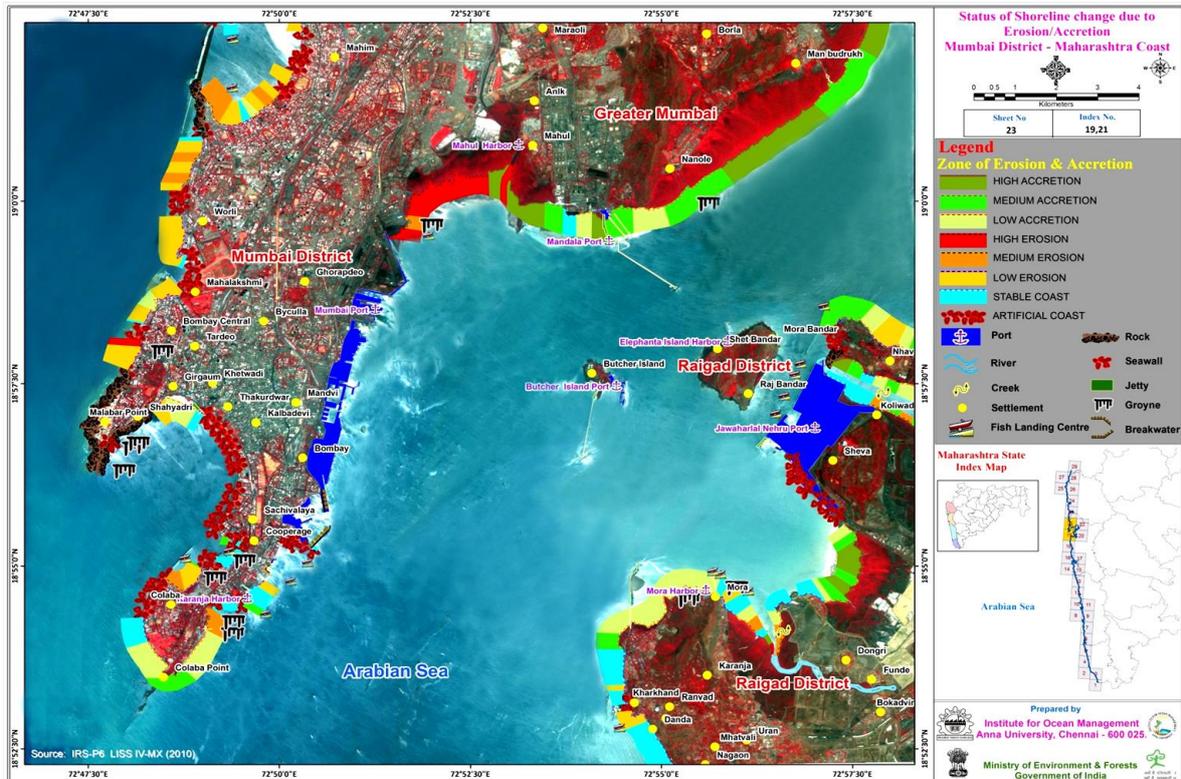
### Key Findings:

Shoreline change maps have been prepared for all the coastal states/ UTs on 1:50,000 scale and these have been approved for the states of Gujarat, Odisha, Kerala, Tamil Nadu and the Union Territory of Puducherry.

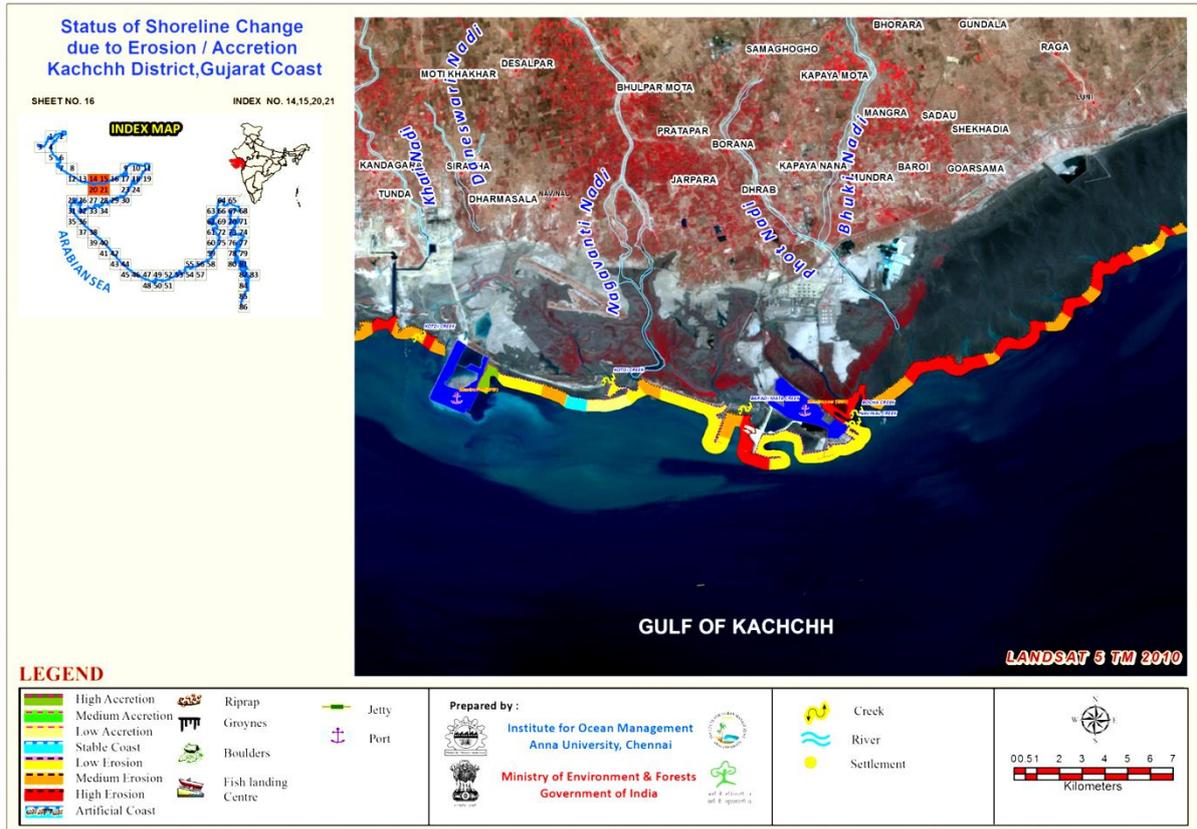
*Summary of Shoreline Change Map Approval Status*

S. No.	State/ UT	Mapping	Presentation to State/ UT Government	Approval Status
1	Gujarat	✓	✓	✓
2	Maharashtra	✓	✓	Awaited
3	Goa	✓	✗ (Maps Submitted)	✗
4	Karnataka	✓	July 2012	Awaited
5	Kerala	✓	✓	✓
6	Tamil Nadu	✓	✓	✓
7	Puducherry	✓	✓	✓
8	Andhra Pradesh	✓	✓	Awaited
9	Odisha	✓	✓	✓
10	West Bengal	✓	✓	Awaited

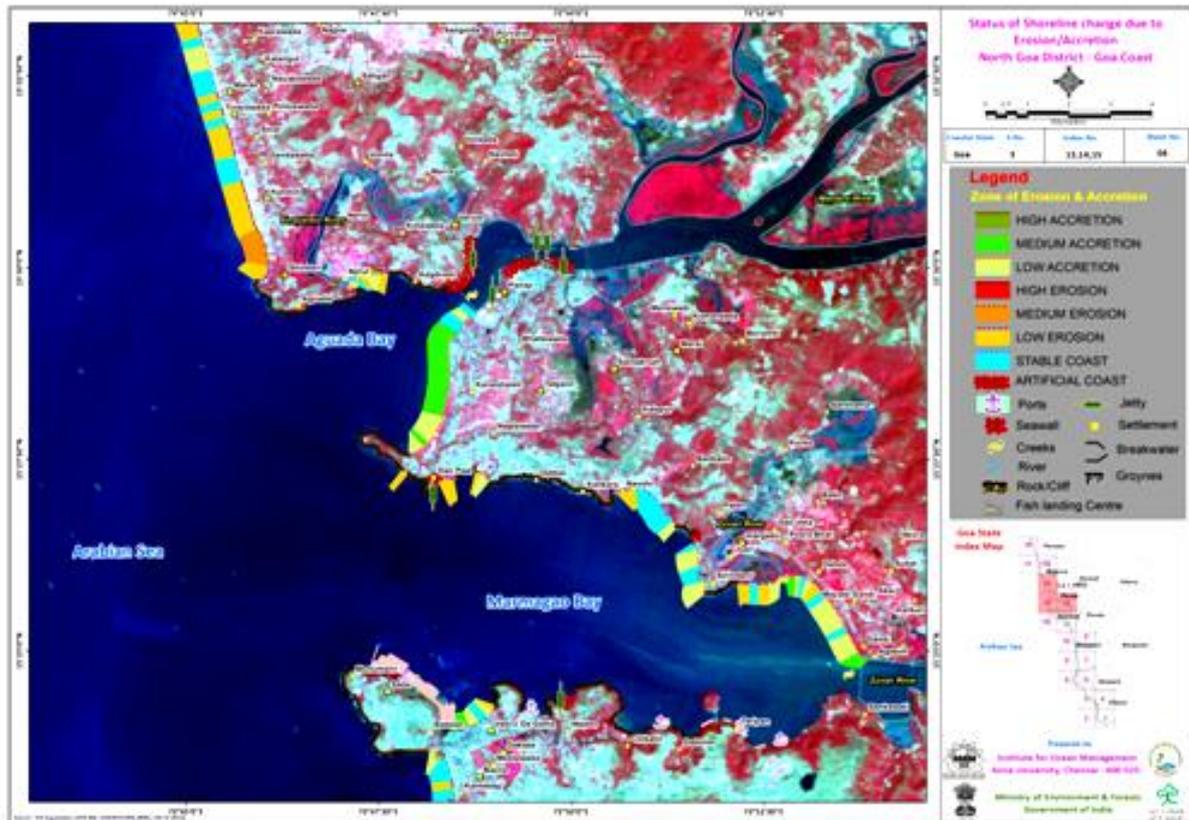
*Shoreline Change Map of Maharashtra*



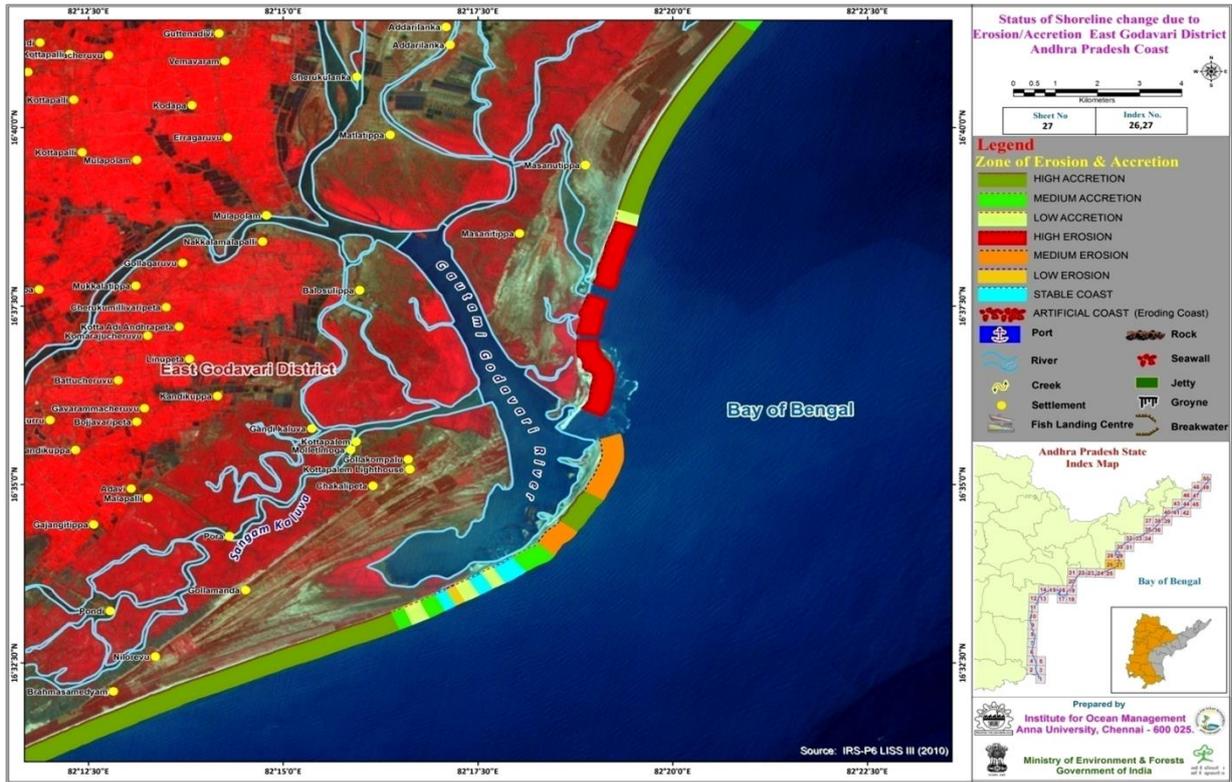
Shoreline Change Map of Gujarat



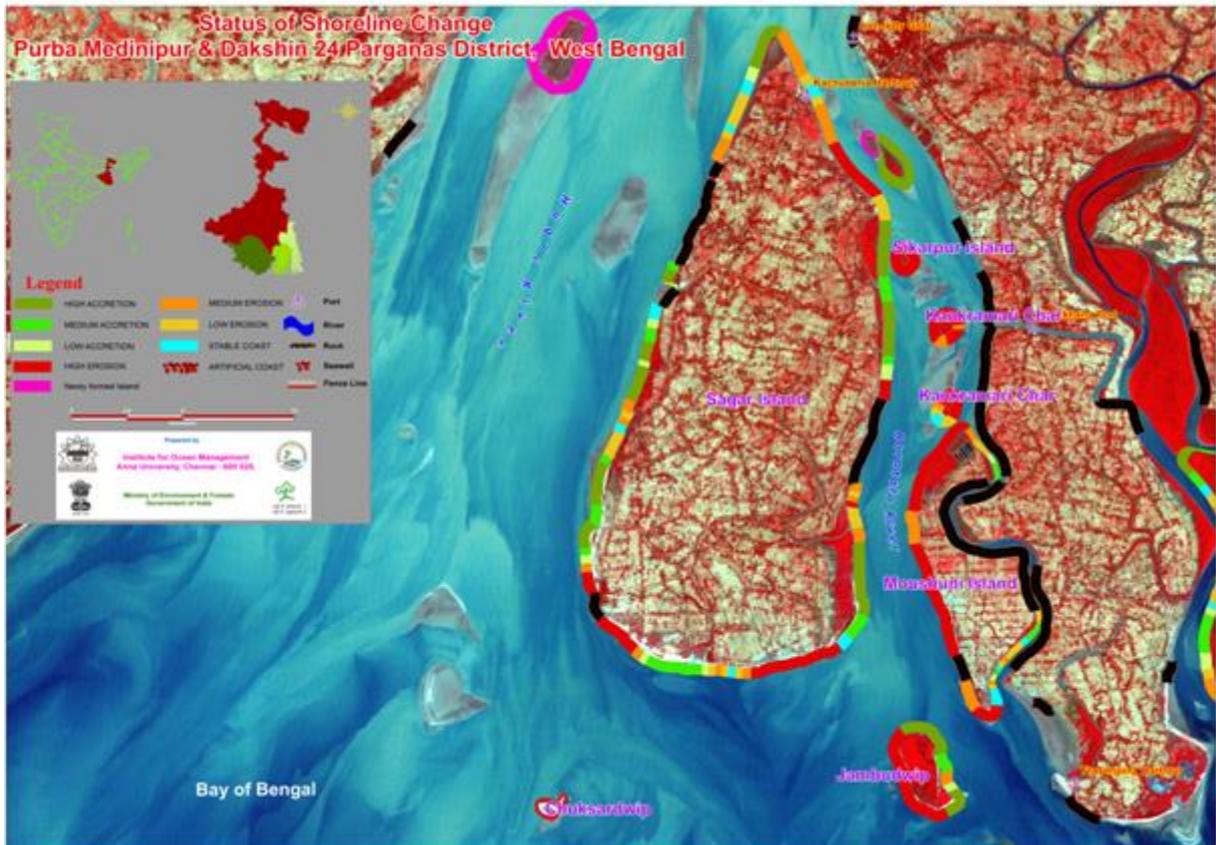
Shoreline Change Map of Goa



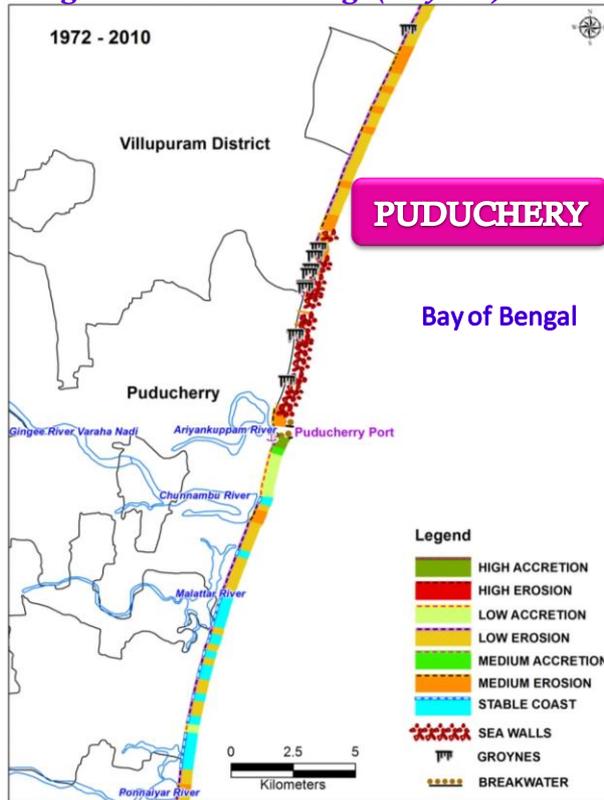
Shoreline Change Map of Andhra Pradesh



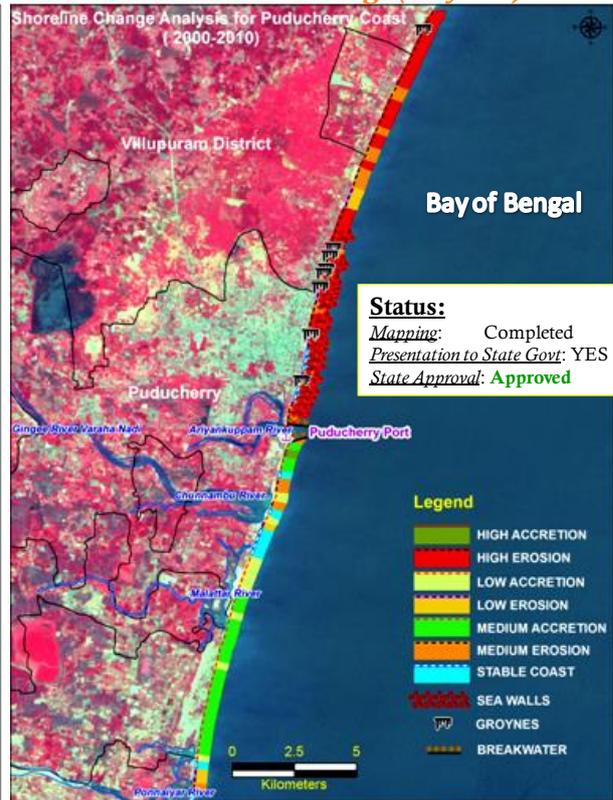
Shoreline Change Map of West Bengal



*Shoreline Change Map of Puducherry*  
*Long term Shoreline Change (38 years)*



*Short term Shoreline Change (10 years)*



*Shoreline Change Map of Tamil Nadu*



## Coastal Sediment Cell Delineation

Delineation of Coastal Sediment Cells (Primary cells, Sub-cells and Management Units) was undertaken in order to develop an overall Shoreline Management Plan. Delineation of Primary cells for the entire mainland of India was done by studying the coastal processes (wave/wind/current, littoral drift pattern, sediment budget and Bathymetry), shoreline change mapping and identifying coastal structures.

Land use/ land cover change mapping helped to delineate the Sub-cell boundaries and with the help of a behavioral model, the identification of Management Units was carried out along the entire coast of mainland India. This study was to provide information useful for necessary policy change towards coastal shore protection, land-use planning, and coastal resources management. The study also provides the technical basis and analytical information useful for adopting a systems approach to infrastructure development and coastal conservation.

The Primary cells for the east and west coast of the entire Indian coast have been delineated while a detailed sediment cell mapping with available secondary coastal process study data has been carried out for the coast of Odisha. The sediment cell delineation will be updated and revised (if necessary) using coastal process study data as and when it becomes available.

### Key Findings:

Delineation of Primary cells for the entire coast of mainland India has been done. Detailed sediment cell mapping with available secondary coastal process study data has been carried out for Odisha coast

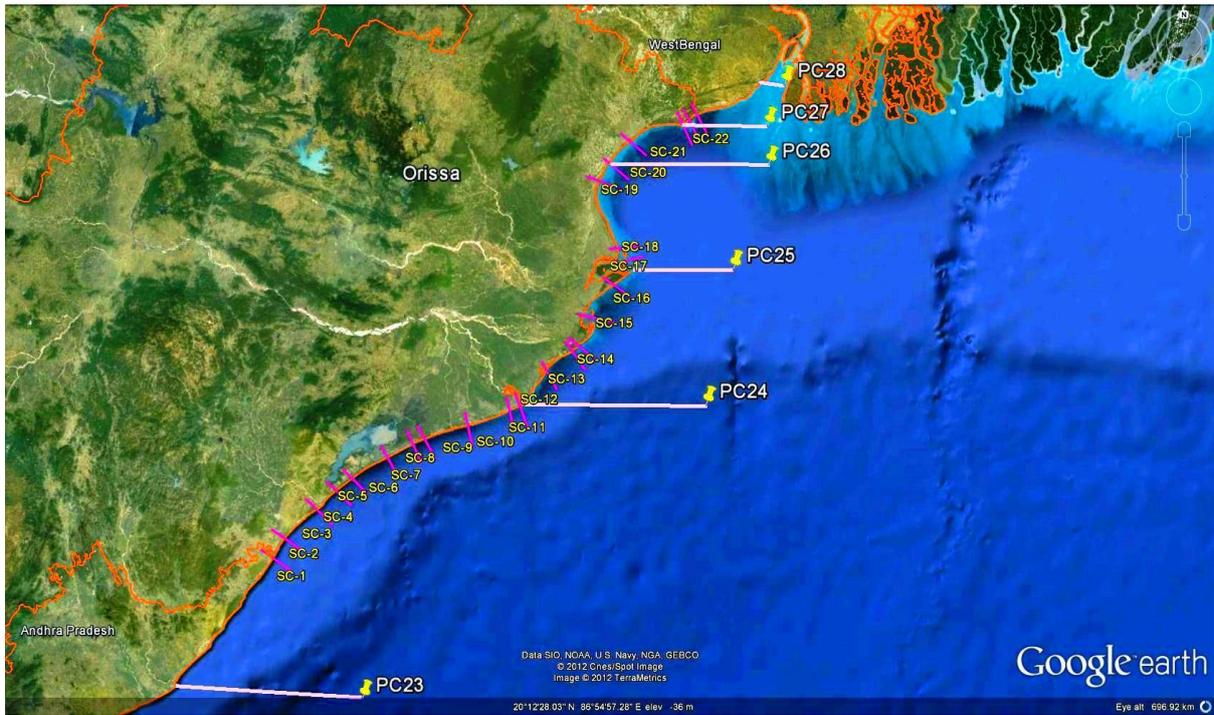
Level	Features	Analysis
Level 1:	Major Coastal Morphological features	e.g. Headlands
	Sediment Sources	Rivers
		Cliff erosion
		Erosion of land due to wind/ waves/ storm surge
	Sediment Stores	Sand dunes
		Beach
		Beach ridges
Spit		
Barrier Islands		
Coastal Alignment	Swash/ Major drift/ Minor drift/ Unstable	
Boundaries	Convergent/ Divergent/ Pulse Boundaries	
<b>Delineation of Primary Cells</b>		
Level 2:	Coastal Processes	Wave/ Wind/ Current
		Littoral Drift Pattern
		Sediment Budget (Net and Gross Sediment Transport)
		Bathymetry
Level 3:	Shoreline Change Mapping	Erosion
		Accretion
		Stable coast
Level 4:	Coastal Structures	Seawalls (Artificial Coast)
		Groynes/ Nearshore Breakwaters
		Ports/ Harbours/ Fish Landing Centres/ Jetties
		Land Reclamation
<b>Delineation of Sub-cell Boundaries</b>		
Level 5:	Landuse/ Landcover change	Landuse/ Land cover
		Land Capability
		Ecologically Sensitive Areas/ CVCAs
<b>Identification of Management Units</b>		
Level 6:	Behavioural Model	Dams/ Barrages and other upstream obstructions
		Sand Mining
		Landuse Change (Time series)
		Maintenance Dredging



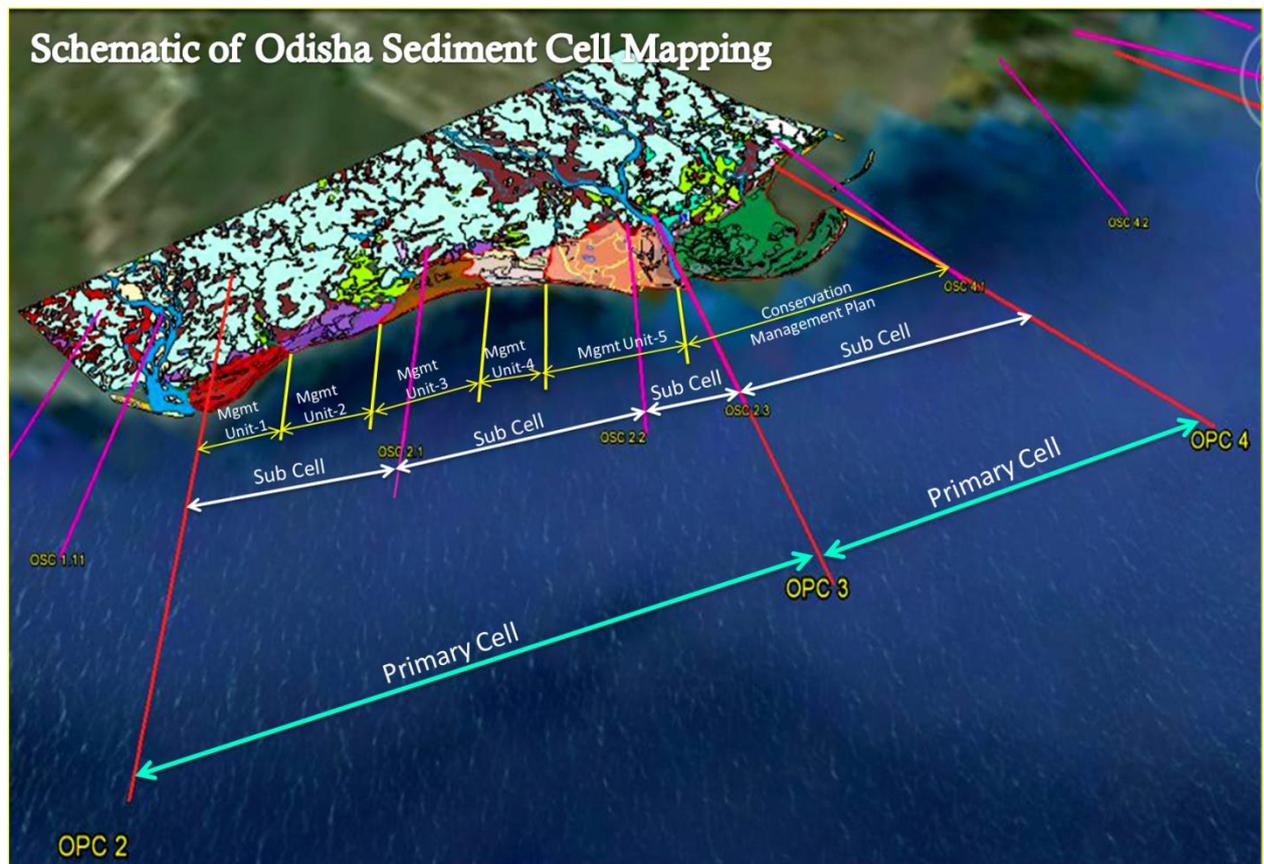
*Primary cell delineation for the East and West Coast of India*



*Proposed sub-cells for the Coast of Odisha State*



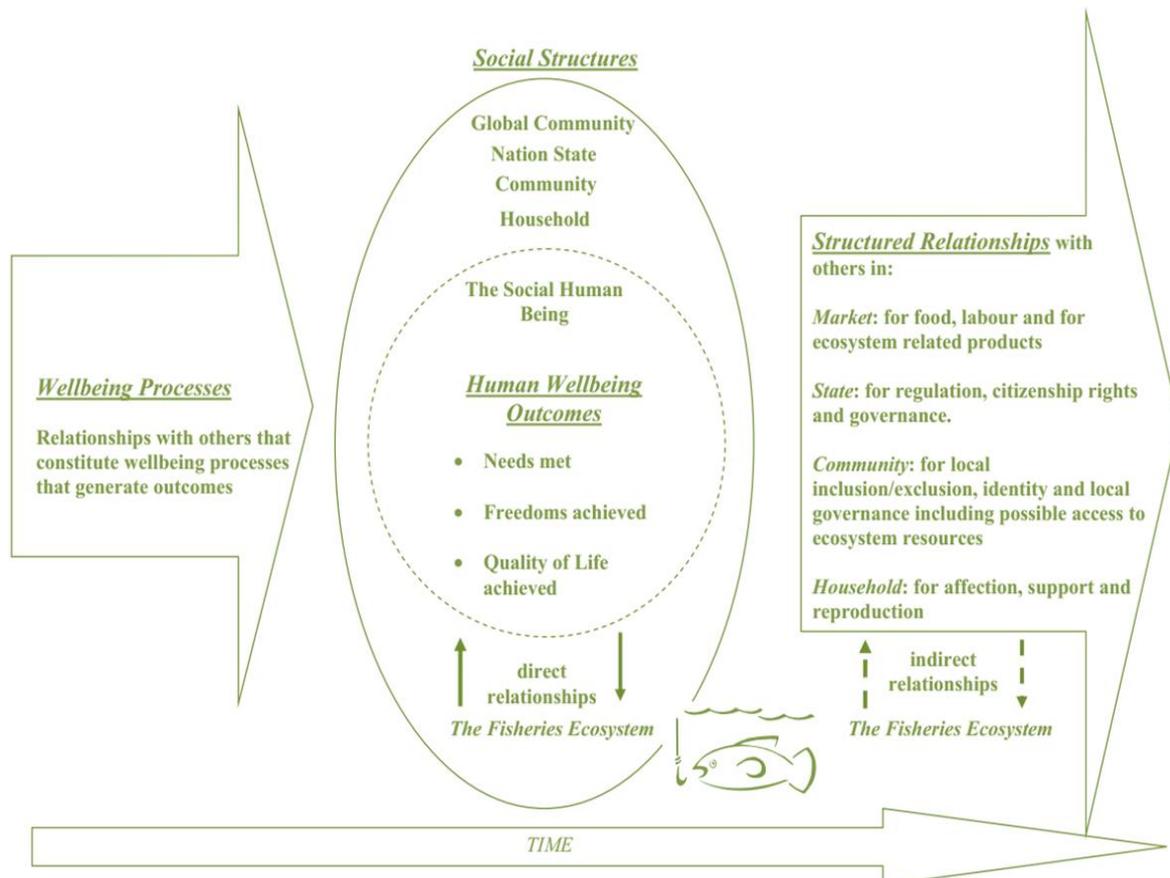
*Proposed Management Units for the Coast of Odisha State*



# Coastal Social Well-being

In November 2011, a workshop on Coastal Well-being Methods was organized in collaboration with the University of Ulster, Ireland. The workshop also served as a training program for using the RANK questionnaire. Participants went on a field visit to Pulicat Lake and tested the different parts of the questionnaire.

## *A Social Well-being Framework for Fisheries*





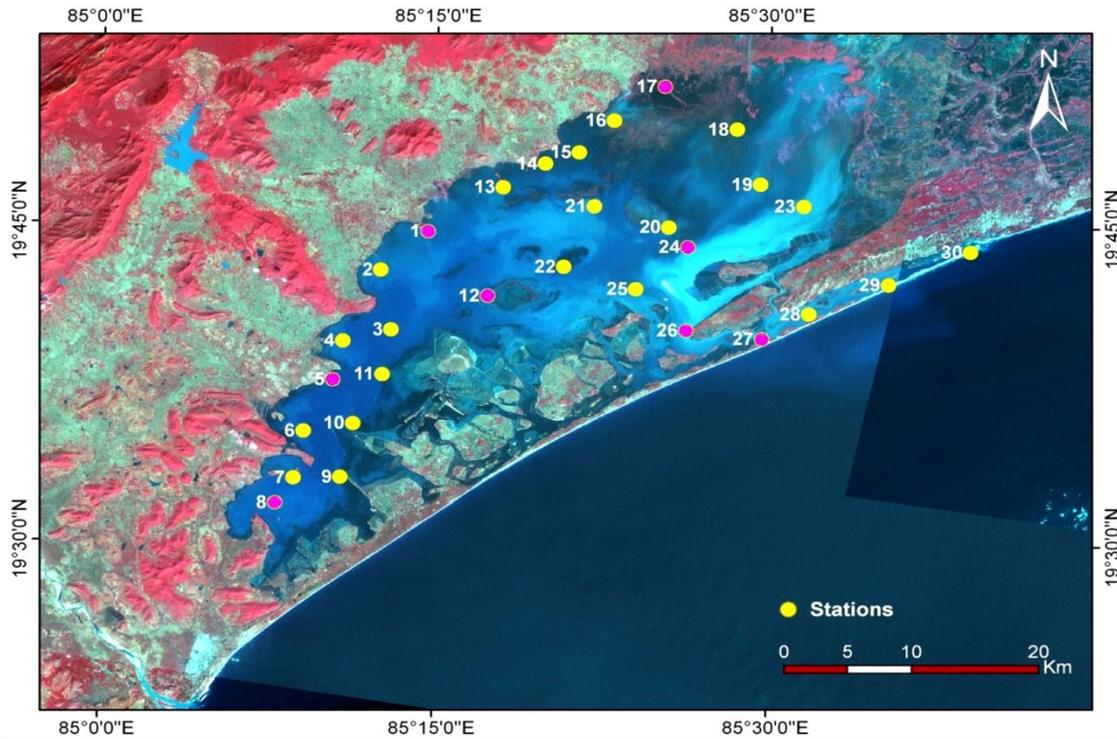
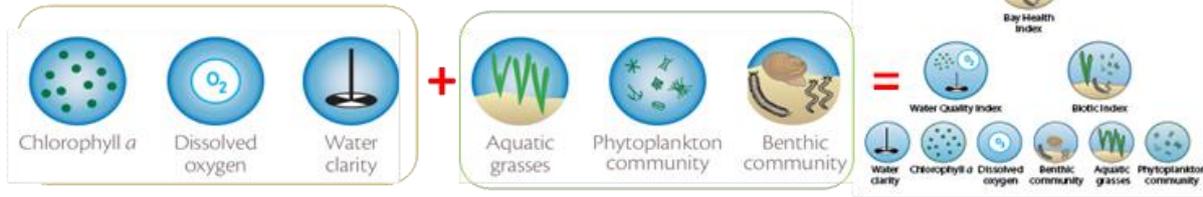
## oastal Ecosystem Health Assessment and Report Card

A Coastal Ecosystem Health Assessment Report Card was prepared for Chilika Lake with the help of a Coastal Ecosystem Health index that includes three water quality indicators (chlorophyll 'a', dissolved oxygen and water clarity) and three biotic indicators (bay grasses [submerged aquatic vegetation], Benthic Index of Biotic Integrity [soft bottom only] and Phytoplankton Index of Biotic Integrity). The purpose behind preparing an ecosystem health report card was to develop an integrated ecosystem health assessment for Chilika Lake and its tidal tributaries. Using selected indicators and top-level indices rank valuation scheme was created to compare ecosystem health assessments, both geographically and temporally, for effective communication of integrated ecosystem health assessments with spatially explicit maps and rigorous scientifically based analyses to the community.

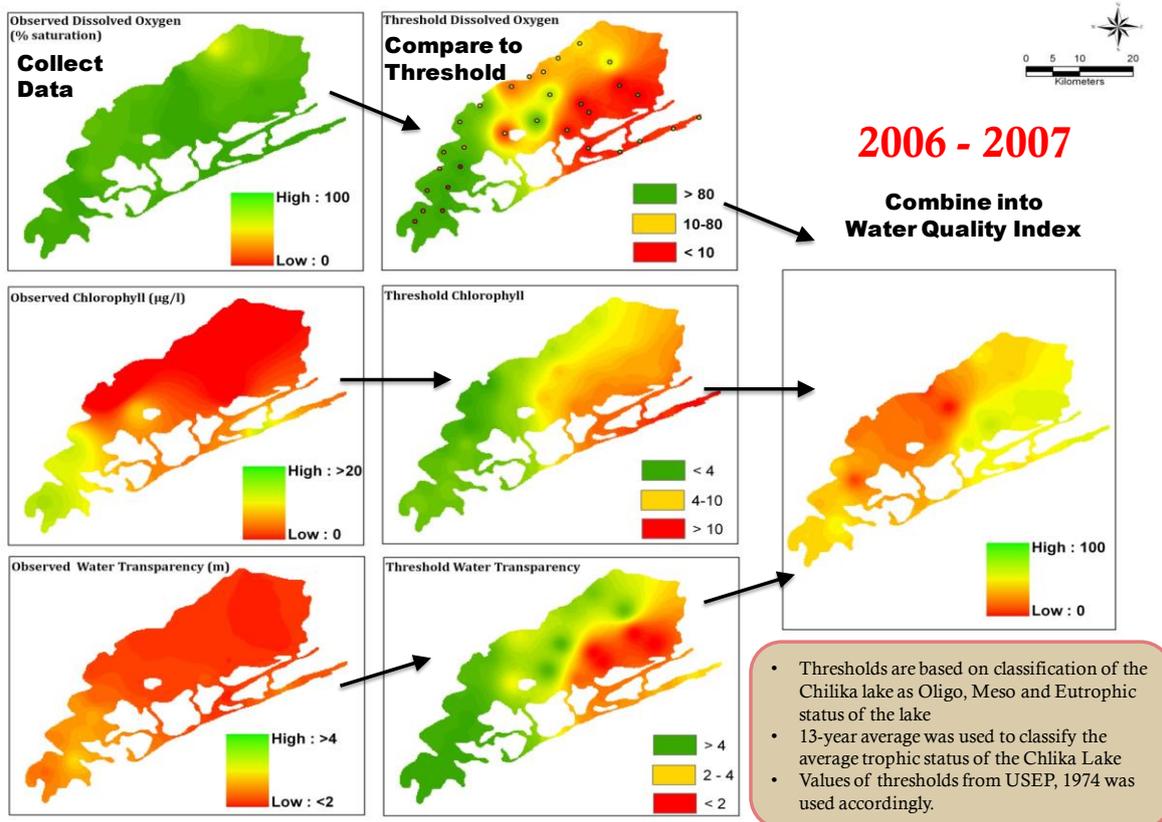
In this study, efforts were made to apply the D-P-S-I-R (Driver-Pressure-State-Impact-Response) framework for the coastal waters of India. This multidisciplinary approach originally promoted by OECD in 1993 and further developed within the LOICZ project allows combining the knowledge and experience of natural and social scientists. Data and information are reviewed in such a way as to produce a complex picture of interactions of economic sectoral activities that affect coastal zone ecosystems and social processes, and to reveal further indicator functions and impacts on natural and social values of the coastal zone. The analysis assesses the response of society on environmental and anthropogenic changes in the coastal zone.

The Chilika Lake report card is unique in that it provides a geographically detailed and integrated approach to form numerical ranking of 3 reporting regions (Northern, Southern and Central) on an annual basis. This approach compliments those focusing on assessment over longer time frames. The geographical detail provided in the report card reflects the complexity of Chilika Lake and its tributaries, and provides information that can help guide and focus restoration efforts. The report card is a developing product, with a more complete assessment of Bay health expected in the future.

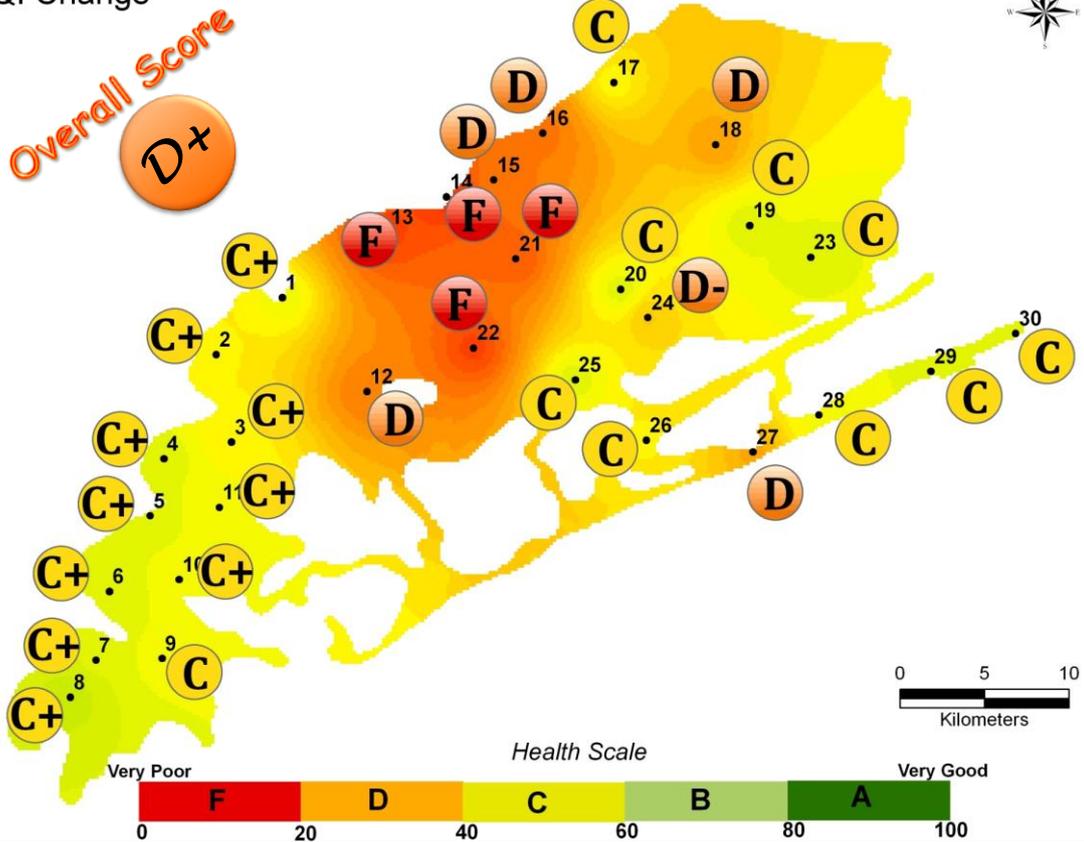
### Indicators and Indices



### Coastal Water Quality Index for Chilika Lake

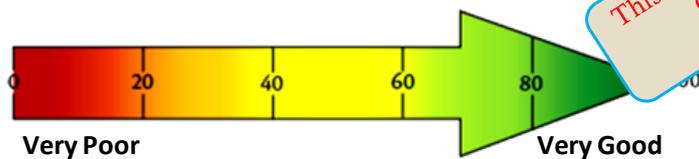


WQI Change



Coastal Ecosystem Health Index for Chilika Lake

Bay health scale Very poor (F) to Very good (A) 0 20 40 60 80 100%	Overall Lake	Southern Sector	Central Sector	Northern Sector	Estuarine Region
Water Quality Index	34	35	28	34	46
Biotic Index	?	?	?	?	?
Bay Health Index	34	35	28	?	?

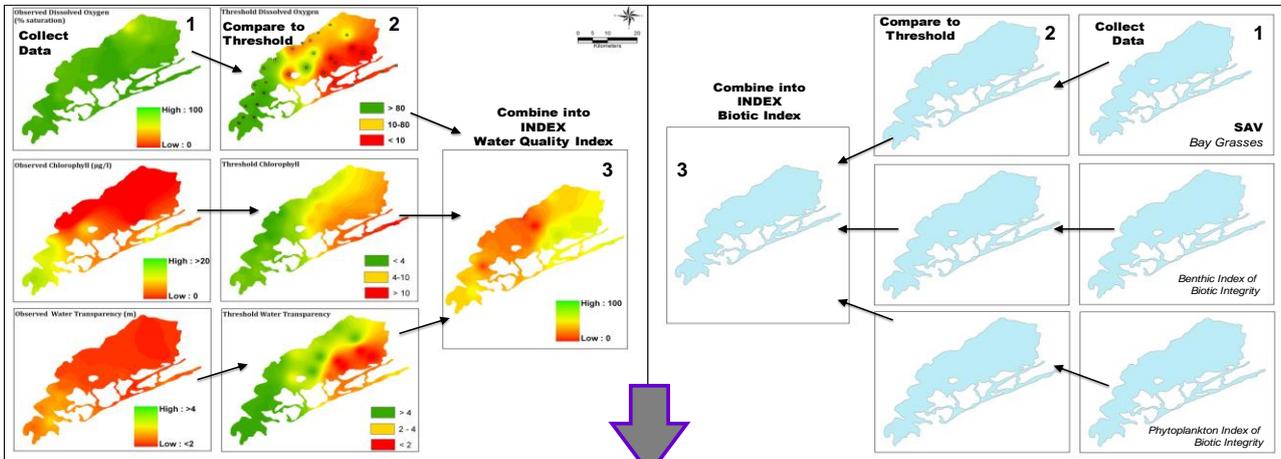


This is an example – from Chilika Lake (- Biotic Index)

The Ecosystem Health Index (EHI) value is ranked in ascending order from the worst (dark red) to the best water quality (green)

WATER QUALITY INDEX → ECOSYSTEM HEALTH INDEX ← BIOTIC INDEX

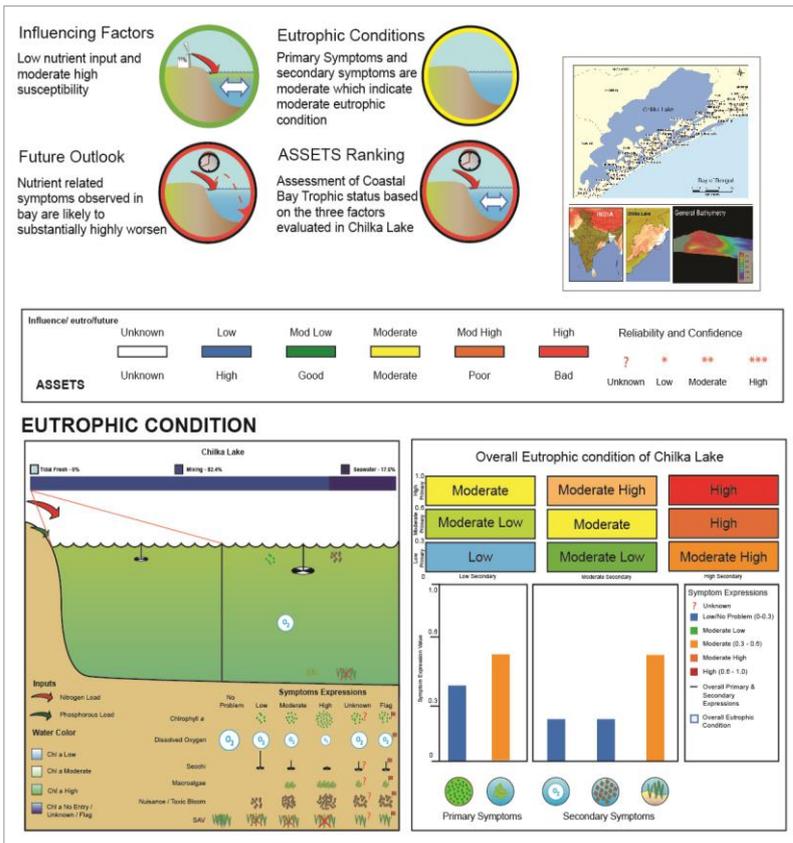
**ECOSYSTEM HEALTH INDEX**



**4 Average into Overall INDEX**

**Chilika Lake, Orissa**

- Eutrophication status of Chilika Lake using ASSETS Model indicate that under increased agricultural activity coupled with increased population stress would worsen the Eutrophication Status to a higher degree in the Chlika Lake waters in the future

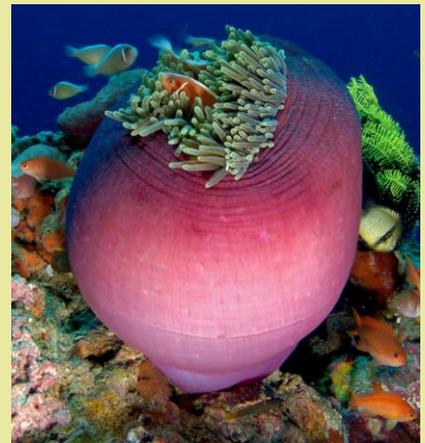


## Guidelines for the Mapping of Ecologically Sensitive Areas

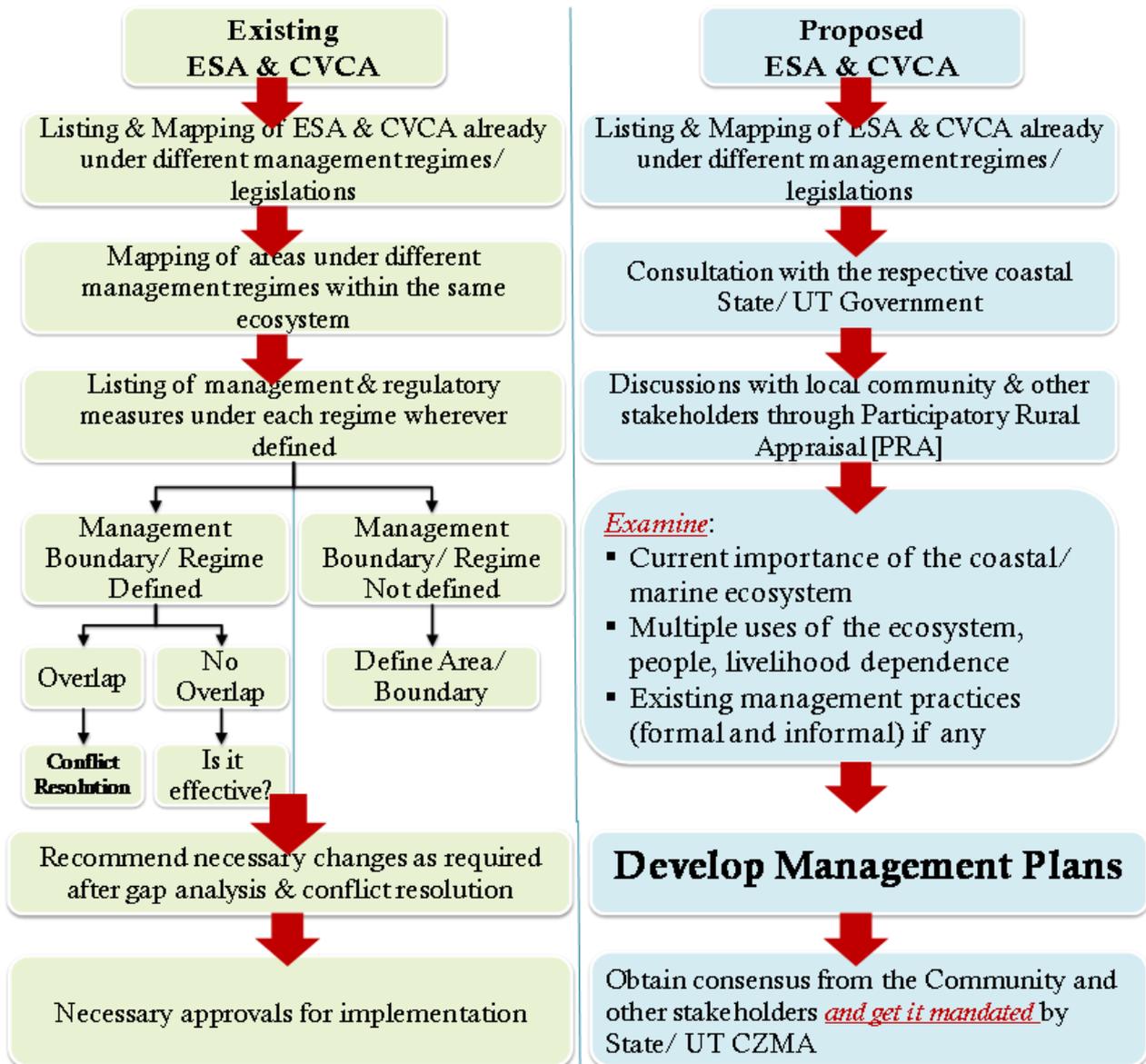
One of the mandates of the National Centre for Sustainable Coastal Management (NCSCM) is to prepare the guidelines to identify and develop management plans for Critically Vulnerable Coastal Areas. The concept being developed is along the following lines.

Along the mainland coast, 18 coastal and marine protected areas are already covered under national parks, wildlife sanctuaries or biosphere reserves having its own management and regulatory systems in place (under the provisions of the Wildlife Protection Act 1972). The CRZ 2011 proposes a list of 12 Critically Vulnerable Coastal Areas (CVCAs), to be managed through people's participation. The ICZMP proposal to the World Bank also lists proposed Ecologically Sensitive Areas (ESAs) including two Ecologically Sensitive Zones (ESZ) identified under provisions of the Environment Protection Act 1982. Some of the CVCAs, and ESAs are already protected areas under the 18 mentioned above.

The details including boundaries of other CVCAs and ESAs or new ESAs along the coast would be identified in consultation with the state/UT Government, satellite imageries or also based on a list proposed by the Wildlife Institute of India. Once identified, a detailed study of the existing use and management practices will be taken up through participatory rural appraisal. A participatory management plan for each would be developed and the approval sought from the state coastal zone management authority. The process proposed for identifying mapping and developing management plans for the ESAs and CVCAs is illustrated below.



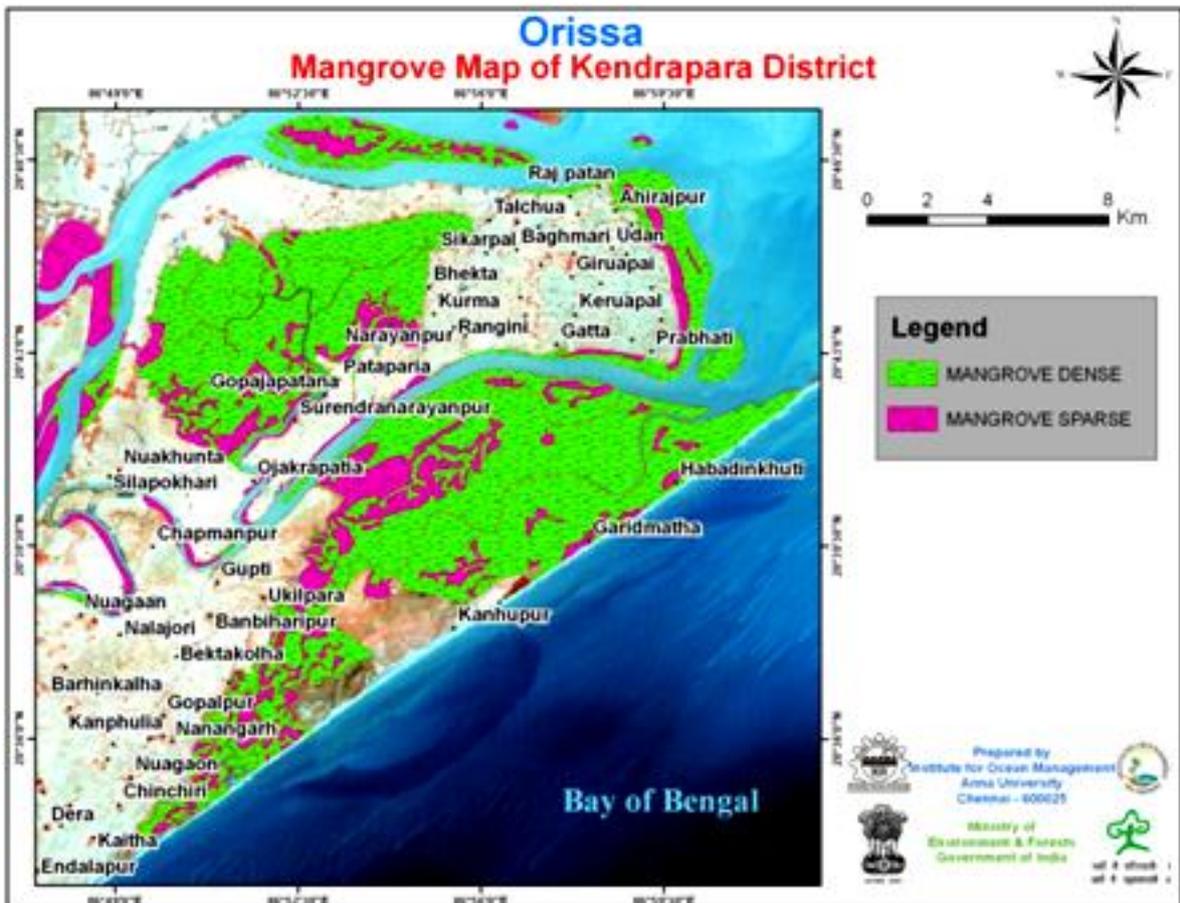
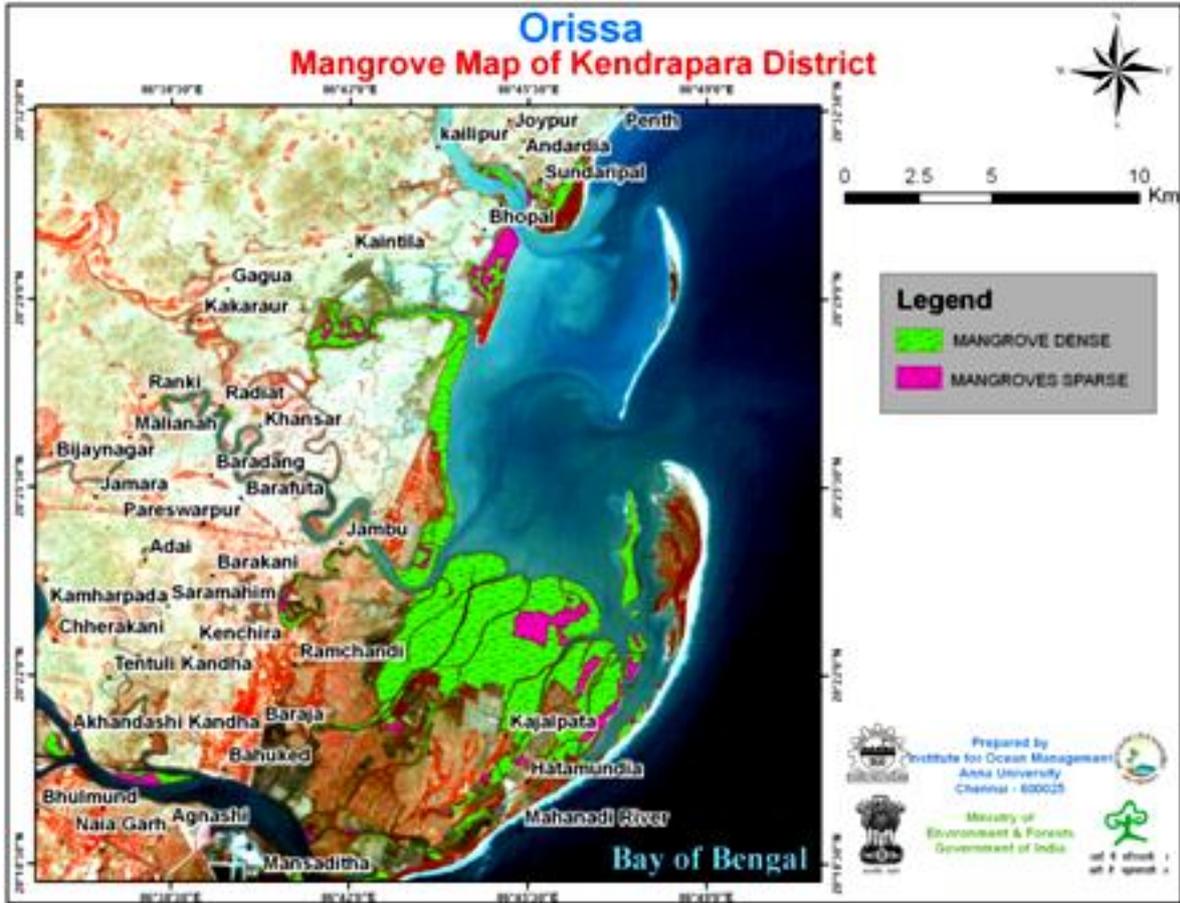
*Developing Guidelines for Mapping of ESA and CVCA*

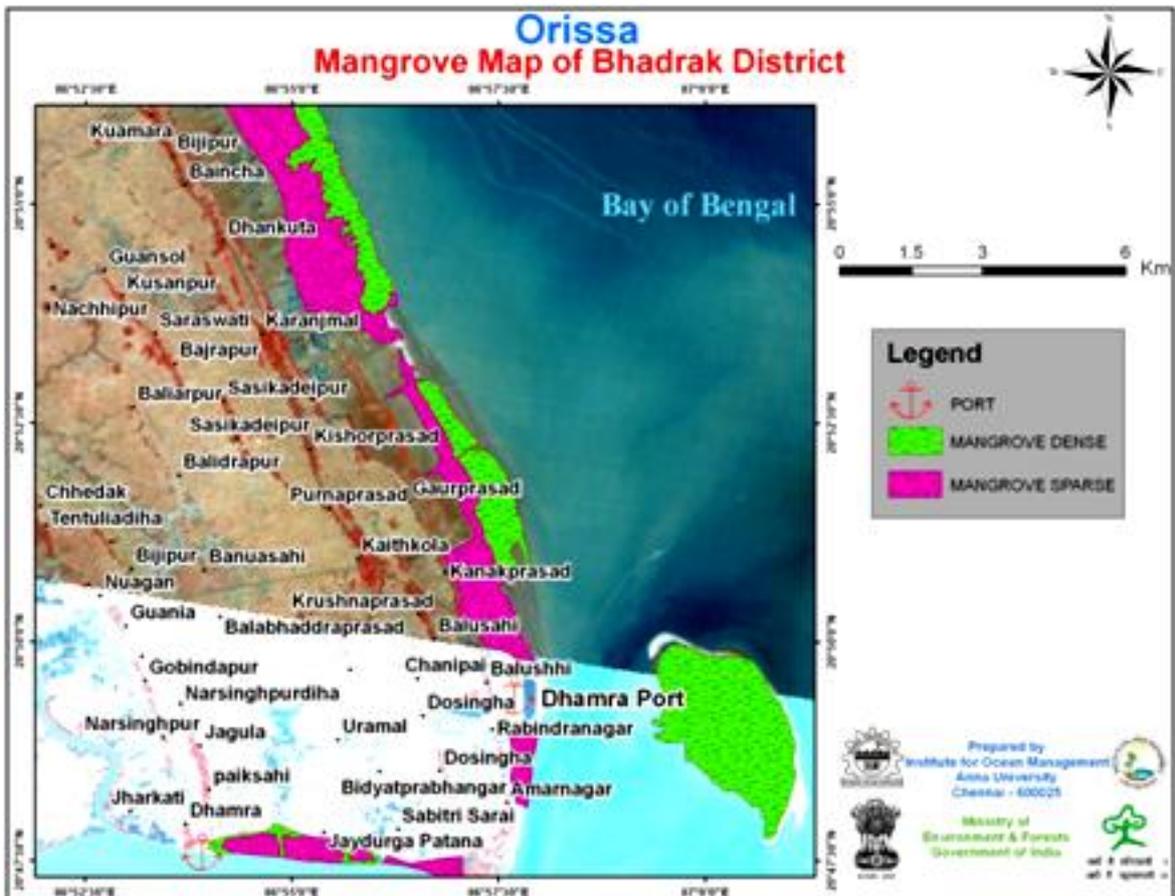
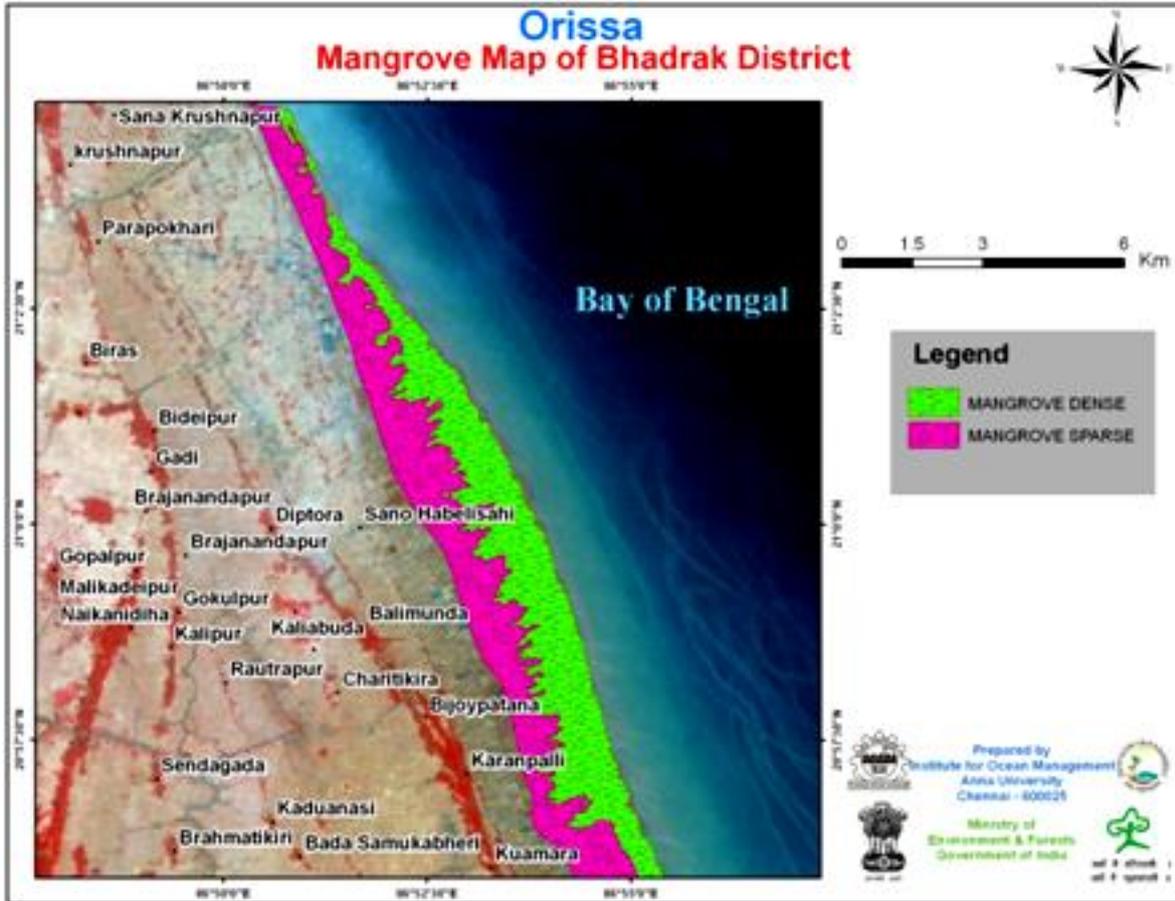


## **M**apping of Ecologically Sensitive Areas/ Critically Vulnerable Coastal Areas (CVCA)

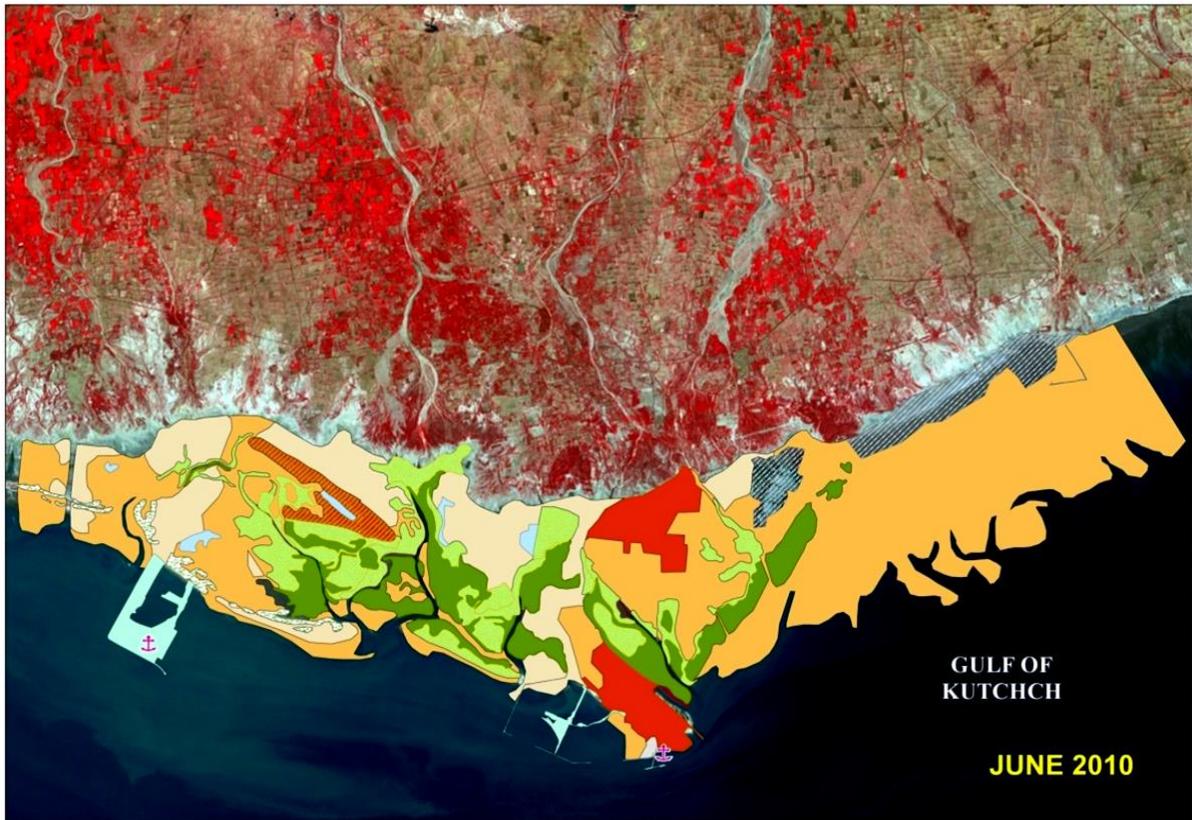
Critically vulnerable coastal areas such as mangroves and coral reef were mapped using time series data and changes that occurred during the ten year period determined. Mangrove mapping was carried out in the states of Gujarat, Odisha, Tamil Nadu, West Bengal and Maharashtra while coral mapping was done for Tamil Nadu and Gujarat.







*Mapping of ESA for Gulf of Kutchch*



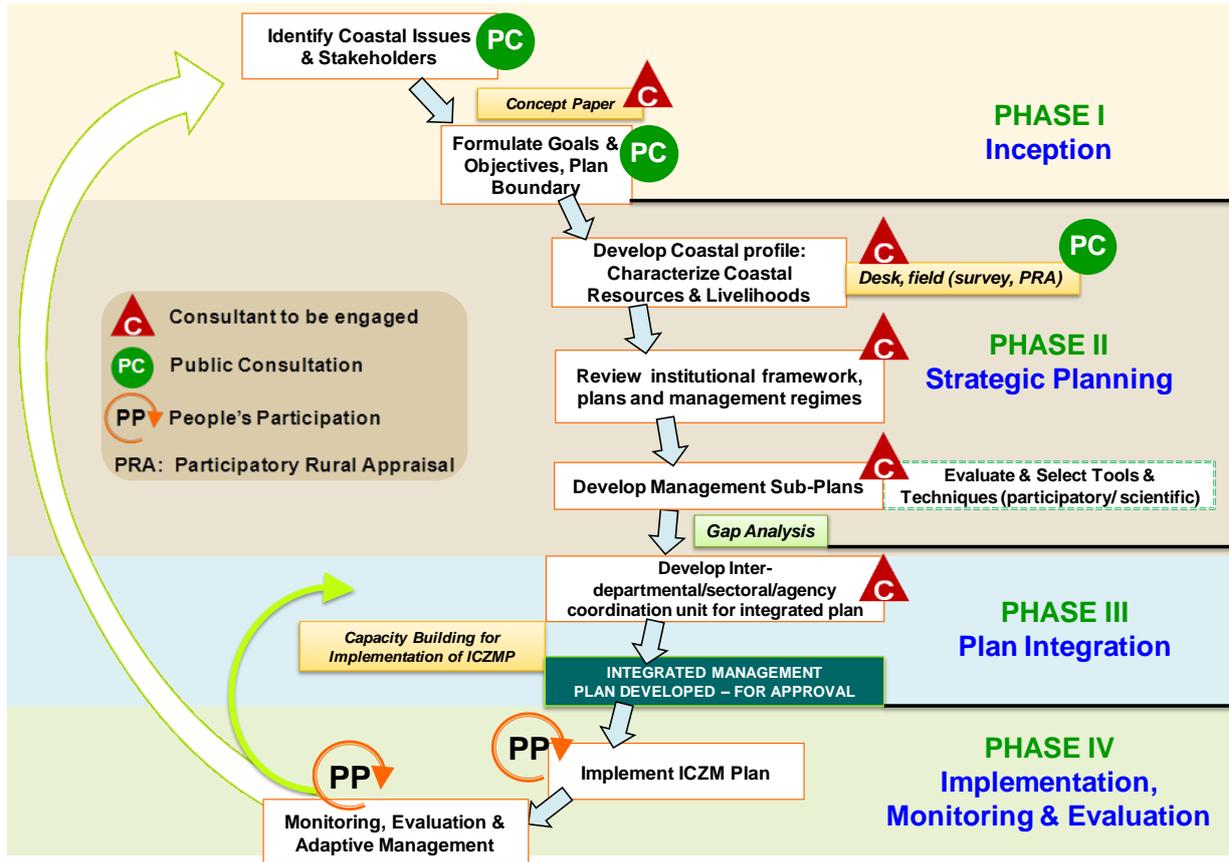
## CZM PLAN – Guidelines for Preparation of ToR

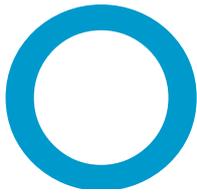
The preparation of an ICZM Plan is a complex multi-step exercise that can be described as a process-driven – to ensure inclusiveness from all points of view. This process begins with the understanding that the various activities and resources of the coast under consideration need to be managed in a coordinated manner to ensure sustainability. A conceptual framework has been developed to assist in formulating ICZM plans for select sites of the coastal states of Gujarat, West Bengal and Odisha (Phase 1 of World Bank ICZM Project). This cycle has been discussed under the four phases of Inception, Strategic Planning, Plan Integration and Implementation, Monitoring & Evaluation. A process document for the same is also under preparation.

The proposed ICZM cycle helps quantify the relationship between the dynamic, interactive and highly complex components of the coastal system. This cycle consists of three phases that are operational and depict the actual plan preparation process. The Inception Phase forms the basic foundation to advance with an ICZM Program. This phase has the two important activities of identification of coastal issues and stakeholders, formulation of goals and objectives and defining the plan boundary. The Strategic Planning Phase provides the foundation to build a coastal profile based on the existing institutional framework, plans and management regimes. Integration of the sub-plans developed in the strategic planning phase will be undertaken by evolving appropriate **“mechanisms for inter-agency coordination and cooperation”** (and conflict resolution) in the Plan Integration Phase. These three phases require considerable detailing and consultations at various level including negotiations, for conflict resolution.

The fourth phase consists of strategic (governance) mechanisms that support the implementation, monitoring and evaluation of the ICZM cycle. This phase is the beginning of an intensive process of implementation to ensure that the ambitious objectives for sustainable development and conservation of the coastal zone are achieved. Any new or revised regulatory programs formulated during the ICZM planning process, must now come into effect. Thus, understanding coastal, natural and socioeconomic processes are fundamental to balanced decision-making in coastal management.

*Guidelines to Prepare ToR for ICZM Plan*





## OFFSHORE WIND ENERGY POTENTIALS

India's coastline offers tremendous potential for offshore wind farms. It is expected that by 2030, 40 per cent of the global wind farm shall be offshore with an annual expected growth rate of 32 per cent. The current onshore installation is about 13,000 MW and the resources are limited with respect to high wind potential sites. Hence, offshore



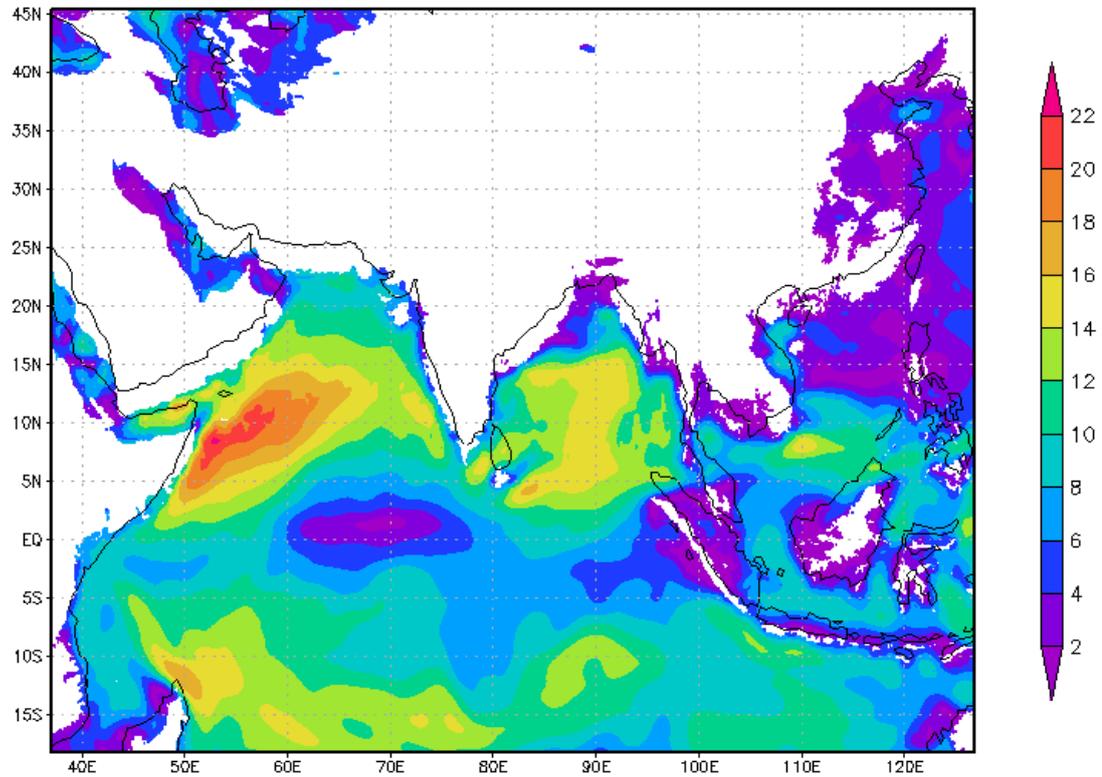
offers a great potential as a renewable alternative. India has not formally made a serious entry into exploiting offshore potential. There is also no policy framework at present. India's 6,400 km-long coastal line should, however, offer enormous potential. Some of the consultants, who have published satellite data of 868 locations globally, have indicated that Kudankulam and Rameshwaram in India have high wind potential of greater than 9 m/s which is almost on par with some of the European farms. The advantage in India is that, the technology in this field has reasonably matured and associated risks of growing with technology are far less. Though India is still to harness the full potential of onshore wind energy, it has begun the initiatives to explore and tap the offshore wind potential as a long coastline and prevailing wind patterns presents a bright opportunity.

In order to determine the potential offshore wind farms, wind data over the ocean is needed at different levels (up to 100 m) above mean sea level. To achieve this, the benefits of an Atmospheric model (WRF) need to be considered. The WRF model is designed to be a flexible, state-of-the-art, portable code that is efficient in a massively parallel computing environment. A modular single-source code is maintained that can be configured for both research and operation. Thus a feasibility study using WRF model would give an idea of potential offshore wind energy packets.

A numerical study has been carried out to map the wind energy potential over the Indian Ocean (around 50 m above mean sea level) using the WRF atmospheric model. Preliminary investigation shows that the southern tip of India has a high

potential for wind energy as evidenced by earlier research. The southeastern part of the Indian coast has more wind power potential than the rest of the coastal area. A more detailed study needed to be conducted to get an accurate assessment of the offshore wind power potential.

*WRF output of Wind speed in  $ms^{-1}$  (25km X 25km) at 50 m height*



GrADS: COLA/IGES

2012-05-30-12:27

## SEA LEVEL RISE SCENARIOS

An increase in the rate of rise of mean sea level is one of the primary and potentially most troublesome aspects of projected climate change. In recent years, the rate of global sea level rise, increased significantly over that of the previous several decades. As global temperatures continue to increase, sea level will continue to rise in response,

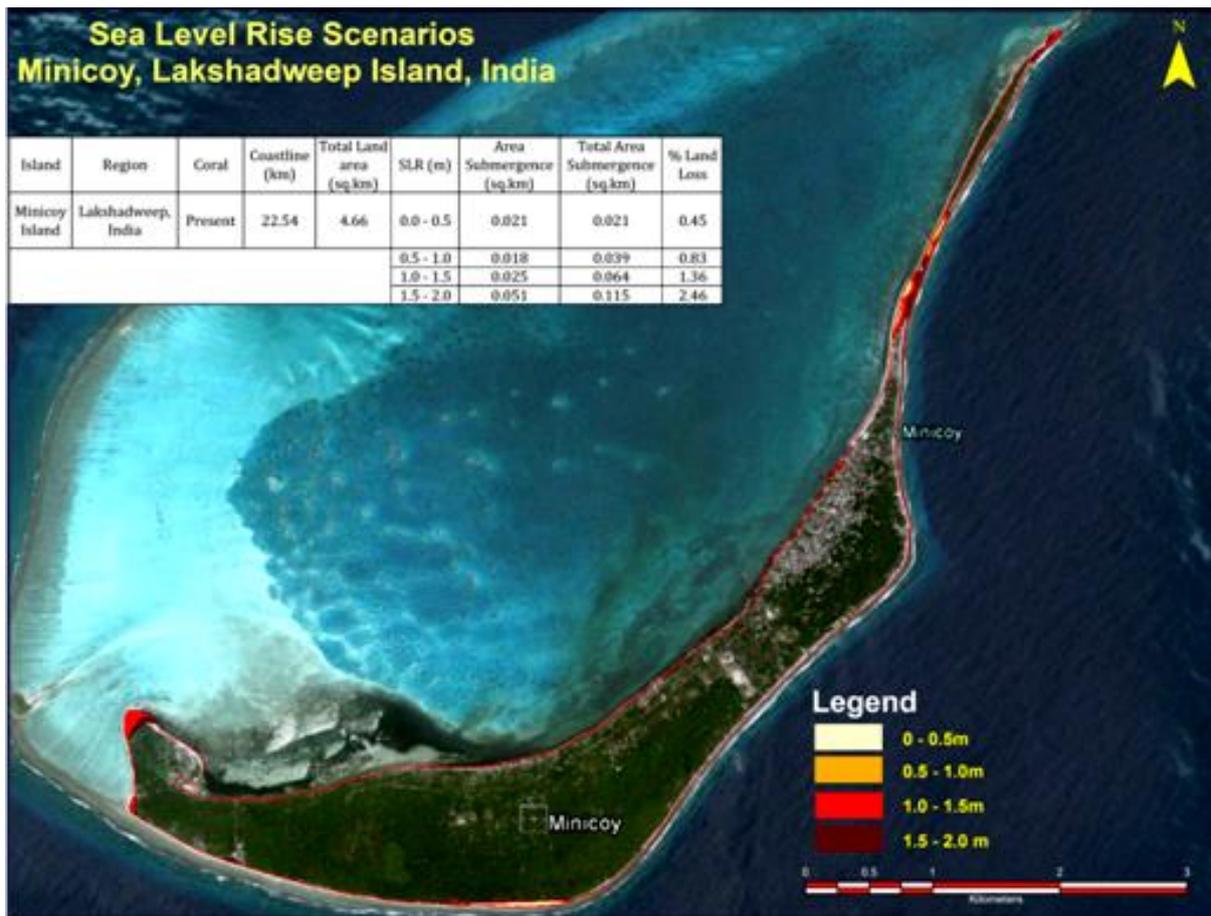
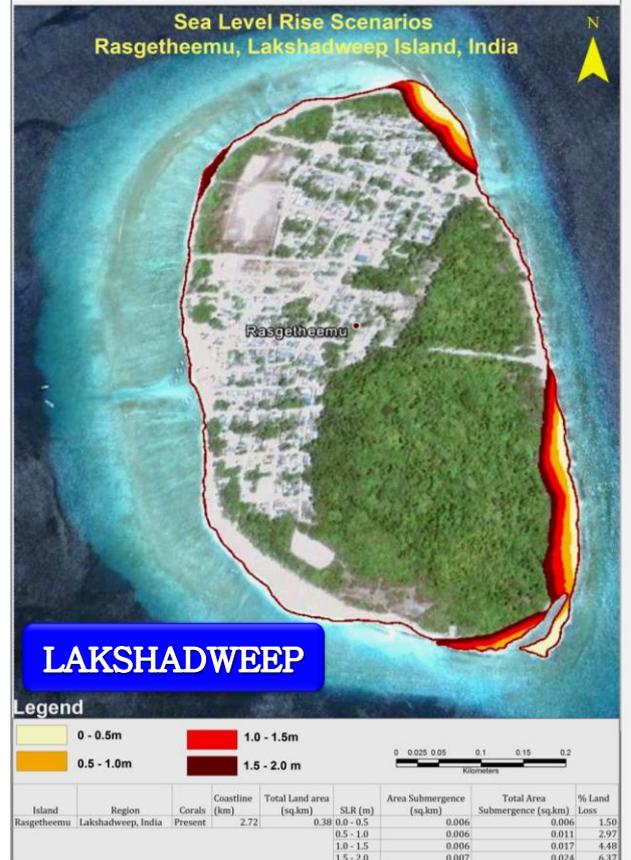
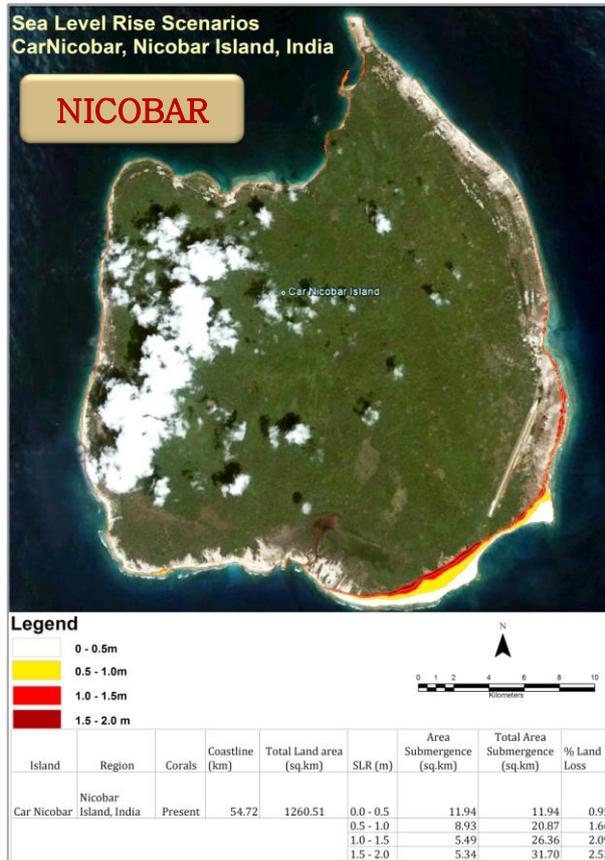


probably at a greater rate than observed historically. A detailed assessment of what areas are vulnerable to inundation due to projected sea level rise is necessary to help avoid future risk in developing residential and commercial areas, to inform infrastructure planning, and to design wetland restoration efforts with the ability to adapt to future changes, among other applications.

Inundation maps showing the possible impacts of four sea level rise scenarios (0.5, 1, 1.5 and 2m) for the islands of Sagar (West Bengal), Minicoy and Rasgatheemu (Lakshadweep), Car Nicobar (Nicobar) and Cook (South Pacific) were prepared. These maps are prepared with the help of SRTM data show a colour-coded representation of vulnerability to inundation for the different amounts of sea level rise. The land area that could be lost due to each of the four sea level rise scenarios were calculated and percent land loss was determined.

This study addresses the question of which areas are vulnerable to inundation, as opposed to quantifying the actual risk of inundation under a future scenario. No distinction was made between vulnerable areas already protected by hard engineering structures and those that are not. Thus, potential improvements to existing protective structures or construction of new ones are not considered. Where such structures currently exist, the results presented below indicate areas that would be flooded if these were to fail (due to, for example, a tsunami or an earthquake).

Sea Level Rise Scenarios for Car Nicobar Island & Rasgetheemu Island (Lakshadweep)





# NCSCM Website

## Home Page

The NCSCM website '<http://www.ncscm.org/>' has been functional since 2010 and has been periodically updated on all events and projects that have been undertaken.

**NCSCM** NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT  
Ministry of Environment and Forests, Government of India

जहाँ है हरियाली ।  
वहाँ है सूर्यवहारी ॥

सत्यमेव जयते

Geospatial Sciences Division

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Consortium  
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Links

**NATIONAL ASSESSMENT OF SHORELINE CHANGE**

As coastal populations continue to grow, and community infrastructures are threatened by erosion, there is increased demand for accurate information regarding past and present shoreline changes.

2010  
2000  
1990  
1972

**Smt. Jayanthi Natarajan**  
Union Minister of State for  
Environment and Forests [read more](#)

**DOWNLOADS**

Minutes of Meeting held on 21.06.2010  
Minister's speech during the signing of



**NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT**  
Ministry of Environment and Forests, Government of India



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वहाँ है खुशहाली ॥



सत्यमेव जयते



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Home > Divisions > Integrated Social Sciences and Economics Division (ISE)

## INTEGRATED SOCIAL SCIENCES AND ECONOMICS DIVISION (ISE)



### Key Objectives

The ISE would focus on coastal communities and their livelihoods. In particular, the ISE would focus on community based approach to coastal vulnerability and coastal management with collaboration with other divisions of the NCSCM. Research interests of ISE would include social aspects of the coastal management, traditional wisdom, and the regional and national level solutions for livelihood security and improved community level resilience against coastal hazards.

The major groups under the ISE are:

- The Coastal Livelihood and Demography Group
- The Traditional Knowledge Group
- The Employment and Education Group
- The Coastal Community, Culture and Heritage Group
- The Regional Planning Group
- The Coastal Conflicts Study Group
- The Coastal Ecosystem Economics Group.

Major groups and functions of the Integrated Social Sciences & Economics (ISE) Division



**NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT**  
Ministry of Environment and Forests, Government of India



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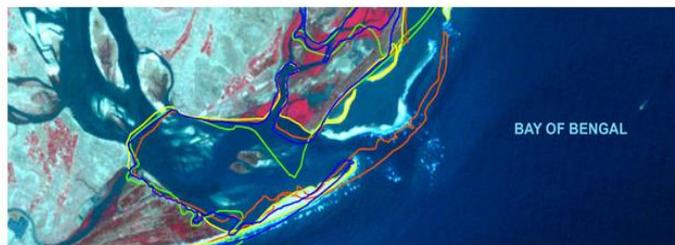


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Home > Projects > National Assessment of Shoreline Change > Odisha

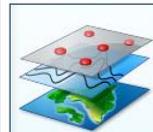
## NATIONAL ASSESSMENT OF SHORELINE CHANGE - ODISHA COAST



This assessment on the Odisha Coast represents long-term shoreline change for a period of 38 years from 1972-2010. The report summarizes the methods of analysis and provides explanations regarding long-term trends and zones of change. Shoreline change evaluations are based on comparing five historical shorelines extracted from satellite imageries for the above time period, with recent shoreline derived from LISS III images and limited field surveys. The historical shorelines represent the following periods: 1972 (Survey of India toposheet) used as base map, satellite imageries of 1990, 2000, and 2010. Primary goal of this study is to develop standardized methods for mapping and analyzing shoreline movement so that internally consistent updates can periodically be made to record shoreline erosion and accretion. Appropriate use of remote sensing technology coupled with limited DGPS surveys was integrated in GIS platform to obtain historical shoreline information.

The coastline of the state of Odisha is ~480km long and consists of six coastal districts as detailed below. The southern tip of the Odisha coast borders the state of Andhra Pradesh and the northern end connects to the state of West Bengal.

### DOWNLOADS



Shoreline Change Maps  
**ODISHA Coast**

Shoreline Change Maps  
Odisha Coast



Fact Sheet -  
Odisha Coast

Google Custom Search

Search



## *Programmatic Activities*

### Workshops/Seminars/ Training Programmes

The following are the series of Workshops/ Seminars/ Training programs held on various topics in Chennai as well as other places in India supported by the NCSCM during the period April 2011 – March 2012

S. No.	Title of the Workshop/ Seminars	Time of Event
1.	Fish workers' participation in the implementation of CRZ 2011	13 <sup>th</sup> – 14 <sup>th</sup> June 2011
2.	Coastal well-being methods	14 <sup>th</sup> – 18 <sup>th</sup> Nov. 2011
3.	Short course on ICZM Project	
4.	National Workshop on ICZM Planning	16 <sup>th</sup> – 17 <sup>th</sup> March 2012



## Coastal Wellbeing Workshop



## ICZM Workshop, Bhubaneswar



**Additional Research Activities  
undertaken as per the  
Overall EFC Approved Mandate  
Priority Research for 2012-2014**





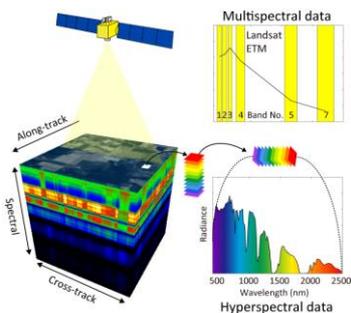
## Coastal Environmental Impact Assessment Division

- Establishment of "*Sentinel*" sites as indicators for coastal and marine ecosystem health
- Assessment of coastal and marine ecosystem health in pollution hotspots
- Cumulative environmental Impact assessment along the coastal and marine areas including hydrodynamic modelling



## Conservation of Coastal & Marine Resources Division

- Creation of a spectral library of mangroves, seagrass and seaweeds etc
- Marine Biodiversity Database
- Mapping of trans-boundary coastal and marine biodiversity



## Knowledge, Governance & Policy Division

- Development of ICZM Plan Training Modules for Training of Trainers
- Guidelines to prepare Terms of Reference for ICZM Plan



## Futuristic Research Division

- Blue Carbon: Offsetting carbon emissions by conserving coastal and ocean vegetation
- Assessment of Offshore wind energy potentials - long term study
- Inventorization of greenhouse gas flux emissions from coastal ecosystems - input into climate modelling



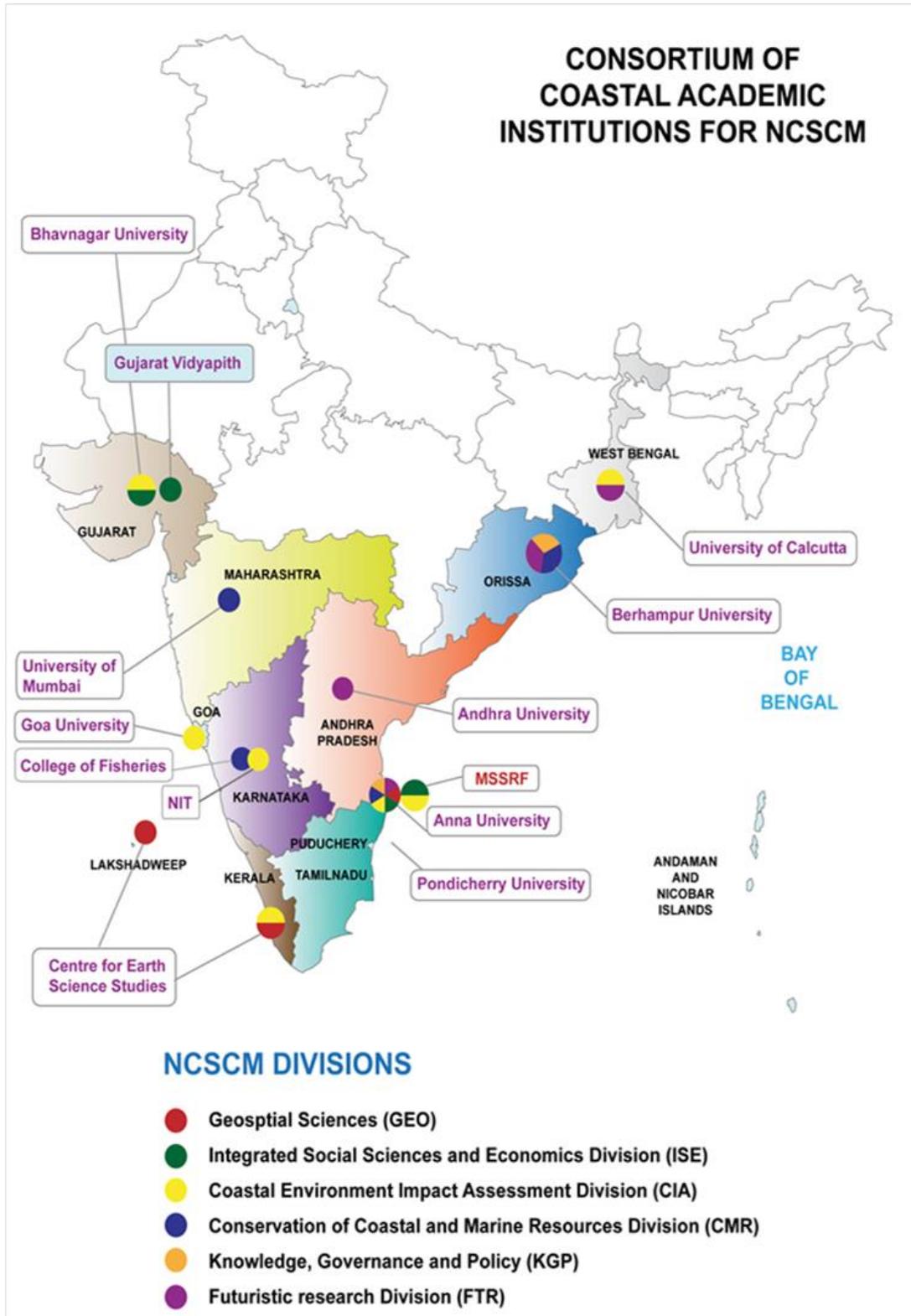
## Integrated Island Management Division

- ICRZ - Andaman and Nicobar Island - Integrated Coastal Regulation Zone Plan Preparation - assist A&N Administration
- IIMP - Andaman and Nicobar Island - Integrated Island Management Plan - assist A&N Administration



# CONSORTIUM NETWORK ACTIVITIES

## SHORT-TERM RESEARCH STUDIES



One of the mandates of the NCSCM is to promote applied research and to establish world-class standards in coastal and marine area research and management by encouraging new multidisciplinary research studies that binds nationally relevant research projects of the NCSCM with the consortium institutions. With this background, the NCSCM proposes to implement projects in three phases:

- 1. Short-term Projects – immediate start up projects (maximum of one year duration)**
- 2. Medium-term Projects (2013 – 2015)**
- 3. Long-term Projects (Beyond 2015 – for 5-year duration)**

The short-term projects aim at building knowledge based on existing/available information, with limited field surveys as appropriate. This may include reconnaissance surveys, data gathering, compilation and creation of initial database from the research on coastal and marine areas and its management in the country. The NCSCM has initiated the first phase of joint collaboration with five partner institutions for short-term project assignment. The broad areas identified include sediment cell demarcation, developing an inventory of pollution sources and management plans for specific areas, developing coastal profiles, inventorization and database creation on marine resources and gender aspects related to coastal management. The proposals are at present being reviewed by the NCSCM.

S.No.	Project Proposal	Institution
1.	Sediment cell demarcation for the east and west coast of mainland India	Institute for Ocean Management, Anna University, Chennai
2.	Developing an inventory of pollution sources and septage management plan for Vembanad Lake – which is a Critically Vulnerable Coastal Area (CVCA)	Centre for Earth Science Studies, Trivandrum, Kerala
3.	Develop a coastal profile for the coast of Odisha (as a case study)	Kalinga Institute of Industrial Technology (KIIT) University, Odisha
4.	Inventorization and database creation on marine microbial diversity along the Indian Coast	Calcutta University, West Bengal
5.	Livelihood challenges and opportunities for fishing women of Maharashtra and Karnataka	M.S. Swaminathan Research Foundation, Tamil Nadu

## International Cooperation Initiatives



## International Cooperation: Ongoing

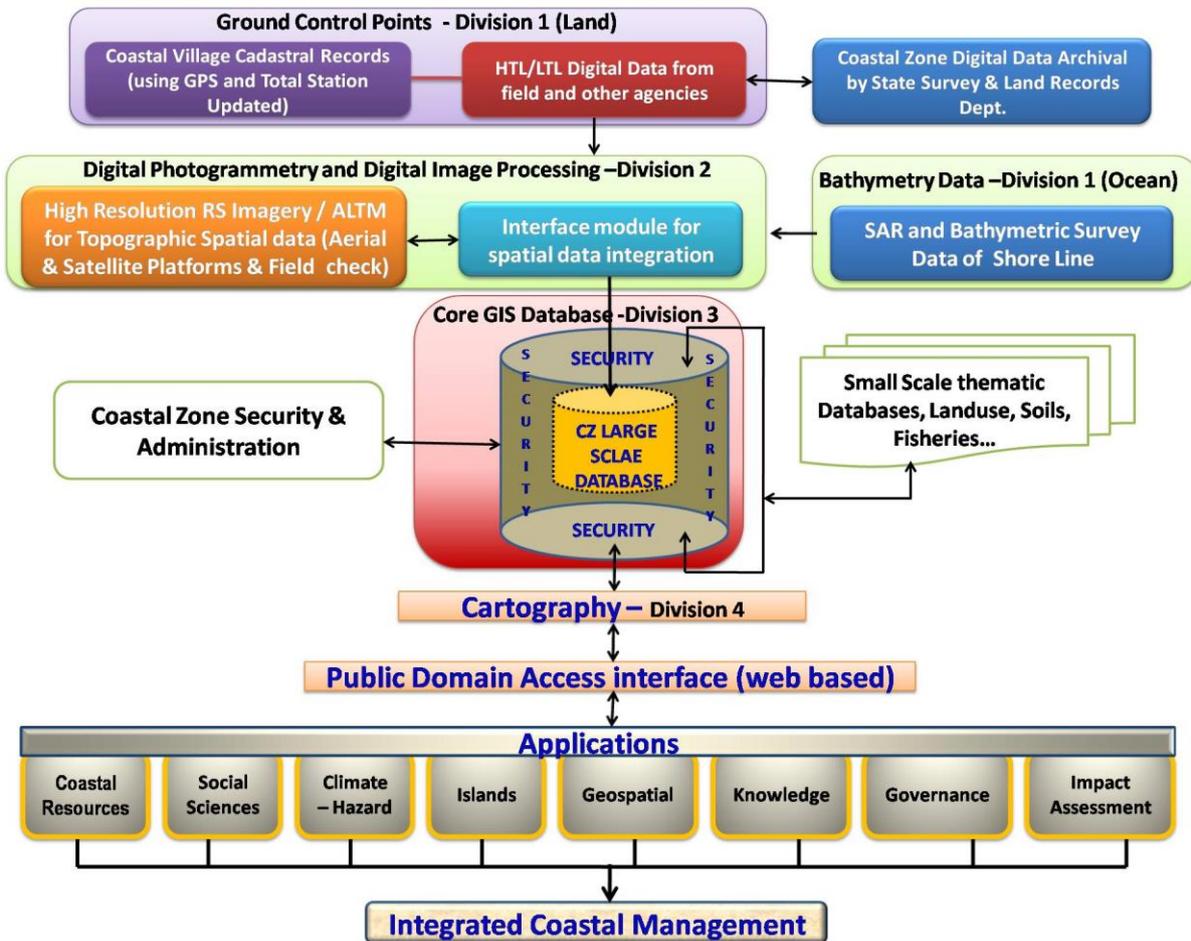
1. Coastal Social Wellbeing – Ongoing with University of Northumbria, UK
2. India – US Field Course on “Island Ecosystem Dynamics” – Ongoing with South Dakota School of Mines and Technology, USA

## International Cooperation: Proposed

1. Belmont Forum Projects – Approval requested to be involved in the Proposed projects – and to be taken up under NCSCM’s mandate
  - Transformation and Resilience on Urban Coasts (TRUC)
  - Model Based Classification of Coastal Vulnerabilities (COCOVID)
  - Building Coastal Resilience through Integrating Knowledge on Island Systems
  - DELTAS: Catalyzing action towards sustainability of deltaic systems with an integrated modeling framework for risk assessment
  - Indicators of Coastal Vulnerability in the Asia Pacific (ICVAP)



# National Coastal Database Repository under MoEF



## Financial Work Progress



**National Centre for Sustainable Coastal Management**  
*Ministry of Environment & Forests, Government of India)*  
**Anna University Campus, Chennai**

**FINANCIAL REPORT FOR THE FY 2010-2011 & 2011-2012**

**Receipt of Funds:** Funds received from SICOM during the FY 2010-2011: ₹11.42 crores

**Usage of Funds:** (₹ in lakhs)

<b>Investment Cost:</b>		
Civil works (Refurbishment existing laboratories, office buildings etc.)	:	29.40
Office Vehicle	:	8.69
<b>Operational Cost:</b>		
Manpower	:	9.61
Operation activities	:	7.56
Electricity & Telephone	:	0.18
Travel, Boarding and Accommodation	:	7.72
Hiring of vehicles	:	1.53
<b>Capacity Building &amp; Projects:</b>		
National workshops/ conferences	:	20.14
<b>Physical</b>		
GIS software	:	86.09
<b>Total usage of funds</b>	:	<b>170.92</b>



**Director**  
National Centre for Sustainable Coastal Management  
Ministry of Environment and Forests, Government of India  
Koodal Building, Anna University Campus  
Chennai - 600 025, India

**National Centre for Sustainable Coastal Management**  
*Ministry of Environment & Forests, Government of India)*  
**Anna University Campus, Chennai**

**PHYSICAL REPORT FOR THE FY 2010-2011 & 2011-2012**

<b>S.No.</b>	<b>Nature of Infrastructure</b>	<b>₹ in lakhs</b>
1.	Refurbishing, Interior and provisions of cubicles at Dana Berg building	: 10.41
2.	Refurbishing, Interior and provisions of cubicles at 2nd floor of IOM	: 8.57
3.	Damp roofing of Dana Berg building and related civil works	: 7.68
4.	Refurbishing works at 2nd floor of IOM and CWR building	: 7.46
5.	Construction of new building - landscaping work	: 1.33
6.	Purchase of GIS software, ESRI	: 86.55
7.	Purchase of Vehicle (Car)	: 8.69
<b>Total expenditure for infrastructure</b>		<b>: 130.69</b>



**Director**  
National Centre for Sustainable Coastal Management  
Ministry of Environment and Forests, Government of India  
Koodal Building, Anna University Campus  
Chennai - 600 025, India



INDEPENDENT AUDITOR'S REPORT

To  
The Project Director,  
National Centre for Sustainable Coastal Management  
Chennai

**Report on Financial Statements**

We have audited the Financial Statements of National Centre for Sustainable Coastal Management (NCSCM), which comprises the Balance Sheet as at March 31, 2012, and Receipts & Payment Accounts for the period then ended, and a summary of significant accounting policies and other explanatory information.

**Management's Responsibility for the Financial Statements**

Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance and cash flows of the Society in accordance with the Accounting Standards applicable and issued by the Institute of Chartered Accountants of India. The Society has prepared and maintained accounts in accordance with the Financial Manual adopted by the Society. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

**Auditor's Responsibility**

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control

**Corporate Office:** Behl House, 13, Daryaganj, New Delhi – 110002.

**Phone:** +91-11-23275021, 23241613 **Fax:** +91-11-23277044, 129-4013729

**Email:** [ncmittalndco@yahoo.com](mailto:ncmittalndco@yahoo.com), [info@ncmittalndco.com](mailto:info@ncmittalndco.com)

**Firm's Website:** <http://ncmittalndco.com> **Resource Website:** [www.auditfirm.net](http://www.auditfirm.net)

**Offices at:** Chennai, Jaipur, Hissar, Kolkatta, Chandigarh, Rajkot, Bangalore, Dehradun, Faridabad and London (UK)





relevant to the Society's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

**Opinion**

*In our opinion and to the best of our information and according to the explanations given to us, the financial statements give the information required by the Act applicable in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India:*

- a. *in the case of the Balance Sheet, of the state of affairs of the Company as at March 31, 2012;*
- b. *in the case of the Receipts & Payments Account, of the cash flows for the year ended on that date.*

For N. C. Mittal & Co.  
Chartered Accountants  
FRN 000237N

(CA KARUNESH MITTAL)  
PARTNER  
M. NO. 095976



Place of Signature: Chennai  
Date: 29-09-2014

**NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT**  
**Annexure to the Balance Sheet as on March 31, 2012**

**ACCOUNTING POLICIES & NOTES TO ACCOUNTS**

**A Significant Accounting Policies :**

**1. Basis of Accounting:**

- a) The Society follows the cash basis system of accounting in the preparation of accounts.
- b) The Company accounts are prepared under the historical cost convention and on the basis of a going concern.

**2. Fixed Assets & Depreciation :**

- a) The society has no fixed assets as on date of the balance sheet. Fixed assets are stated at their original cost of acquisition inclusive of inward freight, duties & expenditure incurred in the acquisition, construction/installation including part of salaries and wages paid to own staff.
- b) The assets transferred as grant in aid are written off as revenue expenses.
- c) The depreciation is not charged on the fixed assets by the society.
- d) The assets after being taken out of use are written off net of the sale value of the asset or scrap of asset from the books of accounts.

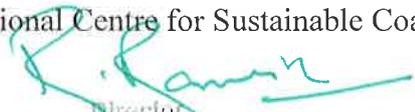
**3. Current Assets And Loans & Advances:**

In the opinion of the management, current assets, loans and advances as shown in the Balance Sheet have a value of realisation in the ordinary course of business at least equal to the amount at which they are stated.

**B Notes to Accounts**

Figure for the previous year have been regrouped and/or rearranged where necessary.

For National Centre for Sustainable Coastal Management



Director  
National Centre for Sustainable Coastal Management  
Ministry of Environment and Forests, Government of India

As per the Audit Report of Even Date Attached  
For N. C. Mittal & Co.  
Chartered Accountants



C.A. Karunesh Mittal  
Partner  
Place: Chennai  
Date: 29-09-2014

## NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT

KODAL BUILDING  
ANNA UNIVERSITY CAMPUS,  
GUINDY,  
CHENNAI

### Receipts & Payment Account For the period ended on March 31, 2012

Receipts	Amount	Payment	In Rupees Amount
<b>Opening Balance</b>		<b>Current Liabilities</b>	
Bank Accounts	5,00,000.00	IOM	4,19,670.00
<b>Current Liabilities</b>		TDS Payable - Professionals	81,012.00
NPMU	70,89,576.00	TDS PAYABLE - STAFF	2,04,690.00
TDS Payable - Professionals	55,140.00	<b>Fixed Assets</b>	
TDS PAYABLE - STAFF	2,04,690.00	CIVIL WORKS	29,39,773.00
<b>Investments</b>		Vehicle	8,68,706.00
FIXED DEPOSIT - UBI SHORT TERM	1,19,80,000.00	GIS Software	86,09,175.00
<b>Current Assets</b>		<b>Investments</b>	
ADVANCES	10,000.00	FIXED DEPOSIT - UBI SHORT TERM	42,00,000.00
<b>Closing Balance</b>		<b>Current Assets</b>	
Bank Accounts	17,20,890.00	ADVANCES	70,000.00
		<b>Indirect Expenses</b>	
		Capacity Building & Projects	19,68,502.00
		OPERATIONAL COST	21,98,768.00
	2,15,60,296.00		2,15,60,296.00

Notes on Accounts & Accounting Policies are annexed to the Receipts & Payments Account

For National Centre for Sustainable Coastal Management

As per the Audit Report of Even Date Attached  
For N. C. Mittal & Co.  
Chartered Accountants

Director

Director

National Centre for Sustainable Coastal Management  
Ministry of Environment and Forests, Government of India  
Place: Chennai  
Kodal Building, Anna University Campus  
Chennai - 600 025, India

Date: 29-09-2014

(CA Karunesh Mittal)  
(M. NO. 095976)  
Partner  
FRN 000237N

**NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT**

KODAL BUILDING  
ANNA UNIVERSITY CAMPUS,  
GUINDY,  
CHENNAI

**Income & Expenditure Account**

As at March 31, 2012

Expenditure	(In Rupees)	
	Expenditure Amount	Income Amount
Capacity Building & Projects	2014374.00	Grant received
Communication	2658438.00	
OPERATIONAL COST	1,24,17,654.00	
Surplus transferred to Corpus Fund		
<b>Total</b>	<b>1,70,90,466.00</b>	<b>Total</b>
		<b>1,70,90,466.00</b>

Notes on Accounts & Accounting Policies are annexed to the Income & Expenditure Account

For National Centre for Sustainable Coastal Management

Director  
National Centre for Sustainable Coastal Management  
Place: Chennai  
Ministry of Environment and Forests, Government of India  
Date: 29-09-2014  
Anna University Campus  
Chennai - 600 025, India

As per the Audit Report of Even Date Attached  
For N. C. Mittal & Co.  
Chartered Accountants

  
N. C. Mittal & Co. Chartered Accountants  
(M. No. 095876)  
FRN 000237N

# NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT

KODDAL BUILDING  
ANNA UNIVERSITY CAMPUS,  
GUINDY,  
CHENNAI

## Balance Sheet

As at March 31, 2012

	(In Rupees)	
Liabilities	Amount	Assets
<b>Corpus Fund</b>		
<b>Current Liabilities</b>		
Society for Integrated Coastal Management	1,24,17,654.00	<b>Fixed Assets</b>
		CIVIL WORKS
		Vehicle
		GIS Software
		<b>Investments</b>
		FIXED DEPOSIT - UBI SHORT TERM
		<b>Current Assets</b>
		Bank Accounts
<b>Total</b>	<b>11,66,16,764.00</b>	<b>Total</b>
		<b>11,66,16,764.00</b>

Notes on Accounts & Accounting Policies are annexed to the Balance Sheet

For National Centre for Sustainable Coastal Management

  
 Director  
 National Centre for Sustainable Coastal Management  
 Ministry of Environment and Forests, Government of India  
 Date: 29-03-2012  
 Chennai - 600 025, India

As per the Audit Report of Even Date Attached  
For N. C. Mittal & Co.  
Chartered Accountants

  
 Partner  
 FRN 000237N