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An Overview of the

**10TH SOUTH &
CENTRAL ASIAN
BIOSPHERE
RESERVE NETWORK
MEETING (SACAM)**
with a Focus on
**UNDERWATER
DOMAIN AWARENESS
(UDA)**



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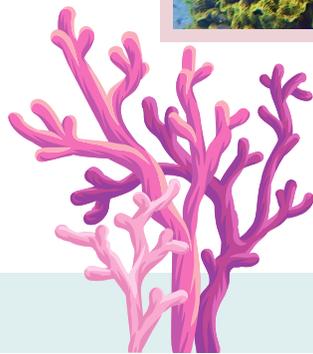
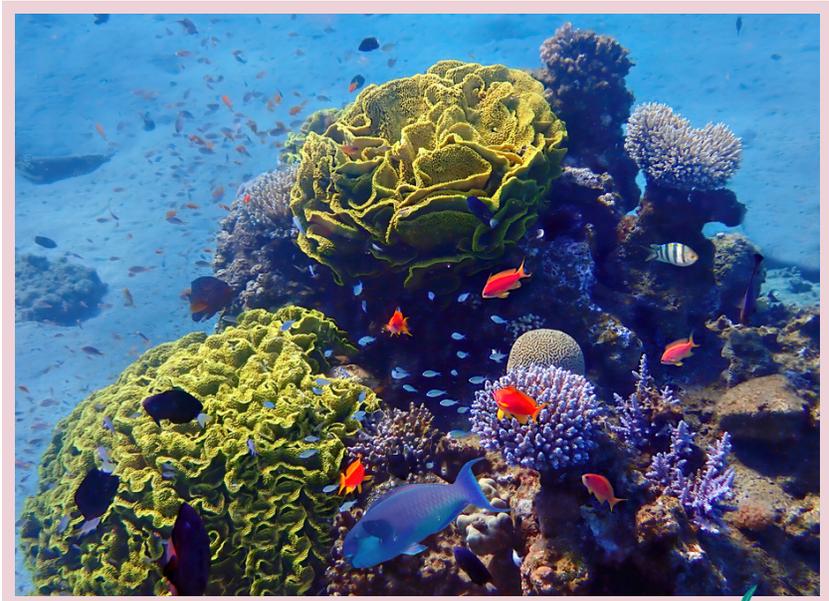
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The Maritime Research Center (MRC) takes immense pride in the distinguished role it played as a technical partner and Panel Chair at the UNESCO 'Ridge to Reef' Event held during the 10th South and Central Asian Biosphere Reserve Network Meeting (SACAM) in Chennai, India. This esteemed partnership underscores the MRC's commitment to advancing scientific knowledge and fostering collaboration in the realm of maritime research and conservation.

At the UNESCO 'Ridge to Reef' event, MRC leveraged its expertise to contribute meaningfully to the discussions and initiatives surrounding biosphere reserves and conservation goals. Dr. Arnab Das, founder of MRC, also took the stage as a distinguished presenter and session chair. His involvement in leading a session on the topic of 'Blue Carbon Ecosystems, Oceans, and Underwater Issues' demonstrated MRC's dedication to addressing critical aspects of marine conservation. The session provided a forum for in-depth discussions, sharing of insights, and fostering collaborative efforts to address the challenges and opportunities associated with blue carbon ecosystems.

- At The Heart of Our Contribution, Dr. Das Presented this Declaration:

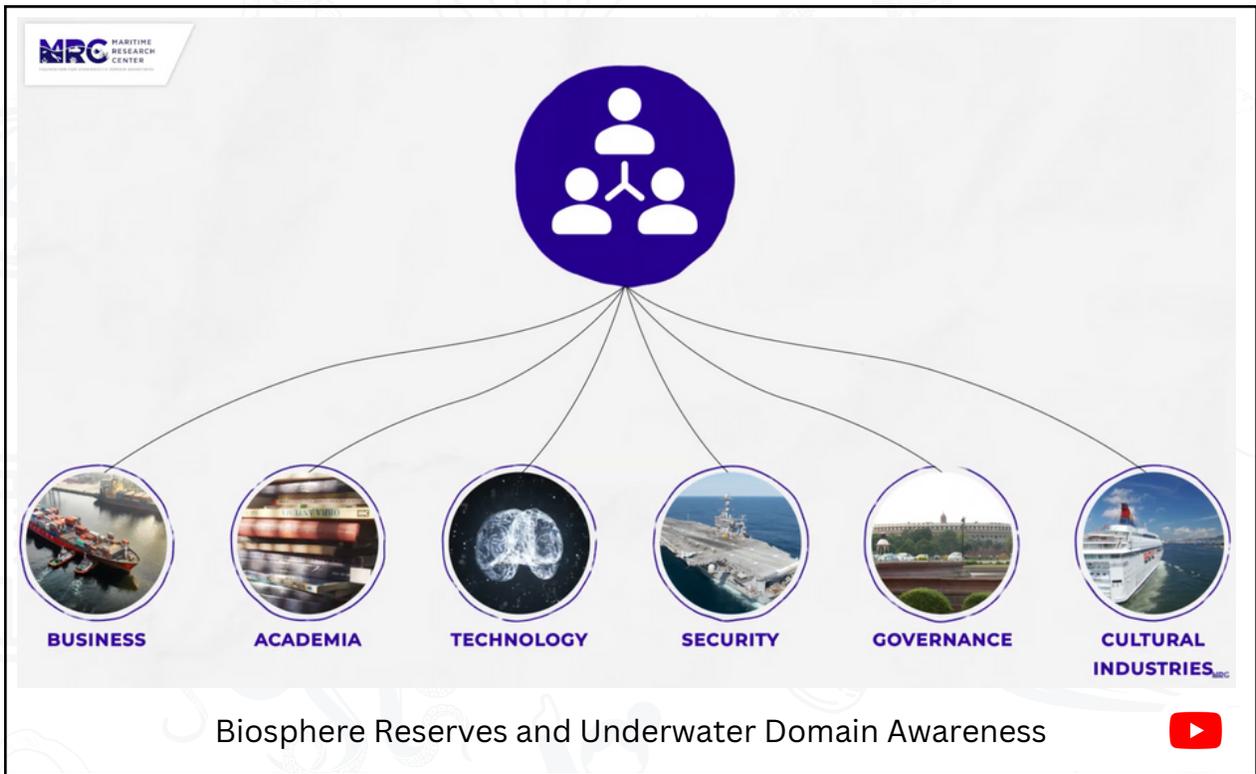
“Biosphere Reserves need to be established with a clear focus on digital transformation driven by the Underwater Domain Awareness (UDA) framework. With knowledge, cooperation, compassion, and shared understanding, we can restore the balance between humankind and nature. These reserves will serve as pilot projects for establishing Marine Spatial Planning across marine and freshwater systems towards the conservation and restoration of ecosystem services.”



Ridge 2 Reef, 10th SACAM



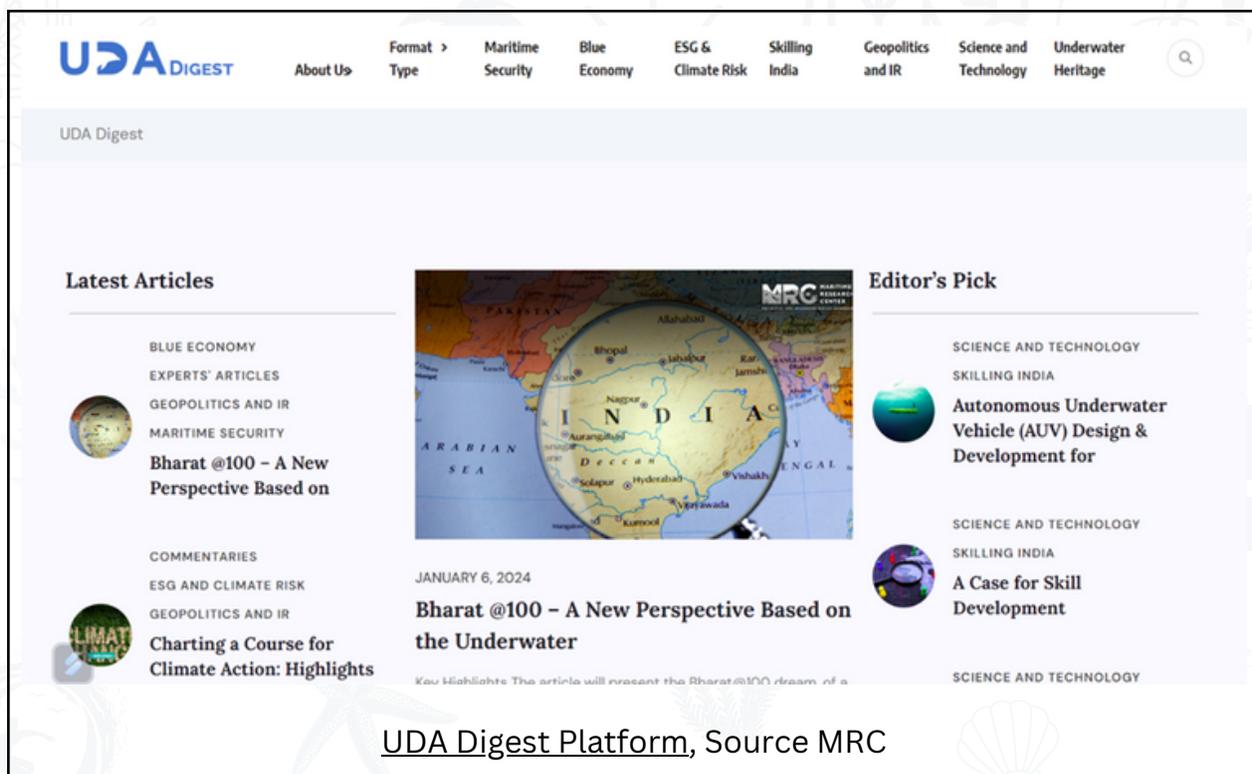
Dr. Arnab Das Presenting The Declaration on 'The Blue Carbon Ecosystems, Oceans, and Underwater Issues'



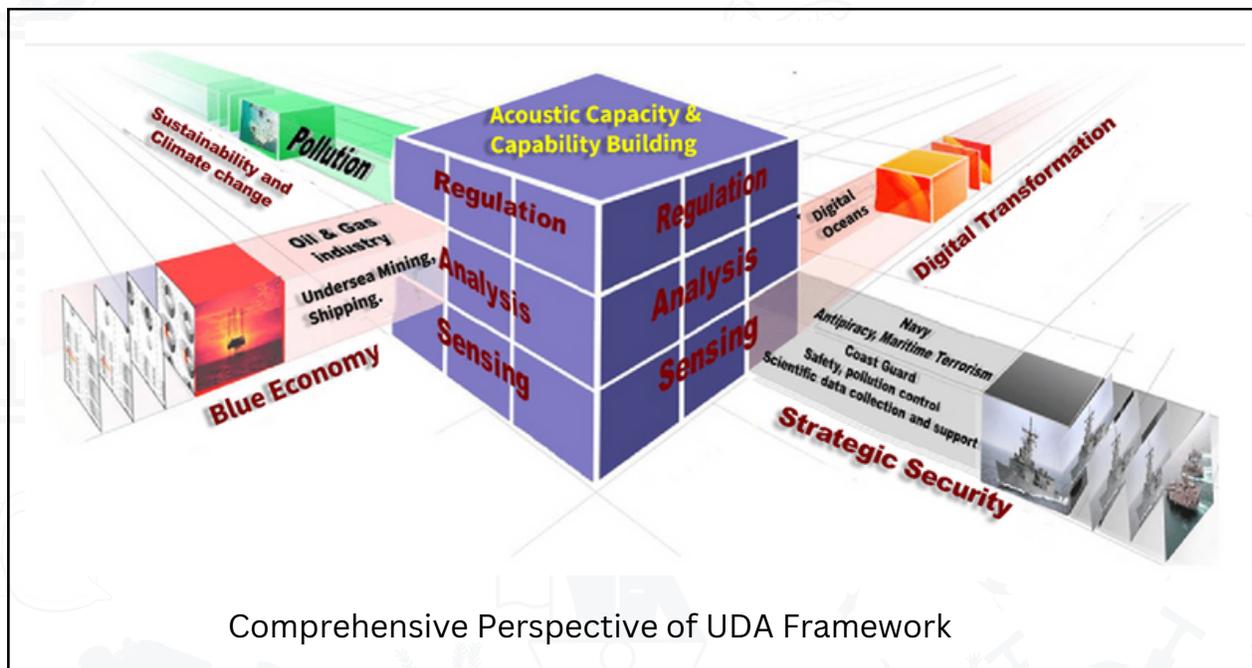
Biosphere Reserves and Underwater Domain Awareness

MRC's Approach to Biosphere Reserves and MSP

During the event, Dr. Das introduced a Short Video on Biosphere Reserves prepared by Maritime Research Center (MRC) highlighting its commitment to sustainable Biosphere conservation. In pursuit of realizing and executing diverse commitments related to Biosphere Reserves and effective ocean resource management, the Maritime Research Center (MRC) has successfully amassed an Extensive Repository (UDA Digest) of knowledge and a suite of tools. This strategic effort has been instrumental in bolstering the organization's capabilities to address the multifaceted challenges associated with oceanic conservation and sustainable utilization.

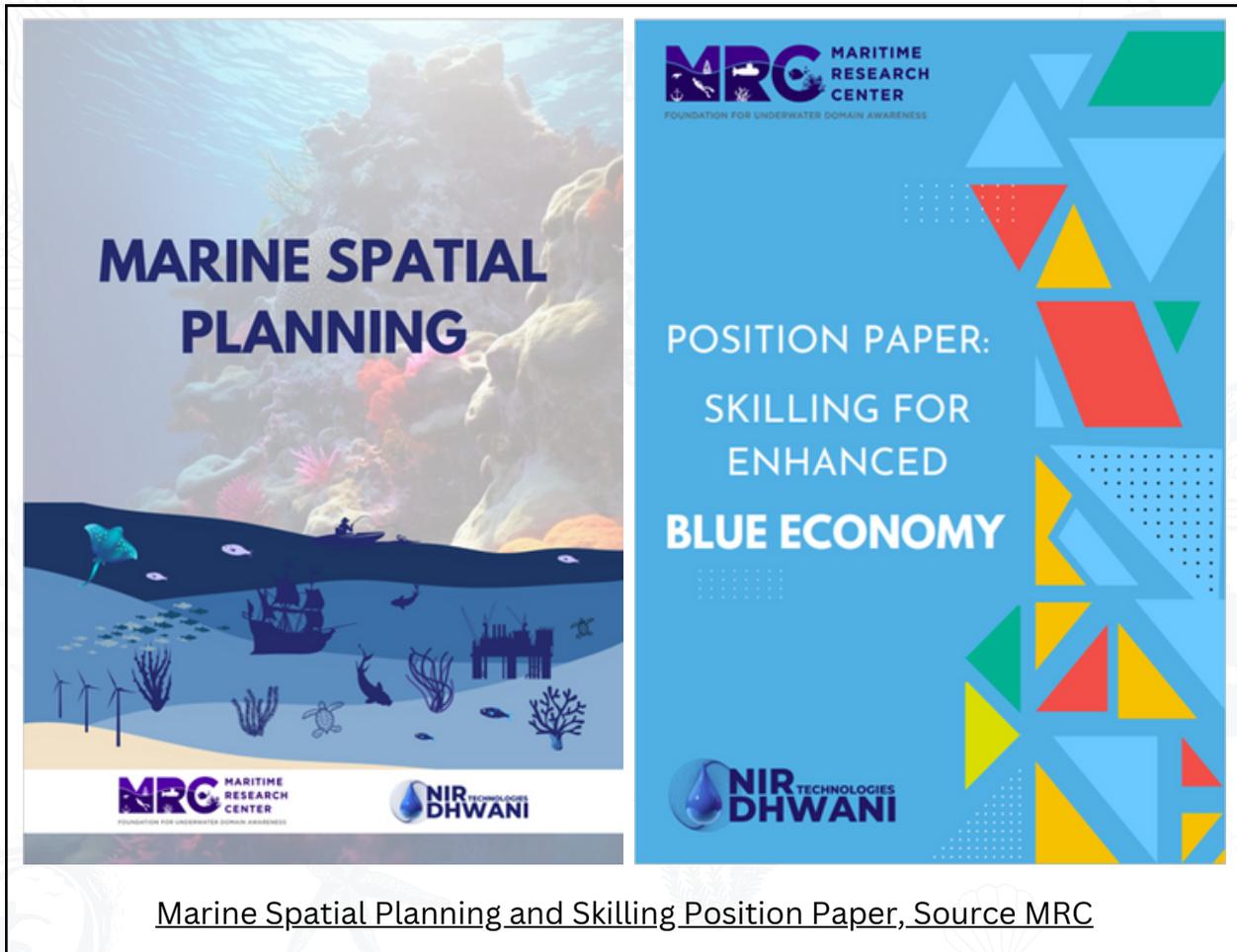


UDA Digest Platform, Source MRC



Comprehensive Perspective of UDA Framework

MRC has recently disseminated a comprehensive Position Paper on Marine Spatial Planning (MSP), strategically emphasizing the distinctive requirements of the Indian Ocean Region. This publication serves as a crucial guide, aligning policies and strategies with the unique characteristics and challenges posed by the Indian Ocean, thereby fostering a targeted and region-specific approach to ocean resource management.



Marine Spatial Planning and Skilling Position Paper, Source MRC

Moreover, recognizing the imperative need to cultivate a skilled workforce capable of navigating the complexities of contemporary ocean-based socio-economic development, the MRC has diligently embarked on establishing a Robust Skilling Ecosystem. This ecosystem is thoughtfully designed to encompass a spectrum of disciplines, fostering a holistic and interdisciplinary approach. Through this initiative, the MRC aims to empower individuals with the diverse skill sets required to address the dynamic and evolving landscape of ocean-related industries, thereby contributing significantly to sustainable development and resource management. The Skilling Position Paper and the video showcasing the proposed Skilling Modules highlight MRC's commitment.

MRC's 2023 Annual Report stands as a compelling testament to the organization's unwavering commitment and relentless efforts in advancing interventions at the intersection of policy and technology. This comprehensive document encapsulates a year of significant milestones and achievements, showcasing MRC's dedication to driving positive change in the realm of maritime research and conservation.

A noteworthy highlight of MRC's 2023 accomplishments is its proactive engagement in **Policy Development**. The annual report details the organization's efforts to contribute valuable insights and recommendations to policymakers, advocating for sustainable practices and conservation measures. MRC's involvement in shaping policy frameworks underscores its commitment to driving positive change at a systemic level.

Furthermore, the report sheds light on MRC's **Technological Advancements and Innovations**. By leveraging state-of-the-art tools and methodologies, MRC is not only staying ahead of the curve but is actively shaping the future of maritime research and technology integration.



One of the report's central themes revolves around MRC's **Leadership in Capacity and Capability Building**. MRC has strategically invested in developing human resources equipped with the skills and knowledge necessary to address the complexities of modern ocean-related challenges. The organization's training programs, workshops, and collaborative initiatives underscore its commitment to nurturing a skilled workforce capable of navigating the intricacies of marine conservation and sustainable development.

MRC's 2023 Annual Report encapsulates a year of dedication, innovation, and impactful contributions to the field of maritime research. It serves as a roadmap for MRC's continuous journey toward realizing enhanced interventions, influencing policy, advancing technology, and leading capacity building initiatives that are pivotal in shaping the future of Marine Spatial Planning and addressing other critical ocean-related issues.

Furthermore, The 10th SACAM Biosphere Reserve Conference served as a melting pot of ideas, experiences, and strategies, demonstrating that the journey toward sustainable coexistence between humanity and nature is a collective and ongoing effort. The conference was a prelude to the 5th World Congress on Biosphere Reserves for 2025. Delegates discussed active participation and representation strategies at the upcoming congress, underscoring the importance of continued international cooperation in addressing shared challenges. A significant shift in the 10th SACAM was including the private sector in nature conservation and climate resilience discussions. The participation of foundations and businesses highlighted the growing recognition of their role in strengthening social and environmental support. Long-term partnerships formed during the event are expected to contribute to the conservation, restoration, and scientific research and monitoring of ecosystems with a focus on the well-being of people.

The 10th SACAM, with its 'From Ridge to Reef' theme, demonstrated a commitment to inclusivity, global collaboration, and the active involvement of the private sector. The conference laid the groundwork for a more interconnected and sustainable future by addressing contemporary socio-ecological issues and fostering discussions among diverse stakeholders. It is a surety that as delegates return to their respective countries; the hope is that the shared experiences and commitments made at SACAM will translate into tangible actions that contribute to a harmonious coexistence between humanity and the environment. It was an honor for MRC to present its work at this scale, and its recognition affirms that MRC's role and contribution to the larger effort for sustainability and environment conservation is effective and geared in the right direction.

Ridge 2 Reef: 10th SACAM

In 2019, Bhutan hosted the 9th South and Central Asian Biosphere Reserve Network Meeting (SACAM), where representatives gathered to discuss and promote the sustainable coexistence of humans and nature. In 2023, the world faces unprecedented challenges, from the ongoing Covid-19 pandemic to global conflicts with far-reaching implications. Recognizing the need for a united front in addressing environmental issues, the 10th SACAM, themed 'From Ridge to Reef,' aspires to foster collaboration and inclusivity among participating Member States. Notably, this edition marks a milestone by encouraging the active involvement of the private sector in nature conservation efforts. The 10th edition of the SACAM was held at the National Centre for Sustainable Coastal Management, Anna University, from the 1st to the 4th of November, 2023.



The Opening Ceremony

One of the key features of the 10th SACAM was its commitment to global outreach. By inviting Biosphere Reserve stakeholders from the global south and north, the conference aimed to create a platform for sharing experiences, challenges, ideas, and best practices internationally. The collaboration with United Nations agencies such as the UNDP and UNEP further reinforced the commitment to a unified approach to tackling global environmental issues.

The conference featured a session dedicated to country reports, providing a platform for participating nations to share their progress and challenges. India, Kazakhstan, Iran, Sri Lanka, the Maldives, Bhutan, Nepal, Bangladesh, Uzbekistan, and Kyrgyzstan presented reports showcasing their respective regions' diverse initiatives and efforts for the conservation of Biosphere Reserves. The conference's agenda included focused and channeled thematic group sessions or panels, each discussing issues crucial to biosphere reserves. These groups aimed to bring together stakeholders with shared interests to collaborate on achieving tangible outcomes and ideating for change.



Dr. Arnab Das, Chair, Blue Carbon Ecosystems, Oceans and Underwater Issues

Various panels were set up to deliberate on different issues concerning Biosphere Reserves. Notably, **Dr. Arnab Das, Founder and Director at Maritime Research Center was invited to chair the session on Blue Carbon Ecosystems, Oceans and Underwater Issues.** The participants included - Rapporteur: Ms. Srishti Kumar (UNESCO), Prof. Dr. Martin Zimmer (ZMT Bremen), Prof Sannasiraj IIT Madras, Mr. Harith Wikrema (IGL), Ms. Shweta Naik Executive Director (JGI, India). Here, MRC engaged with fellow stakeholders to emphasize the use of underwater marine technologies, such as the MSP and displayed a commitment to involving local communities in conquering the problem of loss of biodiversity. It presented a view of bridging scientific innovation and policy. During the session, Dr. Das introduced a short video on Biosphere Reserves prepared by Maritime Research Center (MRC) highlighting its commitment to sustainable Biosphere conservation. The video, meticulously prepared by the MRC team, encapsulated the Essence of Biosphere Reserves and their critical role in preserving biodiversity, fostering sustainable development, and maintaining ecological balance. The visual narrative unfolded, showcasing MRC's involvement in various aspects of biosphere conservation, from research initiatives and data-driven insights to on-the-ground conservation projects.

The video spotlighted MRC's collaborative efforts with diverse stakeholders, including local communities, governmental bodies, and international organizations, emphasizing the holistic and inclusive approach adopted by the organization.

In essence, Dr. Das's introduction and the subsequent video presentation not only captured the attention of the audience but also left an indelible mark, emphasizing MRC's commitment to sustainable biosphere conservation. This dynamic multimedia approach effectively conveyed the depth of MRC's engagement, inspiring stakeholders to join hands in the collective endeavor to safeguard our planet's precious biospheres for future generations.



Presenting The Panel Group Declaration, Dr. Arnab Das, Chair, Blue Carbon Ecosystems, Oceans and Underwater Issues

The conference featured distinguished speakers such as Ms. Supriya Sahu, Additional Chief Secretary for Climate Change and Forests in the Government of Tamil Nadu, and the three-time Grammy Award-winning Indian Music Composer, UNHRC Goodwill Ambassador, Mr. Ricky Kej. Mr. Kej touched upon a memorable note for the audience - ‘we need the blue for the green.’

A Round Table Discussion on Private Sector Support for Biosphere Reserves, chaired by Dr. R Seetharam, and featured key voices from corporate entities actively engaged in conservation efforts. Eric Froese from World Life Spaces (WLS), and Harith Wickrema of IGL discussed their organizations' commitment to biosphere reserve initiatives. This session underscored the growing collaboration between the private sector and conservation endeavors for the environment and the fact that execution is the need of the hour.



The conference also included focused discussion rooms: Journalists' Support for Biosphere Reserves; Intersection between journalism and biodiversity protection; harnessing technology and AI to engage the youth in supporting biosphere reserves; The Seven Sisters discussion; and The Sundarbans.



The final day was marked by a **field trip to Pichavaram Mangrove Forest** Located between the estuaries of two rivers - **Vellar and Kollidam**, it is second largest mangrove forest in the world. The tour focused on Mangrove Ecosystem and Biodiversity Conservation with activities like Boating and Bird watching for all the speakers and attendees.



Blue Carbon, Oceans and Underwater Issues - A New Perspective based on the Underwater Domain Awareness (UDA) Framework

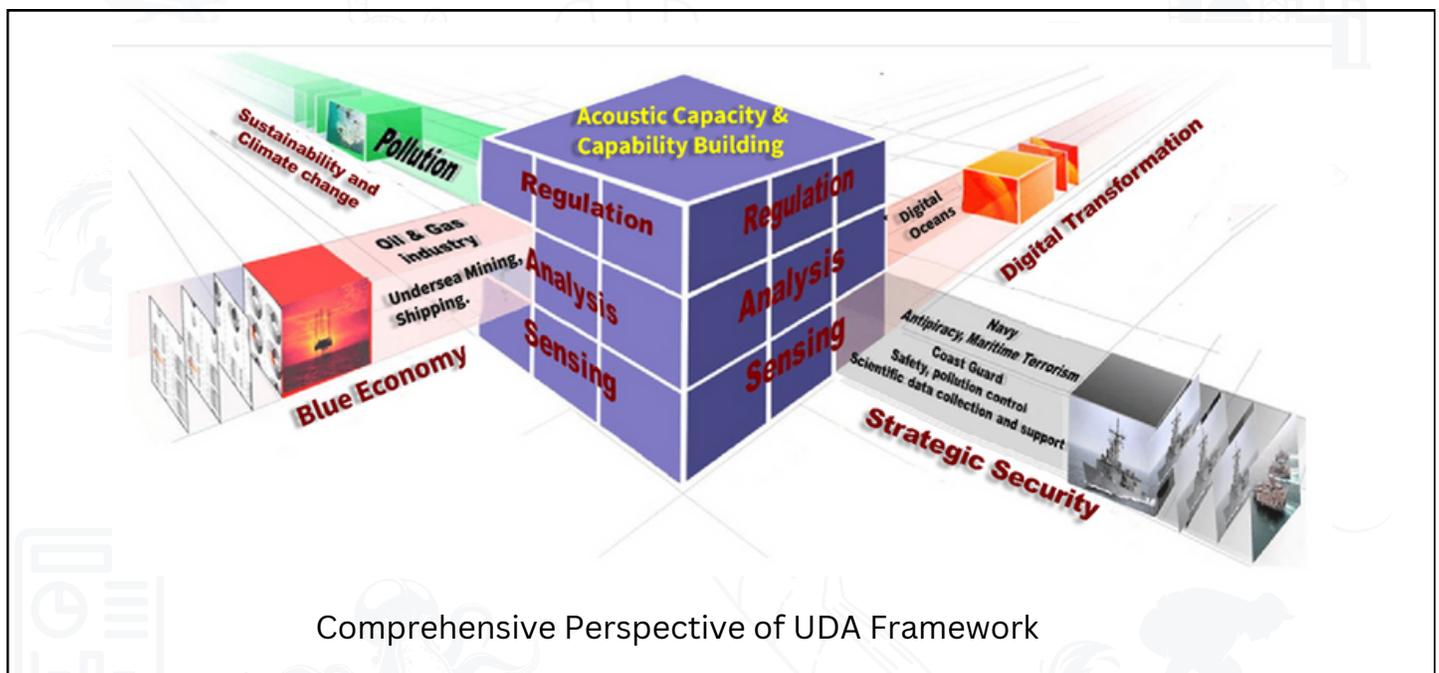
India is emerging as a global power, and the global community has significant expectations from Indian leadership to demonstrate affirmative action in terms of sustainable growth and climate change risk management. The geopolitical and geostrategic center of gravity in the 21st century has shifted to the Indo-Pacific region, and more and more nations are maintaining their strategic presence in the region. The Indo-Pacific strategic space, by definition, includes the tropical waters of the Indian Ocean and the Pacific Ocean. Thus, the contemporary focus must include the blue economy and ocean issues. The 2015 Paris summit for the United Nations Framework Convention on Climate Change (UNFCCC), under the Conference of the Parties (COP21), declared the roadmap to achieve climate goals. The 196 parties committed to the Paris declaration and formulated their own Intended Nationally Determined Contribution (NDC). India updated its NDC in August 2022 in a Union Cabinet meeting chaired by the Honourable Prime Minister Narendra Modi. The updated NDC is a step towards achieving India's Panchamrit (five nectar elements) declarations at COP26 (Glasgow, United Kingdom), with enhanced climate targets. It also aims towards reaching net-zero emissions by 2070.

The recently concluded G20 Summit in New Delhi made a successful declaration to unite the global community and commit to "One Earth, One Family, and One Future." The New Delhi Leaders Declaration has an exclusive component on harnessing and preserving the Ocean-based Economy. The declaration starts with a commitment to strong, sustainable, balanced, and inclusive growth. It is important to note that the declaration brings together diverse global powers with their unique geopolitical and geostrategic priorities to agree on a common agenda for global growth and prosperity. India today is partnering with global powers to shape the new world order.

Biosphere reserves are a great concept to ensure the protection of ecologically sensitive regions from the onslaught of so-called development. However, with changing times and excessive population pressures, the exclusive nature of biosphere reserves needs to give way to an inclusive concept. Coastal and riverine communities have to be allowed to coexist with nature. Traditional practices have to be encouraged, and modern science and technology tools have to be deployed to monitor and optimize the harnessing of underwater resources. Non-intrusive monitoring and an ecosystem-based approach, rather than species-specific studies, need to be prioritized. Conflict among multiple stakeholders, namely strategic security, the blue economy, environment & disaster management, and science & technology, needs to be minimized.

Tropical waters are extremely rich in biodiversity and underwater resources, both in marine and freshwater systems. However, they also face massive population pressures in coastal and riverine regions. Socio-economic and socio-political realities have ensured pre-modern governance mechanisms that are unable to address new challenges. The most important aspect is the sub-optimal sonar performance, which is vital for any underwater monitoring. The sonars designed and developed by the West during the Cold War period are suited for temperate and polar regions. The degradation of performance when deployed in tropical waters is of the order of 60%, thus demanding massive customization. However, customization demands a large-scale Shallow Water Acoustic Measurement (SWAM) exercise that is highly resource-intensive. Developing countries in the Indo-Pacific strategic space can hardly prioritize science & technology, thus remaining dependent on the West for such knowhow. The fragmented approach among these nations internally and at the regional level further aggravates the problem. Capacity and capability building across stakeholders and multiple levels must be undertaken in a nuanced manner.

The Underwater Domain Awareness (UDA) framework, proposed by the Maritime Research Center (MRC) in partnership with M/S NirDhwani Technology Pvt Ltd (NDT), is a unique concept for managing the challenges and opportunities of tropical waters. The UDA framework enables policy and technology interventions, along with acoustic capacity and capability building. The pooling of resources and synergizing of efforts across stakeholders, as shown in Figure 1 below, provides a schematic representation of the UDA framework.



The horizontal construct presents the four stakeholders and their specific resource requirements, along with the unique application-specific deployments. However, the core focus in tropical waters will be acoustic capacity and capability building to yield meaningful outcomes. The vertical construct includes a bottom-up approach, commencing with site-specific data collection, followed by analysis and the formulation of a regulatory framework. The current top-down approach, with minimal site-specific appreciation, is ad hoc and vulnerable to manipulation by external powers. Digital transformation will be a critical element in building a comprehensive and inclusive governance mechanism. Policies driven by ground inputs and supported by modern acoustic technology represent the most optimal way forward.

"The UDA framework, as presented above, provides a structured approach to enable the pooling of resources and the synergizing of efforts, not only among stakeholders within the nation but also among nations in the region."

The oceans are a major source of carbon sequestration, making effective ocean management crucial to meeting COP targets. Real-time monitoring of underwater parameters is essential for ensuring effective ocean health management, with the governance mechanism relying on digital analytics inputs. Short and long-term Modeling and Simulation (M&S) efforts, along with AI-based data analytics, will be necessary to facilitate digital transformation. The digital infrastructure should manage multiple ocean-related and underwater aspects, not limited to blue carbon alone.

The United Nations' declaration of the Decade of Ocean Sciences for Sustainable Development is significant, focusing on oceans and the Sustainable Development Goals (SDGs). Marine Spatial Planning (MSP) has become the de facto governance tool for ocean and freshwater space management. The Inter-Governmental Oceanographic Commission (IOC), driving the decade of ocean sciences for the UN, has prioritized MSP. MSP involves spatio-temporal mapping of underwater resources, sustainability assessments, and climate change risk evaluations. Real-time mapping enables policy and operational intervention with well-informed ground data-driven inputs. Given the vast area coverage required for underwater domain awareness management, M&S supported by field validation at critical locations is the optimal way forward. MSP should cover various applications, including deep-sea mining, fisheries, oil & gas, aquaculture, freshwater resources, water quality, pollution sustainability concerns, acoustic habitat degradation, nutrient contents, and more.

Implementing large-scale MSP across applications and concerns will demand unprecedented acoustic capacity and capability building. The digital infrastructure, particularly the computational framework for real-time data analytics, will require dedicated efforts. Offshore and inshore initiatives need nuanced domain expertise. The multi-disciplinary requirements should be coordinated to ensure effective output. This initiative must manage five pillars: research, academia, skilling, innovation, and policy, under one umbrella, necessitating significant policy support due to its strategic importance. It will be a game changer with a major impact on social and political dynamics.

Biosphere reserves are a macrocosm with multiple and diverse elements. Balancing people, economy, and nature within these reserves is crucial for success. Digital transformation with AI-based data analytics can effectively manage these aspects. The UDA's digital transformation is manifested as MSP. Therefore, substantial efforts are required at multiple levels to ensure progress.

The way forward involves three steps: outreach, engage, and sustain. Outreach entails sensitizing stakeholders, policymakers, and practitioners about the nuances of the UDA framework and its relevance for biosphere reserve management. This outreach should occur at multiple levels with specific and generic content, including workshops, seminars, certificate courses, and both online and offline modes. Engagement includes UDA fellowships for students and young professionals, tailored to the requirements of stakeholders incorporating the UDA framework into their organizational structure. Policymakers must also transition toward digital transformation. The sustainability component translates into infrastructure development and policy drafting at national and regional levels, necessitating project-based and long-term activities to sustain this new approach.

"UDA-driven Biosphere Reserves need to be established with a clear focus on digital transformation. These state-of-the-art reserves will serve as pilot projects for establishing MSP across marine and freshwater systems."



MARITIME RESEARCH CENTER



Let's Collaborate !!

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