

Conference Outcomes



2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development



Decade Collaborative Centre
Indian Ocean Region



सत्यमेव जयते
Ministry of
Earth Sciences



Indian Ocean Regional Decade Conference (IO-Con) 2024

Bridging billions to Barcelona

An Official Prelude to the 2024 Ocean Decade Conference

1-3 February 2024

Decade Collaborative Centre for the Indian Ocean Region (DCC-IOR)

Indian National Centre for Ocean Information Services (INCOIS)

Ministry of Earth Sciences (MoES)

HYDERABAD, INDIA

www.incois.gov.in/dcc-ior / www.incois.gov.in

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Indian Ocean Regional Decade Conference (IO-Con) 2024: A Summary

Executive Summary

(TBA here once report is finalized)



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The Ocean Decade

Proclaimed in 2017 by the United Nations General Assembly, the UN Decade of Ocean Science for Sustainable Development (2021-2030) ('the Ocean Decade') seeks to stimulate ocean science and knowledge generation to reverse the decline of the state of the ocean system and catalyse new opportunities for sustainable development of this massive marine ecosystem. The vision of the Ocean Decade is 'the science we need for the ocean we want'. The Ocean Decade provides a convening framework for scientists and stakeholders from diverse sectors to develop the scientific knowledge and the partnerships needed to accelerate and harness advances in ocean science to achieve a better understanding of the ocean system and deliver science-based solutions to achieve the 2030 Agenda. The UN General Assembly mandated UNESCO's Intergovernmental Oceanographic Commission (IOC) to coordinate the preparations and implementation of the Decade.

DCC-IOR

Decade Collaborative Centres (DCCs) and Decade Coordination Offices (DCOs) provide dedicated long-term support to coordinate Decade Actions at the regional (i.e. around major Ocean basins) or thematic (i.e. around Decade Challenges) levels. They support Decade Actions with capacity development, communications, tracking of progress and resource mobilisation, as well as catalysing new partnerships and initiatives as part of the Decade. DCCs and DCOs enhance collaboration, promote effective co-design and uptake of science, and optimize the use of resources among the diverse stakeholders that contribute to the Ocean Decade. The Decade Collaborative Centre for the Indian Ocean Region (DCC-IOR) is to have a regional focus for the entire Indian Ocean Region.

Vision 2030

To strengthen momentum for ocean knowledge-based solutions, the Ocean Decade has launched a strategic ambition setting process to identify a common measure of success for each of the 10 Ocean Decade Challenges on the road to 2030. It will take stock of current trends, gaps, and priority user needs and identify key targets and milestones to measure progress and enhance collective impact of the Decade. The Vision 2030 process will provide the answer to the question: What does success look like for these Challenges at the end of the Decade? Towards this, ten working groups pertaining to specific ocean decade challenges were formed comprising

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of subject experts globally. These working groups have formulated draft white papers which were made available publicly through DCU, for review and comments. The IO-Con 2024 provided a platform for presenting the white papers to wider audience/stakeholders and to seek feedback that could help in finalizing these white papers by the 2024 Ocean Decade Conference, in Barcelona, Spain during April 2024.

IO-Con 2024

The DCC-IOR is committed to address Ocean Decade Actions providing scientific coordination and planning, identifying collaboration opportunities, awareness raising and stakeholder engagement apart from interacting with the Decade Coordination Unit at IOC. The DCC-IOR, as its part of commitment, organized the 'Indian Ocean Regional Decade Conference (IO-Con) 2024: Bridging Billions to Barcelona', an Official Prelude to the Ocean Decade Conference-2024' with the following objectives. The conference is organized under the auspices of DCC-IOR, and its governing body served as the international steering committee of the conference. The second meeting of DCC-IOR GB was held as a side-event of the IO-Con 2024.

Objectives

1. To involve and engage stakeholders of the Indian Ocean Region in Ocean Decade activities.
2. To provide a platform for deliberating on the future priorities for the Ocean Decade Challenges that are emerging via the Vision 2030 process with focus to the IOR and feed regional inputs to the 2024 Ocean Decade Conference in Barcelona in April 2024.
3. To interact and network among the IOR stake holders including the national decade coordination committees of the Region.
4. To provide a platform to voice the concerns and expectations of the stakeholders from ECOPs, Academicians, Industries, Social Scientists, NGOs, and other ocean stakeholders.

Agenda

The sessions (along with grouped ocean decade challenges) were organized so to reflect the organization of 2024 Ocean Decade Conference at Barcelona later, and to facilitate the key

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takeaways accordingly. Further, to address the national and regional dimensions a special session each on the NDCs and existing IOR-frameworks were also hosted. Each of these sessions started with a keynote. The keynote (except for the special sessions) focused on challenge specific white paper, usually by the Vision2030 working group co-chairs/member. This was followed by five invited talks by the subject-matter experts ensuring gender, geographical and generational diversity. Later, these speakers were joined by three more experts for the panel discussion. At parallel, audience was engaged with interactive online polls being run on the screen. The poll questions focused the ocean decade challenge in particular with an emphasis on the draft white paper as well. The conference session overview is provided as follows while the detailed agenda is provided in Annexure-1.

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February 1, 2024 (Thursday)	February 2, 2024 (Friday)	February 3, 2024 (Saturday)
Forenoon: 0900-1000 Registration Forenoon: 1000-1300 <u>Inaugural and Plenary session</u> First Floor Hall-1 (Plenary Hall)	Forenoon: 1000-1300 Session-2: Breakout sub-sessions <u>Ocean Decade Challenge 3</u> First Floor Hall-1 (Plenary Hall) <u>Ocean Decade Challenges 4</u> First Floor Hall-2 (E - classroom) <u>IOCINDIO-led Special Session: Synergizing Regional Frameworks of the IOR</u> Ground Floor Hall-3 (Breakout Room)	Forenoon: 1000-1300 Session-4: Breakout sub-sessions <u>Ocean Decade Challenge 9</u> First Floor Hall-1 (Plenary Hall) <u>Ocean Decade Challenge 10</u> First Floor Hall-2 (E - classroom) <u>NDC Special Session: Harmonizing NDCs of the IOR and beyond</u> Ground Floor Hall-3 (Breakout Room)
Afternoon: 1400 Session-1: Breakout sub-sessions <u>Ocean Decade Challenge 1</u> First Floor Hall-1 (Plenary Hall) <u>Ocean Decade Challenge 2</u> First Floor Hall-2 (E - classroom) <u>Ocean Decade Challenge 5</u> Ground Floor Hall-3 (Breakout Room)	Afternoon: 1400-1700 Session-3: Breakout sub-sessions <u>Ocean Decade Challenge 6</u> First Floor Hall-1 (Plenary Hall) <u>Ocean Decade Challenge 7</u> First Floor Hall-2 (E - classroom) <u>Ocean Decade Challenge 8</u> Ground Floor Hall-3 (Breakout Room) Evening: 1730-1830 <u>ECOP Side-event</u>	Afternoon: 1400 <u>Conclusion and valedictory</u> Outcomes of IO-Con 2024 (/takeaway to Barcelona, 2024) <u>INCOIS Silver Jubilee celebrations</u> First Floor Hall-1 (Plenary Hall) Cultural Program Conference Dinner



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	First Floor Hall-2 (E - classroom)	
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Highlights of the Inaugural Session

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UN Ocean Decade Challenge 1: Understand and beat marine pollution

Session Chair: Dr Shubha Sathyendranath, Merit Scientist, Plymouth Marine Lab., UK

Rapporteur: Dr Dhanya Mohan Lal, INCOIS

Session Coordinator: Dr Sudheer Joseph, INCOIS, India

Session Overview

The session extensively addressed ocean pollution, focusing on the nuances of its impacts and potential mitigation strategies within the framework of Challenge 1 - Understand and Beat Marine Pollution. Noteworthy topics included the exploration of emerging approaches like Local, Low-cost, and Low technology (LLL) for pollution mitigation at sources and the seasonal customization of industrial and fertilizer effluents, considering the dynamic fate of pollutants in relation to environmental flows and coastal ocean dynamics. The discourse delved into critical issues such as microplastics, oil pollution, heavy metal pollution, cyclonic events, and the crucial aspect of ocean literacy among school children, all slated for enhanced consideration in the draft white paper. The session underscored the urgency of finding efficient alternatives for plastic pollutants and stressed the vital role of community involvement. Furthermore, it emphasised the pressing need for additional research on the behavioural responses of fish and other marine biota to pollution, suggesting dynamic modelling and control experiments to enhance the understanding. The session strongly advocated for a more comprehensive approach in the draft white paper, urging thorough consideration of pollution studies, impact assessments, establishment of pollution monitoring networks, and robust mechanisms for data archival and sharing.

Key highlights and recommendations

A) Vision2030 Challenge-1 white paper related:

- A review of pollutant classes in the white paper draft is essential to ensure the inclusion of all significant and emerging pollutants, with special attention to the importance of

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addressing heavy metal pollution, particularly concerning elevated lead levels in the Indian Ocean.

- The white paper should establish effective coordination mechanisms among diverse agencies and stakeholders involved in developmental sectors to implement marine pollution mitigation measures.

B) General and IOR related:

- To tackle pollution at its source, integrate outreach into policy development, involve local communities in coastal development, and ensure national developmental plans incorporate pollution minimization measures.
- Balance development and ecosystem conservation in ocean health, maintain minimal river flow in water management, and improved coordination between governance levels for effective policy implementation.
- Address sewage treatment issues, discourage pollutant use in cultural activities, advocate for a plastic bottle ban on beaches, and promote ocean literacy among school children.
- Addressing coastal water pollution requires focused attention on microbial pathogens, recognizing their impact on both ecosystems and human health.
- Additionally, there is a crucial need for comprehensive data collection and archiving of oil pollution, emphasizing increased regional coverage.
- It is imperative to consider pollution issues on a global scale rather than from a local perspective.
- Furthermore, there is a need to adopt and scale up emerging trends, such as Local, Low-cost, and Low-technology (LLL) approaches, for effective pollution mitigation.
- Promoting community-based value chains can transform waste into usable products, such as converting discarded fishing nets. Involving coastal communities, including fisherfolk and women, in waste removal and creating alternative livelihoods is crucial.

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- Citizen-science-based approaches and community-based monitoring programs are effective strategies for mitigating various types of pollution. Additionally, policy modification is necessary for controlling emission regimes and improving effluent treatment.
 - Commissioning focused research on effective marine waste utilization is essential. Encouraging research on biodegradable plastic materials and promoting science-based solutions for microbial and Harmful Algal Bloom (HAB) issues, along with raising community awareness, is crucial.
 - Implementing long-term measurement platforms to monitor pollution and advancing modelling skills beyond observations are necessary.
 - Conducting studies on pollution impact assessment, understanding the physiology and behaviour of invasive species and pathogenic organisms, and investigating antibiotic resistance in coastal waters require more research attention.
 - Establishing a follow-up monitoring mechanism for assessing efficiency of mitigation measures is vital that require thrust.
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UN Ocean Decade Challenge 2: Protect and restore ecosystems and biodiversity

Session Chair: Prof. Aileen TAN Shau Hwai, University Sains Malaysia, Malaysia

Rapporteur: Dr Sandip Giri, INCOIS, MoES, Hyderabad

Session Coordinator: Dr Kunal Chakraborty, INCOIS, MoES, Hyderabad

Session Overview

The session focused on different conservation efforts, challenges, and future aspects of marine and coastal biodiversity protection and restoration. The speakers highlighted the major stressors behind biodiversity degradation, conservation efforts already in place, the role of the different national and international bodies in developing conservation networks, biodiversity data repositories, and cost-effective techniques for biodiversity monitoring in the Indian Ocean as well as the global ocean. All these points culminated in a high-level panel discussion that pointed out the significant lacunae in the biodiversity conservation approaches and made several recommendations.

Key highlights and recommendations

A) Vision2030 Challenge-2 white paper related:

- The white paper must reflect baseline data information as well as the process of evaluation of ongoing biodiversity conservation efforts.
- The white paper should add alternate livelihood options from this biodiversity conservation that may contribute to the blue economy.
- Regional coordination and the standard methods that are already in place must be highlighted in the white paper.

B) General and IOR related:

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- Limited data availability for marine biodiversity and ecosystem services at the regional and global scale.
 - Most of the conservation programs are going in silos, where monitoring the effectiveness of the effort with a scientific approach is often lacking.
 - Conservation programs are often not linked to sustainable development strategies and lack the interlink between the environment and society.
 - Unavailability of sufficient trained human resources for making observations and subsequent analysis to address this issue holistically.
 - Data pulling and collecting mechanisms need to be enhanced. Beyond published data, the data available to various institutions/agencies must be brought out to the public domain.
 - Already existing programs that are aligned to the present effort need to be mapped at the regional scale.
 - Several institutes/organizations collect different marine biodiversity data, but there are constraints in data sharing. Govt must designate the specific institutes as nodal agencies for sharing data with international organizations.
 - Economic as well as ecological values of biodiversity need to be evaluated.
 - Every country must identify the record of invasive species and their sources.
 - UN's High Seas Treaty, also known as the Biodiversity Beyond National Jurisdiction (BBNJ) treaty, needs to be implemented in a true sense.
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UN Ocean Decade Challenge 3: Sustainably feed the global population

Session Chair: Dr Erik Olsen

Rapporteur: Dr Sourav Maity, Research Scientist, Vidyasagar University

Session Coordinator: Mr Nagaraja Kumar M., INCOIS, India

Session Overview

The session consisted of five invited speakers- Dr Sachinandan Dutta, and Mr. Dennis Otieno represented Oman and Kenya respectively, while Dr Loveson Edward, Ms. Ashwini Sathnur, and Dr S. Velvizhi representing Indian perspectives. The session focused on various sustainable approaches such as fisheries management, mariculture, ECOP views and integration, UN world food program, and local action. The panellists from India and Bangladesh engaged with speakers had diverse subject matter and profession backgrounds ranging from oceanography to fisheries research and global trade.

Key highlights and recommendations

A) Vision2030 Challenge-3 white paper related:

- Overall structure and approach of the White Paper was OK.
- The perspective and importance of SSFAs (Action at community level)
- Inclusive of youth (ECOPs)
- Strengthening science – policy interface
- Science to support trade certification requirements.
- Digitization – capitalize on telecom (5G, 6G), AI and Blockchain
 - Improve efficiency and sustainability of industry.
 - Science outreach – engagement with public and stakeholders
 - Traceability and Marketplace

B) General and IOR related:

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- Trade-off between:
 - 1) Need for increasing food production
 - 2) reducing habitat impacts
 - 3) reducing CO₂ emissions from food systems
- Increase sustainability of fisheries and aquaculture
- Monitoring and enforcement necessary to ensure that new sustainable management is effective.
- Reduce pollution (organic, chemical, and plastic)
- Habitat restoration (e.g. coral and mangroves)
 - Particularly important in areas with high population density
- Bycatch reduction.
- Reduction of waste and loss (circularity)
- Energy efficiency and renewable energy use in fisheries and aquaculture
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UN Ocean Decade Challenge 4: Develop a sustainable and equitable ocean economy.

Session Chair: Dr Peter Haugan, Policy Director, Institute of Marine Research, Norway

Rapporteur: Dr Sneha Jha, INCOIS, India

Session Coordinator: Dr T M Balakrishnan Nair, INCOIS, India

Session Overview:

The session consisted of five invited speakers- Dr Md Rezah Badal, representing Mauritius', while, Prof. S.K. Mohanty, Dr M. V. Ramanamurthy, Dr G. Ramadass & Cmdr. P. K. Srivastava representing India's perspective of the sustainable and equitable ocean economy and the planned roadmap towards a successful blue economy. Marine Spatial Planning (MSP) and Ocean Accounting (OA) were testified to being policy instruments for the Blue Economy. Key takeaways from the session were: (i) clarifying equity on the level of individuals (not only countries), (ii) response to climate change and other human impacts, especially, sea level rise, impacts of acidification on corals and algae and uncertainties about pollution and microbiology with potential ecosystem impacts deserve scientific attention and (iii) development of common principles for environmental impact assessments applicable to all sectors.

Key highlights and recommendations

A) Vision2030 Challenge-4 white paper related:

- Standardize data collection and sharing protocols across countries and sectors to facilitate collaboration and informed decision-making.
- Develop and implement open-source data platforms for easy access to marine data and information for research, planning, and management.
- Invest in capacity building to equip individuals and organizations with the skills and knowledge needed to analyse and utilize marine data effectively.

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- Invest in training and education programs to equip individuals and organizations with the skills and knowledge needed to manage the ocean sustainably.
- Facilitate knowledge exchange and collaboration between countries and regions to share best practices and lessons learned.
- Support the development and implementation of local and regional ocean governance frameworks that are tailored to specific needs and contexts.

B) General and IOR related:

- Develop and implement comprehensive Marine Spatial Plans (MSPs) that balance competing uses of the ocean while protecting biodiversity and ecosystem services.
 - Involve stakeholders from all sectors in the MSP process to ensure transparency and buy-in.
 - Regularly monitor and update MSPs to adapt to changing conditions and emerging needs.
 - Develop innovative financing mechanisms such as blue bonds and impact investments to support sustainable ocean activities.
 - Direct public funding towards activities that generate positive social, environmental, and economic benefits.
 - Encourage private sector investment in sustainable ocean businesses by reducing risks and providing incentives.
 - Invest in research and development of new technologies that can improve the efficiency and sustainability of ocean industries.
 - Promote the adoption of existing technologies that can reduce pollution, optimize resource use, and enhance monitoring and enforcement.
 - Support capacity building to ensure that developing countries have access to and can benefit from new technologies.
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UN Ocean Decade Challenge 5: Unlock ocean-based solutions to climate change

Session Chair: Dr. Kilaparti Ramakrishna, Woods Hole Oceanographic Institution, USA

Rapporteur: Dr. Laxmikant A. Dhage, INCOIS

Session Coordinator: Dr. Abhisek Chatterjee, INCOIS, India

Session Overview:

Effective ocean-based solutions to climate change should emphasize the regenerative aspects of human activities over claims of 'sustainable harvesting' of ocean resources. It's crucial to quantify local-scale impacts and risks of global warming beyond set targets and address land activities' significant impacts on oceans, particularly through coastal effects and ocean heat uptake. Immediate action is needed for near-term consequences outlined in the 2030 agenda, while a deliberate approach involving careful experimental studies is suitable for challenges expected by 2050. Strategies like reducing aerosol emissions for short-term mitigation and conducting large-scale experimental studies for long-term carbon dioxide removal technologies are recommended. Establishing a regulatory body to oversee large-scale carbon dioxide removal initiatives is essential, as is developing region-specific adaptation solutions and robust early warning systems for extreme events. Enhancing decadal forecasting models, particularly for the global south, and prioritizing ocean knowledge sharing, literacy, and awareness, including the role of the ECOP, are crucial. Additionally, improving accessibility and availability of ocean data, enhancing remote sensing and in situ capabilities, and promoting research and decision-making processes are vital for better monitoring and understanding of oceanic conditions.

Key highlights and recommendations

A) Vision2030 Challenge-5 white paper related:

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- Global warming targets are not as important as quantifying the impacts and risks of warming beyond these targets at very local scales.
- Immediate action is required for the near-term consequences, such as those outlined in the 2030 agenda. Conversely, a more deliberate approach involving careful experimental studies is appropriate for addressing the challenges expected by 2050.
- Establishing a regulatory body is essential to keep in check the detrimental effects of large-scale carbon dioxide removal technologies. This body would play a crucial role in overseeing and regulating these initiatives.
- In terms of adaptation, a crucial focus should be placed on developing region-specific solutions, with a particular emphasis on implementing a robust early warning system to address extreme events.

B) General and IOR related:

- To mitigate short-term impacts, reducing aerosol emissions is a potential solution. Studies indicate positive effects, particularly in the Indian Ocean region, affecting phenomena like monsoons and upwelling.
 - For Long term approach, more careful experimental studies can be carried out especially for carbon dioxide removal technologies. Large scale experiments should be carried out in the coming 2-5 years.
 - Work towards establishing decadal models that enhance our capacity to predict oceanic, climate, and weather patterns within a 1–10-year timeframe, thereby improving our strategic planning for the future.
 - Improve accessibility and availability of ocean data to facilitate research and decision-making processes. Enhance ocean remote sensing and in situ capabilities to gather more accurate and comprehensive data for better monitoring and understanding of oceanic conditions.
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UN Ocean Decade Challenge 6: Increase community resilience to ocean hazards

Session Chair: Dr. Nadia Pinardi, Head, DCC-CR, Italy

Rapporteur: Mr. Ravichandra V, INCOIS, India

Session Coordinator: Dr Sunanda Manneela, INCOIS, India

Session Overview

The chair briefed on the objectives of the session and a quick note of the Challenge 6 white paper review. The invited talks representing various aspects on how ocean hazards are dealt across the globe, comprised of Ms. Suci Dewi Anugrah (BMKG, Indonesia), Ms. Hellen J. Kizenga (ECOP, Tanzania) while Dr Joaquin Tintore represented SOCIB, Spain. The Indian delegates were comprised of Dr. Srinivasa Kumar (WG co-chair, Head, DCC-IOR and Director, INCOIS), Dr Mrutyunjay Mohapatra (DG, IMD). They were engaged by the panelists professionally ranging from industry to research to UNESCO representative.

Key highlights and recommendations

A) Vision2030 Challenge-6 white paper related:

- Coastal resilience, including hazard-to-risk transmission, risk assessment, risk reduction, institutional governance, and social transformation.
- Emphasizing the integration of AI and numerical modeling for effective coastal resilience
- The "system of systems" approach
- A people-centered approach for vulnerable communities, emphasizing the necessity of capacity building to achieve the program's goals and outlining specific pathways for implementation.
- The need for predicting the total water level envelop, an essential forecasting parameter for coastal flooding due to cyclones, storm surges, tides interaction, wave tide interaction needs to be thoroughly studied.

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- Critical role of effective communication, community engagement, and the leveraging of initiatives like the Ocean Decade to enhance resilience in the face of present challenges.
- The outbreak of diseases further compounds the hazards, necessitating collaborative efforts between communities and governments for mitigation.

B) General and IOR related:

- Despite agencies communicating with stakeholders, there is a notable lack of public awareness, resulting in uncertainty about the effectiveness of communication systems.
 - The importance of regular drills, mock exercises, and the development of a mobile app for planning and mitigation were highlighted for tsunami resilience communities.
 - A multi-platform approach, ranging from near shore to open ocean, was underscored for a comprehensive understanding of multi-scale ocean variability.
 - The importance of open science and broad access to data sources to bridge societal gaps was stressed.
 - The importance of economic metrics and cross-integration with the blue economy, emphasizing institutional transformation involving planning, finance, and sustained ocean science integrated into an overall framework.
 - The importance of real-time observations for enhanced forecasting capabilities.
 - Coastal resilience needs to be collaborative effort between communities, industry, government partnership and cannot be addressed by any single stakeholder.
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UN Ocean Decade Challenge 7: Expand the Global Ocean Observing System

Session Chair: Dr Nick D'Adamo, University of Western Australia, Australia

Rapporteur: Dr M S Girish Kumar, INCOIS, India

Session Coordinator: Dr Aneesh Lotliker, INCOIS, India

Session Overview

White paper Challenge 7 "*Sustainably expanding the global ocean observing system*" was roundly very well received, appreciated and commended – as a well written, clear, well-constructed argument, comprehensive in its coverage, and as an excellent basis to go forward. The draft was prepared and written in a way that made it easy to examine and comment upon for the community in the Session 3 Challenge 7. Joe O’Callaghan and authorship group were thanked for their work. All comments from the floor were constructive and made in this positive context. Perhaps the over-arching sentiment (added to that of commending the quality and fit for purpose nature of the draft) was the need to critically assess, in the context of meeting Challenge 7 as we go forward, the ‘gaps’ between current Global Ocean Observing System efforts/networks in the IO and what is aspired to by the Decade via the White Paper. However, in saying that, many current comprehensive basin to sub-basin scale efforts (observing networks and associated research, monitoring, application for societal benefit and capacity building) were highlighted through the presentations as being already highly relevant to Challenge 7. It was noted that they were variously developed with the three key Challenge 7 elements underpinning them (multi-disciplinary, multi-national and co-designed). However, it was noted that to meet Challenge 7 much more needs to be achieved. In that regard, priorities on to *what to tackle* going forward need to be determined, and that task necessarily requires a fit for purpose prioritising framework to be designed, accepted by the Challenge 7 constituency in the Indian Ocean, and then objectively employed for the assessment. The resources need to be found to undertake the GOOS enhancement in the Challenge 7 context, as to be determined by the prioritising process. Within this process, the many specific points received from the panellists and then from the



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prompted open discussion during Session 3 Challenge 7 may be worked into the prioritisation as input from the IO-CON 1-3 Feb 2024 meeting.

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Key highlights and recommendations

A) Vision2030 Challenge-7 white paper related:

- The white paper highlights Development and deployment of innovative (e.g. autonomous technology, sensors and platforms), easy to use, affordable, reliable and robust observing technologies.
- The Citizen Science approach could be one of the options to collect affordable data in sustainable manner and could be included in the white paper.
- The ‘Data as a Service’ approach is also an approach in partnership with industry to enhance the measurements in data gap regions using multi-institutional and multi-national funding.

B) General and IOR related:

- The Need to Consult Industry on Reporting & Formats: Working Groups between Industry and Academia need to be set up to ensure community needs can be met by industry while industry can report back various advantages or disadvantages on technical grounds.
 - It is important to merge similar bodies/agencies in the oceanography/marine world to avoid duplication in infrastructure resources and financial burden and create an easy mechanism for reporting and retrieving multiple oceanographic datasets.
 - The need for implementing a unified common protocol for ocean observation and ocean data quality control and the need to enhance data availability and visibility to various stakeholders.
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UN Ocean Decade Challenge 8: Create a digital representation of the ocean

Session Chair: Dr Enrique Alvarez F, Technical Coordinator of the OceanPrediction Decade Collaborative Centre, at Mercator Ocean International

Rapporteur: Dr Siva Srinivas Kolukula, INCOIS, India

Session Coordinator: Dr Venkat Shesu Reddem, INCOIS, India

Session Overview:

The panel consisted of other members: Dr Swadhin Behera, Capt. Jamie McMichael-Phillips, Mr E. Pattabhi Rama Rao, Mr Busumprah Peter Teye, Ms Aditi Modi and Prof. Dr Aidy Mohammed Shawal Bin M Muslim. This session focused on the digital representation of ocean data and its products, based on the White Paper – Challenge 8 and developing a comprehensive digital representation of the ocean and available data products utilizing a dynamic ocean map to provide free and open access for exploring, discovering and visualizing past, current and future ocean conditions for various stakeholders.

Key highlights and recommendations

A) Vision2030 Challenge-8 white paper related:

- The ambition for 2030 is “Digital Twin”, with 10 global base layers/ products, 10 local case studies, help docs, tools, and an interface for data viewing and connection. Data would be accessible to anyone and anywhere.
- Panel members appreciated the White Paper and raised a few questions on the security of the data, how data is disseminated, the copyright/ licensing of the data, policy on the data, and validation of the data.

B) General and IOR related:

- Data is vital in research, for researchers to mitigate pollution, and for the ecosystem.
 - Highlighted five strategic objectives for the data.
 - Showcasing of various ocean products by panel members.
 - Discussed about coordination and interconnections for data sharing.
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- In the coming 2 to 3 years, the target is to incorporate toolkits, training materials, and virtual assistance on the website.

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UN Ocean Decade Challenge 9: Skills, knowledge and technology for all

Session Chair: Dr Justin Ahanhanzo, Programme Specialist. IOC Paris. France

Rapporteur: Dr Rohith B, INCOIS, India

Session Coordinator: Dr Uday Bhaskar TVS, INCOIS, India

Session Overview:

This session focused on education and training, employment opportunities, and other aspects that are unevenly distributed throughout the world's coastal regions. Presentations and discussions covered various areas, including the current advancements in capacity-building training conducted by INCOIS and IODE, the importance of integrating physical and virtual workshops, the transfer of knowledge and technology to citizens, and finally, empowering coastal communities through skill development, knowledge sharing, and technological advancement.

Key highlights and recommendations

A) Vision2030 Challenge-9 white paper related:

- It is essential to promote equal representation of minority groups, including women and early career professionals.
- It is important to encourage innovative solutions through fit-for-purpose technology.
- Encouraging constructive, multi-directional partnerships is crucial.
- Difficulty in understanding advanced applications can hinder the adoption of new technologies among users.
- Low awareness among the target audience and lack of interest may impede participation in training programs.
- Administrative concerns, such as resource allocation and logistical arrangements, need to be addressed to ensure the smooth operation of training initiatives.

B) General and IOR related:

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- Virtual training has provided a new digital learning experience by saving the cost of traveling and time.
- Training programs must help in developing skills to study, sustainably exploit, and manage the ocean.
- Physical training is also emphasized along with virtual ones to introduce social engagement.
- Future training must introduce user-friendly approaches, community engagement, transparency, and communications.
- Empowering coastal communities through skill development, knowledge sharing, and advancing technology is very essential in tackling climate change resilience.
- Regular engagements among trainee users are very essential to foster collaboration and knowledge sharing.
- To keep the participants motivated to complete online courses, it's crucial to provide interactive and engaging content.
- Time zone differences can limit virtual training participation and require flexible scheduling options.
- Virtual training often limits social engagement and practical exercises, impacting the overall learning experience.
- The selection of interesting and high-quality students may become challenging due to the large pool of applicants.
- While using innovative technology in Coastal Ecosystem monitoring, it's important to consider accessibility and usability for all users.
- Accessibility to new technology may be limited, posing challenges to implementing advanced monitoring methods.

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UN Ocean Decade Challenge 10: Change Humanity's relationship with the ocean

Session Chair: Raghu Murtugudde, Professor at IIT Bombay, India

Rapporteur: Ms. Perna Singh, INCOIS, India

Session Coordinator: Dr. Francis P, INCOIS, India

Session Overview:

The session encompassed a comprehensive discussion on strategies for establishing environments and conditions conducive to motivating individuals to engage in actions that promote ocean health focused on changing human relationship with the ocean. Participants included scholars, academics, and social entrepreneurs from India Ocean rim countries, who engaged in exchanging ideas aimed at overcoming obstacles hindering the behavioral changes essential for fundamentally reshaping humanity's interaction with the ocean while sustainably harvesting its bounties. The participants also discussed methods to enhance public awareness regarding the invaluable services the ocean offers for human well-being and sustainable development. Ongoing and future interventions needed were also explored to address existing gaps.

Key highlights and recommendations

A) Vision2030 Challenge-10 white paper related:

- The white paper addressed key drivers for promoting pro-ocean behaviours, specifically focusing on the knowledge system, education, communication, and cultural connections. Additionally, recommendations were put forth to incorporate norms, rules, and punishments into this comprehensive list. Making the strategies and implementation plans relevant and acceptable for the Global South needs special attention.
- It was suggested that identifying key actions, responsible parties, necessary resources, and performance indicators for prioritized actions and progress measurement. A matrix is needed

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to assess the human relationship with the ocean, outlining the required data for effective measurement.

- We must shift away from human-centric, extractive thinking and explore innovative and regenerative solutions to mitigate our negative impacts on the oceans.
- Collaboratively developing a common language that bridges scientific and societal understanding is critical for achieving the goals of Challenge 10. There should be no winners or losers in managing and sustaining the ocean to achieve a triumph of the commons.
- Incorporating ocean protection measures into the development plans at the village level for comprehensive integration is fundamental while protecting lives, livelihoods and marine resources.

B) General and IOR related:

- Early warning systems for each sector in marine activities with local-scale risk information was seen as critical for engaging stakeholders and in changing relationship with the ocean. Regional leadership and coordination must be incentivised to manage the joint destiny of the rim countries.
- The imperative for incorporating indigenous knowledge systems and fostering knowledge transfer across communities and countries is crucial. Additionally, the documentation of indigenous wisdom, along with its validation and seamless integration into decision support and prediction systems, is essential for comprehensive and informed decision-making.
- Sharing the benefits of the marine economy with those who safeguard the marine ecosystem is paramount, requiring an inclusive, equitable, just and agile marketing approach. Furthermore, involving coastal communities in the policy-making process is vital to ensure their voices are heard and their perspectives are considered.
- Providing training for instructors to effectively convey knowledge to the local communities is an urgent imperative. Moreover, integrating a higher number of Early Career Ocean Professionals (ECOPs) into marine protection activities is essential for bolstering the efforts in safeguarding the marine environment for all.



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NDC Special Session: Harmonizing NDCs of the IOR and beyond

Session Chair: Dr Matt Frost, Head of International Office, Plymouth Marine Lab., UK

Session Coordinator & Rapporteur: Dr Rao Pamaraju, DCC-IOR (& India NDC rep.)

Session Overview

The special session on Ocean Decade NDCs was held to provide a platform for the Indian Ocean regional NDCs to interact and benefit from exchange of information on respective NDCs activities and approach to meet the ocean decade challenges.

Key highlights and recommendations

- NDCs to represent wider range of stakeholders; mapping of stakeholders and their needs.
- NDCs operate very differently with different levels of resources.
- Mechanism for collaboration and interaction of NDCs for exchange of best practices
- NDCs to coordinate ongoing activities and develop new programmes at the national level to meet the objectives and goals of ocean decade and to enhance national access to decade benefits.
- Bay Of Bengal Programme-An Inter Governmental Organisation for enhancing co-operation among member countries, other countries and organisations in the region and provide technical and management advisory services for sustainable marine fisheries development and management in the BOB region with the specific themes of Fisheries Resource Management, Ecosystem & Biodiversity, Conservation, Livelihoods and Occupational Safety and capacity building.

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IOCINDIO-led Session: Synergizing Regional Frameworks of the IOR

Session Chairs: Dr.T. Srinivasa Kumar (INCOIS) and Justin Ahanhanzo (IOC-UNESCO)

Rapporteur: Dr. Nurul Hazrina Binti Idris, UTM, Johor Bahru, Malaysia

Session Coordinator: Dr. Nimit Kumar, DCC-IOR, INCOIS, India

Session Overview

The purpose of organizing this special session was to provide a platform for the various frameworks in the Indian Ocean region to engage and pave way for further synergized activities so to fulfill Ocean Decade objectives and contribute to Vision 2030 agenda.

Key highlights and recommendations

- The session recollected that several activities in the Indian Ocean region starting from IIOE-1 (1959-1965), Perth Programme Office of the IOC (2000) and IO-GOOS secretariate (INCOIS) that supported the establishment of IO-GOOS in 2002, IORP, SIBER, IRF and related initiatives, Indian Ocean tsunami (2004) and establishment of tsunami service providers (Australia, India, and Indonesia in 2011), IIOE-2 (2015-), establishment of ITCOcean (2013) and Category-2 Centres (India, Iran in 2015-16), UN Ocean Decade Collaborative Centre at INCOIS (2022), IOCINDIO sub-commission (2023), RIMES, WIOMSA etc. All these mechanisms enabled coming together of individuals, scientists, institutions, dedicated to developing ocean science and activities in the region.
- It is important to align existing and future initiatives in the region with the UN Ocean Decade challenges. Some such examples are the activities of RIMES that link to challenges- 6, 7 and 9; IO-GOOS/IndOOS/IIOE-2 that link to challenges- 7, 8 and 9; and IOTWMS that links to challenges- 6 and 9.
- The minimal cash (by IOC, SCOR etc) and in-kind resources provided by several member states need to be sustained since it is critical to bring together experts who voluntarily contribute their time and efforts for planning and sustaining the regional programmes.

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- A scoping workshop could be organised to explore the linkages of existing programs with IOCINDIO sub-commission with a view to strengthening the intergovernmental framework while retaining the flexibility of the effective governance mechanisms of the existing programs.
- There is a need to take stock of current activities within the member states, and their contribution towards achieving sustainable development goals (SDGs) based on agreed Key Performance Indicators (KPIs).
- There is a need to design regional projects that demonstrate the end-to-end operational ocean value chain to user communities spanning science to policy to practise.
- It is time to build on the capabilities in physical oceanographic observations and move ahead move to biogeochemical (BGC) and coastal regions since they impact human health and coastal ecosystems.
- There is a need to reinvigorate ocean data management programs such as the former ODINCINDIO in the current context of IODE, Digital Twins and Capacity Development Hub.
- It is important to continue involvement of ECOPs and integrating their thoughts into the present and future programs.
- Programs such as POGO, regional cruises, ITCOOcean C2C, and ChloroGIN as well as Open Challenges, Hackathons have proven to be a very effective tool for regional capacity development and hence should be promoted.
- It is important to involve NGOs, local communities, and industry partners in ocean literacy and other ocean related programs.
- Programmes such as UN Ocean Decade communities of practice and FutureEarth could be used as frameworks to create knowledge action networks in the region.



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Key takeaways from the Concluding session:

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Annexure-1

Full Agenda as at https://incois.gov.in/documents/IOCON2024/IO-CON24_Agenda.pdf to be added here.



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Annexure-2

List of Participants as at https://incois.gov.in/documents/IOCON2024/List_of_Participants.pdf to be added here.



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Annexure-3

Outcomes of interactive audience polls being run during sessions to be added here.



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Annexure-4

Select glimpses of conference moments (from <https://incois.gov.in/dcc-ior/pg.jsp>) to be added here.