## **IOGOOS PILOT PROJECTS**

STATUS AND VIABILITY.....

## FORMULATION OF PROJECTS

• Basin-scale contributions to the observing system

- Concerned with present and future availability of basin-scale observations and the need to develop an implementation strategy that builds on the plans developed at the SOCIO Workshop in Perth (November 2000)
  - Argo Program
  - Mooring arrays
  - Ship-of-Opportunity Project
- Regional-scale contributions to the observing system
  - Concerned with the regional priorities, needs, and contributions to Indian Ocean GOOS, supplementing the needs identified at the SOCIO Workshop and bearing in mind that the proposed actions and projects should be of value to people in the region
    - Exploiting climate predictability
    - Fishery Applications
    - ${\circ}\,$  Ocean data and products
- Coastal Issues

## COASTAL OCEAN OBSERVING

- 60 representatives of the coastal research and coastal-zone management communities from 16 countries in the Indian Ocean region met for the first time and agreed to
  - Formulate three proposed pilot projects that (1) target high-priority phenomena of interest in coastal waters and (2) require regional (multi-national) to global approaches
  - Initiate planning to establish a network of coastal laboratories for data and information exchange

• Agreed that each country would describe 2–3 phenomena that are accorded the highest priority in the country in terms of their impact on the socio-economics of the countries in the region; that are feasible; and make good subjects for pilot projects that would demonstrate the effectiveness of the GOOS approach and would therefore be likely to attract funding.

## COASTAL – PHENOMENON OF INTEREST FROM COUNTRIES

- Mauritius: Coastal Erosion, Loss of biodiversity and Marine Pollution
- Rodrigues: Coastal Erosion, Loss of biodiversity and Marine Pollution, Soil erosion, Harmful Algal Blooms
- South Africa: Overexploitation of inshore fish and invertebrate stocks, Impact of human activities in catchment basins, Inappropriate coastal development – needed ecosystem approach involving modeling
- Mozambique: Sustainable tourism, coastal erosion, Coastal pollution, Safety at Sea, Fisheries (Dynamics, stocks, illegal fishing)
- La Reunion: Degradation of marine ecosystems; cyclones, coastal pollution
- Thailand: Overexploitation of fisheries resources, degradation of coastal ecosystems, coastal erosion, Coastal water pollution

### COASTAL – PHENOMENON OF INTEREST FROM COUNTRIES

- Australia: Increased nutrients concentrations, habitat alteration and loss, marine pests, contaminants, turbidity
- Tanzania: Degradation of ecosystems and loss of biodiversity, coastal erosion, pollution of inshore waters
- Bangladesh: Data scarcity, Coastal pollution, habitat destruction in the coastal zone, aquaculture, coastal flooding
- Comoros: Overexploitation of the marine environment, Contaminants, coastal erosion, protection of endemic species
- Seychelles: land reclamation, oil pollution
- Sri Lanka: coastal erosion, coastal habitat loss, coastal pollution

### COASTAL – PHENOMENON OF INTEREST FROM COUNTRIES

- Kenya: Coral bleaching, Pelagic fish distribution, coastal erosion, harmful algal blooms, overexploitation of mangroves (04 pilot projects suggested - pelagic fish stock displacements with respect to the IO monsoon; SST monitoring and env. & eco. relation; improved resource monitoring; capacity-building)
- India: Biodiversity and habitat loss, coastal erosion, harmful algal blooms
- Madagascar: Overfishing of some marine species, degradation of the coastal ecosystem, coastal pollution, coastal desertification
- Iran: Habitat modification and loss of biodiversity, coastal erosion, water-quality degradation

## $COASTAL - PILOT \ PROJECTS$

- In light of country reports, phenomena of interest in coastal waters were prioritized
  - Coastal erosion; habitat / bodiversiy; nutrient pollution; sustainable fisheries; chemical contamination; non-native species; aquaculture; coastal flooding; harmful algal blooms; safety of life at sea
- Develop pilot projects for
  - Coastal Erosion
  - Habitat/biodiversity
  - Sustainable fisheries
- Working Groups
  - Monitoring and Predicting Coastal Shoreline change
  - Multi-scale Monitoring and Mapping of Keystone Coastal Ecosystems
  - Development of a Monitoring and Management System for the Penaeid Prawn Resources

# DEVELOPMENT OF PILOT PROJECT ON SHORELINE CHANGES

- The objectives of the project are:
  - To assess historical data on shoreline change, establish trends and place these in the context of coastal geomorphology, hydrodynamic regime and natural and anthropogenic drivers of change
  - To establish an adequate, cost effective system to monitor changes in the shoreline and coastal morphology.
  - To develop a quantitative understanding of coastal processes and the relationship between shoreline change and the various natural and anthropogenic drivers
  - To develop the ability to make predictions of shoreline change due to extreme events.

#### • Expected products

- Shoreline definition, with quantified variation and trends
- sediment budgets for coastal "cells"
- GIS showing erosion-prone areas
- forecasts of near shore wave climate
- predictions of coastal erosion during extreme events
- Participating countries: Bangladesh, India, Malaysia, Maldives, Mauritius, Seychelles, Sri Lanka and Tanzania,

## DEVELOPMENT OF PILOT PROJECT ON SHORELINE CHANGES

- An e-group for discussions, requested for preliminary country information but poor response
- To develop network of contact persons and fill the country information on CZM, etc
- Capacity Building needs
- IOGOOS IV recommended to abandon the project after seeking the interest of the participating members. However, NARA, Sri Lanka expressed to take up this project and has been continued since then
- Pilot case studies for India, Sri-Lanka, Thailand and Tanzania were conducted in November 2008
- Draft proposals have been prepared during December 2008

### CASE STUDIES - INDIA





Plate was showing the shorelines of 1972/73 1and 1999/2000 and corresponding rate of the shoreline change for Agatti, Bangaram and Thinnakara Islands.

## CASE STUDY – SRI LANKA



## CASE STUDY - TANZANIA



Seaward edge north of Bumba River



Map showing the areas of acretion and erosion. The arrow showing the area of maximum acretion.

## CASE STUDY - THAILAND



## MULTI-SCALE MONITORING AND MAPPING OF KEYSTONE COASTAL ECOSYSTEMS

#### • Project Objectives

• Monitor the keystone ecosystems by remote sensing in specific areas, by community-based monitoring at specific sites under the supervision of scientists; and disseminate information to governments, to integrated coastal-zone management programs, to communities and fishermen (especially those dependent on the mangrove ecosystem), tourist organizations, and to the IOGOOS network

#### • Expected outputs

- As appropriate, baseline data on and maps of the keystone ecosystems (coverage, habitat characteristics, species density, composition and biodiversity);
- spectral analysis of remote-sensing data;
- statistical comparisons of remote-sensing and community-based data;
- indices of change and predictions of important changes;
- recommendations on conservation and restoration strategies; enhancement of environmental awareness.

## MULTI-SCALE MONITORING AND MAPPING OF KEYSTONE COASTAL ECOSYSTEMS

- Methodology, long-term sustainability (governments involvement), futue plans
- New interest from countries enabled 11 countries involvement (Australia, Bangladesh, India, Iran, Kenya, Mauritius, Reunion, South Africa, Sri Lanka, Tanzania and Thailand)
- Pre-project Planning Workshop in Phuket, Thailand during February 17-19, 2006 - 8 countries who were experts in coral reefs, mangrove forests, seagrass bed or remote sensing
- Project case studies by the project members
- Project proposals
- Drafted the project proposals during December 2008 (Log frames, SWOT analysis, etc.)

#### Monitoring the Pichavaram Mangrove environs in the Tamil Nadu Coast, India

Digital Classification of Mangrove in the Pichavaram, Tamilnadu Coast, India



Legend

Hot Spot Well Managed

Map showing the hot spots and well managed areas

Mangrove Zonation Maps in different periods

Mangrove Class	Area in sq. km.		
	1991	2000	2006
Dense Mangrove	2.76	3.17	2.06
Open Mangrove	1.80	3.38	5.00
Total	4.55	6.55	7.06

Expansion of Port Klang cleared most of the mangroves along coastline of Malaysia. However, no massive changed of the mangroves cover at 2 islands within 12 years.



#### THE DEVELOPMENT OF MONITORING AND MANAGEMENT SYSTEMS FOR THE SHALLOW WATER PENAEID PRAWN / SHRIMP RESOURCE IN THE INDIAN OCEAN

- Project objectives
  - Creation of links amongst scientists (coastal laboratories), coastal managers and communities;
  - creation of a central data service/product hub available to all;
  - building of sustainable capacity and infrastructure;
  - monitoring of prawn recruitment and abundance via existing fisheries;
  - determination of effects of local conditions (e.g., freshwater run-off);
  - creation of a link to ocean-climate observations;
  - detection of change in prawn-fishery yield in relation to local and regional oceanic/climatic events.

#### THE DEVELOPMENT OF MONITORING AND MANAGEMENT SYSTEMS FOR THE SHALLOW WATER PENAEID PRAWN / SHRIMP RESOURCE IN THE INDIAN OCEAN

- An exploratory Workshop at Perth, Australia in Nov 2003 towards a first step in formation of a network of prawn researchers in the IO rim countries and Islands (Australia, Bangladesh, India, Kenya and South Africa, Iran, Sri Lanka and Tanzania) – a possible plan of action was drawn up
- IOGOOS IV recommended to abandon the project after seeking the interest of the participating members. There is no further response from the members.

#### ENHANCED COOPERATION IN OBSERVATIONS ON WHALE SHARKS IN THE INDIAN OCEAN

- Aims at enhanced cooperation in observation of whale sharks in the Indian Ocean.
  - Relevance and reasons for successful outcomes:
    - Apparent yet poorly understood link between migration and oceanography;
    - Mechanism to link IOGOOS oceanographic observations to biology and socio-economic activity;
    - Range of existing activities in place; As yet not well coordinated (except perhaps East Africa/Seychelles);
    - Committed people with good networks;
    - Conservation and community building socio-economic outcomes not just research;
    - Link to strong international conservation agenda; Whale Sharks = Smart Argo buoys!, ability to provide oceanographic depth/temperature profiles.

#### • IOGOOS Role:

- Host regional meetings and workshops
- Endorse project under IOGOOS Coastal Projects framework;
- Support capacity building through IOC (e.g. In Photo ID);
- Support Remote Sensing requirements;
- Facilitate data availability and exchange;
- Support applications to member country governments for funding

IOGOOS IV recommended to cease the project after the response from the participating members and was withdrawn.

## TIMOR SEA DEEP OCEAN TO CONTINENTAL SHELF MODEL DEMONSTRATION PROPOSAL

- Aims to examine the feasibility of demonstrating the coupling of the deep ocean operational model Bluelink with a shelf model
- This project is consistent with the Coupling Shelf and Deep Ocean Models strategy of the COOP Implementation Strategy for the Coastal Module of GOOS
- Application in Timor Sea: Apply model to Timor Sea considering (a) Bluelink (Australia Navy/CSIRO/Bureau of Meteorology); (b) Appropriate higher order shelf model; (c) Data and information; (d) Assimilation; (e) Application to environment and or engineering.
- Implementation: Dr Ray Steedman, chairman of WAGOOS, will present the concept to next WAGOOS meeting. If approved WAGOOS shall proceed with: (a) seek an Indonesian partner agency,

(b) develop a plan

(c) determine funding mechanism

## REMOTE SENSING APPLICATIONS AND CHLOROPHYLL-A MAPPING

- Started as a Remote Sensing and Capacity Building it RS
- Conducted several training programmes under the umbrella of IOGOOS with the support of IOC, INCOIS, POGO, etc.
- Daily Images of (a) MODIS Chlorophyll-a, (b) MODIS SST and (c) Turbidity (Kd 490) are identified as the general remote sensing products to the IOGOOS Members
- Interface with Chlorophyll-a pilot project and POGO
- Amalgamated into Indian Ocean Core Remote Sensing Project, containing three sub-projects as components

## REMOTE SENSING APPLICATIONS AND CHLOROPHYLL-A MAPPING

- The base map for the generation of products for requested domains was prepared based on the inputs from participating IOGOOS countries
- Web based dissemination of near real-time satellite products viz. Chlorophyll-a, SST, kd\_490, TSM to all requested countries was initiated on 1 November 2008
- In-situ measurements for the Indian region have been initiated as part of a National Project.
- Plan for in-situ measurements for other participating countries has to be drawn up.
- Generated remote sensing case studies for the following areas:
  - Keystone Ecosystems Tanzania, Malaysia;
  - Shoreline Changes Sri Lanka, Tanzania, Madagascar and Malaysia;
  - ChloroGIN Iran, Kenya, Maldives, Oman, Sri Lanka, Tanzania and Thailand

# REMOTE SENSING APPLICATIONS AND CHLOROPHYLL-A MAPPING

#### • Standard Products:

• True Colour Composite, Chlorophyll\_a, Kd\_490, AOT869, CDOM\_index, SST

#### • Value Added Products (VAP)\*:

• TSM (Clark), Bloom Indices (Ahn and Shanmugham), 3-Days Rolled Composite, 7-Days Rolled Composite, 30-Days Rolled Composite, 30-Days Rolled Anomaly

#### • Domain (40 S to 31 N & 35 E to 103 E):

• India, Sri Lanka, Iran, Maldives, Oman, Tanzania & Thailand

#### • Format:

• HDF, PNG & TIFF

### • Resolution:

• 1 km & 4 km

• **Dissemination:** INCOIS website at Near real-time (NRT)

## CONSTRAINTS AND SUGGESTIONS FOR WAY FORWARD

#### • National focal points

- Most of present focal points of the project due to unknown reasons weak in correspondence
- Therefore it is necessary to review national focal points. Membership can assist to find active focal points

### • A long journey...

- Identify the national experts in each country (from member institutes) and involve them as the national focal points
- Review the methodologies, time frames, etc.
- Finalize the project proposals
- Submit to the Donor Agencies

## Thank you &

Welcome your suggestions / comments...