IOC Regional Committee for the Central Indian Ocean (IOCINDIO)

Workshop on Methodologies and Approaches of coastal vulnerability and Advances in Operational Oceanography Science and Technology in the Indian Ocean.

With the support and under the patronage of the Intergovernmental Oceanographic Commission of UNESCO and

the Ministry of Earth Sciences, Government of India

Draft Plan of Execution

Venue: The Workshop will be kindly hosted by the Indian National Centre for Ocean Information Services (INCOIS) hosting the International Training Centre for Operational Oceanography (ITCOocean) as a Category 2 Centre under the auspices of UNESCO "Ocean Valley" Pragati Nagar (B.O.), Nizampet (S.O.) Hyderabad - 500 090, India.

Date of Workshop: 13 - 17 Dec 2021

Sponsors: IOC of UNESCO, INCOIS-ITCOocean, NIOT, NCCR

Geographical scope/benefiting countries: All the nineteen (19) IOCINDIO Member States:

Australia, Bangladesh, France, India, Indonesia, Iraq, Iran, Kuwait, Malaysia, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, United Kingdom of Britain and Northern Ireland and partners.

Background of the project

Goal: The goal of the workshop is to support IOCINDIO Member States in their efforts to respond to the effects and impacts of coastal vulnerability, using various techniques, methodologies and approaches. Among others, the workshop will bring together Member States representative experts to share experiences and review the status of coastal vulnerability and advances in operational oceanography in the region. Experts will work together to prepare Framework guidelines for coastal vulnerability including indexes and early warning systems for storm surges in the region. The workshop will assist countries in the region for their preparedness to cope with anticipated sea level rise in the region. The Experts Group will assist countries to develop their codes and standards for the preparedness in face of consequences of storm surges and sea level rise.

The Challenge: In fact, the global climate change and the threat of accelerated sea-level rise exacerbate the already existing high risks of storm surges, severe waves and tsunamis in

coastal areas. Climate change may not only enhance the most threatening extreme events but also aggravate long-term bio-geophysical effects, such as sea-level rise, shoreline erosion, sediment deficits, saltwater intrusion into coastal aquifers and the loss of coastal wetlands. Considering these existing hazards and increasing risks in coastal regions, there is a great need to gain as much insight as possible into the exact nature and extent of possible risk increases related to future climate trends.

As per the ***IPCC predictions*** (i) If the whole world goes for renewable energy, the sea level will rise up to 25 cm by 2100. (ii) If 50 % of the world power generated from renewable and the rest is from conventional power sources, then the sea level rise will be up to 50 cm by 2100. (iii) Status quo, sea level rise will be up to 1 m by 2100.

For all the above scenarios, all the countries in the region are strongly encouraged to invest resources in ocean sciences, research and applications, allowing deep knowledge on inundation and erosion threats and to take responsive remedial actions; for storm surges will increase the vulnerability to those countries which are prone to cyclones.

The workshop activities include the following.

- Identify and list the countries, which already have the coastal vulnerability Framework including indexes and those countries which need guidance to prepare the same.
- Identify and list those countries, which have developed or adopted early warning systems for storm surges and those countries which need guidance to prepare the same.
- Review the guidelines in place for the north Indian Ocean to handle the storm surges and their coastal vulnerability index maps.

The workshop will:

- Highlight the importance of studies, research and technology applications by each country for sustainable national coastal development.
- Promote the development of scientific investigations and technology by interested countries.
- Determine the economic and financial impacts of coastal vulnerability in terms of What if? (in terms of loss of human life, Economic and Financial damages and lost if NO Actions?). Local social and societal impacts on populations, stakeholders, and businesses versus responsibilities of Municipalities.
- In view of the looming threats due to climate change and the ever increasing need to mitigate and manage coastal hazards it is imperative to develop expertise among the coastal stakeholders and especially the government officials on the tools and techniques available to model and map the coastal vulnerability arising out of hazards such as sea level rise, storm surges, urban flooding, tsunamis etc.
- Thus, this Workshop is conceived as a forum where experts from respective countries will present and share their experiences and expertise leading to the development of

national and regional comprehensive guidelines for preparing Coastal Vulnerability Framework

Participants will exchange experiences and best practices about field data collection using GPS, satellite image processing, development of a spatial database in GIS, spatial analysis and interpretations of results for preparation of hazard maps for management purpose using case studies.

Workshop programme:

1. Coastal Risk & Vulnerability – Introduction
2. Sea Level Rise and its impacts
3. Storm surge modelling and mapping
4. Coastal urban flooding
5. Coastal Inundation mapping
6. Tools, Instrumentations for field data collection
7. Coastal Vulnerability indices
8. Climate database and its utilization
9. Climate change, projections and impacts

Targeted audience

Scientists/experts in different fields from member countries of IOCINDIO along with experts from the premier Institutes of the host country including INCOIS, NCCR and NIOT.

The tentative schedule of the programme

Module 1	1. Introduction of participants 2. Presentation by the representatives of Member States 3. Discussions on the needs and priorities of Member States.
Module 2	1. Coastal vulnerability index calculation – test case for an Indian State. 2. Coastal observations 3. Tools, Instrumentations for field data collection.
Module 3	Feedbacks from participants from different countries.
Module 4	Coastal Risk & Vulnerability – Introduction Coastal Vulnerability indices
Module 5	Storm surge modelling and mapping Coastal urban flooding & Inundation mapping Coastal Flooding

Module 6	Sea Level Rise and its impacts
Module 7	Climate change, projections and impacts Climate database and its utilization
Module 8	Discussion about preparation of guidelines and framework document. Concluding Marks

Tentative agenda

Date/Time	13-Dec-2021	14-Dec-2021	15-Dec-2021	16-Dec-2021	17-Dec-2021
11:00 – 12:	Inaugural Session	**Climate change and its impacts (Dr Krishnan)**	Strom Surge Modelling and Mapping **Dr PLN Murty**	Coastal Risk and Vulnerability -Indian Perspective **Dr MV Ramana Murty, NCCR**	Rregional Coastal Vulnerability Framework for IOCINDIO Coastal areas - Draft **Dr. Tune Usha**
12:00 – 13:	Ocean Observations and Data Management **Dr. TVS Udaya Bhaskar**	Sea level assessment using satellite and in situ data **Dr Prakash**	Discussion on preparation of guidelines for Tsunami Hazards.	Coastal Vulnerability Index Calculation and Coastal Indices **Dr. S Neelamani**	Discussion on guidelines for all components/indices of coastal vulnerability (physical, social, economic, environmental)
13:00 – 14:	**Lunch Break**				
14:00 – 15:	Multi Hazard Services **Dr. RS Mahendra**	Tsunami Hazard/Risk Assessment and Early warning System in the Indian Ocean **Dr. T Srinivasa Kumar**	Demonstration of Tsunami Standard Operating Procedures **Dr. J Padmanabham**	Coastal flooding & inundation Mapping **Dr SK Dash, NCCR**	Discussion on guidelines for impact of climate changes on coastal areas
15:00 – 16:	Discussion on Operational Observation Strategy for Coastal Vulnerability Mapping	Discussion on preparation of guidelines for Tsunami Hazards.	Country presentation on mitigation coastal hazards	Shoreline change monitoring along the Indian coast **Dr. RS Kankara**	Valedictory session
