



IOCINDIO-VII/3s  
Paris, 21 June 2019  
English only

**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**  
(of UNESCO)

**SEVENTH SESSION OF THE IOC REGIONAL  
COMMITTEE FOR THE CENTRAL INDIAN OCEAN  
(IOCINDIO-VII)**

Indian National Centre for Ocean Information Services (INCOIS)  
Hyderabad, India  
31 May–1 June 2019

**EXECUTIVE SUMMARY**

In accordance with Rule of Procedure 48.3, IOCINDIO, as a primary Subsidiary Body of IOC, is required to report to a Governing Body on its sessions.

The IOC Assembly at its Thirtieth Session (UNESCO, Paris, 26 June–4 July 2019) will be invited to consider this Executive Summary including the Recommendations herein.

1. The Seventieth Intergovernmental Session of the IOC Regional Committee for Central Indian Ocean was hosted upon the kind and generous invitation of the Government of India at the Indian National Centre for Ocean Information Services (INCOIS), from 31 May–1 June 2019 in Hyderabad, India.
2. Preceding the Seventh Session, the IOCINDIO Scientific, Technical and Institutional Innovations Workshop for National and Regional Framework on Coastal Vulnerability Assessment and Monitoring for Sea-Level Rise and Storm Surges in the Indian Ocean Region, was kindly hosted by the International Training Centre on Operational Oceanography, (ITCOcean) as a centre under the auspices of UNESCO (category 2); at the Indian Centre for Ocean Information services in Hyderabad, India, 27 May – 30 May, 2019.

3. The two meetings were hosted upon the kind and generous invitation and support of the Government of India through the Indian Centre for Ocean Information services in Hyderabad, the National Institute of Ocean Technology and the Institute of Coastal Research of India. The Kuwait Institute for Scientific Research (KISR) and the Second International Indian Ocean Expedition (IIOE-2), co-organised the meeting with in kind contributions.
4. The workshop attracted a great number of accomplished senior scientists together with mid-career and young enthusiastic professionals and students both from the IOCINDIO and outside the IOCINDIO region, in particular from the *IOCAFRICA region (mid-career physical oceanographer and sea level scientist from the Kenya Marine Fisheries Research Institute, KEMFRI with a research subject on Modeling the Response of Coastal Wetland to Tide and Sea-Level Rise; and a student in a first year Master Programme from the Institute of Marine Science of the University of Zanzibar based in Zanzibar, United States of Tanzania)*. The Director of the National Centre for Coastal Research, and senior scientists of the Center, two experts from the US-NOAA, the Associate Director of the IPG Global, the Representative of the World Bank Office in New Delhi and the Programme Director of the Odisha Programme funded by The World Bank also attended the Workshop. Experts came from Australia, Bangladesh, India, Indonesia, Kuwait, Malaysia, Saudi Arabia, Sri Lanka and United Kingdom of Great Britain and Northern Ireland.
5. At the inaugural Session, Monday, 27 May 2019. the Director of INCOIS, Dr. Satish ShenoI welcomed the participants and expressed the full support of his institutions to the two meetings. The Chairman of IOCINDIO, Dr. Atmanand also welcomed the participants and stressed the critical intergovernmental role of IOCINDIO. The key challenge as he pointed out is the lack of funding support by a number of Member States to their national Representatives to the IOC Governing Bodies meetings and technical activities including IOCINDIO Sessions. The IOC Regional Liaison Officer and Technical Secretary of IOCINDIO, Justin Ahanhanzo welcomed the participants and expressed the gratitude of the IOC Secretariat to the host country, the Government of India for its continued support to the IOC and IOCINDIO including the Workshop. He extended warm thanks and appreciation to the IOCINDIO Chairman for his able leadership, to the Director of INCOIS for his personal involvement, the support and hospitality of INCOIS with the organising Committee, notably, Dr. TVS Udaya Bhaskar, the Head of Training Program Planning and Implementation Group of INCOIS and his supportive team, which provided unparalleled logistics support for the preparation of the workshop including travel arrangements for participants. The Director of the National Centre for Coastal Research, Dr. M. V. Ramana Murthy and his staff including Dr. Dash, Dr. Usha provided groundbreaking scientific and technical background to the Workshop. The IOCINDIO Technical Secretary further set the scene for the workshop, highlighting the goal, objectives and expected results.
6. The Executive Secretary of the IOC and Assistant Director General of UNESCO, who was unable to attend the meeting in person, participated via Skype. He thanked the Government of India for hosting the two meetings with significant in-kind contributions. He also expressed his appreciation to the Chairman of IOCINDIO, Dr. Atmanand, the Director of INCOIS, Dr. S. ShenoI and the Organising Committee. He further made a presentation on the major developments within the IOC and at international level, notably, the UN Decade of Ocean Sciences for Sustainable Development including its first global meeting recently concluded in Copenhagen, the ongoing preparation of the forthcoming IOC Mid-Term Strategy, the 30th Session of the IOC Assembly. In conclusion, he expressed appreciation to the Member States of IOCINDIO and meetings participants.

7. The Secretary to the Government of India for Ministry of Earth Sciences, Dr. M. Rajeevan, was unable to attend in person, but he addressed the meeting via Skype. He welcomed the Member States Representatives, invited experts and observers. He highlighted the efforts of the Government of India in the fields of ocean observations and sustainable coastal development. He stressed the importance of coastal vulnerability for the entire Indian Ocean region including India. He assured participants of the support of the Government of India. Finally, he expressed the keen readiness of the Government of India to support the implementation of the meetings Recommendations.
8. On the 31st May, Dr. Satish Shenoi opened the IOCINDIO-VII Session on behalf of the host country, the Government of India and welcomed the participants. The Chairman of IOCINDIO also welcomed the distinguished Representatives of Member States, invited experts, partners and observers, notably the Director General of the South Asia Co-Operative Environment Programme (SACEP), Dr. Abas Basir; the Representatives of the National Oceanic and Atmospheric Administration (NOAA) of the United States of America, Dr. Terry L. Schaefer and Dr. Bianca Prohaska. contributions. He extended to the meeting the Greetings of the Vice Chairperson Dr. Faiza who was unable to attend. He informed the Session that despite the efforts of the Officers and the IOC Secretariat since March 2018, it became difficult to reach out to the Second Vice-Chair, Dr. Nasser Zaker elected at the IOCINDIO-V Session in 2016.
9. The IOC Regional Liaison Officer, Mr. Justin Ahanhanzo, proceeded with the meeting arrangements. The Agenda of the Session was adopted as presented without amendments. The Session elected as the Rapporteur of the Session, the Representative of Malaysia, Dr. Afiq Zhofri Bin Abdul Razak.

**REPORT BY THE CHAIR ON IOCINDIO-VI INCLUDING  
THE IOCINDIO SCIENTIFIC, TECHNICAL AND INSTITUTIONAL INNOVATIONS  
WORKSHOP FOR NATIONAL AND REGIONAL FRAMEWORK ON COASTAL  
VULNERABILITY ASSESSMENT AND MONITORING FOR SEA-LEVEL RISE  
AND STORM SURGES IN THE INDIAN OCEAN REGION**

10. The Chairman of IOCINDIO presented the statutory intersessional report indicating the activities conducted since the IOCINDIO-VI Session, held in Kuwait City, Kuwait, 24-25 May 2017. He demonstrated that IOCINDIO is back on rail and that its revitalization has been achieved on a solid basis at the right time when important regional and international initiatives, notably, the IIOE 2 and the UN Decade of Ocean Science for Sustainable Development are in progress. His report was based on the IOC functions as the fundamental pillars for the IOCINDIO Work plan as decided at the IOCINDIO VI meeting and endorsed by the 29<sup>th</sup> Session of the IOC Assembly, (UNESCO, Paris, 21-29 June, 2017). The list of project proposals in relation to the IOC Functions as included in the work programme are the following:

- **IOC Function A: Ocean Science and Research**
  - Effects of human induced changes: Ocean acidification, eutrophication, hypoxia, harmful algal blooms (HABs) in coastal waters of the North-western Indian Ocean.

- **IOC Function B: Observing Systems & Data**
  - Ocean observations, coastal zone management, circulations and fisheries.
- **IOC Function C: Ocean Hazards**
  - Coastal vulnerability assessment for sea level rise and storm surges.
  - Monitoring with Responsible Response of Oil Spill in inner ROPME Sea.
- **IOC Function D: Assessments & information for Policy**
  - 2050 Integrated Ocean Policy Advice for Proactive Planning and Managements for IOCINCIO Member States.
- **IOC Function E: Governance**
  - Blue Economy Business opportunities in the context of climate change adaptation and Disaster Risk Reduction.
- **IOC Function F: Capacity Development**
  - “IOCINDIO Networking Research Infrastructures, Facilities and Human Resources” project proposal is a direct contribution to this function taking into account specificities in needs and capacities of Member States.

11. The IOCINDIO Chairman commended the support of a number of Member States, notably; India, Indonesia, Kuwait and the ongoing arrangements with the Government of United Kingdom of Great Britain and the Northern Ireland for a financial support to IOCINDIO.

12. Owing to the reinforced cooperation with the IIOE-2, the IOCINDIO officers with the support of the IOCINDIO Technical Secretary and the Coordinator of the IOC Perth Office in Australia with the in-kind contributions of the Government of Indonesia, organized a joint IIOE-2/IOCINDIO side session on Prioritization, Information sharing and Collaborative Approach in the framework of the 2018’ International Indian Ocean Science Conference of the IIOE-2 in Jakarta, Indonesia on Tuesday, 20 March 2018. As a result, it became apparent that due to limited financial resources and lack of a full time staffing for the IOCINDIO, the priority was given to only two project proposals for the ongoing biennium (2017-2019) while the Committee continues to seek Member States support for the full implementation of the entire Work plan. The two proposals in progress are: “*Coastal vulnerability assessment for sea level rise and storm surges*”; and “*IOCINDIO Networking Research Infrastructures, Facilities and Human Resources*”.

13. To fast-track the IOCINDIO project proposal on “*IOCINDIO Networking Research Infrastructures, Facilities and Human Resources*”, the Committee participated in and contributed to the IOC Experts Group Meeting on Capacity Development, 21 to 23 March 2018 at the IOC-UNESCO Headquarters in Paris. The IOCINDIO Technical Secretary presented the status progress on the Committee’s efforts to network major ocean science institutions in the region including partnerships with the IIOE-2 science task teams, the network of Nansen Environmental Centers in Europe, Asia and Africa.

14. He stressed the key role played by the two UNESCO Category 2 Centres located in the region, namely, the Regional Education and Research Centre on Oceanography for West Asia at the Iranian National Institute for Oceanography and Atmospheric Science in Teheran, Islamic Republic of Iran and the International Training Centre on Operational Oceanography, (ITCOOcean) at the Indian Centre for Ocean Information Services (INCOIS) in Hyderabad, India (see IOC/INF-1370).
15. Dr Atmanand further reported that IOCINDIO side meeting was organized during the 51<sup>st</sup> session of the IOC Executive Council on the 4<sup>th</sup> July 2018 to inform Member States and partners on the progress with IOCINDIO work programme.
16. The IOCINDIO contributed to the Second of two regional workshops under the Auspices of the United Nations on the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects for the Indian Ocean (including the Arabian Sea and the Bay of Bengal), the Red Sea and Gulf of Aden and the ROPME/RECOFI Area) with two Representatives together with the UNESCO Science Officer in Doha in Qatar, 26 November-01 December 2018.
17. IOCINDIO co-organized the 2019 International Indian Ocean Science Conference at the Nelson Mandela University in Port Elizabeth in South Africa, 11-15 March, 2019. At this conference, participants reviewed the preparations of the Coastal vulnerability workshop resulting in a broader experts contributions globally, including major ocean sciences and operational institutions such as US-NOAA and the South Asia Co-Operative Environment Programme (SACEP).
18. The preceding Coastal Vulnerability workshop kindly is the timely response to the prioritization of the work programme focused on the most pressing coastal challenge in the Indian Ocean with strong damaging impacts to the countries, their populations, infrastructures and economies. The Workshop included twenty different themes on coastal vulnerability from theory, tools, and methodologies to practical case studies with financial valuation. Thematic sessions included ocean observation systems from climate change, services and products, coastal vulnerability solutions using technological interventions, tools and techniques, coastal vulnerability index calculation and coastal indices, storm surge modelling and mapping, prediction of extreme winds and waves for coastal risk assessment, multi hazard vulnerability mapping, coastal hazard and coastal urban flooding and inundation mapping, coastal risk and vulnerability with the Indian perspective. Tsunami hazard and risk assessment and early warning system experience in the Indian Ocean was seen as a best practice in the region. Odisha State vulnerability Experiences sponsored by The World Bank provided guiding elements for further funding opportunities.
19. Representatives of following Member States took the floor and expressed their support to the progress report of the Chairman, and expressed specific country needs and priorities with engagement into IOC workplan as follows:

Kingdom of Saudi Arabia: Prof. Yasser O. Abualnaja of the Red Sea Science Research Center (RSRC) at the King Abdullah University of Science and Technology (KAUST) congratulated the Chairman for his leadership and efforts. He commended the progress achieved in such a short time despite the lack of significant budgetary allocations. He briefly informed the Session on programmes and activities and priorities in his country including research interests on Evolutionary Biology of Red Sea Marine Life, Coral Genome, Coral Reef Ecosystem Studies, Marine Microbial Environment, Extremophiles and Deep Brines,

Pelagic Environment, Fisheries & Aquaculture, Coastal Meteorology and Air-Sea Interaction, Sea Level Variations and Tide, Climate and Meteorological Modeling, Coupled Air-Sea Modeling with Data Assimilation, Develop a Red Sea Operational System. He further informed the meeting of the keen interest of his country to play an important role in the IOCINDIO. He would consult with the relevant national authorities at home to consider hosting the 8th Session of IOCINDIO back to back with a scientific and technical workshop on priority issues for the Gulf countries Council such as oil spills, Blue Economy and capacity building. He expressed the interests of his country to work with other countries in order to ensure the prompt implementation of the IOCINDIO Work plan Project on Oils Spiils. He further requested the IODE in collaboration with the IOCINDIO Secretariat and officers to start discussions on establishing a data management facility in Saudi Arabia.

Bangladesh indicated interests in collaboration with IIOE-2, joint regional cruises and projects related to Climate change, economic opportunities: business opportunities in the conservation and management of seaweeds or/mangrove ecosystems, storm surge and coastal modelling.

The project on coastal vulnerability is very important for Bangladesh because the country is prone to severe multi-hazards coastal and ocean vulnerability. In term of capacity building, the department of Oceanography at Chittagong University is keen to develop joint training activities with KISR, INCOIS, NIOT and NCCR on ocean circulation, development of management procedures and national policies in marine sciences as well as the establishment of training centers.

India: Observations, acidification, sea lever rise, coastal zone management, modelling, storm surge. India is leading together with Kuwait the project on coastal vulnerability. India offered to host the Coastal vulnerability Leadership Workshop aimed at the harmonisation and standardisation of the Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (**RCVF CARI-Coast**).

Indonesia: indicated a great interest in the entire work plan of the IOCINDIO with a particular emphasis on the Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (**RCVF CARI-Coast**). Capacity building a priority area for Indonesia which is keen to reinforce cooperation with the Indian Tsunami Center at the INCOIS.

Kuwait: indicated that there is a critical need for the region to develop wind streams Atlas, Climate change, coastal zone management, microplastics, ocean acidification, harmful algal blooms (HABs) and fish kill eutrophication, hypoxia, oil spills, ocean circulation, and extreme events like tsunami, winds, and waves, coastal erosion and sedimentation problems. He informed the meeting that the Arabia Gulf countries established waves Atlas. The Representative of Kuwait called for urgent communication in order to follow-up on the past IODE mission in Kuwait with the objective of establishing a national oceanographic data management facility. In term of capacity building and mutual assistance, Kuwait is willing to transfer knowledge to interesting countries in the following areas: (i) Establishment of coastal engineering lab with wave flumes, basin and tools for physical modeling (ii) Training in the area of Analysis and design of coastal structures; establishing design marine environmental conditions; and coastal vulnerability assessment.

Malaysia: expressed a keen interest for the Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (RCVF CARI-Coast), capacity building, ocean circulation, and ocean policy framework.

20. The Committee adopted Workshop result, namely the Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (RCVF CARI-Coast).
21. Member States and partners agreed to work together to ensure the full success of the implementation of the Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas.
22. The Committee endorsed the IOCINDIO Working Group which was formed at the workshop to assist the IOCINDIO officers and the IOC Secretariat in the implementation of the recommendations and relevant project proposals.
23. IOCINDIO-VII endorsed the organization of a follow-up leadership workshop with the view to bring together leading experts from the region and outside to review progress with Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (RCVF CARI-Coast).
24. Regarding the United Nations Decade of Ocean Science for Sustainable Development, IOCINDIO expressed the full support and commitment of IOCINDIO Member States through their massive mobilisation with partners. The Committee welcomed and commended with appreciation the membership of its Chairperson, Dr. M. A. Atmanand, in the Executive Planning Group of the Decade and encouraged him to pursue more vigorously his efforts in support to the preparatory phase of the Decade.
25. The Committee endorsed the offer of the Government of India to host the regional workshop related to the Indian Ocean under the umbrella of IOCINDIO in the context of the UN Decade of Ocean Science for Sustainable Development and invited Member States for support.
26. The Committee recommended the improvement of communication among Member States, partners and experts through various means including the update IOCINDIO mailing list using existing various IOC networks and lists including Ocean Experts and specific lists of Groups of Experts such as Tsunami Working Groups; GOOS Regional Alliances, Ocean Sciences and IODE; with the view to circulate information on activities in the IOCINDIO region. This mailing list could be used as a secondary list to distribute IOC Circular Letter that are of relevance to IOCINDIO.
27. The Committee recognized the huge demand for all the data archived in the region as many publications and dissertation works have emerged from the heterogeneous data archived at INCOIS.
28. Subsequently, the Committee called for the reactivation of the ODINCINDIO: The committee noted that the Ocean Acidification requires specific types of data. The reactivation of ODINCINDIO can contribute to this need as well as it would contribute to: ODISCat, OceanExpert, OBIS, CHM/TMT. IOCINDIO also agreed to organize training courses in collaboration with OBIS, the UNESCO Category 2 ITCOOcean and the regional training centres of the Ocean Teacher Global Academy to enhance the capacity in using OBIS data standards and data management best practices, as well as train scientists in using OBIS for data analysis and the creation of biodiversity information products to support science, assessments (including climate-change impacts) and area-based management.

29. Following the debate on the Chairman Report, Representatives of Member States, invited partners, experts and the IOC Secretariat staff; made presentations related to the contributions of the IOC programmes to the IOCINDIO including the following:
- Panel discussions on Ocean observations and data management in the Indian Ocean by *Dr TVS Udaya Bhaskar, Scientist and Head, Training Program Planning and Implementation Group, ITCOocean, INCOIS and Mr. Peter Pissierssens, IOC/UNESCO, IODE Project Office.*
  - Ocean sciences and applications in the Indian Ocean by *Dr. Yasser Omar S. Abualnaja, King Abdullah University of Science and Technology (KAUST) & Red Sea Science & Engineering Research Center*
  - Ocean/climate related early warning systems “Need for an ocean observing system to monitor the changing climate”. by the key note speaker *Dr. Satish Sheno, Director, INCOIS*
  - Panel discussions on implementation of the IOC capacity building strategy by *Peter Pissierssens (IOC), Dr. Mohammad Muslem Uddin (Department of Oceanography at Chittagong University, Bangladesh) & Dr TVS Udaya Bhaskar, Scientist and Head, Training Program Planning and Implementation Group (TPG), UNESCO C2C, INCOIS, India.*
  - Regional and international programmes: the needs for a reinforced cooperation in the framework of IOCINDIO: linkages and synergies with IIOE-2, by *Dr. Sathya Prakash, INCOIS. South Asia Cooperative Environment Programme (SACEP), by Dr. Abas Basir, Director General of SACEP. Cooperation with US-NOAA by Dr. Bianca Prohaska & Dr. Terry Schaefer, US-NOAA.*
30. In term of capacity development, the Committee identified specific requirements for IOCINDIO Capacity Development including on-job training, international and in-region science mobility, Fellowships/Bursaries, joint regional and international projects, specific area for manpower training. Network among ocean scientists for knowledge sharing, online newsletter indicating challenges would be of benefit to member states. The IOCINDIO CD project proposal anticipated the setting up of data base of all **Oceanographic** related infrastructures such as laboratory facilities, research vessels and their capability in every Member State. With the support of the National Institute of Ocean Technology in India, the initial implementation of the Communication work package including IOCINDIO web site is in progress.
31. Civil society organizations are influencing policies related to climate change and disaster management at local and national level, and contribute to build capacity of communities, practitioners and government officials. They channel and process the demands and concerns of diverse interest groups to the state and strengthen state’s capacity for building resilience. Because Ocean science and practice are an emerging area in many countries in the region, the civil society can play alongside government and academicians, a big role to build the capacity of communities, local governments, practitioners as well as the national government agencies. Hence it urges to include civil societies on board of the capacity building platform of IOCINDIO.



32. Regional and international cooperation should be explored with IPE Global, NOAA (Ocean & Weather services etc). Existing cooperation should be reinforced with the Portsmouth University and more, specifically with the IOC Perth Office regarding resource industries social licence to operate.

33. The Committee expressed a strong appreciation for the capacity development results obtained by the Ocean Teacher Global Academy project in general, and the work carried out by INCOIS as the host the first OTGA Regional Training Centre (RTC) for the IOCINDIO region.

34. The IOCINDIO Member States called on the Government of Flanders (Kingdom of Belgium) to continue its support for a second phase of OTGA which will also gain experience from the highly qualified and experienced Indian and overseas trainers of the International Training Centre on Operational Oceanography, (ITCOOcean) as a centre under the auspices of UNESCO (category 2) for the benefit of the Indian Ocean RIM countries, other relevant interested partners and stakeholders,

35. The partner organizations and observers also significantly contributed to the IOCINDIO meetings as follows:

Dr. Abas Basir, Director General of SACEP expressed his gratitude to the IOCINDIO for inviting SACEP at IOCINDIO VII and expressed SACEP's interests for long-term collaboration with IOCINDIO. SACEP wishes to engage with IIOE-2. SACEP as the Secretariat for the South Asian Seas Programme (SASP), which is one of the eighteen Regional Seas Programme of the United Nations Environment Programme (UNEP) identified the following areas for areas of interest regarding IOCINDIO Work plan and project proposals: Effects of human induced changes: Ocean Acidification, nutrient and eutrophication, hypoxia, Harmful algal blooms, marine litters, in coastal waters of Indian Ocean, Arabian Seas and Bay of Bengal, Response to oil spills, Blue economy business opportunities in the context of climate change adaptation and disaster risk reduction, Coastal vulnerability assessment for sea level rise and storm surges. The Modes of collaboration between IOCINDIO and SACEP include:

- Organizing joint policy dialogue forum, in which policy makers and research institutions would be invited to discuss marine environmental challenges.
- Organizing technical workshops for capacity building on ocean research

The Representatives of NOAA, Drs. Prohaska and Schaefer gave an overview of NOAA's presence and engagement in the IOCINDIO region (as was included in the presentation given in the workshop that included information on **Argo**, the Global Drifter Program (**GDP**) and the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (**RAMA**). This presentation was followed by a discussion of priorities in the region along with exploration of how NOAA could help IOCINDIO and its Member States. A mode of collaboration may follow the same approach as with WESTPAC whereby NOAA may nominate its experts to attend IOCINDIO meeting with the view to share the knowledge.

36. Relevant contributions from the above presentations were used to revise, refine and complete the IOCINDIO project proposals.

37. The Committee called upon the IOCINDIO Member States to contribute to the global CD needs assessment to be included in the Clearing House Mechanism for the Transfer of Marine Technology (CHM/TMT).
38. The participant from Tanzania showed interests of the active participation of his country in IOCINDIO and requested the modalities for a membership to IOCINDIO.

#### **PROGRAMME OF WORK AND BUDGET FOR 2020–2021**

39. The Committee used the contributions from Member States and Partner Representatives as well as the invited experts and refined, completed and endorsed the following set of project proposals as the Work plan for 2020-2021 giving a priority status to Coastal Vulnerability and Capacity Development in the IOCINDIO Region. The Committee recommended that the IOC Secretariat should support the efforts of Member States and the officers in fund raising including IOC Member States Voluntary contributions.
40. The project proposals adopted are available in [Annex II](#).

#### **ELECTED OFFICERS AT THE IOCINDIO-VIII**

41. The Committee congratulated and commended the officers elected at the IOCINDIO-V Session in Chennai, India, 25-27 April 2016 for their sustained leadership and success accomplished in a very short period; assuring the vibrant reactivation of the IOCINDIO. The Committee further proceeded with the election of a new Vice Chair, Dr. Mohammad Muslem Uddin (Bangladesh) in replacement of Dr. Nasser Hadjizadeh Zaker (I.R Iran) and recommended with acclamation that the current Chairman, Dr. M. A. Atmanand (India) and the Vice Chair Dr Faiza Al Yamani (Kuwait) should pursue the leadership in their respective functions as officers of the Committee until the IOCINDIO-VIII along the IOC guidelines.

##### **Dr M. A. Atmanand (India)**

Former Director of the National Institute of Ocean Technology (NIOT)  
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##### **Chairperson**

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##### **Vice-chairperson**

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**Vice-chairperson**

**PLACE AND DATES OF IOCINDIO-VIII**

42. The Committee decided that the Officers in consultation with the IOC Secretariat should invite Member States to host the next Session at the lowest possible cost to the IOC regular budget. The host country is expected to support local logistics and expenses. The IOCINDIO-VIII Session should be organized prior the 31<sup>st</sup> Session of IOC Assembly in 2021.

**ADOPTION OF THE SUMMARY REPORT**

43. The Committee adopted the draft Summary Report (Document IOCINDIO-VII/3s) with the related recommendations (see [Annex I](#)).
44. Closure of the Session: The Chairman of IOCINDIO declared the session closed at 13:30 on the 1st June 2019.

ANNEX I

**RECOMMENDATIONS**

**The IOC Regional Committee for the Central Indian Ocean at its Seventh Session (IOCINDIO-VII)**, Hyderabad, India, 31 May-1 June 2019,

**Recalling** the IOC-Resolutions EC-XLIX.1 and EC-XLIX.2 relevant to IOCINDIO,

**Expressing appreciation** to Member States for active participation in the above IOCINDIO Scientific, Technical and Institutional Innovations Workshop for National and Regional Framework on Coastal Vulnerability Assessment and Monitoring for Sea-Level Rise and Storm Surges in the Indian Ocean Region, hosted by the International Training Centre on Operational Oceanography, (ITCOOcean) as a centre under the auspices of UNESCO (category 2); at the Indian Centre for Ocean Information services, 27<sup>th</sup> May – 30<sup>th</sup> May, 2019 and IOCINDIO-VII Session, 31 May - 01 June 2019 at the same venue in Hyderabad, India.

**Recognising with appreciation** the participation of partners including governmental and non-governmental organisations, academic and research institutions, notably the INCOIS, NIOT, NCCR, KISR, the SACEP, the IPG Global, the Representatives of the World Bank Office in New Delhi and a number of overseas academic institutions including the NOAA and the Portsmouth University,

**Expressing** a warm gratitude to the Government of India, which mobilised national public institutions to provide a strong contribution for hosting the Workshop and the IOCINDIO-VII Session with a full board accommodation to all participants and the expenses covering the meetings logistics,

**Expressing also** a warm gratitude to the Government of India for the financial contribution for the re-activation of IOCINDIO in general and the IOCINDIO-VII related Workshop and Session,

**Further recognizing** with appreciation the efforts of the Executive Secretary for the initial implementation of the above Resolutions and the IOCINDIO-V and IOCINDIO-VI Recommendations with the development of the IOCINDIO CAP and for having made available extrabudgetary funds amounting thirty thousand American dollars (40,000 \$US) for the reactivation of IOCINDIO including the organisation of the Workshop and IOCINDIO-VII session with the subsequent follow up recommendations;

**Welcomed with appreciation** the IOCINDIO full support and commitment to the success of the United Nations Decade of Ocean Science for Sustainable Development through the mobilisation of IOCINDIO Member States and partners.

**Expressing with appreciation** the recognition to the pivotal role for autonomous national and regional capacity building of the 2 Category 2 Centres in the region, namely, the Regional Education and Research Centre on Oceanography for West Asia a centre under the auspices of UNESCO (category 2) at the Iranian National Institute for Oceanography and Atmospheric Science in Teheran, Islamic Republic of Iran and the International Training Centre on Operational Oceanography, (ITCOOcean) as a centre under the auspices of UNESCO (category 2); at the Indian Centre for Ocean Information Services (INCOIS) in Hyderabad, India.

**Endorsed** the IOCINDIO-VII Summary Report including the recommendations, the project proposals and the Working Group established during the IOCINDIO Workshop as the intersessional Working Group to support the Officers and the IOC Secretariat towards implementation of the work programme,

**Recommended** the transformation of the IOC Regional Committee for the Central Indian Ocean to the IOC Sub Commission for the Central Indian Ocean with the relevant prerogatives, Secretariat support, programme and operational budget as it is the case for the other IOC Regional Subsidiary Bodies such as IOCAFRICA, IOCARIBE and WESTPAC,

**Endorsed** the offer of the Government of India to host the Regional workshop related to the Indian Ocean in the context of the UN Decade of Ocean Science for Sustainable Development in India and invited all Member States for contributions and full support,

**Recommended** that the IOCINDIO Officers and the IOC Secretariat should explore appropriate mechanisms to facilitate cooperation with IOC regional bodies and other interested organizations and partners.

**Further recommended** a reinforcement of effectiveness of IOCINDIO national coordinating bodies or focal points with terms of reference as a matter of high urgency. The Terms of Reference should include guidance on the composition of the coordinating bodies. The list of focal points should be made widely available using existing various IOC networks and mailing lists including Ocean Experts and specific list of Group of Experts such as Tsunami Work Groups; GOOS Regional Alliances, Ocean Sciences and IODE;

**Agreed** on the needs for a coordinated approach for the IIOE-2 success and endorsed the joint IOCINDIO/IIOE-2 International Ocean Science Conference in GOA; India, 2020,

**Requested** the IOC Executive Secretary to support the IOCINDIO Officers in their efforts for mobilising bilateral and multilateral partnerships for financial and in-kind extra budgetary resources, notably from the Indian Ocean Rim Association, The World Bank, the Global Environment Facility, the European Union/European Commission, the United Nations Environmental Funds including the Adaptation Funds, the Green Climate Funds, etc.

**Finally requested** the 30<sup>th</sup> Session of IOC Assembly to identify allocations of financial resources from the Regular Budget and extra budgetary of the IOC to support the full implementation of the IOCINDIO-VI Recommendations.

## ANNEX II

### ADOPTED PROJECT PROPOSALS

#### **Regional Coastal Vulnerability Framework towards Climate change Impacts, Adaptation and Resilience for IOCINDIO Coastal areas (RCVF CARI-Coast).**

**Geographical scope/benefitting countries:** All IOCINDIO Member States

**Tentative budget:** \$US 90, 000

**Brief justification and rationale of the project.** The goal is to have all the countries in the region becoming ready for the anticipated sea level rise by developing their own coastal vulnerability index and early warning systems for storm surges. Countries in the region need to develop their codes and standards to make them ready for the consequences of storm surges and sea level rise. The IPCC predictions provide a strong background justification for the project:

- Scenario 1: If the whole world goes for renewable energy, the sea level will rise up to 25 cm by 2100.
- Scenario 2: 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.
- Scenario 3: Status quo, sea level rise will be up to 1 m by 2100.

For all the above scenarios, all the countries in the region should know the inundation and erosion threats and should be invited to take responsive remedial actions; for storm surges will increase the vulnerability to the those countries which are prone to cyclones.

#### **The project activities includes the following.**

- Identify the list of countries, which already have the coastal vulnerability index and those in needs.
- Identify the list of countries, which have developed or adopted early warning systems for storm surges and those in needs.
- North Indian Ocean area requires a specific focus because storm surges associated with severe tropical cyclones stand out as by far the most damaging among natural disasters. The South Asian countries bordering the Bay of Bengal and the Arabian Sea are frequently affected by cyclonic storms. About 9,000 km of coastal zones from Oman to Thailand and about 300 million people are exposed to cyclone induced storm surges, (<http://unesdoc.unesco.org/images/0011/001133/113310Eo.pdf>). Storm surges due to cyclone in 1977 November that made landfall along Andhra Pradesh coast that killed around 10,000 lives. About 15,000 people lost their lives due to the storm surge generated by Odisha Super cyclone in October 1999 (Dube et al., 2009). Storm surge due to Bhola cyclone (November 1970) that made land fall along Bangladesh coast that took around 3,00,000 lives (Das PK, 1994). Although storm surges are less frequent in Arabian Sea than in the Bay of Bengal, major destructive surges occasionally have occurred along the countries bordering Arabian Sea.

Cyclonic storm Gonu that struck Oman which causing about \$4 billion in damage and 49 deaths (Dube et al., 2009). The high and increasing population density along the coastal stretch necessitates a dedicated operational storm surge warning system in order to mitigate the loss due to storm surges. Considering the same, the Earth System Science Organization (ESSO) - Indian National Centre for Ocean Information Services (INCOIS), Government of India initiates the setting up the Storm Surge Early Warning System (SSEWS) for the Indian coasts. ESSO-INCOIS is mandate to storm surge warnings to disaster management offices and coastal authorities of the coastal regions of India. Timely issuance of surge bulletins from INCOIS during recent very severe cyclonic storms 'Hudhud' and 'Phailin', could helped coastal authorities in their successful evacuation processes and in turn lessen the human loss.

- A workshop to 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.

### **IOCINDIO Networking Research Infrastructures, Facilities and Human Resources**

**Geographical scope/benefitting countries:** All IOCINDIO Member States (Bangladesh, India, Sri Lanka, Kuwait and Iran indicated a strong interest at the meetings. It is expected that the IOCINDIO Officers will also approach countries non-represented at the meeting for their involvement as a collective effort).

**Tentative budget** for the project is US \$ 50,000

**Period of implementation:** September 2017 - September 2021.

**Brief justification and rationale of the project:** This project is aimed at bringing IOCINDIO Member States into a dynamic mode of communications and cooperation in a very simple and concrete manner with available resources in each relevant national and regional institutions dealing with ocean, atmospheric and climate related sciences and technology. It is obvious that successful cooperation and joint project development require a good knowledge of own's facilities and those available in each Member States of IOCINDIO towards resources haring and mutual assistance in the region. This project derived from the factual lessons learned at the two meetings when it appeared that there is no baseline documentation on research Infrastructures, facilities and human resources in several countries. This information is also lacking at regional level while most of the countries in the region are countries with economies in transition with increased investments in scientific development with building of related infrastructures and training of high-level national experts over the last two decades.

**Cost effective methodology:** ICT with internet-based approach will be used to record national information, which will serve to develop the regional baseline.

The results of the project will provide a clear picture on existing facilities in the region and will foster pooling of resources to avoid duplication in effective cost sharing in project implementation and reinforcement regional institutional capacity and expertise. This baseline information will attract interests of partners willing to invest in the region.

## **Ocean observations, coastal zone management, circulations and fisheries**

**Geographical scope/benefitting:** All IOCINDIO Member States

**Tentative budget:** US \$ 350,000

(Direct discussions will be initiated immediately with interested potential funding institutions identified including the Kuwait Foundation for Advancement of Sciences (KFAS); the Kuwait National Petroleum Company (KNPC) and the Regional Organization for the Protection of the Marine Environment (ROPME). India and Kuwait indicated a strong interest assistance for fund mobilization for the project.

**Brief justification and rationale of the project:** The main objective is to develop a regional framework for '**Research for management plans**'. The larger objectives of the project include (1) livelihood improvements, (2) ensuring food security and (3) maintenance of ecosystem health.

With an underline principle of ecosystem approach, the following three components are considered:

- (i) Restoration of coral reef ecosystem
- (ii) Modelling of nutrient cycle fluxes
- (iii) Monitoring of coastal zone in relation to marine activities

Capacity building as a crosscutting theme will focus on the following focal areas (i) Ocean Observation-data collection and management, (ii) Utilization of coastal structures for nourishing of beaches.

All the three components will be implemented over a time span of 18 months.

The overall agency responsible for the implementation of the project will be the Kuwait Institute of Scientific Research (KISR) with responsible designated scientist staff for each component as appropriate.

## **Monitoring with Responsible Response of Oil Spill in inner ROPME Sea Area '**

**Geographical scope/benefitting:** Member States of ROPME

**Tentative budget:** US \$ 250,000

(ROPME and Kuwait indicated interest for active fund raising for the project: potential sources for funding include the Petroleum Corporation, Aramco, BP and Shell).

**Brief justification and rationale of the project:** This project will have the following 3 components with a timeline of 1eighten months:

1. Assessment of the problem



2. Causal analysis
3. Interventions

ROPME will coordinate the project and will take the necessary actions to convene in close collaboration with interested countries and potentials funding partners' experts, a technical workshop which will develop the detailed proposal for immediate implementation.

**Effects of human induced changes: Ocean acidification, eutrophication, hypoxia, harmful algal blooms (HABs) in coastal waters of the North western Indian Ocean**

**Geographical scope/benefitting countries:** North-western Indian Ocean

**Tentative budget:** \$US 350,000

**Brief justification and rationale of the project:** (i) Due to the semi-enclosed nature of the region, a disproportionately large part of the NWIO falls within the exclusive economic zones of the littoral countries. Oceanographic processes in the region are closely linked by seasonal reversing currents. The Persian Gulf, for example, a small (area ~250,000 km<sup>2</sup>), shallow (average depth ~35 m) basin, is surrounded by eight countries. Therefore, these processes can only be studied in a cooperative mode. The IOC/UNESCO through the Regional Committee provides the added-value for facilitating international collaboration; (ii) The project will constitute an important component of the ongoing Second International Indian Ocean Expedition (IIOE-2) of which IOC/UNESCO is a co-sponsor. The project is particularly relevant to the following research themes of IIOE-2: Theme 1: Human impacts; Theme 4: Circulation, climate variability and change; and Theme 6: Unique geological, physical, biogeochemical and ecological features of the Indian Ocean.

**Global significance of the project:** The results of the project will be of global significance taking into consideration the fact that the marginal seas of the region make important contributions to the water mass composition and biogeochemistry of the mesopelagic oxygen minimum zone of the open ocean. Ocean acidification data type's collections in the region would provide a strong contribution to Ocean acidification research. The reactivation of ODINCINDIO would be instrumental to fill the gap. IODE will contribute to the reactivation.

**ODINCINDIO expected contributions** are the following:

- ODISCat: find out what MS have what data and information
- OceanExpert: who does what in the IOCINDIO region
- Focus on IOCINDIO MS that have data relevant to eg OA, OBIS
- Collaborate in CHM/TMT
- Identify regional focal point to coordinate the above actions in close collaboration with IODE Secretariat
- IOCINDIO collaboration with OBIS and the regional OBIS nodes (PEGO-OBIS, IndOBIS, SEA-OBIS, OBIS Malaysia, OBIS Australia) to share biodiversity data

through the open-access OBIS platform. Countries that lack an OBIS node are invited to establish a national node or can work through one of existing regional nodes.

- IOCINDIO training courses in collaboration with OBIS and the UNESCO Category 2 Centres, regional training centres of the Ocean Teacher Global Academy to enhance the capacity in using OBIS data standards and data management best practices, as well as train scientists in using OBIS for data analysis and the creation of biodiversity information products to support science, assessments (including climate-change impacts) and area-based management.
- Develop IOCINDIO a regional marine biodiversity project in collaboration with OBIS to map the marine ecosystem habitats as a contribution to the development of a comprehensive digital atlas of the ocean floor as part of the UN Ocean Decade.

**Links with 2030 Agenda:** The objectives of the proposed project are directly relevant to the **United Nations' Sustainable Development Goals** including **SDG#13 (Climate Action)** and even more so, **SDG#14 (Life Below Water)** which makes a specific mention about **Ocean Acidification (Target # 3)**. Unfortunately, this part of the ocean lags far behind other oceanic areas in research on ocean acidification, largely because of lack of technical expertise and infrastructure. **Capacity Building (Target # 8) in the region, not only in ocean acidification, but in overall marine scientific research is expected to be one of the most important outcomes of the project.** The project will also contribute to varying degrees for achieving the other seven targets under SDG 14 in the region.

### **2050 Integrated Ocean Policy Advice for Proactive Planning and Managements for IOCINDIO Member States**

**Geographical scope/benefitting countries:** IOCINDIO Member States.

Kuwait, India, Pakistan and Bangladesh indicated a proactive leadership to assist in resources mobilization for this project

**Budget:** 120,000\$US

#### **Brief justification and rationale of the project**

This project is urgently needed because most coastal nations are not prepared for and are not taking an informed, integrated and proactive policy, planning and management decisions today, that will be required to respond to the serious negative trajectories that ocean science indicates will occur by 2050. Indeed, these changes are happening today and are predicted to accelerate.

The rapidly advancing changes in ocean ecosystem health and functioning, the distribution and abundance of marine living resources, the sustainability of critical coastal and marine habitats and biodiversity, and the fundamental physical, chemical and biological composition of marginal seas, will have profound near- and long-term impacts on coastal communities and infrastructure, societies and economies. This is particularly and acutely true in the IOCINDIO region.

The leading-edge ocean science and monitoring being conducted by respected intergovernmental organizations - including the IOC, regional oceanographic institutes, etc.,

and being interpreted by policy bodies such as the IPCC, OECD, UNEP, UNDP, FAO, etc.; clearly indicates that the global ocean is warming, rising, acidifying, deoxygenating and increasing in energy and unpredictability. Yet we continue to tie our thinking, behaviors, economies and societies to present transient conditions. Given the broad societal implications of the changes underway in ocean socio-economic-ecological systems worldwide, virtually all UN 2030 SDG goals and targets will be highly relevant, either as being challenged, or as solutions to the growing threats. These changes will have direct implications for addressing: existing poverty and hunger challenges that will be exacerbated by inaction and/or inappropriate policy measures by responsible Governments and stakeholders concerned (Goals 1 & 2). Good health and well-being (Goal 3) and gender equality (Goal 5) will be challenged without proactive and integrated planning, as will the availability of clean water and sanitation (Goal 6) and affordable and clean energy (Goal 7) in inundated coastal areas and by damaged infrastructure. Decent work and economic growth (Goal 8) may be difficult to realize and inequalities (Goal 10) may be increased.

Promise can, however, be found though in Goals 9 (Innovation and infrastructure), the development of sustainable cities and communities (Goal 11), through responsible consumption and production (Goal 12) and climate action (Goal 13), and in efforts to support life on land (Goal 15). Peace, justice and strong institutions (Goal 16), partnerships (Goal 17), and centrally, Goal 14 Life Below Water including oceans and its ambitious targets point us in the right direction.

### **Blue Economy Business opportunities in the context of climate change adaptation and Disaster Risk Reduction.**

**Geographical scope/benefitting countries:** Interested IOCINDIO Member States (Bangladesh, India, Sri Lanka, Kuwait and Iran indicated a strong interest at the meetings. It is expected that the INCINDIO Officers will also approach countries non represented at the meeting and which may have interest to join such as Myanmar, Iraq, KSA, Bahrain, United Arab Emirates, Qatar, Oman, etc.).

**Tentative budget** for the project is US \$ 600,000 (US\$ Six Hundred Thousand)

**Brief justification and rationale of the project:** The project is composite in nature and suggests ways and means to collect, collate and evaluate information for creating sustainable business opportunities in the context of climate change adaptation and Disaster Risk Reduction. The aim of the project is to promote sustainable ocean/marine-based economies, through the development of Blue Economy activities that create wealth for coastal population and contribute to the conservation of marine and coastal ecosystems.

The Project components are related to several crosscutting areas – such as building a knowledge economy, learning process for sustainable management of ecosystems, preservation of biodiversity, life under water and livelihoods support.

The SDG 1, 3, 5, 8, 11, 13, and 14 are intricately interlinked with the processes deployed with the project. After detailed consultations on the prospects and problems associated with a rather rapidly changing oceanic paradigm, ICOINDIO-VI, has taken the three following objectives under the project, which would demonstrate a commercially attractive set of outputs and outcomes for creating community-based tractions in the Member States. The idea is to create and showcase the added-value for comparatively small projects, which the

communities can partake and claim as their own – so that greater and transcendental components of climate change adaptations could be infused.

In order to mitigate the devastation due to storm surges, it is necessary that the problem of the storm surge be seriously addressed through the collective efforts and in an integrated way, by the Member States in the region in collaboration with relevant regional and international partners.